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UNITED STATES DISTRICT COURT  
 NORTHERN DISTRICT OF CALIFORNIA

AliveCor, Inc.,  
 Plaintiff,  
 vs.  
 Apple Inc.,  
 Defendant.

CASE NO.  
**COMPLAINT**  
 JURY TRIAL DEMANDED

1           **I. INTRODUCTION**

2           1.       When Apple Inc. (“Apple”) first released the Apple Watch in 2015, it presented the  
3 new device, a smartwatch, primarily as a high-tech fashion accessory. The first Apple Watch came in  
4 multiple colors—several with gold plate—and the biggest features Apple advertised were the Watch’s  
5 multiple different types of band, all of which were decorative in nature. Although the first version of  
6 the Apple Watch included some fitness and health features, it was clear that Apple viewed the Apple  
7 Watch primarily as a way for luxury and high-end watch purchasers to dress up their wrist with an  
8 extension of their smartphone.

9           2.       Plaintiff AliveCor, Inc. (“Plaintiff” or “AliveCor”) was an innovator that helped change  
10 that perception, first for the public and then for Apple. AliveCor’s founder, Dr. Dave Albert, realized  
11 that smartwatches, such as the Apple Watch, were the perfect device to monitor one’s heart for  
12 potentially life-threatening conditions. Dr. Albert and AliveCor therefore went to work to develop a  
13 wristband for the Apple Watch, the KardiaBand, that was capable of recording an electrocardiogram  
14 (“ECG” or “EKG”).<sup>1</sup> Simultaneously, AliveCor developed first-of-their-kind apps: (i) the Kardia app,  
15 that could analyze those readings on the Apple Watch; and (ii) a heartrate analysis app powered by  
16 artificial intelligence, SmartRhythm, that could monitor a user’s heartrate and alert them when there  
17 was some irregularity suggesting they should record an ECG. AliveCor was open with Apple about its  
18 intentions and, in fact, Apple not only initially approved AliveCor’s apps for distribution through the  
19 App Store, but also advertised AliveCor’s innovations in order to sell more Apple Watches.

20           3.       In 2017, after an extensive clearance process with the U.S. Food and Drug  
21 Administration (“FDA”), AliveCor obtained approval to sell the KardiaBand in the U.S. Consistent  
22 with its history with Apple so far (which involved multiple meetings in which AliveCor demonstrated  
23 its new device’s capabilities), AliveCor informed Apple about the FDA clearance and that it intended  
24 to begin selling KardiaBands shortly along with its previously-approved Kardia and SmartRhythm  
25 apps. What AliveCor did not know is that Apple had finally realized heart health analysis was  
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27           <sup>1</sup> ECG readings can be used to detect whether a patient is experiencing atrial fibrillation  
28 (“AFib”) or other heart-related health events.

1 incredibly valuable to (and desired by) smartwatch users, and thus had been working in the  
2 background to copy AliveCor’s ideas—including both the ability to record an ECG on the Apple  
3 Watch, as well as to provide a separate app for heartrate analysis. Apple apparently decided that it  
4 needed to try to undercut AliveCor’s success and, the same day AliveCor told Apple that it planned to  
5 announce its FDA clearance, Apple “pre-announced” a heart initiative for the Apple Watch. Apple  
6 also tried to steal AliveCor’s thunder through various other public relations tactics, but the irony is  
7 that Apple’s demonstrated commitment to heart health on the Apple Watch validated AliveCor’s  
8 business concept and, as healthy competition should do, initially led to an increase in AliveCor’s sales  
9 and public brand awareness.

10 4. But, as it has done multiple times over the years in other markets, Apple decided that it  
11 would not accept competition on the merits. Almost immediately after AliveCor started selling  
12 KardiaBand and its apps, Apple began a concentrated campaign to corner the market for heartrate  
13 analysis on the Apple Watch, because the value of controlling such critical health data (with the  
14 accompanying ability to exploit it) was apparently too much of a temptation for Apple. Thus, despite  
15 previously accepting SmartRhythm without objection (when Apple did not have designs to own the  
16 market), Apple suddenly claimed that the app “violated” various unwritten App Store guidelines.  
17 When AliveCor pushed back on these accusations, Apple responded by literally rewriting the rules.  
18 Nevertheless, AliveCor adapted and updated SmartRhythm multiple times over several months so it  
19 was in compliance with Apple’s new and ever-changing guidelines.

