



U.S. Patent No. 8,581,710



* This claim chart applies to all Respondents Apple Inc. ("Apple"), AT&T Inc., and AT&T Mobility LLC (together, "AT&T"). The activities of Respondents all involve the same Apple products detailed in this chart.

Claim Language	Apple iPhones
<p>1. A system for generating haptic effects to confirm receipt of a command, the system comprising:</p>	<p>Apple and AT&T import, sell for importation, and/or sell after importation several versions of mobile phones, including the iPhone 6s and iPhone 6s Plus.</p> <p>iPhone 6  Plus iPhone 6 </p>  <p>Ex. 12 at 1 (downloaded from http://www.apple.com/iphone/compare/).</p> <p>The Apple iPhone 6s, iPhone 6s Plus, and other models with the same functionality (collectively referred to as "Apple iPhones") comprise a system for generating haptic effects to confirm receipt of a command, as follows.</p>

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Claim Language	Apple iPhones
	<p>3D Touch. The next generation of Multi-Touch.</p> <p>iPhone 6s introduces an entirely new way to interact with your phone. For the first time, iPhone senses how much pressure you apply to the display. In addition to familiar Multi-Touch gestures like Tap, Swipe, and Pinch, 3D Touch introduces Peek and Pop. This brings a new dimension of functionality to the iPhone experience. And when you use 3D Touch, your iPhone responds with subtle taps. So not only will you see what a press can do — you'll feel it.</p> <p>Ex. 12 at 98 (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p> <div><p>All-new Taptic Engine</p><p>iPhone 6s gives you real-time feedback both onscreen and in the form of subtle taps from the Taptic Engine. These responses correspond to how deeply you're pressing the display, and they let you know what actions you're performing and what you can expect to happen.</p></div> <p>Ex. 12 at 136 (downloaded from http://www.apple.com/iphone-6s/technology/).</p> <p>To the extent the preamble is found to be a limitation, each of the Apple iPhones satisfy the limitation(s) of this claim element literally and/or under the doctrine of equivalents.</p>

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Claim Language	Apple iPhones
[a] a sensor;	<p>The Apple iPhones include a sensor, including, for example, sensors for detecting touch location as well as pressure. <i>See, e.g.:</i></p> <p>The Apple iPhones include a touch screen with 3D Touch capability.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>Retina HD display with 3D Touch</p> <p>4.7-inch (diagonal) LED-backlit widescreen</p> <p>1334-by-750-pixel resolution at 326 ppi</p> <p>1400:1 contrast ratio (typical)</p> </div> <div style="text-align: center;">  <p>Retina HD display with 3D Touch</p> <p>5.5-inch (diagonal) LED-backlit widescreen</p> <p>1920-by-1080-pixel resolution at 401 ppi</p> <p>1300:1 contrast ratio (typical)</p> </div> </div> <p>Ex. 12 at 77 (downloaded from http://www.apple.com/iphone-6s/specs).</p>

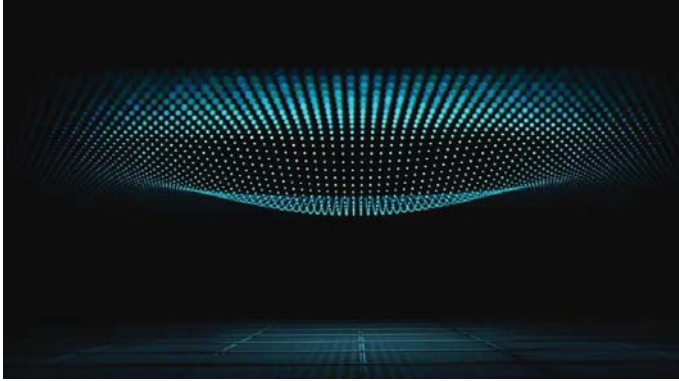

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Claim Language	Apple iPhones
	 <p>Retina HD display with 3D Touch The technology behind 3D Touch starts with the display, which recognizes the pressure you apply in addition to the familiar Multi-Touch gestures you already use.</p> <p>Capacitive sensors Designed to measure microscopic changes in pressure, capacitive sensors are integrated into the backlight of the display. These measurements are then combined with signals from the touch sensor and accelerometer to provide fast, accurate, and continuous responses using a series of complex algorithms.</p> <p>All-new Taptic Engine iPhone 6s gives you real-time feedback both onscreen and in the form of subtle taps from the Taptic Engine. These responses correspond to how deeply you're pressing the display, and they let you know what actions you're performing and what you can expect to happen.</p> <p>Ex. 12 at 135-36 (downloaded from http://www.apple.com/iphone-6s/technology/).</p>


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Claim Language	Apple iPhones
	<p>3D Touch.</p> <p>The next generation of Multi-Touch.</p> <p>iPhone 6s introduces an entirely new way to interact with your phone. For the first time, iPhone senses how much pressure you apply to the display. In addition to familiar Multi-Touch gestures like Tap, Swipe, and Pinch, 3D Touch introduces Peek and Pop. This brings a new dimension of functionality to the iPhone experience. And when you use 3D Touch, your iPhone responds with subtle taps. So not only will you see what a press can do — you'll feel it.</p> <p>Ex. 12 at 98 (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p> <p>The innovation beneath 3D Touch.</p> <p>Using 3D Touch to do more with your iPhone is as simple as pressing the display. But what's happening underneath the surface is a sophisticated process. To provide the nuanced effect of force being gradually applied and removed, 3D Touch detects a dynamic range of pressure to a microscopic degree. It even accounts for changes in gravity as you hold your phone.</p> <p>Ex. 12 at 135 (downloaded from http://www.apple.com/iphone-6s/technology/).</p> <p>"Tapping, swiping and pinching have forever changed the way we navigate and experience our digital world. Until now, these gestures had been defined by a singular plane in two dimensional space. For iPhone 6s and 6s Plus we're introducing an entirely new interaction and a whole new dimension to the way you experience your iPhone. It's made possible by a technology called 3-D Touch. This is the next generation of Multi-touch. For the first time, along with recognizing familiar gestures, iPhone also recognizes faults, enabling new</p>

