UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TCL CORPORATION; TCL COMMUNICATION TECHNOLOGY HOLDINGS, LTD.; TCT MOBILE LIMITED; TCT MOBILE INC.; AND TCT MOBILE (US) INC.

Petitioners,

v.

TELEFONAKTIEBOLAGET LM ERICSSON

Patent Owner.

Cases IPR2015-01674, IPR2015-01676, IPR2015-01761, IPR2015-01806

U.S. Patent No. RE43,931

PATENT OWNER'S RESPONSE

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Patent Owner Telefonaktiebolaget LM Ericsson ("Patent Owner" or "Ericsson") respectfully submits this collective Response to Petitioners TCL Corporation, TCL Communication Technology Holdings, Ltd., TCT Mobile Limited, TCT Mobile Inc., and TCT Mobile (US) Inc.'s (collectively, "TCL") *inter partes* review petitions IPR2015-01674, -01676, -01761, and -01806 of U.S. Patent No. RE43,931 ("the '931 patent," Ex. 1001) per the Board's Consolidation Order. Paper No. 13. As detailed below, the claims challenged by TCL are patentable over the cited references. Accordingly, the Board should confirm the patentability of all challenged claims without amendment.

I. INTRODUCTION

The '931 patent disclosed, for the first time, a handheld mobile phone allowing a user to scroll through rows of information with the swipe of a finger. This was no trivial feat, as mobile phones in 1997 were a far cry from the modern smartphones of today. Due to size, power, and processing constraints, adding ***any*** functionality to a mobile phone in 1997 presented significant challenges. There was no teaching at the time realizing the benefits and vision of the '931 patent's improvement for the user interface of a mobile phone. And Petitioners' cited prior art, singly or in combination, fails to disclose or suggest the features of the claims as a whole.

In particular, no prior art discloses the required "second mode" of each independent claim. Simply put, the required "second mode" does not exist in Moore. This deficiency is then exacerbated by the fact that the Petitioner uses improper hindsight analysis to rationalize having the "second mode" in the alleged combination of Palatsi and Moore.

Similarly, a person of ordinary skill in the art ("POSITA") would also have recognized that Moore's embodiment involving four touch strips, which TCL explicitly relies on, would have yielded unpredictable results and that this embodiment in Moore is inconsistent with the teaching of Palatsi.

Neither Palatsi nor Moore recognized that using a moving-contact-sensitive transducer to perform scrolling as in the '931 patent facilitates one-handed operation on a portable handheld device. This result was far ahead of its time and has proven to be extremely valuable in the handheld device industry. Ex. 2057 at ¶ 101.

For these reasons, among others, Ericsson respectfully requests that the Board affirm the patentability of claims 1-12, 15-26, 29-31, 33-41, and 45-69 of the '931 patent.

II. BACKGROUND

A. Mobile Phone Display Functionality at the Priority Date

Mobile phones in 1997, unlike the smartphones we use today, used simple interfaces to provide basic functionality. Ex. 2057 at ¶ 34. The best-selling phones of that period typically included a rudimentary keypad and display configuration, as shown below:

Model	**Nokia 1610**	**Nokia 2160**	**Mitsubishi D203**	**Nokia 8110**	**Nokia 252**	**Nokia 550**
						
Release Date	1996	1996	1997	1998	1998	1998
Phone Dimensions (mm)	168 x 58 x 28	139 x 55 x 25	123 x 40 x 26	141 x 48 x 25	143 x 48 x 21	143 x 48 x 21
Touch screen?	No	No	No	No	No	No

Id. and Ex. 2005-2010.

TCL has not identified a single prior art document describing a mobile phone or handheld device allowing a user to scroll through information using a swiping motion. In the prior art, if a user wanted to scroll through a list of

information (such as a list of contacts), the user was forced to do so one entry at a time by pressing a button. Ex. 2057 at ¶¶ 34, 36, and 38. In some phones, scrolling was performed by pressing a number, such as pressing 2 to scroll up and 8 to scroll down. *Id*. at ¶ 34. Other phones included softkeys on the side of or directly below the screen corresponding to up and down arrows. *Id*. Even the IBM Simon, the first touchscreen phone, presented arrows on the touchscreen that the user clicked to scroll through each entry one at a time. *Id*. at ¶ 36.

B. Hand-Held Devices with Contact-Sensitive Interfaces

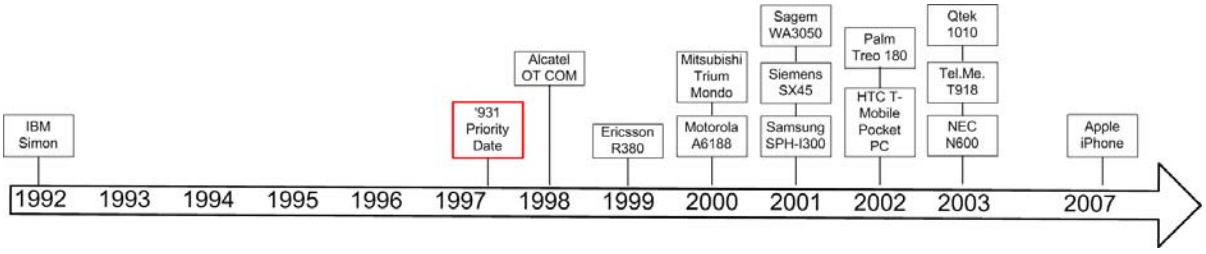
The IBM Simon was released in 1992 and was on the market for about six months. *Id*. Simon was larger than many of the mobile phones in the chart above, with dimensions of 8 x 2.5 x 1.5 inches and weighing over one pound:

IBM Simon
1992

Id.

Although the IBM Simon included a touch-sensitive screen, it did not allow a user to scroll through rows ***with a finger swipe***. *Id*. Every commercial application of a user interface on a handheld radiotelephone on or before the priority date of the '931 patent having rows of separate graphical objects required a user to tap an arrow button on the screen to scroll through the information. *Id*.

Contrary to TCL's assertion (Petition at 7), the rate of innovation in hand-held radio telephone user interfaces was quite slow before the priority date of the '931 patent. In fact, very little happened in this field in the six years between the IBM Simon and the priority date of the '931 patent. But after 1998, after the '931 patent was filed, contact-sensitive user interfaces started to develop rapidly for handheld devices.



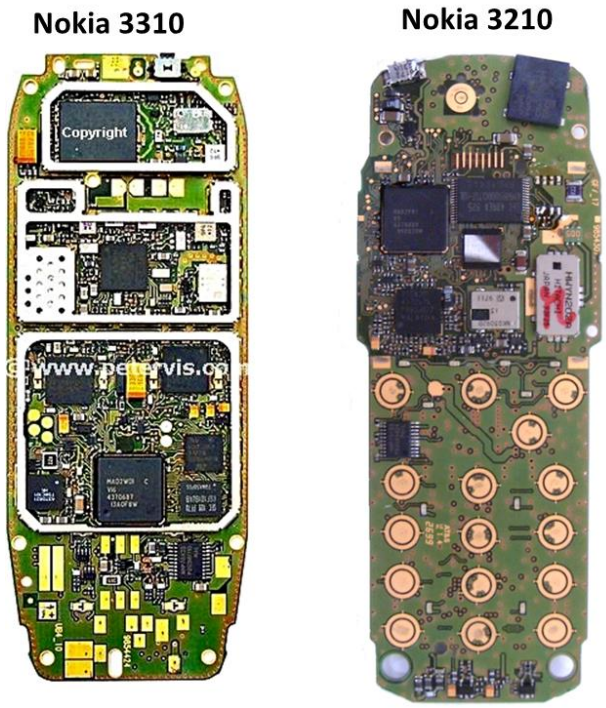
Ex. 2011, 2014-2024, 2040-2041; and Ex. 2057 at ¶ 37.

In addition, early non-radiotelephone hand-held devices such as the Palm Pilot 1000/5000 (shown below), originally released in 1996, also failed to provide scrolling functionality ***with a finger swipe***.

Id. at ¶ 38. The Palm Pilot 1000/5000 included a monochrome resistive touch screen. *Id*. Like the IBM Simon, scrolling on the Palm Pilot was performed via two dedicated mechanical scroll buttons, shown in the middle of the bottom row of buttons in the illustration above. *Id*.

Thus, as of December 1997, there were no commercially-available portable hand-held devices that accepted a moving contact, such as a sliding gesture or a swipe, to a contact sensitive surface to deliberately scroll through displayed rows, as separate graphical objects, of content. This feature would later prove to be extremely valuable in the hand-held industry. *Id*. at ¶ 39; Ex. 2065-2069.

The hardware configuration of a mobile phone is primarily disposed on a printed circuit board ("PCB") as illustrated below for examples of mobile phones released in the 1990s/early 2000s.



Ex. 2057 at ¶ 40, Ex. 2075, Ex. 2076.

As is apparent, the size of a mobile phone PCB is much smaller than a desktop motherboard, and as shown above, the circuitry becomes quite congested. Ex. 2057 at ¶ 41. Additionally, processor sizes used for desktop computers and mobile phones greatly differed. *Id.* at ¶ 42.