20 5. Faced with AliveCor’s tenacity, Apple next resorted to behind-the-scenes acts of  
21 sabotage, consisting primarily of undocumented updates to the Apple Watch’s operating system,  
22 watchOS. Those unannounced updates would suddenly render SmartRhythm inoperable and were out  
23 of the norm for devices like the Apple Watch (and particularly out of the norm for Apple, which  
24 typically documents every minor change to its operating systems). Nevertheless, this tactic occurred  
25 with unfortunate regularity throughout the first half and late summer of 2018, and AliveCor was  
26 forced each time to drop everything to update its app so that its customers (who relied on  
27 SmartRhythm for medical purposes) were not left without its lifesaving monitoring for too long.

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1           6.       In September 2018, Apple released the Series 4 Apple Watch, which included the  
2 ability to record an ECG as a default app with the Watch’s hardware and software. Apple also released  
3 a heartrate analysis app (like SmartRhythm) that came standard on the new Apple Watch, a fact that  
4 Apple heavily advertised as a selling point for the new device. Had that been the extent of Apple’s  
5 actions, the market would have dictated who won or lost. Apple’s app came standard on the Watch,  
6 which gave it an advantage, but AliveCor’s SmartRhythm app was simply better at identifying  
7 worrisome heart-related health events, a quality difference industry participants clearly recognized.  
8 Other preexisting heartrate analysis apps offered similar functionality that consumers could have  
9 selected if they thought it better than Apple’s offering. But, unfortunately, Apple did not allow the  
10 market to make its decision. Instead, Apple used its control over watchOS to ensure that its new  
11 heartrate analysis app had no competition from the likes of AliveCor or any other provider.

12           7.       Apple did so by exploiting its knowledge that AliveCor and similar competitors  
13 depended on watchOS’s heartrate algorithm to provide them critical information for heartrate  
14 analysis.<sup>2</sup> Although direct access to the Watch’s sensors would have been preferable, the original  
15 heartrate algorithm was transparent enough to allow third parties to meaningfully identify irregular  
16 heartrates and determine whether the user likely required medical assistance. The algorithm was  
17 virtually the same on the first four versions of watchOS, but, with the introduction of the Series 4  
18 Apple Watch and Apple’s introduction of its competing heartrate analysis app, Apple released  
19 watchOS5, which, among other things, “updated” the Watch’s heartrate algorithm. That update did not  
20 improve the user experience for Apple Watch purchasers; instead, its purpose and effect was simply to  
21 prevent third parties from identifying irregular heartrate situations and, thus, from offering competing  
22 heartrate analysis apps. Even more insidiously, the update was also pushed out to Series 1-3 Watch  
23 users (who did not have ECG capabilities built into their Watches like Series 4 users), which rendered  
24 their copies of SmartRhythm ineffective and negated the reason they purchased KardiaBands and  
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27           <sup>2</sup> The heartrate algorithm took readings from the Watch’s sensors and converted them into  
28 heartrate information.

1 AliveCor's other apps. In short, to gain an unfair competitive edge, Apple put countless AliveCor  
2 users' lives in danger.

3 8. Faced with the reality that, due to Apple's exclusionary conduct, SmartRhythm could  
4 no longer consistently predict irregular heart rate situations, AliveCor was forced to remove  
5 SmartRhythm from the App Store. Other companies offering heartrate analysis apps on the Apple  
6 Watch either did the same or limited their apps to just heartrate *tracking*, which is a more limited type  
7 of app that operates in a separate market than heartrate analysis (discussed further below). All of this  
8 has been devastating to competition, as Apple today commands 100% share of heartrate analysis apps  
9 on watchOS devices and, if viewed in the alternative as part of either the U.S. ECG-capable  
10 smartwatch or U.S. ECG-capable wearable devices market, over 70% market share. With a single  
11 update, Apple thus eliminated competition that consumers clearly wanted and needed, depriving them  
12 of choice for heartrate analysis that is better than what Apple can provide. And all for an incremental  
13 value gain for an already-two-trillion-dollar company.

14 9. Apple's anticompetitive conduct was and remains rotten to the core. AliveCor  
15 therefore brings this antitrust action to right past wrongs and to permit future competition, so that  
16 Apple can no longer exclude it and other heartrate analysis providers from the market. U.S. consumers  
17 deserve the right to have the best possible heartrate analysis made available to them. This lawsuit is  
18 the first step in that direction.

19 **II. THE PARTIES**

20 10. Plaintiff AliveCor, Inc. is a Delaware corporation having its principal place of business  
21 at 444 Castro St, Suite 600, Mountain View, CA 94041. AliveCor is a leader in the design and  
22 development of products that provide intelligent, highly-personalized heart data to help diagnose heart  
23 conditions.