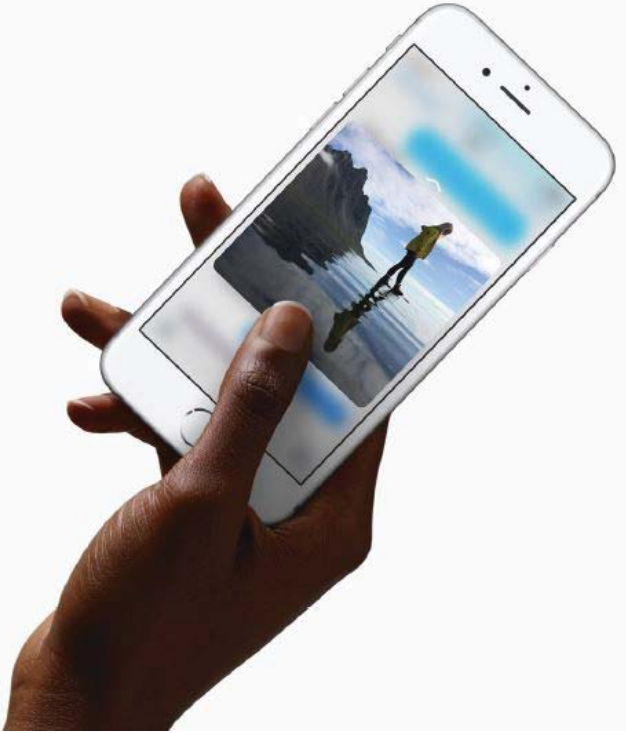
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Claim Language	Apple iPhones
	<p data-bbox="394 596 675 625">gestures, peek and pop."</p> <p data-bbox="394 638 1179 667">Ex. 16, video (downloaded from http://www.apple.com/iphone-6s/).</p>  <p data-bbox="394 1073 1425 1102">"At its heart are capacitive sensors integrated into the backlight of the retina HD display."</p> <p data-bbox="394 1106 1438 1136">Ex. 16, video at 2:19 (downloaded from http://www.apple.com/iphone-6s/#product-demo).</p> 


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Claim Language	Apple iPhones
	<p>"With each press, these sensors measure microscopic changes in the distance between the cover glass and the backlight." Ex. 16, video at 2:31 (downloaded from http://www.apple.com/iphone-6s/#product-demo).</p>  <p>"These measurements are then combined with signals from the touch sensor and accelerometer to provide fast, accurate, and continuous response to finger pressure." Ex. 16, video at 2:37 (downloaded from http://www.apple.com/iphone-6s/#product-demo).</p> <p>Each of the Apple iPhones satisfies the limitation(s) of this claim element literally and/or under the doctrine of equivalents.</p>
[b] a housing configured to be contacted by a user;	The Apple iPhones include a housing configured to be contacted by a user. <i>See, e.g.,</i>


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Claim Language	Apple iPhones
	 <p data-bbox="394 1350 1274 1381">Ex. 12 at 98 (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p>

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Claim Language	Apple iPhones
	 <p>Retina HD display with 3D Touch The technology behind 3D Touch starts with the display, which recognizes the pressure you apply in addition to the familiar Multi-Touch gestures you already use.</p> <p>Capacitive sensors Designed to measure microscopic changes in pressure, capacitive sensors are integrated into the backlight of the display. These measurements are then combined with signals from the touch sensor and accelerometer to provide fast, accurate, and continuous responses using a series of complex algorithms.</p> <p>All-new Taptic Engine iPhone 6s gives you real-time feedback both onscreen and in the form of subtle taps from the Taptic Engine. These responses correspond to how deeply you're pressing the display, and they let you know what actions you're performing and what you can expect to happen.</p> <p>Ex. 12 at 135-36 (downloaded from http://www.apple.com/iphone-6s/technology/). Each of the Apple iPhones satisfies the limitation(s) of this claim element literally and/or under the doctrine of equivalents.</p>
[c] an actuator configured to output a haptic effect to the housing; and	The Apple iPhones have an actuator configured to output a haptic effect to the housing. <i>See, e.g.,</i>

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Claim Language	Apple iPhones
	<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>Retina HD display with 3D Touch</p> <p>The technology behind 3D Touch starts with the display, which recognizes the pressure you apply in addition to the familiar Multi-Touch gestures you already use.</p> <p>Capacitive sensors</p> <p>Designed to measure microscopic changes in pressure, capacitive sensors are integrated into the backlight of the display. These measurements are then combined with signals from the touch sensor and accelerometer to provide fast, accurate, and continuous responses using a series of complex algorithms.</p> <p>All-new Taptic Engine</p> <p>iPhone 6s gives you real-time feedback both onscreen and in the form of subtle taps from the Taptic Engine. These responses correspond to how deeply you're pressing the display, and they let you know what actions you're performing and what you can expect to happen.</p> </div> </div> <p>Ex. 12, at 135-36 (downloaded from http://www.apple.com/iphone-6s/technology/).</p> <p>"3D Touch works on the home screen, giving you short cuts to the things you do frequently. It also works inside applications themselves. Press lightly and it gives you a peek at the content. Continue pressing and it pops you into the content itself. Sensors embedded in the display read how hard you are pressing and react in a smooth, linear way. This is a dynamic system, deeply integrated into iOS 9. You can dip in and out of where you are without losing a sense of your context. It provides distinct, tactile feedback for your actions, letting you</p>

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Claim Language	Apple iPhones
	<p>know exactly what you've done and what to expect."</p> <p>Ex. 16, video (downloaded from http://www.apple.com/iphone-6s/#product-demo).</p>  A close-up photograph of the internal components of an iPhone. The large black battery is visible on the left, featuring a recycling symbol and the text 'Li-ion'. To the right of the battery is the silver logic board, which has the Apple logo and 'iPhone' printed on it. Various other components, including screws and smaller electronic parts, are visible on the right side of the frame.