Key design considerations for a mobile phone include maintaining a reduced handset size so that the device could be easily carried in a pocket or handbag. *Id.* at ¶ 43. Additionally, it was desired to use a minimalist design on the user interface in which soft-keys were used to trigger actions on a phone. *Id.* The need for a minimalist approach is even described in TCL's primary reference Palatsi. Ex. 1087 at 1:21-25. Devices of the late 1990s and early 2000s were constrained in terms of processing capability, memory costs, and display capabilities. *Id.* It was known that adding more components to a mobile phone required more processing capabilities to perform their functions. *Id.* Additionally, because improvements in battery technology are modest, innovative techniques at all levels of design were necessary to use the limited available energy as efficiently as possible, a key differentiator between mobile handset solutions and traditional desktop solutions. *Id.* Thus, because avoiding increasing the overall handset size was an understood goal, successfully integrating additional electronics in the mobile phone industry is time consuming and challenging due to the associated implications on chipset and operating system integration. *Id.*

III. THE '931 PATENT

The '931 patent discloses a radiotelephone that includes a housing, a radiotelephone communications transceiver, and a display attached to the housing.

Ex. 1001, Abstract. Of particular note, a "contact-sensitive transducer, such as a resistive transducer, a capacitive transducer, or a semi[-]conductive transducer, is attached to the housing and produces an output signal that characterizes contact with a contact-sensitive surface of the contact-sensitive transducer." *Id.* The contact-sensitive transducer of the '931 patent is a novel approach to touch screen interfaces by providing "a contact-sensitive surface… which produces an output signal in response to ***moving*** contact of an object along the contact-sensitive surface of the contact-sensitive transducer." *Id*. (emphasis added); *see* claim 1.

The '931 patent was the first disclosure of a portable radiotelephone that accepted a ***moving*** contact for scrolling through displayed rows of information without using moving parts. Ex. 2057 at ¶ 44-45 and 107. Prior to the '931 patent, there was no known radiotelephone capable of detecting touch-based scrolling. *Id*. The only commercially available mobile phone with a touch-sensing capability available prior to the priority date of the '931 patent, the IBM Simon, could detect only a single touch by a user and was not capable of detecting the '931 patent's touch-based ***scrolling***. *Id.* at ¶¶ 35-36.

Using contact-sensitive transducers that were responsive to moving contact, in a mobile phone to scroll through rows of information offers numerous advantages never before realized. *Id*. at ¶ 45. First, by using the contact-sensitive

transducer as an input device, the inventors of the '931 patent were able to minimize the thickness of the phone because no mechanical scroll switches were necessary. *See* Ex. 1001 at 2:29-40. Second, because different ***types*** of movement could be detected, "such as swiping motions or taps, the transducer may be used to perform display movements such as scrolling or cursor movement, as well as for selection of items displayed on the display." *Id.* at 2:34-38. Third, using a contact-sensitive transducer improved the reliability of the input device by eliminating moving parts in the transducer. *Id.* at 2:38-40.

The inventors of the '931 patent also recognized that a controller should have a mode wherein it is rendered ***non***-responsive to a contact sensitive transducer to prevent inadvertent generation of signals caused by gripping of the radiotelephone. *Id*. at 5:44-48.

Illustrative claim 1 (with emphasis added) recites:

> 1. A radiotelephone, comprising:
>
> a housing having a front surface, a rear surface and first and second side surfaces adjoining respective opposite edges of the front surface and extending from the respective opposite edges of the front surface to respective opposite edges of the rear surface, the housing

configured to be held in a user's hand such that the rear surface confronts the user's palm;

a radiotelephone communications transceiver, supported by the housing;

a display, supported by the housing, that displays an image at the front surface of the housing;

a contact-sensitive transducer, supported by the housing and having a contact-sensitive surface disposed at at least one of the first and second side surfaces said front surface, which produces an output signal that characterizes in response to moving contact of an object along the contact-sensitive surface of the contact-sensitive transducer; and

a controller, responsive to the output signal and operatively associated with the display and the radiotelephone communications transceiver, which controls at least one of the display and the radiotelephone communications transceiver according to and which ***scrolls displayed rows along an axis of the display based upon the output signal of the contact-sensitive transducer, the controller having a first mode*** wherein the controller is responsive to contact with the contact-sensitive transducer ***and a second mode*** wherein the controller is unresponsive to contact with the contact-

sensitive transducer, ***the second mode being entered in response to an input from a user***.

Independent claims 16, 30, 33, 58, and 64 each recite certain features analogous to those of claim 1 shown above, and the grounds presented in the Petition for challenging claims 16, 30, 33, 58, and 64 are the same as for claim 1. Therefore, while the analysis below will refer to claim 1, it is equally applicable to the features of independent claims 16, 30, 33, 58, and 64. Ex. 2057 at ¶ 47.

IV. PROSECUTION HISTORY OF THE '931 PATENT

The '931 Patent was filed March 11, 2005 as a reissue application of Patent No. 6,278,888 (the "'888 Patent," Ex. 1004), and claims priority back to Application No. 09/001,173 filed December 30, 1997, now Patent No. 6,131,047 (the "'047 Patent," Ex. 1005). The reissue application was subject to three rounds of prosecution before allowance.

The first round of prosecution concluded on August 6, 2007 with a pre-appeal panel withdrawing pending obviousness rejections over O'Hagan, which discloses a cell phone with a thumb wheel, and Yaniv, which discloses a device with a touch screen but no scrolling functionality. Ex. 2007 at 617-18. The panel recognized that the '931 specification distinguished a "contact-sensitive transducer" from prior art mechanical wheel-type switches (such as taught by

O'Hagan and relied upon by the examiner). *Id.* at 621-22; Ex. 1004 at 2:20-30. "[A] contact-sensitive transducer is understood to be a non-mechanical device, not a mechanical wheel-type switch such as disclosed by O'Hagan." *Id*. at 623.

In the second round of prosecution ending October 13, 2010, the examiner continued to apply O'Hagan as a primary reference, and cited Allard which disclosed a scrolling capability. Ex. 2007 at 590-610. Applicant) pointed out to the examiner that Allard requires a user to push a button to scroll, and did not disclose a dragging gesture. *Id.* at 571. The examiner then dropped the Allard reference and replaced it with a combination of Gillespie, which discloses a touchscreen, and Moore, which discloses the use of touch strips to effect scrolling based on moving contact along the strips. *Id.* at 517-41. On appeal, the obviousness rejections were maintained. *Id.* at 398-99.

The third round of prosecution started with a request for continued examination in which the applicant added limitations directed to a radiotelephone having a contact-sensitive transducer which produces an output signal and a controller responsive to the output signal, "the controller having a first mode wherein the controller is responsive to contact with the contact-sensitive transducer and a second mode wherein the controller is unresponsive to contact with the contact-sensitive transducer." Ex. 2007 at 365. The examiner continued to cite

O'Hagan, along with additional references such as Jeong, to support its obviousness rejections. *Id.* at 249-278.

The Examiner asserted that Jeong discloses a second mode wherein its controller is unresponsive. *Id.* at 255-56. In response, however, Applicant argued that Jeong merely discloses an unresponsive mode caused by ***a lack of user input*** for a predetermined length of time, but not a mode which was entered in response ***to an input from a user*** as required by the reissue claims. *Id.* at 235. The third round of prosecution ended when the examiner issued a notice of allowance during the appeal process. *Id.* at 42.

V. OVERVIEW OF THE PRIOR ART

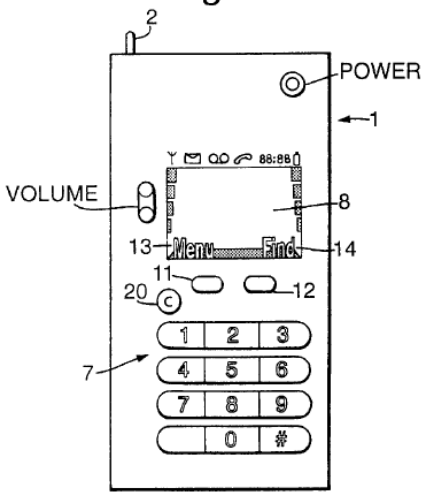
TCL asserts that several claims would have been obvious over U.S. Patent No. 5,892,475 to Palatsi (Ex. 1087, "Palatsi") in view of U.S. Patent No. 4,566,001 to Moore et al. (Ex. 1012, "Moore") and that other claims would have been obvious over Palatsi in view of Moore and further in view of EP Patent Application No. 0,721,272 to Tiilikainen (Ex. 1088, "Tiilikainen").

A. Summary of Palatsi

Palatsi discloses a user interface for a telephone device. Ex. 1087 at Abstract. Palatsi describes a need for portable, hand-held, telephones to be

smaller, making it necessary to reduce the size of their keypads. *Id*. at 1:5-28. An embodiment of Palatsi is shown in Fig. 2 below.

Fig.2.



Palatsi does not teach providing scrolling functionality ***with a finger swipe***. Rather, the portable telephone in Fig. 2 of Palatsi illustrates two "soft" keys 11 and 12 incorporated in a keypad 7. These keys are part of the mechanical keypad. *Id.* at 2:26; 4:15. The keys are "soft" in that their functions can vary, and the current functions are indicated by corresponding soft key zones 13 and 14 of the display. *Id*. at 2:18-37.