24 11. Defendant Apple is a California corporation with its principal place of business in  
25 Cupertino, California. Apple is likely the largest public company in the world. Apple sells hardware,  
26 including Apple Watches, as well as a number of related services.

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1           **III.    JURISDICTION AND VENUE**

2           12.     This Court has subject matter jurisdiction over plaintiff’s federal antitrust claims under  
3 the Clayton Antitrust Act, 15 U.S.C. § 26, and 28 U.S.C. §§ 1331 and 1337. The Court has  
4 supplemental jurisdiction over plaintiff’s state law claims pursuant to 28 U.S.C. § 1367.

5           13.     This Court has personal jurisdiction over Apple because Apple’s headquarters are  
6 located in Cupertino, California. Apple has engaged in sufficient minimum contacts with the United  
7 States and has purposefully availed itself of the benefits and protections of both United States and  
8 California law such that the exercise of jurisdiction over Apple would comport with due process.  
9 Apple has also entered into agreements with developers and consumers that require related disputes to  
10 be litigated in this District.

11          14.     Venue is proper in this District pursuant to 28 U.S.C. § 1391(b) because Apple  
12 maintains its principal place of business in the State of California and in this District, and because a  
13 substantial part of the events or omissions giving rise to plaintiff’s claims occurred in this District. In  
14 the alternative, personal jurisdiction and venue also may be deemed proper under Section 12 of the  
15 Clayton Antitrust Act, 15 U.S.C. § 22, because Apple may be found in or transacts business in this  
16 District.

17           **IV.    INTRADISTRICT ASSIGNMENT**

18          15.     Pursuant to Civil Local Rule 3-2(c), this antitrust case shall not be assigned to a  
19 particular Division of this District, but shall be assigned on a District-wide basis.

20           **V.    FACTS**

21          16.     Apple has injured both AliveCor and competition by way of its unlawful  
22 anticompetitive behavior in the U.S. market for watchOS heartrate analysis apps. It has done so via  
23 abusing its monopoly power in that market, as well as the power it holds in the U.S. market for ECG-  
24 capable smartwatches.<sup>3</sup> Apple’s behavior has excluded competitors, reduced output and reduced

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26           <sup>3</sup> As discussed below, if one broadens these market definitions in the alternative to heartrate  
27 analysis apps for wearable devices and ECG-capable smartwatches or wearable devices, Apple  
28 still has monopoly power in both, and has violated the Sherman Act with anticompetitive activity  
that harmed competition in the app market, however defined.

1 innovation, and raised prices to supracompetitive levels for consumers. It has also caused AliveCor  
2 substantial damages, including up to the present, due to Apple’s continued anticompetitive conduct.

3 **A. ALIVECOR: AN INNOVATOR APPLE ORIGINALLY EMBRACED TO SELL**  
4 **APPLE WATCHES, BUT THEN EXCLUDED ONCE IT DECIDED TO COPY**  
5 **ALIVECOR’S KEY INNOVATIONS**

6 17. When the first Apple Watch launched, it was not an “intelligent guardian for your  
7 health,” as Apple claims today—it was a fashion accessory.<sup>4</sup> The original version of the Apple Watch  
8 lacked basic features such as water resistance, GPS, and 4G LTE—much less the ability to record an  
9 ECG.<sup>5</sup> In a self-evident misunderstanding of the Apple Watch’s best uses, Apple premiered the  
10 original Watch with a cover spread in *Vogue* and sold upscale versions of the device that incorporated  
11 features like gold inlays and high-end fashion bands, for prices up to \$17,000.<sup>6</sup> The original Apple  
12 Watch also was not made available to the average consumer who showed up at an Apple Store—it  
13 required a fitting appointment.

14 18. Dr. Dave Albert, one of AliveCor’s founders, was among the first to recognize that the  
15 Apple Watch could be so much more than just an expensive extension to a smartphone. Dr. Albert was  
16 a physician, inventor, and entrepreneur that graduated with honors from Harvard College and Duke  
17 University Medical School. In 2010, he was featured in a viral YouTube video depicting how the  
18 iPhone could be used together with a phone case to record an ECG.<sup>7</sup> Dr. Albert realized that portable  
19 devices like the iPhone could enable tremendous innovation in personal health monitoring and  
20 analysis, and that the Apple Watch presented an even better use case for that sort of medical tool. In  
21 2011, Dr. Albert helped translate that insight into AliveCor.

22 19. AliveCor showed the potential the Apple Watch had as a medical device in 2015, the  
23 same year Apple released the first Apple Watch. In a video much like the one he created in 2010, Dr.