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Claim Language	Apple iPhones
	<div data-bbox="394 594 1157 1031"></div> <p data-bbox="394 1045 1414 1140">"For a truly communicative experience, we had to develop a more precise level of haptic feedback." Ex. 16, video at 2:50 (downloaded from http://www.apple.com/iphone-6s/#product-demo).</p>

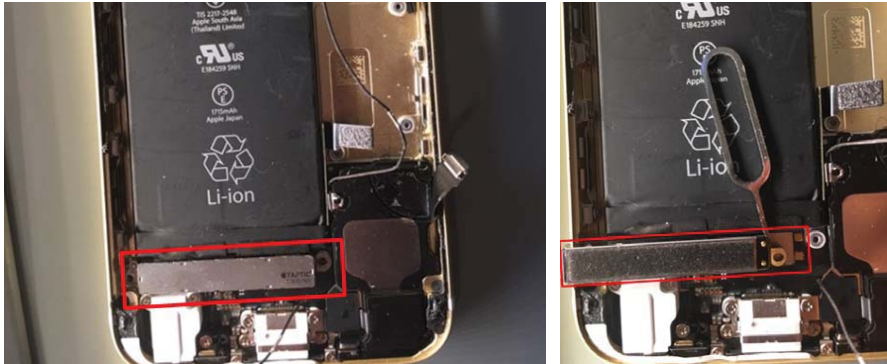
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	 The image contains two photographs of an iPhone's internal components, specifically the bottom edge showing the Lightning connector and surrounding metal housing. The top photograph is a close-up, angled view of the Lightning connector assembly, showing the gold-plated contacts and the black plastic housing. The bottom photograph is a side-by-side view of the Lightning connector assembly, showing the gold-plated contacts and the black plastic housing. The background of both photographs is a blurred view of the internal components of the iPhone.

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Claim Language	Apple iPhones
	<div data-bbox="394 594 1157 1031"></div> <p data-bbox="394 1045 1463 1178">"While the vibrating system on a typical phone requires 10 or more oscillations to reach full power, the Taptic Engine in iPhone 6s reaches peak output in just one cycle and stops just as quickly." Ex. 16, video at 2:57 (downloaded from http://www.apple.com/iphone-6s/#product-demo).</p> <p data-bbox="394 1234 1463 1295">The Apple iPhones each have an actuator configured to output a haptic effect to the housing. Below are photographs of the iPhone 6s linear actuator:</p>

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Claim Language	Apple iPhones
	<div></div> <p>Ex. 13, at 16-17 (iPhone 6s teardown images).</p> <div><h2>3D Touch.</h2><h2>The next generation of Multi-Touch.</h2><p>iPhone 6s introduces an entirely new way to interact with your phone. For the first time, iPhone senses how much pressure you apply to the display. In addition to familiar Multi-Touch gestures like Tap, Swipe, and Pinch, 3D Touch introduces Peek and Pop. This brings a new dimension of functionality to the iPhone experience. And when you use 3D Touch, your iPhone responds with subtle taps. So not only will you see what a press can do — you'll feel it.</p></div> <p>Ex. 12, at 107 (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p> <p>"Using 3D Touch is simple. But the engineering behind it is incredibly advanced. When you press the display, capacitive sensors instantly measure microscopic changes in the distance</p>

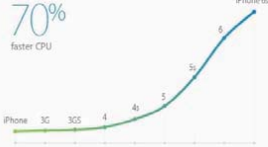
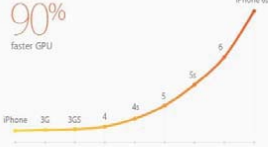
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Claim Language	Apple iPhones
	<p>between the cover glass and the backlight. iOS uses these measurements to provide fast, accurate, and continuous response to finger pressure, which could only happen with deep integration between software and hardware. iPhone 6s also provides you with responsive feedback in the form of subtle taps, letting you know that it's sensing the pressure you're applying." Ex. 12, at 117. (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p> <h2>The innovation beneath 3D Touch.</h2> <p>Using 3D Touch to do more with your iPhone is as simple as pressing the display. But what's happening underneath the surface is a sophisticated process. To provide the nuanced effect of force being gradually applied and removed, 3D Touch detects a dynamic range of pressure to a microscopic degree. It even accounts for changes in gravity as you hold your phone.</p> <p>Ex. 12, at 141 (downloaded from http://www.apple.com/iphone-6s/technology/).</p> <h2>All-new Taptic Engine</h2> <p>iPhone 6s gives you real-time feedback both onscreen and in the form of subtle taps from the Taptic Engine. These responses correspond to how deeply you're pressing the display, and they let you know what actions you're performing and what you can expect to happen.</p> <p>Ex. 12, at 136 (downloaded from http://www.apple.com/iphone-6s/technology/).</p>


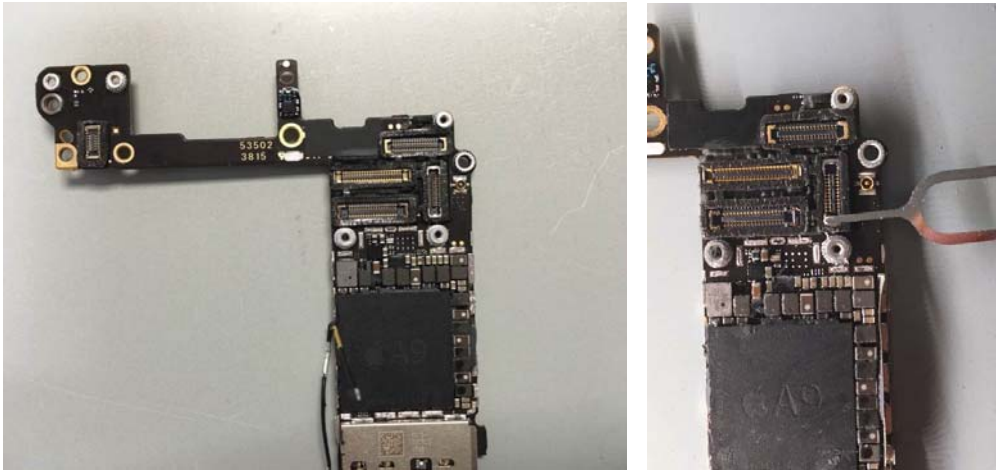
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Claim Language	Apple iPhones
	<p>Using 3D Touch is simple. But the engineering behind it is incredibly advanced. When you press the display, capacitive sensors instantly measure microscopic changes in the distance between the cover glass and the backlight. iOS uses these measurements to provide fast, accurate, and continuous response to finger pressure, which could only happen with deep integration between software and hardware. iPhone 6s also provides you with responsive feedback in the form of subtle taps, letting you know that it's sensing the pressure you're applying.</p> <p>Ex. 12, at 117 (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p>
[d] a processor in communication with the sensor and the actuator, the processor configured to:	<p>The Apple iPhones include a processor in communication with the sensor and the actuator. For example, the iPhone 6s and 6s Plus include an A9 processor and co-processor, touch-screen controller (e.g., Analog Devices 343S00014), display controller (A9 APL0898), among others. <i>See, e.g.:</i></p>