One of the objectives of Palatsi is to avoid using dedicated arrow keys and a separate "select" key. *Id*. at 2:43-46. Scrolling in Palatsi is accomplished using the soft keys, but whether these keys perform a scrolling function or not depends

upon other factors, such as the time since the last key press. *Id.* at 2:63-3:2. Thus, as illustrated in Fig. 3, the telephone processor monitors the time period since either of the soft keys was last pressed. *Id.* at 3:2-4. When a certain set time after a scroll keypress has elapsed, the soft key zone 13 corresponding to key 11 changes to display "OK." *Id.* at 3:4-6. Pressing key 11 will then select the currently-displayed menu item and cause the processor to take the appropriate action corresponding to that item. *Id*. at 3:7-9. Thus, Palatsi discloses a process for scrolling using mechanical keys, not scrolling by moving contact of an object along a contact-sensitive surface of a contact-sensitive display. Specifically, Palatsi does not describe a contact-sensitive display.

B. Summary of Moore

Moore discloses a display terminal which has touch strips extending along the horizontal and vertical edges of the screen. Ex. 1012, Abstract. Fig. 1 of Moore shows a terminal that has a cathode ray tube unit 10 with a rectangular screen 12, a keyboard 14, and touch sensitive strips 16 and 18 extending horizontally and vertically along two edges of a bezel surrounding the rectangular screen. *Id*. at 2:15-22.

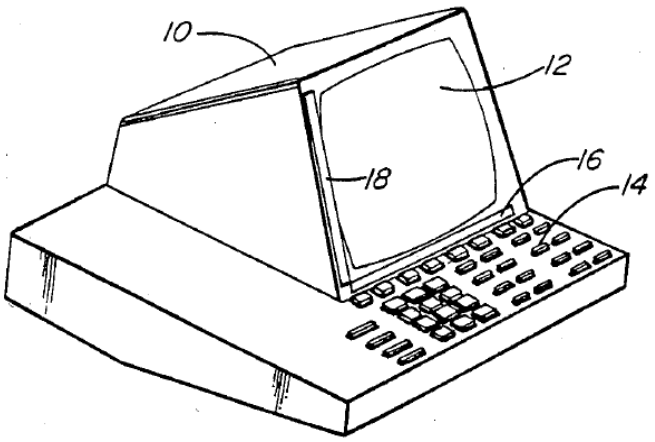


FIG. 1

The vertical and horizontal touch strips are described as having identical construction and, in use, each has a voltage output which is representative of the distance along its length at which it is touched. *Id*. at 2:22-25. Fig. 2 of Moore, shown below, illustrates that each of the touch strips has a flexible conductive strip 20 overlaying a resistive substrate 22. *Id.* at 2:26-29. The conductive strip and the substrate are normally separated from one another by an insulating frame 24 but can be locally brought together by pressing the strip downwardly at a desired location along the strip. *Id.* at 2:29-33. A voltage gradient is established along the resistive substrate by applying voltages V+, and V- through resistors R to electrodes contacting the substrate ends. *Id*. at 2:33-36.

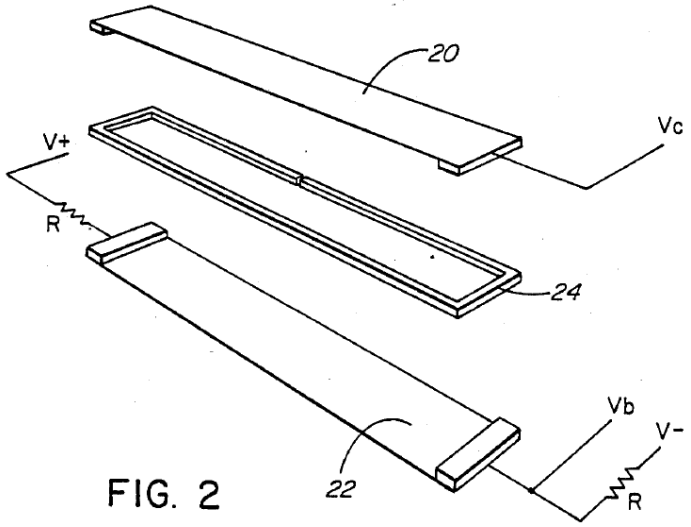


FIG. 2

Fig. 3 of Moore shows a block diagram of the hardware used in the terminal:

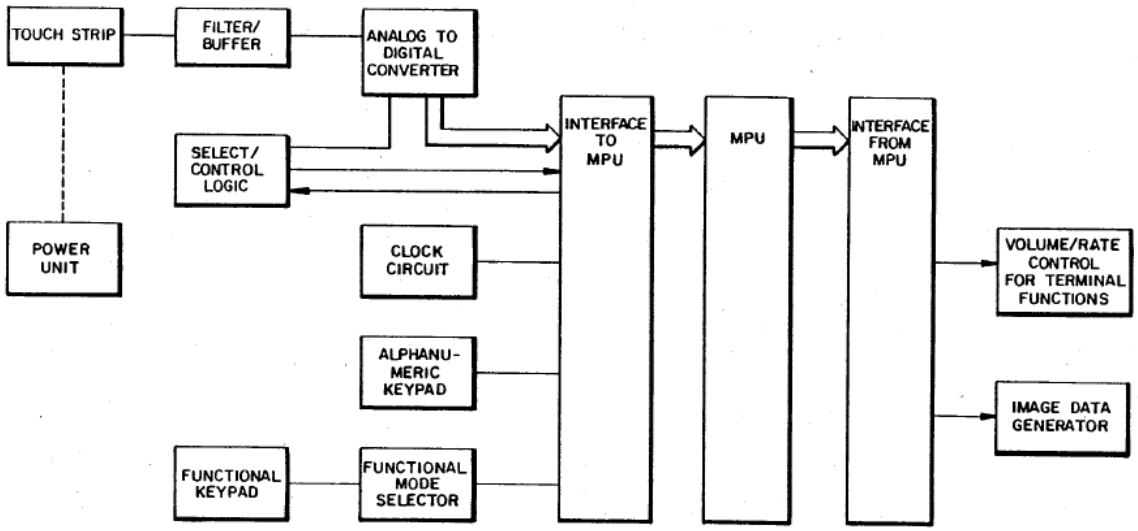


FIG. 3

The touch strips have a power supply to establish the voltage gradient along the resistive substrates. *Id.* at 2:37-39. The output of a touch strip is provided to

the input of a filter/buffer unit and the output of the filter/buffer unit is provided to one input of an analog-to-digital converter. *Id.* at 2:39-42. Moore describes the electronic operation of the touch strips. *Id*. at 2:39-51.

The touch strips can have a variety of functions, depending on the manner in which the microprocessor is programmed. *Id*. at 3:18-20. In order to select the desired function, one of the functional-designation keys in the primary keyboard is pressed. *Id*. at 3:20-22. Typical functional keys associated with the touch strips are soft-key designation, menu selection, cursor generation, graded control and scrolling. *Id*. at 3:22-25.

To scroll using the touch strips, a user must specifically select and press the scrolling key from among the functional designation keys in the primary keyboard. *Id*. at 3:18-25. By pressing the scrolling functional key on the keyboard, the terminal permits the displayed text or graphics to be moved vertically or laterally to display adjacent parts of the displayed matter. *Id*. at 4:20-27.

Moore notes that a bank of touch strips can be mounted along each edge of the display. *Id*. at 4:32-33. In this case, keys associated with the functional keyboard must permit switching between different banks of strips. *Id*. at 4:33-35.

C. Summary of Tiilikainen

Tiilikainen discloses a portable telephone as shown in Fig. 1. Tiilikainen describes a telephone 15 including a "scrolling key" illustrated as a bifurcated pad with an up arrow and a down arrow. Ex. 1088 at 1:21-22 and 3:17. Fig. 2 of Tiilikainen (below) shows that different phone numbers are stored on the phone and can be displayed in columns 25, 26, and 27 having corresponding headers 21, 22, and 23. *Id.* at 3:8-10.

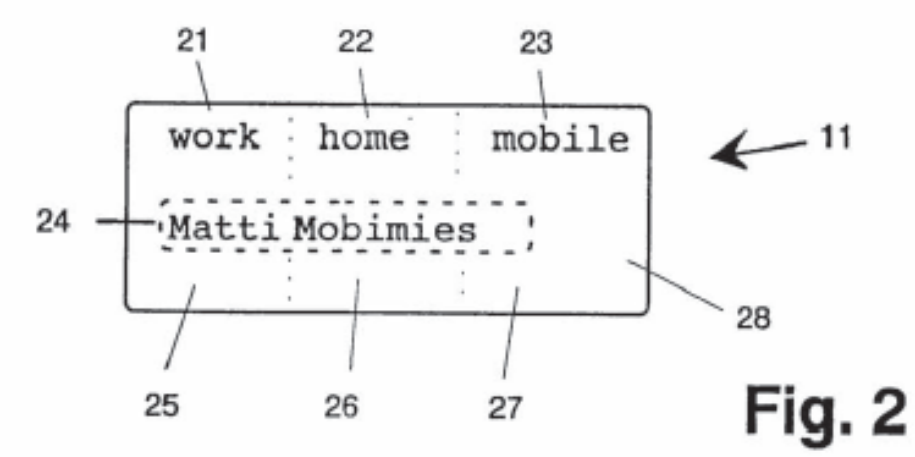


Fig. 2

A user presses the appropriate up or down arrow to scroll to the desired number; when this number is displayed in the field, the user can select it by pressing the corresponding column 25, 26, or 27. *Id*. at 3:16-19. Selection can be made by pressing with a finger or, *e.g.*, with a pen, whereby the phone makes a call to the chosen number. *Id*. at 3:19-22.