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24 <sup>4</sup> <https://www.washingtonpost.com/news/innovations/wp/2015/03/05/apple-watch-is-competing-as-a-fashion-accessory-and-thats-a-risky-move/>

25 <sup>5</sup> <https://swappa.com/blog/apple-watch-series-0-worth-buying/>

26 <sup>6</sup> <https://www.cnet.com/news/remember-when-apple-watch-was-luxury-item-we-look-back-5-year-evolution/>

27 <sup>7</sup> <https://www.mobihealthnews.com/12224/iphone-ecg-developer-alivecor-raises-3-million>

1 Albert demonstrated an initial prototype of a new product, KardiaBand, which would allow users to  
2 turn their fashionable Apple Watch into a medical device with the ability to record an ECG.<sup>8</sup>

3 20. AliveCor's innovations, however, were not just limited to hardware. When AliveCor  
4 eventually released its commercial KardiaBand product, AliveCor also released SmartRhythm, a first  
5 of its kind app that remains best in class to this day. As discussed below, SmartRhythm used data from  
6 the Apple Watch's heartrate algorithm to detect when a user's heartrate was likely irregular and  
7 required follow up (*e.g.*, an ECG reading) to determine if it was a medically-worrisome event.<sup>9</sup>

8 21. Today, it is clear that Dr. Albert's insights into linking portable technologies (like the  
9 Apple Watch) to personal health monitoring and analysis were forward-thinking. In the six years since  
10 Apple introduced the Apple Watch, fitness and health features have taken much more of "center  
11 stage" for smartwatch devices,<sup>10</sup> and devices with high-end medical features now constitute their own  
12 product sub-category (discussed further below). Indeed, at the same time AliveCor made the ability to  
13 record an ECG and to provide true heartrate analysis on the Apple Watch, Apple was discontinuing its  
14 line of \$10,000+ Apple Watches, because it had finally realized that the device's greatest potential  
15 was not as a fashion accessory.<sup>11</sup>

16 22. AliveCor's innovations did not go unnoticed. After Dr. Albert first presented his idea  
17 for the KardiaBand just a month after the Apple Watch release, he received a message from Dr.  
18 Michael O'Reilly, Apple's VP of Medical Technology, asking him to come to Apple's campus and  
19 present his ideas. At that meeting, Dr. Albert demonstrated the KardiaBand prototype to Apple  
20 engineers and to Apple's COO, Jeff Williams. Mr. Williams told Dr. Albert—at least at that time—  
21 that Apple wanted to figure out how to work with AliveCor. A few months later, Dr. Albert and

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23 <sup>8</sup> <https://www.medgadget.com/2015/10/alivecor-previews-apple-watch-ecg-video.html>

24 <sup>9</sup> [https://www.alivecor.com/press/press\\_release/fda-clears-first-medical-device-for-apple-watch/](https://www.alivecor.com/press/press_release/fda-clears-first-medical-device-for-apple-watch/)

25 <sup>10</sup> <https://www.cnet.com/news/remember-when-apple-watch-was-luxury-item-we-look-back-5-year-evolution/>

26 <sup>11</sup> <https://www.theverge.com/circuitbreaker/2018/9/12/17851918/apple-watch-edition-discontinued>



1 AliveCor's then-CEO met with Phil Schiller, Apple's SVP of Worldwide Marketing, to demonstrate  
2 the KardiaBand prototype and to hopefully establish a relationship that would allow AliveCor to work  
3 together with Apple.

4 23. During this period, visitors to Apple's campus noted that a large number of Apple  
5 engineers in its Health division had KardiaBands on their Apple Watches. At the time, this was not all  
6 that surprising (and was, in fact, exciting to AliveCor) because, from the moment AliveCor came on  
7 the scene, Apple was fully aware of it and its innovations. Apple even advertised those innovations to  
8 help sell the Apple Watch; specifically, by playing up AliveCor's heartrate analysis capabilities and  
9 explaining how useful they would be for purchasers. Those advertisements clearly worked, as Apple  
10 Watch sales continued to climb year over year over year and its potential as a health device came into  
11 ever greater focus.

12 24. Following these advertisements and the Apple Watch's exponential growth, and after  
13 over 18 months of conversations between Apple and AliveCor executives regarding AliveCor's  
14 products, AliveCor received clearance from the FDA for the KardiaBand and gave Apple a heads-up  
15 on KardiaBand's official launch date. A few hours later, Apple suddenly released a statement to the  
16 press pre-announcing a heart initiative for the Apple Watch—a clear attempt to steal AliveCor's  
17 thunder, given that AliveCor was just about to be the first company to actually provide the ability to  
18 record an ECG on the Apple Watch and, just as importantly, real heartrate analysis that users could  
19 utilize to figure out if they were in a potentially dangerous medical situation. Indeed, the pre-  
20 announcement was all the more striking given Apple's general policy *against* pre-announcing  
21 initiatives.