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	<p data-bbox="558 596 854 659">A9. The most advanced chip ever in a smartphone.</p> <p data-bbox="495 672 915 716"><small>The A9 chip brings a new level of performance and efficiency to iPhone 6s. Not only a faster experience, but a better one. The A9 chip is capable of gaming console-class graphics performance that makes games and other apps much richer and more immersive.</small></p>  <p data-bbox="751 804 935 856">64-bit desktop-class architecture.</p> <p data-bbox="751 869 990 959"><small>The A9 chip is our third-generation chip with 64-bit architecture. It sits at the cutting edge of mobile chips, improving overall CPU performance by up to 70 percent compared to the previous generation. And boosting graphics performance by up to a staggering 90 percent compared to the previous generation.</small></p> <p data-bbox="751 995 808 1050">70% faster CPU</p>  <p data-bbox="751 1192 808 1247">90% faster GPU</p>  <p data-bbox="396 1409 1352 1438">Ex. 12 at 136-37 (downloaded from http://www.apple.com/iphone-6s/technology/).</p>

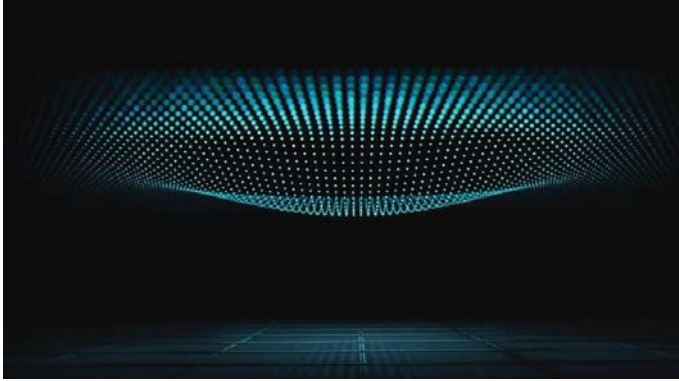

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Claim Language	Apple iPhones
	<p data-bbox="397 604 462 640">Chip</p> <div data-bbox="706 609 857 760">  <p data-bbox="938 646 1266 718">A9 chip with 64-bit architecture Embedded M9 motion coprocessor</p> </div> <p data-bbox="397 781 1266 814">Ex. 12 at 77-78 (downloaded from http://www.apple.com/iphone-6s/specs).</p> <div data-bbox="393 823 1383 1291">  </div> <p data-bbox="397 1306 1084 1339">Ex. 13, at 12-13 (photographs from teardown of iPhone 6s).</p> <p data-bbox="397 1348 1421 1411">Each of the Apple iPhones satisfies the limitation(s) of this claim element literally and/or under the doctrine of equivalents.</p>
[e] receive, from the sensor, a sensor signal associated with	<p data-bbox="397 1432 1372 1495">The Apple iPhones include a processor that receives, from the sensor, a sensor signal associated with a user input. <i>See, e.g.,</i></p> <p data-bbox="397 1507 1453 1537">The processor receives the touch position and pressure associated with a user input from the</p>


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Claim Language	Apple iPhones
a user input;	<p>touchscreen sensor.</p> <p>3D Touch. The next generation of Multi-Touch.</p> <p>iPhone 6s introduces an entirely new way to interact with your phone. For the first time, iPhone senses how much pressure you apply to the display. In addition to familiar Multi-Touch gestures like Tap, Swipe, and Pinch, 3D Touch introduces Peek and Pop. This brings a new dimension of functionality to the iPhone experience. And when you use 3D Touch, your iPhone responds with subtle taps. So not only will you see what a press can do — you'll feel it.</p> <p>Ex. 12 at 98 (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p> <p>The innovation beneath 3D Touch.</p> <p>Using 3D Touch to do more with your iPhone is as simple as pressing the display. But what's happening underneath the surface is a sophisticated process. To provide the nuanced effect of force being gradually applied and removed, 3D Touch detects a dynamic range of pressure to a microscopic degree. It even accounts for changes in gravity as you hold your phone.</p> <p>Ex. 12 at 135 (downloaded from http://www.apple.com/iphone-6s/technology/).</p> <p>"Tapping, swiping and pinching have forever changed the way we navigate and experience our digital world. Until now, these gestures had been defined by a singular plane in two dimensional space. For iPhone 6s and 6s Plus we're introducing an entirely new interaction and a whole new dimension to the way you experience your iPhone. It's made possible by a technology called 3-D Touch. This is the next generation of Multi-touch. For the first time, along with recognizing familiar gestures, iPhone also recognizes faults, enabling new gestures, peek and pop."</p>

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Claim Language	Apple iPhones
	<p>Ex. 16, video (downloaded from http://www.apple.com/iphone-6s/#product-demo).</p>  <p>"At its heart are capacitive sensors integrated into the backlight of the retina HD display." Ex. 16, video at 2:19 (downloaded from http://www.apple.com/iphone-6s/#product-demo).</p>  <p>"With each press, these sensors measure microscopic changes in the distance between the cover glass and the backlight." Ex. 16, video at 2:31 (downloaded from</p>

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Claim Language	Apple iPhones
	<p data-bbox="394 594 971 625">http://www.apple.com/iphone-6s/#product-demo).</p>  <p data-bbox="394 1031 1469 1125">"These measurements are then combined with signals from the touch sensor and accelerometer to provide fast, accurate, and continuous response to finger pressure." Ex. 16, video at 2:37 (downloaded from http://www.apple.com/iphone-6s/#product-demo).</p> <p data-bbox="394 1140 1469 1234">The iOS operating system tracks an object contacting the iPhone touch screen by, for example, creating UITouch data structures and passing them to an application's UIResponder interface.</p>