VI. PERSON OF ORDINARY SKILL IN THE ART

For purposes of the analyses presented below for each ground of challenge submitted by the Petitioners, Patent Owner submits that a POSITA was someone with a bachelor's degree in computer engineering, electrical engineering, or computer science having multiple years of hands-on experience working with hand-held contact-sensitive user interface devices, or graphic user interfaces. The POSITA had direct knowledge of the types of contact-sensitive user interfaces used in mobile phones or handheld devices as of December 30, 1997 and understood the design and functional tradeoffs with regard to the physical constraints of a hand-held device. Ex. 2057 at ¶ 22.

VII. TCL ERRONEOUSLY DEFINES THE PERSON OF ORDINARY SKILL IN THE ART

The proper definition of a POSITA is crucial to any obviousness analysis. 35 U.S.C. §103(a) explicitly provides that determining whether claimed subject matter is obvious requires an analysis whether the subject matter as a whole "***would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains***." In this case, claim 1 is unambiguously directed to a "radiotelephone." Moreover, the body of claim 1 specifically requires a "housing configured to be held in a user's hand such that the

rear surface confronts the user's palm," and a "radiotelephone communications transceiver, supported by the housing." Thus, at the very least, claim 1 is directed to a handheld radiotelephone device that includes a radiotelephone communications transceiver. More to the point, the claims are directed to either a portable handheld radiotelephone, also known as a mobile phone or cell phone, or a portable handheld device. *Id*.

However, in defining the POSITA, TCL ignores the important factor of specific experience with respect to the art of ***handheld radiotelephones***, mobile phones, cell phones, or ***handheld devices***. *Id*. TCL states:

> For purposes of the obviousness analyses presented below for each ground, Petitioners submit that a person of ordinary skill in the art ("POSITA") is someone with a bachelor's degree in computer engineering, electrical engineering, or computer science, and two years of experience with touch-based user input systems or equivalent education and experience on December 30, 1997, the date to which the '931 patent claims priority. (Ex. 1205, ¶¶ 56-58; *see* also *id.* at ¶¶ 5-19 (in support of qualifications as expert of Andrew L. Wolfe).)

Petition at 10.

Consequently, TCL's obviousness analysis fails to consider the challenges of implementing a touch-based user input display system for handheld radiotelephones as of December 31, 1997. Ex. 2057 at ¶ 22.

VIII. CLAIM CONSTRUCTION

Consistent with the statute and legislative history of the America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), the Board interprets claims using the "broadest reasonable construction in light of the specification of the patent in which [they] appear[]." 37 C.F.R. § 42.100(b); *see also* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). In construing claims of an unexpired patent challenged at the U.S. Patent and Trademark Office, the Board must give primacy to the language of the claims, followed by the specification. *See Tempo Lighting, Inc. v. Tivoli, LLC*, 109 USPQ2d 1599, 1602 (Fed. Cir. 2014). The Federal Circuit has advised that "[t]he PTO should also consult the patent's prosecution history in proceedings in which the patent has been brought back to the agency for a second review." *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015).

Ericsson generally agrees that the constructions proposed by TCL are in keeping with how a POSITA would have understood those terms.

IX. INDEPENDENT CLAIMS 1, 16, 30, 33, 58, AND 64 WOULD NOT HAVE BEEN OBVIOUS OVER PALATSI IN VIEW OF MOORE

A. Moore does not disclose the "second mode" of the independent claims.

Neither Palatsi nor Moore discloses "a second mode wherein the controller is unresponsive to contact with the contact-sensitive transducer, the second mode being entered in response to an input from a user." TCL attempts to apply the touch sensitive strips of Moore to the portable telephone in Palatsi. Petition at 20. But TCL's argument is based on a clear mischaracterization of Moore because Moore does not disclose a second mode as required by the claims.

The errors in TCL's analysis are shown here, where TCL asserts:

> Moore discloses '***switching between*** ones of the banks of touch strips' to disable one bank of touch strips . . . while enabling another bank of touch strips, such that the controller is responsive to contact only with the second bank of touch strips. (*Id.*, ¶ 185; Ex. 1012, 4:33-36.)

Petition at 39 (emphasis added).

However, ***switching between*** different physical entities is not at all the same as providing a ***second mode*** of operation of a ***single*** component. Ex. 2057 at ¶ 71.

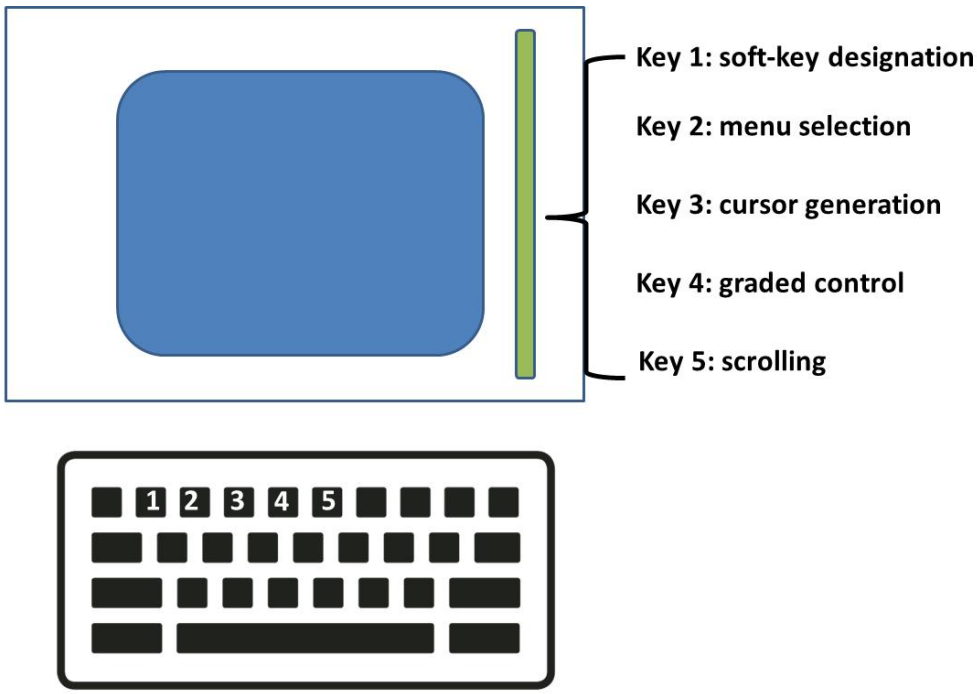
Similarly, Moore never discusses "activating" and "deactivating" touch strips as suggested in the background description of Moore at pages 17-18 of the Petition. *Id.* A POSITA would not have understood Moore to teach or suggest "deactivating" or "disabling" a touch strip (*id.* at ¶¶ 71-78), and TCL's complete failure to point to any description in Moore where this purported teaching is actually provided is a clear failure to address all of claim elements of each independent claim.

Dr. Wolfe's Declaration does not contain a substantive argument to support TCL's position. *See Apotech, Inc. v. Synopsys, Inc.*, IPR2014-01150, Paper 11 at 18 (PTAB Jan. 21, 2015) (commenting on the lack of probative value of a declaration that merely recites, verbatim, the conclusions of a Petition). And at his deposition, Dr. Wolfe acknowledged that Moore does not explicitly describe that a touch strip is disabled or made unresponsive to contact. Ex. 2003 at 101:1-9. Dr. Wolfe also acknowledged that the term "switching" as used in Moore does not necessarily mean selecting two touch strips to be operable while another two touch strips are inoperable. *Id.* at 99:15 to 100:5. Nonetheless, Dr. Wolfe attempted to conclude that Moore teaches the "concept" of disabling a touch strip to a POSITA. *Id.* But Dr. Wolfe's reading of Moore is unpersuasive because Moore never

discloses disabling a touch strip and nothing in Moore even suggests rendering its controller unresponsive to either set of strips. Ex. 2057 at ¶ 76.

On the contrary, when Moore states that "keys associated with the functional keyboard must permit switching between different ones of the banks of strips," Moore is simply referencing the ability to select one of the banks of touch strips and then to select a desired program that corresponds to a different mode of the touch strips, ***not*** that any of the banks of strips are made unresponsive to contact or that using a functional key in the primary keyboard disables a touch strip. *Id*. at ¶ 72. As discussed in Moore, some examples of different modes are soft-key designation, menu selection, cursor generation, graded control and scrolling. Ex. 1012 at 3:18-24.

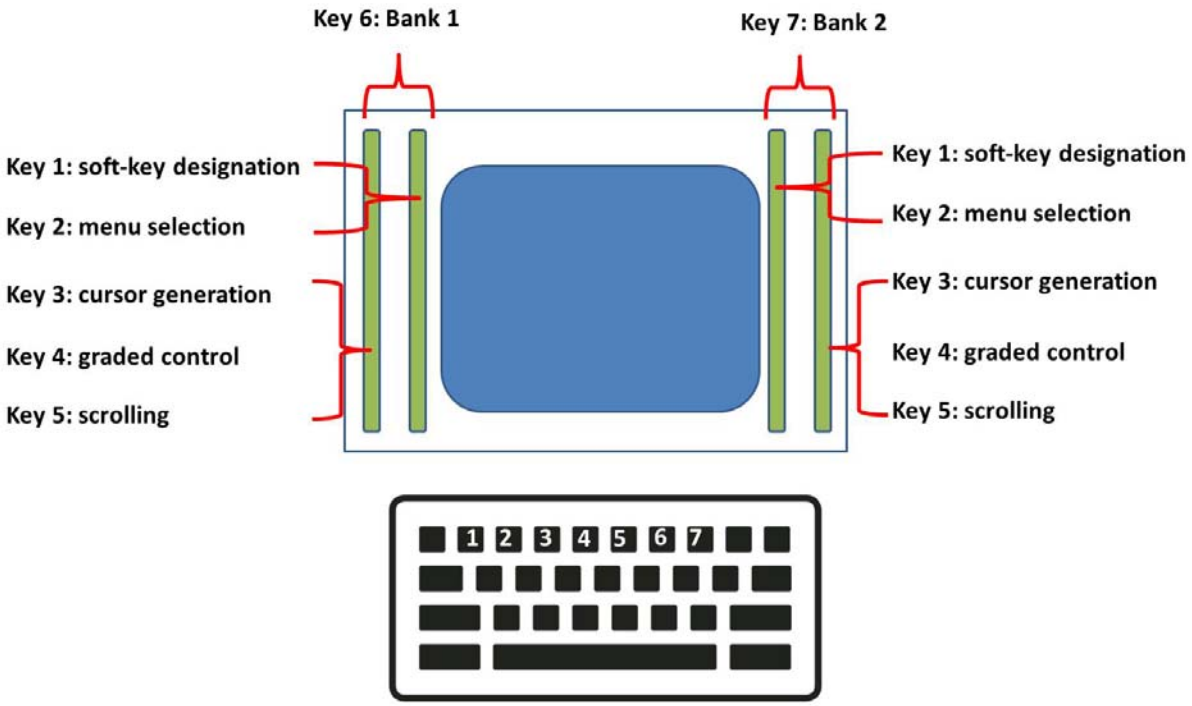
Therefore, based on the primary embodiment discussed in Moore, a key on the keyboard is used to assign a function to a single touch strip as illustrated below.



Ex. 2057 at ¶ 73.

In the alternative embodiment which briefly describes the use of banks of touch strips, Moore recognizes that assigning functions to each of the touch strips in each bank would take too many keys to assign a separate key for each function of each touch strip. *Id*. at ¶ 74. For example, for two banks of touch strips, each bank having two touch strips, creating a total of four touch strips, this would entail having 20 (4 x 5) separate functional keys to assign any of the above-noted five functions to any of the touch strips. *Id*. Therefore, Moore allows for switching which bank of touch strips is the object of the user's intention. *Id*. For example, if the user wanted to change the functionality of a touch strip within a bank, the same

keys could be used for the function designations on any of the banks of touch strips while a different set of keys is used to designate which bank of touch strips the user is interested in changing the functionality therefore. *Id*. An example of this situation is shown below.



Id.

In this illustrative example, functional keys 1-5 could still be used to select a functionality of a touch strip with five keys on the keyboard while keys 6 and 7 can select which one of the bank strips is having its functionality changed. *Id*. at ¶ 75.

Thus, because Moore only describes using additional functional keys of a keyboard to ***switch*** the functionality of a given touch strip at a given time in the primary embodiment, it logically indicates that "switching" referred to in Moore's brief description of "keys associated with the functional keyboard must permit switching between different ones of the banks of strips" with respect to the embodiment in which banks of touch strips are used merely means selecting one of the banks of touch strips and then to assign or switch a desired program or function to one or more of the touch strips within one of the banks as depicted above. *Id*. at ¶ 76. There simply is not any reason to disable or render unresponsive any one of the touch strips described in Moore, and Moore does not describe any functional key with this particular function. *Id*.

In fact, Moore provides several examples where multiple touch strips can be enabled simultaneously, and actually need to be enabled ***at the same time*** in order to execute a selected function. *Id*. at ¶ 77. For example, Moore discloses:

> cursor manipulation depends upon ***pressing contacts at both strips*** to establish a position on the screen area . . . To reposition the cursor from the reference to a selected position, ***the two touch strips are touched*** at positions corresponding to the XY co-ordinates of the selected position.

Ex. 1012 at 3:60-62, 3:66 -4:1 (emphasis added).

Similarly, to implement the graded control function, Moore discloses:

> [b]y pressing the graded control key and an appropriate character key, ***one or both of the touch strips can be used*** to control a continuously varying quantity."

Id. at 4:10-12 (emphasis added).

Thus, there is ***no*** disclosure or suggestion in Moore that "switching between different ones of the banks of strips" entails ***enabling and disabling*** the touch strips.

As would have been understood by a POSITA, Moore simply relates to an arrangement where, if a plurality of strips is provided as a "bank of strips" or a batch, there needs to be a designation on the functional keyboard allowing the user to switch to or select a particular strip among the group of strips if a function of the touch strip needs to be changed. Ex. 2057 at ¶ 77. This arrangement is mere functionality-switching among the strips, nothing more. *Id*. at ¶¶ 75-77.

B. TCL's motivation to use the "second mode" is based on hindsight.

Assuming, *arguendo*, that Moore discloses the second mode required by claim 1, the motivation identified in the Petition to include that feature in a hand-held radiotelephone is impermissible hindsight. Pages 38 and 39 of the Petition state "the ability to hold the portable telephone in a user's hand with a thumb

extending around one side and the thumb extending around the other … would create a risk of the user accidentally activating an unintended touch strip on the opposite side of the display." But the device of Moore is not hand-held:

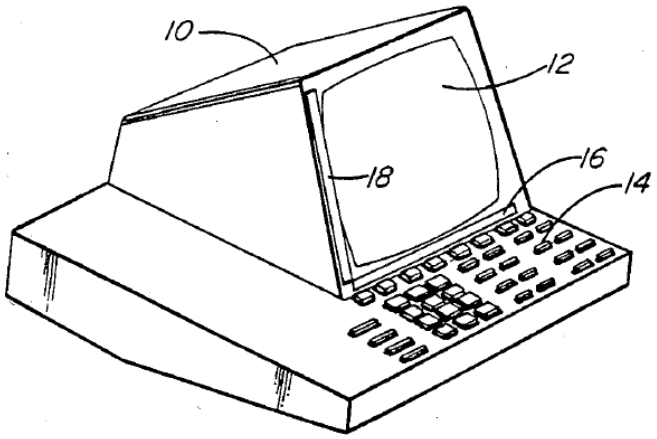


FIG. 1

In other words, Moore does not present a problem where a user will ***hold the device in one hand and the thumb will extend from one side to the other***.

Thus, TCL has manufactured a problem created by the hypothetical combination of Palatsi and Moore itself. Ex. 2057 at ¶¶ 80-81. That is, the purported solution to this "problem" is only based on hindsight because the problem did not exist at all in the prior art and thus the solution could not have been gleaned from any knowledge that existed at the priority date of the '931 patent. *Id*. at ¶ 82. With this argument TCL literally requires a POSITA to have the inventive intuition to solve a previously-unknown problem. Petition at 39. Not

even TCL's expert asserts that a POSITA in December 1997 would have recognized this as a known problem with a known solution.

On the contrary, even assuming a POSITA incorporated one or more touch strips from Moore into the mobile phone of Palatsi, there would have been absolutely no reason for the POSITA to know to include a "second mode" in which a touch strip is made unresponsive to contact because the POSITA would have been completely unaware of the risk of the user accidentally activating an unintended touch strip as described in the Petition. Ex. 2057 at ¶ 80. TCL was forced to conjure a reason for having a "second mode" when combining Moore and Palatsi because, as pointed out above, ***neither reference teaches or suggests a second mode***.

C. It would not have been obvious to incorporate the dedicated hardware of Moore into Palatsi.

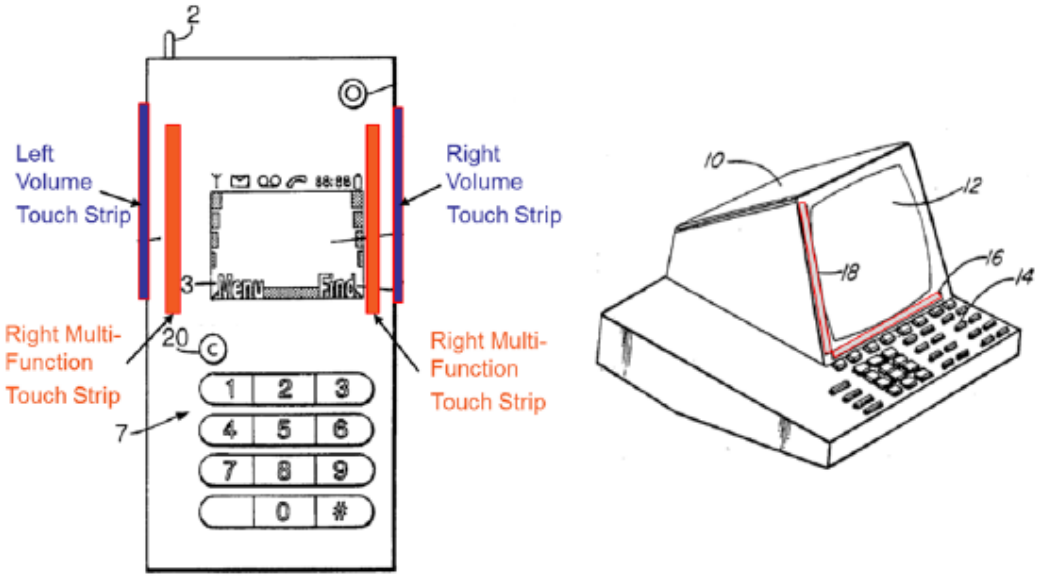
A POSITA would not have been motivated to incorporate Moore's dedicated hardware required to implement the touch strips into the handheld Palatsi device. *Id*. at ¶ 83.