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Claim Language	Apple iPhones
	<p>Implementing the Touch–Event Handling Methods in Your Subclass</p> <p>iOS recognizes touches as part of a multitouch sequence. During a multitouch sequence, the app sends a series of event messages to the target responder. To receive and handle these messages, the responder object's class must implement the following <code>UIResponder</code> methods:</p> <pre>- (void)touchesBegan:(NSSet *)touches withEvent:(UIEvent *)event; - (void)touchesMoved:(NSSet *)touches withEvent:(UIEvent *)event; - (void)touchesEnded:(NSSet *)touches withEvent:(UIEvent *)event; - (void)touchesCancelled:(NSSet *)touches withEvent:(UIEvent *)event;</pre> <p>Note: These methods have the same signature as the methods you override to create a custom gesture recognizer, as discussed in Creating a Custom Gesture Recognizer.</p> <p>Each of these touch methods correspond to a touch phase: Began, Moved, Ended, and Canceled. When there are new or changed touches for a given phase, the app object calls one of these methods. Each method takes two parameters: a set of touches and an event.</p> <p>The set of touches is a set (<code>NSSet</code>) of <code>UITouch</code> objects, representing new or changed touches for that phase. For example, when a touch transitions from the Began phase to the Moved phase, the app calls the <code>touchesMoved:withEvent:</code> method. The set of touches passed in to the <code>touchesMoved:withEvent:</code> method will now include this touch and all other touches in the Moved phase. The other parameter is an event (<code>UIEvent</code> object) that includes all touch objects for the event. This differs from the set of touches because some of the touch objects in the event may not have changed since the previous event message.</p> <p>Ex. 12 at 174 (downloaded from https://developer.apple.com/library/ios/documentation/EventHandling/Conceptual/EventHandlingiPhoneOS/multitouch_background/multitouch_background.html).</p>

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	<p>A UITouch data structure contains data about the object contacting the iPhone touch screen, including data about location, radius, and force of the contact.</p> <p>UITouch</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Inherits From</p> <p><code>NSObject</code> <code>UITouch</code></p> </div> <div style="width: 30%;"> <p>Conforms To</p> <p><code>NSObject</code></p> </div> <div style="width: 30%;"> <p>Import Statement</p> <p><code>OBJECTIVE-C</code> <code>@import UIKit;</code></p> <p>Availability</p> <p>Available in iOS 2.0 and later</p> </div> </div> <p>A <code>UITouch</code> object represents the location, size, movement, and force of a finger on the screen for a particular event. The <code>force</code> of a touch is available starting in iOS 9 on devices that support 3D Touch.</p> <p>You access touch objects through <code>UIEvent</code> objects passed into responder objects for event handling. A touch object includes accessors for:</p> <ul style="list-style-type: none"> • The view or window in which the touch occurred • The location of the touch within the view or window • The approximate radius of the touch • The force of the touch (on devices that support 3D Touch) <p>A touch object also contains a timestamp indicating when the touch occurred, an integer representing the number of times the user tapped the screen, and the phase of the touch in the form of a constant that describes whether the touch began, moved, or ended, or whether the system canceled the touch.</p> <p>To learn how to work with swipes, read Handling Swipe and Drag Gestures in <i>Event Handling Guide for iOS</i>.</p> <p>A touch object persists throughout a multi-touch sequence. Never retain a touch object when handling an event. If you need to keep information about a touch from one touch phase to another, copy that information from the touch.</p> <p>The <code>gestureRecognizers</code> property of a touch contains the gesture recognizers currently handling the touch. Each gesture recognizer is an instance of a concrete subclass of <code>UIGestureRecognizer</code>.</p> <p>Ex. 12 at 215 (downloaded from https://developer.apple.com/library/ios/documentation/UIKit/Reference/UITouch_Class/index.html#//apple_ref/occ/instp/UITouch/force).</p> <p>For example, the force associated with the contact can be retrieved by inspecting the force</p>

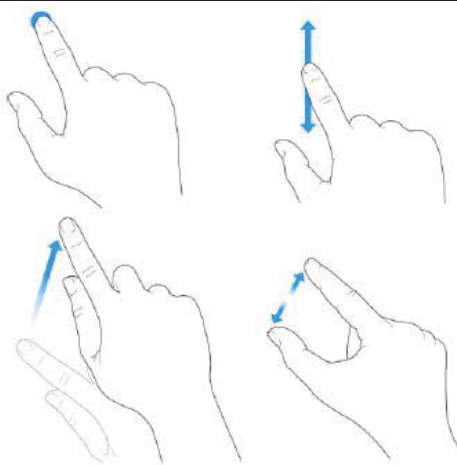
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Claim Language	Apple iPhones
	<p>property of the UITouch data structure.</p> <div data-bbox="397 632 1312 1262" style="border: 1px solid #ccc; padding: 10px; margin: 10px 0;"> <p><i>force</i> Property</p> <p>The force of the touch, where a value of 1.0 represents the force of an average touch (predetermined by the system, not user-specific). (read-only)</p> <p>Declaration</p> <pre> SWIFT var force: CGFloat { get } OBJECTIVE-C @property(nonatomic, readonly) CGFloat force </pre> <p>Discussion</p> <p>This property is available on devices that support 3D Touch. To check at runtime if a device supports 3D Touch, read the value of the <code>forceTouchCapability</code> property on the trait collection for any object in your app with a trait environment. For more information, see <i>UITraitEnvironment Protocol Reference</i> and the <code>UIForceTouchCapability</code> enumeration in <i>UITraitCollection Class Reference</i>.</p> <p>Availability</p> <p>Available in iOS 9.0 and later.</p> <p>See Also</p> <p><code>maximumPossibleForce</code></p> </div> <p>Ex. 12 at 216 (downloaded from https://developer.apple.com/library/ios/documentation/UIKit/Reference/UITouch_Class/index.html#//apple_ref/occ/instp/UITouch/force).</p> <p>Apple provides example code showing the reception of the sensor signals.</p>

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Claim Language	Apple iPhones
	<pre>// An array of the touch properties that may be of interest. let touchProperties: [UITouchProperties] = [.Altitude, .Azimuth, .Force, .Location] // Iterate through possible properties. for expectedProperty in touchProperties { // If an update to this property is not expected, continue to the next property. guard !estimatedPropertiesExpectingUpdates.contains(expectedProperty) else { continue } // Update the value of the point with the value from the touch's property. switch expectedProperty { case UITouchProperties.Force: force = touch.force case UITouchProperties.Azimuth: azimuthAngle = touch.azimuthAngleInView(touch.view) case UITouchProperties.Altitude: altitudeAngle = touch.altitudeAngle case UITouchProperties.Location: location = touch.locationInView(touch.view) preciseLocation = touch.preciseLocationInView(touch.view) default: () } }</pre> <p>Ex. 12 at 213-14 (downloaded from https://developer.apple.com/library/ios/samplecode/TouchCanvas/Listings/TouchCanvas_Line_swift.htm).</p> <p>"Multi-Touch screen</p> <p>A few simple gestures—tap, drag, swipe, and pinch—are all you need to use iPhone and its apps.</p>