The first requirement of claim 1 is "a housing having a front surface, a rear surface and first and second side surfaces adjoining respective opposite edges of the front surface and extending from the respective opposite edges of the front

surface to respective opposite edges of the rear surface, ***the housing configured to be held in a user's hand such that the rear surface confronts the user's palm***."

As described above, Moore describes a terminal (*see* Fig. 1 above) having a cathode ray tube unit with a rectangular screen and touch sensitive strips extending horizontally and vertically along two edges of a bezel surrounding the rectangular screen. Ex. 1012 at 2:15-22.

TCL proposes to apply four of Moore's touch sensitive strips to the portable telephone in Palatsi as illustrated below (Petition at 20).



(Demonstrative Fig. 2 (Palatsi modified by Moore).)

TCL strictly relies upon a ***four touch strip*** embodiment as taught by Moore because, as discussed above, TCL asserts that the embodiment of Moore which

uses multiple banks of touch strips has a "second mode" of operation as required by claim 1. However, modifying Palatsi to include the four touch strips would have resulted in unpredictable technical challenges. Ex. 2057 at ¶ 91.

For example, TCL fails to show or explain how the hardware used to support and operate the four touch-sensitive strips in Moore could have been implemented in the portable telephone of Palatsi while maintaining the requirement of claim 1 that the device be "configured to be held in a user's hand such that the rear surface confronts the user's palm." *Id*. at ¶ 84. As described above, Fig. 3 of Moore (below) illustrates the hardware used to achieve the operation of the touch-sensitive strips.

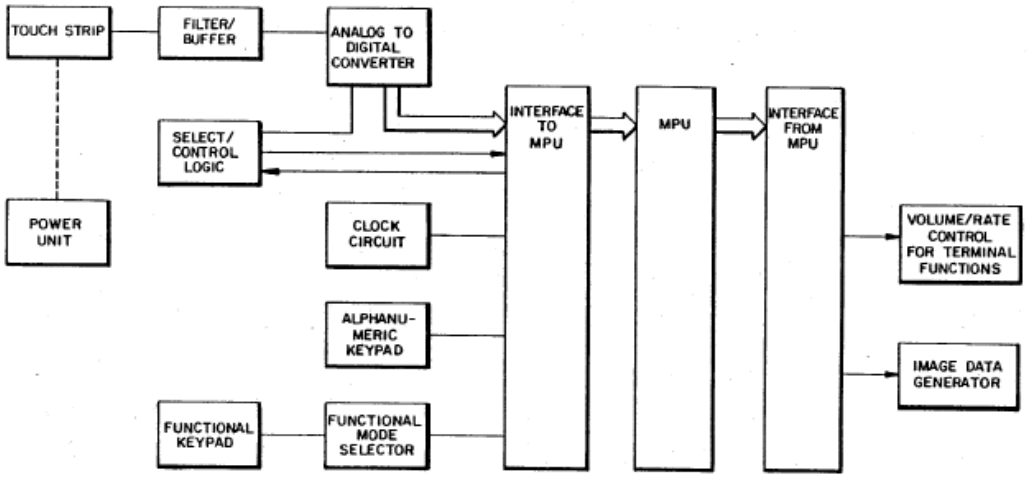


FIG. 3

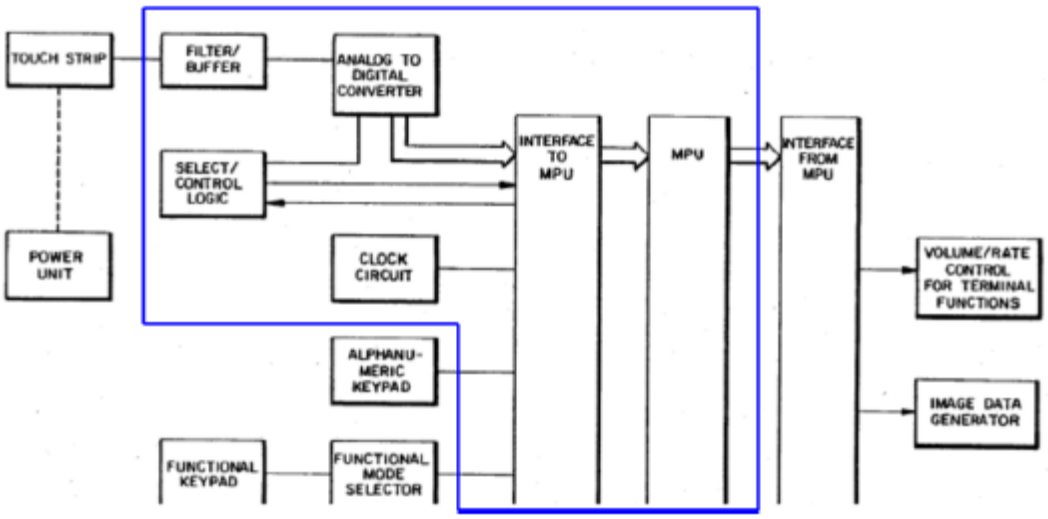
Moore's touch strips have their own power supply to establish the voltage gradient along the resistive substrate. Ex. 1012 at 2:37-39. Additional hardware used in Moore to operate the touch-sensitive strips includes a filter/buffer unit, an analog-to-digital converter, a select/control logic circuit driven by timing impulses from a clock circuit, an interface circuit, and a microprocessor unit. *Id*. at 2:37-47. This collection of hardware, in 1997, would have required a considerable package. Ex. 2057 at ¶ 89.

TCL attempts to address the hardware requirements of Moore in the Petition at page 32:

> Moreover, a POSITA would have known that processor 5 in Palatsi would be responsive to the output signal from the touch strip of Moore, just as it is responsive to the output signal from the soft keys. (Ex. 1205, ¶ 176.) In particular, referring to Fig. 3, Moore teaches a microprocessor unit (MPU) in combination with a filter/buffer unit and analog digital converter, that "accept[s] data from the touch strip" and performs functions, such as "menu selection, cursor generation, graded control, or scrolling," based on that data. (*Id*.; Ex. 1012, 2:38-56; 3:1-4; 3:22-25, Fig. 3 (with the controller highlighted in **blue**).) Indeed, it would have been apparent to a POSITA to modify the processor 5 in Palatsi with the microprocessor electronics described in Moore to facilitate the incorporation of the touch strips of Moore into

the radiotelephone of Palatsi. (Ex. 1205, ¶ 176.) Thus, Palatsi in combination with Moore renders obvious a controller responsive to the output signal. (*Id.*)

The elements that TCL describes as highlighted in blue in Moore's hardware description are shown below.



(Annotated Fig. 3 (Moore).)

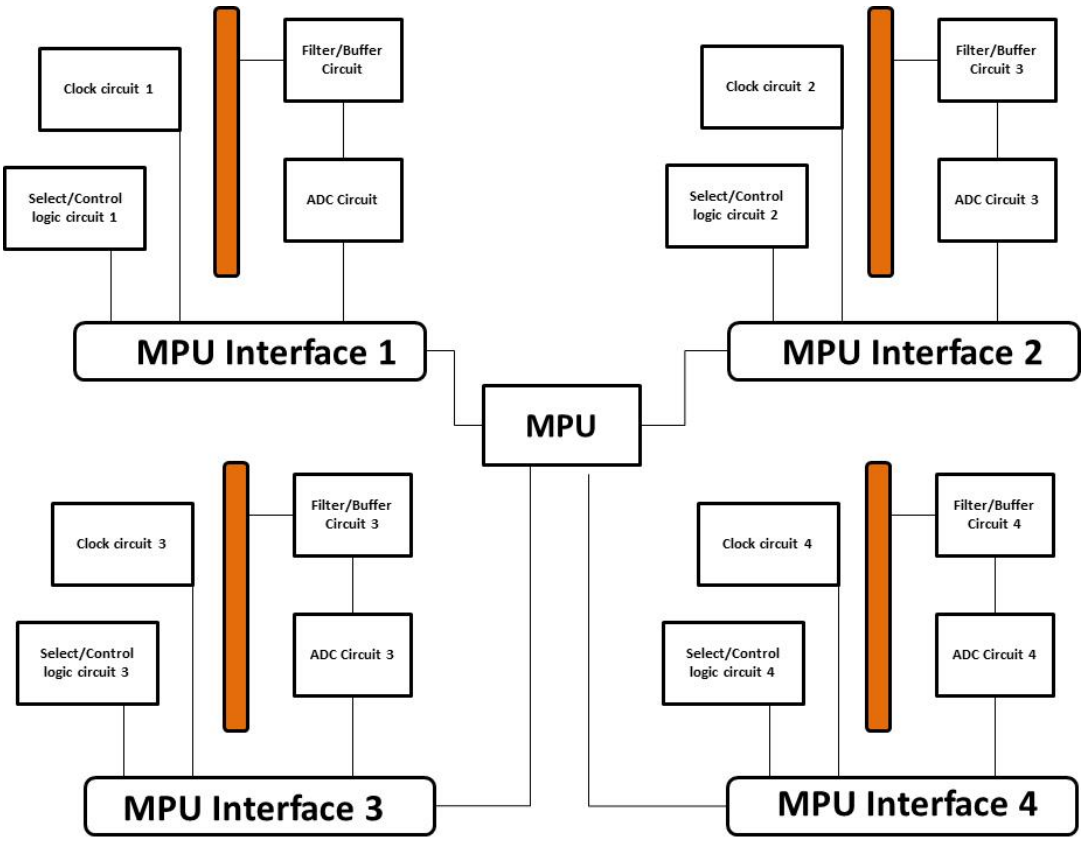
TCL suggests that it would have been obvious to modify the existing processor in Palatsi to have all the elements shown in the blue box above and to be connected to the touch strip. However, what TCL completely omits is that the above-noted elements need to be incorporated ***four times*** because the embodiment from Moore the Petitioner relies upon requires four touch strips. Ex. 2057 at ¶ 85. Thus, the actual hardware modifications to Palatsi's native processor would have

required ***significantly more modification than single blue box example depicted above***. *Id*. at ¶ 89.

Furthermore, Moore ***only discloses*** touch-sensitive strips integrated into a computer terminal device large enough to support a cathode ray tube display. As such, nothing in Moore teaches a POSITA in 1997 that it would have been possible to fit this hardware in a hand-held radiotelephone. *Id*. at ¶ 90. Given the size and power constraints of mobile phone technology compared to display terminal technology in the 1997 timeframe, ***there could have been no reasonable expectation*** that four new hardware elements (which each require four sets of dedicated hardware circuitry) could be successfully implemented in Palatsi. *Id*. at ¶ 91.

For instance, the elements shown in Fig. 3 of Moore delineated by TCL's "blue box" are not mere functional elements that can be readily programmed into the existing hardware of Palatsi. *Id*. at ¶ 87. These are discrete integrated circuits which will take up already limited real estate on the existing printed circuit board of Palatsi's phone. *Id*. For instance, in a mobile phone there is already one analog to digital converter chip that is used for converting the voice signal through the microphone to digital data is shown below as the "AD Converter." *Id*. The analog to digital converter is a separate component from the microprocessor (*id*.), and not

included in the microprocessor as Dr. Wolf tried to assert in his deposition. Ex. 2003 at 93:14-19. Therefore, in TCL's asserted combination, the phone would have at least four more A/D converters chips, four filter/buffer circuits, four clock circuits, four select/control logic unit, and four MPU Interface units as depicted below.



Ex. 2057 at ¶ 88.

Therefore, the actual hardware modifications to Palatsi's native hardware environment would have required ***significantly more modification than conveyed in the Petition***. *Id*. at ¶ 89.

Furthermore, Moore ***only*** discloses touch-sensitive strips integrated into a computer terminal device large enough to support a cathode ray tube display. Ex. 1012 at Fig. 1. As such, nothing in Moore teaches a POSITA how to apply this hardware on a smaller scale in a hand-held radiotelephone. Ex. 2057 at ¶ 90. A POSITA would not have had a reasonable expectation of success to accomplish such a modification to Palatsi without substantially undue effort and experimentation. *Id*.

Additionally, given the size and power constraints of mobile phone technology compared to display terminal technology during the 1997 timeframe, ***there would have been no reasonable expectation*** that four new hardware elements (which each require four sets of dedicated hardware circuitry) could be successfully implemented in Palatsi without considerable undue experimentation and trade-offs that would be utterly undesirable to the POSITA. *Id*. at ¶ 91.

A POSITA would have just taken a common sense approach to addressing the scale of the device in Moore compared with that of Palatsi. *Id*. at ¶ 92. For instance, the ATX motherboard size released by Intel in 1995 was 12 × 9.6 inches

(305 × 244 mm) (Ex. 2070), while the Nokia 1610 mobile phone released in 1996 was 168 x 58 mm (Ex. 2005). Thus, even if generously assumed that the PCB of the Nokia 1610 was the same size as the phone itself, then the total area of the desktop motherboard (74,420 mm^2) is ***over seven times the size of the mobile phone PCB*** (9,744 mm^2). Ex. 2057 at ¶ 92.

A POSITA would have been aware of this difference in the structure of Moore compared to the structure of Palatsi and would have been immediately skeptical about transferring four touch strips, and their accompanying circuitry, to the size-constrained housing and PCB of Palatsi. *Id*. at ¶ 93. TCL and Dr. Wolfe ignore this very apparent challenge which a POSITA, as correctly defined by Patent Owner above, would have known had to be addressed. *Id*.

Both TCL and Dr. Wolfe ignore what the POSITA would have been aware of: notably, that additional components require additional processing capabilities, (*id*. at ¶ 94), and the particular need to minimize the power budget of a portable hand-held device or radiotelephone. *Id*. They also ignore the industry recognized need to minimize any increase in size in any portable device (*id*.), which would also have been well known by a POSITA, and that mobile phones in the 1997 time period were very constrained in terms of processing power. *Id*.

Under cross-examination, Dr. Wolfe makes several unsubstantiated claims about how a "microprocessor, whether we're talking about in Moore or in Palatsi, it would ordinarily include additional circuitry. And in this particular case, it would ordinarily include analog-to-digital converter circuitry capable of connecting to the touch strips of Moore." However, given the state of the art at the time, no such hardware would have existed in any device such as the representative radiotelephones cited above in the background section. To achieve the industry dictated smaller size, it would have been necessary to perform a high degree of integration (Ex. 2071 at 155) of only the functionality needed for the overall design—as a POSITA would have readily appreciated. Ex. 2057 at ¶ 97. A POSITA would have an expectation that a microprocessor in 1997—even one designed specifically for radiotelephones held in the palm of the hand—would not have the necessary support circuitry for the touch strips. *Id*.

Thus, there was no precedent in 1997 for a microprocessor used in a handheld device to incorporate four analog-to-digital converters, four filter/buffer circuits, four clock circuits, while also maintaining its ability to handle the additional processes already required for a mobile phone. To design such a microprocessor in 1997 would have been well beyond the knowledge of a POSITA, much less the ***less*** experienced POSITA proposed by TCL. *Id*. at ¶ 99.

And the size advantages of the '931 invention are important. The significance of size in the portable telephone industry is described in Palatsi itself:

> There is a need for portable telephones (especially hand-portable telephones) to be smaller, to make them more convenient to carry, and as they become smaller it is necessary to reduce the size of their keypads. However, this has the risk of making the telephones less easy to use; either because the keys are too small or, if fewer keys are used, because a more basic but less user-friendly control system has had to be adopted.

Ex. 1087 at 1:22-28.

In fact, Palatsi teaches that even using three keys to implement scroll-and-select functionality may require too much space on a portable telephone. *Id.* 1:7-22. Yet TCL suggests that a POSITA would have thought to add four touch strips to the Palatsi housing. TCL's proposed addition teaches away from the objectives of Palatsi—without even acknowledging the numerous difficulties relating to power consumption, physical implementation, cost, and integrated circuit constraints. *Id*. at ¶ 95. TCL's proposed combination fails to explain why a POSITA would have had a reasonable expectation of success of implementing such a combination and thus fails the liberal requirements for obviousness laid out in *KSR*. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007).

D. Each of Claims 1, 16, 30, 33, 58, and 64, as a whole, provides unexpected results over the combination of Palatsi and Moore.

Evidence of unexpected results may rebut a *prima facie* case of obviousness. An unexpected result of an invention may include the presence of an unexpected property. *See Graham v. John Deere Co.*, 383 U.S. 1 (1966). Here, the '931 specification describes that a user can swipe a contact-sensitive transducer to achieve scrolling while the radiotelephone is held in a one-handed fashion. Ex. 1001 at 5:44-48. The presence of this unexpected property, the ability to do one-handed swipe scrolling on a handheld device, would not have been apparent to a POSITA from either Palatsi or Moore. Ex. 2057 at ¶¶ 101-102.

Palatsi uses single touch inputs to effectuate scrolling and thus does not envision the swipe gesture at all. *Id.* at ¶ 103. Further, as noted above, Moore provides touch strips on a large desktop device. *Id.* The unique benefit of performing a scrolling operation with a swipe gesture using a single hand that is also used to grip the entire device would not have been apparent at all in Moore. *Id.*

The one-handed swipe-to-scroll ability provided by the '931 patent was a significant breakthrough for its time. *Id.* at ¶ 104. For instance, the ability to easily scroll through lists on a hand-held device with one-handed operation was a

heavily-touted feature of the Apple iPod's scroll wheel. *Id*. and Ex. 2068. And the Apple iPod came out in 2001, well after the priority date of the '931 patent. Ex. 2057 at ¶ 105.

Additionally, as mentioned above, there was no radiotelephone device that existed prior to the '931 patent that received a moving contact to scroll through displayed rows of graphical objects. The fact that Moore is not even directed to a handheld device only underscores the unexpected benefit of having one-handed swipe-to-scroll capability in a handheld radiotelephone device. *Id*. at ¶ 107.