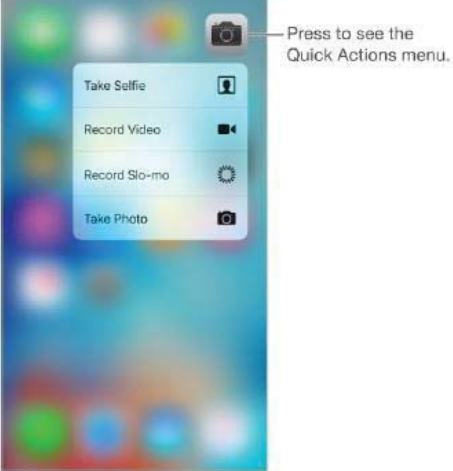
U.S. Patent No. 8,581,710

Claim Language	Apple iPhones
	 <p>3D Touch</p> <p>With the iPhone 6s and iPhone 6s Plus, you can use 3D Touch to see previews, find useful shortcuts, and more.</p> <p>For example, in Mail, press a message in the mailbox list for a peek at the message contents, then slide up to see a list of actions. Or press a little deeper to pop the message open. In Photos, press to peek at an image; then swipe up to share or copy it, or press a little deeper to pop the image to full screen.</p>

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Claim Language	Apple iPhones
	<div data-bbox="402 604 639 1024"> </div> <div data-bbox="656 762 813 842"> <p>Press the message for a preview (Peek). Press deeper to open the full message (Pop).</p> </div> <p data-bbox="396 1094 1409 1224">In some cases you can press an item to get a Quick Actions menu. For example, you can press the Camera icon on the Home screen, then choose Take Selfie. Or press a name in Messages, then choose to create an email message, make a voice or video call, or send a message.</p>


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Claim Language	Apple iPhones
	<div data-bbox="402 604 852 1071"></div> <p data-bbox="394 1140 1437 1234">3D Touch lets you vary the pressure when you draw to change the quality of your lines (in some apps). For example, press as you draw in Notes to make a line darker. You can also use 3D Touch to turn your keyboard into a trackpad and select text when typing.</p> <p data-bbox="394 1297 933 1325">Among other things, you can use 3D Touch to:</p> <ul data-bbox="394 1346 1404 1543" style="list-style-type: none">• View or get information about a location by pressing a pin or an address in Maps.• View the contents of a playlist in Music by pressing the playlist.• Preview a webpage by pressing a link.• Preview a specific note's content within a list by pressing the note in Notes.• Preview a video by pressing a thumbnail in Photos.• Make a Live Photo come to life by pressing it in Photos.

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Claim Language	Apple iPhones
	<ul style="list-style-type: none"> • Access your default card, relevant pass, or last transaction by pressing Wallet on the Home screen. • Get more information about movies, TV shows, and music videos in the Videos app by pressing a thumbnail. • Learn how far you've read in a book in iBooks by pressing its cover. • Call, send a message to, or email a contact by pressing his or her phone number in Contacts. • See a list of recommended games by pressing Games in Game Center. <p>Change 3D Touch sensitivity. Go to Settings > General > Accessibility > 3D Touch, then set 3D Touch sensitivity to Light, Medium, or Firm."</p> <p>Ex. 15 at 3-6, iPhone User Guide for iOS 9.2, at 4-6 (downloaded from http://help.apple.com/iphone/9/).</p> <p>In particular, with the Quick Actions functionality on the Apple iPhones, the processor receives the touch position and pressure associated with a user input from the touchscreen sensor when a user attempts to trigger Quick Actions for an app.</p> <div style="background-color: #333; color: white; padding: 10px;"> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <p>Quick Actions.</p> <p>A shortcut to the things you do the most.</p> </div> <div style="width: 35%; font-size: 0.8em;"> <p>Quick Actions let you do the things you do most often faster and in fewer steps. You can start a message to your favorite contacts. Or instantly bring up the camera to snap a selfie. Or immediately get directions home. Many of these actions can even be done with a single press, right from the Home screen.</p> </div> </div> </div>

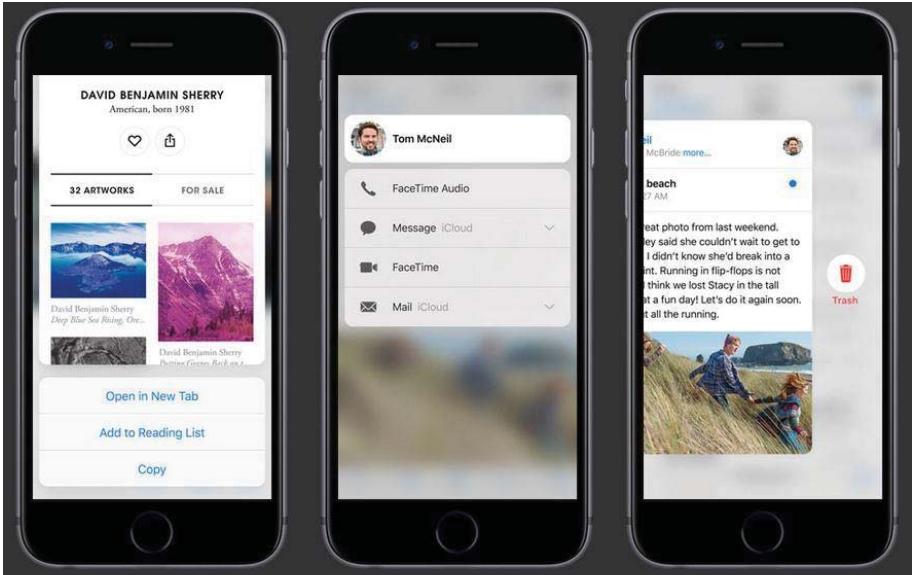
U.S. Patent No. 8,581,710

Claim Language	Apple iPhones
	<div data-bbox="394 596 1263 1297">A hand holding a white iPhone. The screen displays a contact quick action menu with options like 'Call', 'Text', 'Add to Favorites', and 'Share My Location'. The background is dark.</div> <p data-bbox="412 1003 654 1108">Many Quick Actions work right from the Home screen and require only a single press. For example, just press the Phone icon to quickly call one of your favorite contacts.</p> <div data-bbox="394 1308 1239 1392"><p>See what you can do with Quick Actions.</p></div>

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Claim Language	Apple iPhones
	<div data-bbox="394 594 1281 1171">  </div> <div data-bbox="394 1199 1281 1350"> <div> <p>Start shooting video, selfies, and more with just one press.</p> <p>Press the Camera icon on the Home screen, and you can immediately snap a selfie, shoot a video, or even go straight into a camera mode such as slo-mo.</p> </div> <div> <p>Get a conversation going faster than ever.</p> <p>Simply press Messages on the Home screen to begin a new message or quickly reach out to one of your favorite contacts.</p> </div> <div> <p>Get where you're going with fewer steps.</p> <p>Just press Maps to instantly get directions home, drop a pin on your current location and send it to a friend, or search what's nearby.</p> </div> </div>


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Claim Language	Apple iPhones
	<div data-bbox="394 594 1300 1360">  <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div data-bbox="412 1190 665 1350"> <p>Swipe up to get things done. When you Peek into content, you can simply swipe up to bring up a menu of commonly used actions. For example, swipe up in Safari to copy a link, open a page in a new tab, or add a site to your Reading List.</p> </div> <div data-bbox="717 1190 971 1325"> <p>Quickly reach your contacts. Anywhere you see their photos. Press someone's profile photo in Mail, Messages, or anywhere you see it in iOS 9 to bring up all the contact info you have for them.</p> </div> <div data-bbox="1021 1190 1274 1304"> <p>Take control of your email with a press and a swipe. While you're taking a Peek at an email, you can swipe left to delete it or swipe right to mark it as unread.</p> </div> </div> </div> <p>Ex. 12, at 101-02. (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p> <p>Each of the Apple iPhones satisfies the limitation(s) of this claim element literally and/or under the doctrine of equivalents.</p>
[f] recognize the user	The Apple iPhones include a processor that recognizes the user input and determine a




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Claim Language	Apple iPhones
input and determine a command associated with the user input;	<p>command associated with the user input. <i>See, e.g.,</i></p> <p>The Apple iPhones have many apps (e.g., phone, text, music, safari, camera, photo, etc.) that include Quick Actions. A command corresponding to an attempt to invoke Quick Actions may be determined.</p> <p>Ex. 15 at 3-6, iPhone User Guide for iOS 9.2, at 4-6 (downloaded from http://help.apple.com/iphone/9/).</p> <div data-bbox="399 825 1401 1012"><p>Quick Actions.</p><p>A shortcut to the things you do the most.</p><p>Quick Actions let you do the things you do most often faster and in fewer steps. You can start a message to your favorite contacts. Or instantly bring up the camera to snap a selfie. Or immediately get directions home. Many of these actions can even be done with a single press, right from the Home screen.</p></div>


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Claim Language	Apple iPhones
	<div data-bbox="394 596 1263 1297">A hand holding a white iPhone. The screen displays a contact quick action menu with options like 'Call', 'Text', 'Add to Favorites', and 'Share My Location'. The background is dark.</div> <p data-bbox="412 1003 654 1108">Many Quick Actions work right from the Home screen and require only a single press. For example, just press the Phone icon to quickly call one of your favorite contacts.</p> <div data-bbox="394 1308 1239 1394"><p>See what you can do with Quick Actions.</p></div>

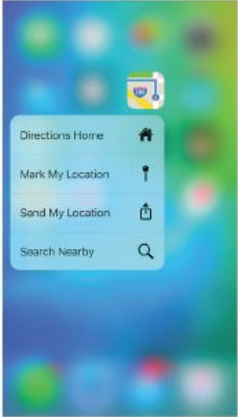
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Claim Language	Apple iPhones
	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>Start shooting video, selfies, and more with just one press.</p> <p>Press the Camera icon on the Home screen, and you can immediately snap a selfie, shoot a video, or even go straight into a camera mode such as slo-mo.</p> </div> <div style="text-align: center;">  <p>Get a conversation going faster than ever.</p> <p>Simply press Messages on the Home screen to begin a new message or quickly reach out to one of your favorite contacts.</p> </div> <div style="text-align: center;">  <p>Get where you're going with fewer steps.</p> <p>Just press Maps to instantly get directions home, drop a pin on your current location and send it to a friend, or search what's nearby.</p> </div> </div> <p>Ex. 12, at 101-02. (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p>

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Claim Language	Apple iPhones
	<p data-bbox="402 604 574 636">Quick Actions</p> <p data-bbox="402 653 610 825">Quick Actions let users do the things they do most often, faster and in fewer steps. Many of these actions can even be done with a single press, right from the Home screen.</p>  <p data-bbox="394 1367 1304 1398">Ex. 12, at 150. (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p>

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Claim Language	Apple iPhones
	<p>Home Screen Quick Actions</p> <p>A user has always been able to tap an app icon to launch it, or touch and hold any app to edit the Home screen. Now, by pressing an app icon on an iPhone 6s or iPhone 6s Plus, the user obtains a set of <i>quick actions</i>. When the user selects a quick action, your app activates or launches and your app delegate object receives the quick action message.</p> <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>The best quick actions anticipate and accelerate a user's interaction with your app. The iOS 9 SDK offers APIs that let you define static or dynamic quick actions, available to users with new iPhone models.</p> </div> </div> <p>Ex. 12, at 153. (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p> <p>Each of the Apple iPhones satisfies the limitation(s) of this claim element literally and/or under the doctrine of equivalents.</p>
[g] if the user input is recognized and the command is determined:	If the app supports Quick Actions: (see citations for element [f] above)

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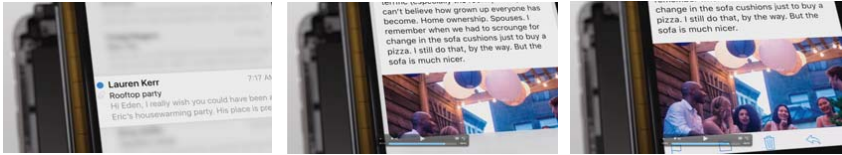
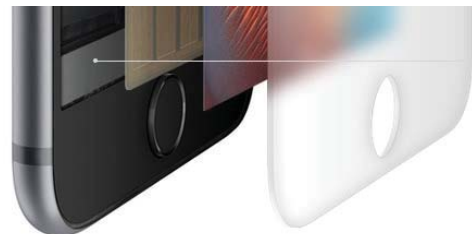
Claim Language	Apple iPhones
<p>[h] generate a first actuator signal configured to cause the actuator to output a first haptic effect; and</p>	<p>The Apple iPhones include a processor that generates a first actuator signal configured to cause the actuator to output a first haptic effect if the user input is recognized. For example, a first haptic effect is output when sufficient pressure is applied to an application that has Quick Action functionality. <i>See, e.g.:</i></p> <div data-bbox="394 741 1344 1144"> <p align="center">3D Touch. The next generation of Multi-Touch.</p> <p>iPhone 6s introduces an entirely new way to interact with your phone. For the first time, iPhone senses how much pressure you apply to the display. In addition to familiar Multi-Touch gestures like Tap, Swipe, and Pinch, 3D Touch introduces Peek and Pop. This brings a new dimension of functionality to the iPhone experience. And when you use 3D Touch, your iPhone responds with subtle taps. So not only will you see what a press can do — you'll feel it.</p> </div> <p>Ex. 12, at 98. (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p> <p>"Using 3D Touch is simple. But the engineering behind it is incredibly advanced. When you press the display, capacitive sensors instantly measure microscopic changes in the distance between the cover glass and the backlight. iOS uses these measurements to provide fast, accurate, and continuous response to finger pressure, which could only happen with deep integration between software and hardware. iPhone 6s also provides you with responsive feedback in the form of subtle taps, letting you know that it's sensing the pressure you're applying." Ex. 12, at 104. (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p>