It is emphasized that many solutions to the problems with developing a scrolling technique for portable devices were only developed after 1997, and in particular, after the release of Apple's iPod and modern-day smartphones, such as the iPhone. *Id*. and Ex. 2034 and 2039. Similar to the iPod, the ability to use a flicking gesture to scroll on the iPhone has itself been described as a game-changing feature. Ex. 2057 at ¶107 and Ex. 2039 at 3. Therefore, the '931 patent provides an *unexpected result* that rebuts the obviousness of combining Palatsi and Moore, since it is the first reduction to disclose a one-handed swipe-to-scroll capability on a handheld device without using moving parts, and thus breaking an entrenched paradigm on mobile phones of using single-touch buttons to perform scrolling. Ex. 2057 at ¶ 107.

For these reasons, among others, TCL's obviousness analysis should be rejected.

X. CLAIM 11 IS NOT OBVIOUS OVER PALATSI IN VIEW OF MOORE

Claim 11 depends from independent claim 1 and base claims 10 and 7, and recites the following features:

> wherein the controller is operative, responsive to the contact-sensitive transducer to detect a momentary contact with the contact-sensitive transducer and to initiate the action associated with the identified graphical object responsive to detection of the momentary contact.

The "identified graphical object" is determined in response to the "moving contact" of claim 1 (*see also* base claim 7 and Ex. 2057 at ¶ 109). In other words, claim 11 requires in combination with base claims 1, 4, 7, and 10 that a ***graphical object can be identified in response to moving contact*** at a contact-sensitive transducer, and an action can be taken related to the identified graphical object the contact-sensitive transducer ***in response to a momentary contact at the same contact-sensitive transducer***.

The combination of Palatsi and Moore does not disclose or suggest the operations of claim 11. *Id.* at ¶ 111. First, Palatsi does not suggest that a user can facilitate scrolling as in claim 11. *Id*. at ¶ 112. As described above, to avoid using

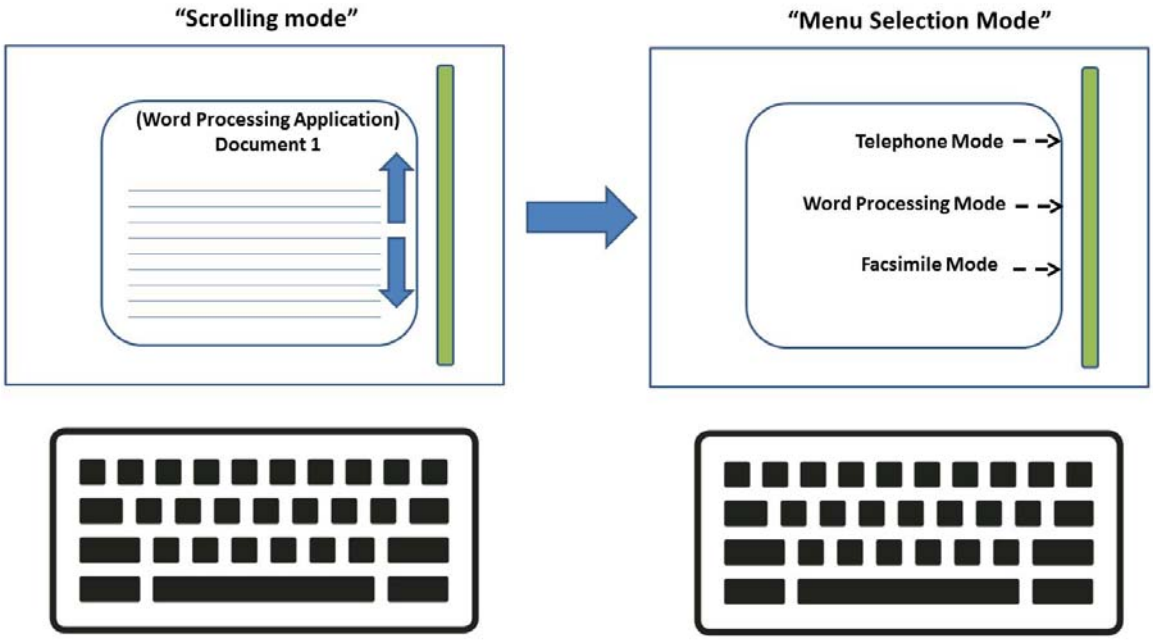
dedicated arrow keys and a separate "select" key, Palatsi describes an entirely different method of operation than that in claim 11. Ex. 1087 at 2:43-46. As illustrated in Fig. 3, Palatsi describes that the processor of the telephone monitors the time period since either of the soft keys was last pressed. *Id.* at 3:2-4. When a certain set time has elapsed, the soft key zone 13 corresponding to key 11 changes to display "OK." *Id.* at 3:4-6. Pressing key 11 will then select the currently-displayed menu item and cause the processor to take the appropriate action corresponding to that item. *Id*. at 3:7-9. In other words, ***Palatsi is only responsive to momentary contacts*** and does not allow for determining an identified graphical object based on a moving contact, and then using a momentary contact to initiate an action with respect to the identified graphical object.

Similarly, Moore also describes an entirely different method of operation than that of claim 11. The touch strips in Moore have a particular function (such as scrolling) unless deliberately switched to another function by pressing a key on the keyboard. Ex. 1012 at 3:17-24. Therefore, in Moore, if a user makes a "moving contact" on one of the touch strips to perform a scrolling function, then the user would still only be able to provide a scrolling input even if a subsequent momentary contact is made to the touch strip because the touch strip would still be in the scrolling mode. Therefore, Moore also does not allow for determining an

identified graphical object based on a moving contact and then using a momentary contact to initiate an action with respect to the identified graphical object. Ex. 2057 at ¶ 113.

The Petition (at 52) misrepresents Moore's description of the menu selection function key. As pointed out above, there are different functions possible for the touch strip in Moore, and pressing a function key on the keyboard changes function. Ex. 1012 at 3:17-24. The menu selection function is distinct from the scrolling function, and it causes a list of displayed titles to be displayed adjacent to a portion of touch strip. Ex. 2057 at ¶ 114. Thus, when the user presses a portion of the touch strip adjacent to the desired menu title, it selects this title. Ex. 1012 at 3:45-53.

However, when the touch strips are used to scroll, text or graphics that are already displayed can be moved vertically or laterally to view other portions of the displayed matter. *Id.* at 4:20-27. Moore simply does not provide for the scrolling function and the menu function to work in conjunction. Ex. 2057 at ¶ 115. As illustrated below, if displayed text or graphics are scrolling vertically or laterally while the touch strips are being used to scroll and a user switches to the menu function by pressing the menu selection function key on the keyboard, then a new list of titles will be displayed adjacent to respective portions of the touch strip.



Id.

Moore does not describe that an item which was displayed while the strips are used for scrolling can itself become a selectable item when the user changes to the menu selection function. *Id*. at ¶ 116.

Moore does not teach a contact-sensitive transducer which, when a graphical object that is displayed while the touch strips are used for scrolling, can then become a selectable menu item using "momentary contact" at the same touch strip while it is being used for menu selection. *Id*. at ¶ 118. Therefore, Palatsi and Moore do not disclose determining an identified graphical object based on "moving contact," received at a contact-sensitive transducer and then initiating an

action associated with the identified graphical object responsive to detection of a momentary contact at the same contact-sensitive transducer. *Id*. at ¶¶ 117-118.

As such, Palatsi and Moore fail to render obvious claim 11.

XI. CLAIMS 12 AND 49 ARE NOT OBVIOUS OVER PALATSI IN VIEW OF MOORE AND TIILIKAINEN

Claim 12 depends indirectly from independent claim 1, adding the feature that the controller is operative to initiate the action in response to detection of a plurality of momentary contacts occurring within a predetermined time interval.

As described above, Tiilikainen is directed a portable telephone with a touch-sensitive display and a scrolling key as shown in Fig. 1. Tiilikainen describes using the scrolling key 12 to scroll through stored telephone numbers, and when the required number has been brought to the field 24 (Ex. 1088 at Fig. 2), the user can select the required number by pressing the display (with a finger or a pen) at the corresponding column 25, 26, or 27, whereby the phone immediately makes a call to the chosen number. *Id*. at 3:19-22.

The scrolling key of Tiilikainen operates in the same way as the "soft" keys of Palatsi, in which a single touch operation on the scroll buttons causes the scrolling operation. Thus, Tiilikainen is deficient for failing to describe scrolling by way of a ***moving contact*** of an object along the surface of the touch screen.

Further, Tiilikainen does not remedy the deficiencies of combining Palatsi and Moore discussed above with regard to claim 1 or claim 11. As such, Palatsi, Moore, and Tiilikainen fail to render obvious claim 12.

XII. CONCLUSION

For the foregoing reasons, claims 1-12, 15-26, 29-31, 33-41, and 45-69 are patentable over the grounds of review instituted by the Board. Accordingly, denial of the petition is respectfully requested.

Respectfully submitted,
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Dated: June 20, 2016

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), the undersigned certifies service of PATENT OWNER'S RESPONSE and EXHIBITS 2002-2057; 2060-2074 on the counsel of record for the Petitioners by filing this document through the Patent Review Processing System as well as delivering a copy via electronic mail to the following addresses:

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CERTIFICATE OF COMPLIANCE

The undersigned certifies this document complies with the type-volume limitation of 37 C.F.R. § 42.24. The brief contains 8959 words, as calculated by the Microsoft Word program excluding the parts of the brief exempted by 37 C.F.R. § 42.24(a).

Respectfully submitted,

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