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Claim Language	Apple iPhones
	<p>All-new Taptic Engine</p> <p>iPhone 6s gives you real-time feedback both onscreen and in the form of subtle taps from the Taptic Engine. These responses correspond to how deeply you're pressing the display, and they let you know what actions you're performing and what you can expect to happen.</p> <p>Ex. 12, at 136 (downloaded from http://www.apple.com/iphone-6s/technology/).</p> <p>Using 3D Touch is simple. But the engineering behind it is incredibly advanced. When you press the display, capacitive sensors instantly measure microscopic changes in the distance between the cover glass and the backlight. iOS uses these measurements to provide fast, accurate, and continuous response to finger pressure, which could only happen with deep integration between software and hardware. iPhone 6s also provides you with responsive feedback in the form of subtle taps, letting you know that it's sensing the pressure you're applying.</p> <p>Ex. 12, at 104. (downloaded from http://www.apple.com/iphone-6s/3d-touch/).</p> <p>"While the vibrating system on a typical phone requires 10 or more oscillations to reach full power, the Taptic Engine in the iPhone 6s reaches peak output in just one cycle and stops just as quickly. This allows us to create shorter more distinct feedback events like a mini-tap lasting just 10 milliseconds (video shows peek feature) and a full tap which lasts 15 milliseconds (video shows pop feature)."</p>

Field

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Claim Language	Apple iPhones
	<div data-bbox="394 594 1230 747">  </div> <p data-bbox="394 804 1458 867">Ex. 16, Video at 2:57 to 3:26 (Downloaded from http://www.apple.com/iphone-6s/#product-demo).</p> <div data-bbox="394 877 1312 1108">  <div data-bbox="963 884 1312 1066"> <p data-bbox="963 884 1187 915">All-new Taptic Engine</p> <p data-bbox="963 926 1312 1066">iPhone 6s gives you real-time feedback both onscreen and in the form of subtle taps from the Taptic Engine. These responses correspond to how deeply you're pressing the display, and they let you know what actions you're performing and what you can expect to happen.</p> </div> </div> <p data-bbox="394 1129 1312 1161">Ex. 12 at 136 (downloaded from http://www.apple.com/iphone-6s/technology/).</p> <p data-bbox="394 1178 1474 1409">"3D Touch works on the home screen, giving you short cuts to the things you do frequently. It also works inside applications themselves. Press lightly and it gives you a peek at the content. Continue pressing and it pops you into the content itself. Sensors embedded in the display read how hard you are pressing and react in a smooth, linear way. This is a dynamic system, deeply integrated into iOS 9. You can dip in and out of where you are without losing a sense of your context. It provides distinct, tactile feedback for your actions, letting you know exactly what you've done and what to expect."</p> <p data-bbox="394 1419 1352 1451">Ex. 16, video (downloaded from http://www.apple.com/iphone-6s/#product-demo).</p>

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Claim Language	Apple iPhones
	<div data-bbox="394 594 1144 1024">A close-up photograph of the internal components of an iPhone. A large black battery with a recycling symbol and 'Li-ion' text is visible. To its right is a silver rectangular component labeled 'TAPTIC ENGINE'.</div> <div data-bbox="394 1035 1157 1472">A close-up photograph of the silver rectangular Taptic Engine component, showing the 'TAPTIC ENGINE' label and the Apple logo.</div> <p data-bbox="394 1482 1419 1547">"For a truly communicative experience, we had to develop a more precise level of haptic feedback." Ex. 16, video at 2:50 (downloaded from http://www.apple.com/iphone-</p>

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Claim Language	Apple iPhones
	<p data-bbox="394 594 623 625">6s/#product-demo).</p> 

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Claim Language	Apple iPhones
	 <p>"While the vibrating system on a typical phone requires 10 or more oscillations to reach full power, the Taptic Engine in iPhone 6s reaches peak output in just one cycle and stops just as quickly." Ex. 16, video at 2:57 (downloaded from http://www.apple.com/iphone-6s/#product-demo).</p> <p>Each of the Apple iPhones satisfies the limitation(s) of this claim element literally and/or under the doctrine of equivalents.</p>
[i] transmit the first actuator signal to the actuator;	<p>The Apple iPhones include a processor to transmit the first actuator signal to the actuator. <i>See</i> citations for element [h] above.</p> <p>Each of the Apple iPhones satisfies the limitation(s) of this claim element literally and/or under the doctrine of equivalents.</p>
[j] otherwise:	<p>If the app does not support Quick Actions (see citations for element [f] above):</p> <p>Each of the Apple iPhones satisfies the limitation(s) of this claim element literally and/or under the doctrine of equivalents.</p>

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Claim Language	Apple iPhones
[k] generate a second actuator signal configured to cause the actuator to output a second haptic effect; and	<p>The Apple iPhones include a processor that generates a second actuator signal configured to cause the actuator to output a second haptic effect, if the user input is not recognized. For example, if an app does not have Quick Action functionality, a second haptic effect (several quick taps) will be output. <i>See</i> citations for element [h] above.</p> <p>Each of the Apple iPhones satisfies the limitation(s) of this claim element literally and/or under the doctrine of equivalents.</p>
[l] transmit the second actuator signal to the actuator.	<p>Apple's iPhone 6s and 6s Plus include a processor that transmits the second actuator signal to the actuator. <i>See</i> citations for element [h] above.</p> <p>Each of the Apple iPhones satisfies the limitation(s) of this claim element literally and/or under the doctrine of equivalents.</p>