22 25. Over the next several weeks, Apple took additional steps to publicly undercut  
23 AliveCor, now that it was clear that Apple viewed AliveCor as a competitor rather than as an  
24 innovator helping drive Apple Watch sales. For example, AliveCor gave exclusive interviews to  
25 Christina Farr, a technology and health reporter for CNBC in San Francisco. In 2017, Ms. Farr ranked  
26 AliveCor as one of the top 10 most innovative companies in health, for “mobilizing health  
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1 monitoring.”<sup>12</sup> After AliveCor told Apple about KardiaBand’s release, Apple decided it too would  
2 suddenly grant Ms. Farr an exclusive, presumably to squash any article or report Ms. Farr was  
3 developing about AliveCor. It worked, as she released an article that month mentioning AliveCor, but  
4 centering on Apple’s health initiative.<sup>13</sup>

5         26. One of the ironies of Apple’s “pre-announcement” and subsequent efforts to draw  
6 attention to its heart initiative rather than AliveCor, however, is that it actually validated AliveCor’s  
7 business concept and initially led to an uptick in AliveCor’s sales. Given Apple’s much larger  
8 megaphone on public relations issues, Apple Watch users were better able to learn about the ability to  
9 utilize their Watch as a heart health device and began looking for companies offering that  
10 functionality. AliveCor therefore benefited from Apple confirming that Apple itself saw a future in  
11 this realm. Competition was healthy for AliveCor, and welcomed. But Apple had other designs.

12         27. In September 2018, Apple announced an updated Apple Watch along with an updated  
13 version of the operating system running the device (watchOS) that not only added the ability to record  
14 an ECG (like what KardiaBand already provided), but also for the first time included an Apple-  
15 developed heartrate analysis app. According to Apple CEO Tim Cook, Apple did not initially intend  
16 to offer such features, but was scrambling in 2018 to add such functionality because it saw that users  
17 demanded those features.<sup>14</sup> Of course, the only reason Apple learned this fact is that it saw firsthand  
18 the popularity of AliveCor’s products. But Apple apparently decided that it wanted to completely own  
19 the market, so, in the months leading up to the September 2018 announcement, Apple took numerous  
20 steps to try to hamper and limit AliveCor, but failed each time. Unable to accept this state of affairs

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22         <sup>12</sup> [https://www.fastcompany.com/3067883/the-10-most-innovative-companies-in-health-2017?itm\\_source=parseely-api](https://www.fastcompany.com/3067883/the-10-most-innovative-companies-in-health-2017?itm_source=parseely-api)

24         <sup>13</sup> <https://www.cnbc.com/2017/09/20/apple-watch-as-diagnosis-tool-cardiologists-skeptical.html>

25         <sup>14</sup> <https://www.outsideonline.com/2420733/tim-cook-apple-fitness-wellness-future> (“As  
26 Cook and I make our way into the Apple Park courtyard, he explains how, in 2018, Apple found  
27 itself developing sensors and software for the Watch that could detect atrial fibrillation, or A-fib—  
28 an irregular heartbeat that can be deadly if not properly managed. This was not something the  
design team had planned to do. Like many of the Watch’s features, it came about after learning  
how the device was being used.)

1 because it stood to reap massive benefits by monopolizing heartrate analysis on Apple Watches—and,  
2 specifically, the health data that analysis provides—Apple chose to eliminate competition entirely by  
3 including a change in watchOS5 that made it effectively impossible for any third party to provide  
4 heartrate analysis on the Apple Watch. To understand why this mattered for consumers and  
5 developers, it bears first discussing the relevant markets in which Apple and AliveCor operate, and the  
6 scope of Apple’s considerable monopoly power in each.

7 **B. APPLE MONOPOLIZES HEARTRATE ANALYSIS APPS**

8 28. Although this case focuses on Apple’s exclusionary conduct regarding heartrate  
9 analysis apps, it involves the abuse of monopoly power in multiple markets. Those markets include  
10 the U.S. markets (or aftermarket) for watchOS heartrate analysis apps (*e.g.*, AliveCor’s SmartRhythm  
11 and Apple’s version of that same app) and ECG-capable smartwatches (*e.g.*, Apple Watch Series 4  
12 and later, Samsung Galaxy Watch 3, etc.), as well as the power Apple possesses over locked-in Apple  
13 Watch users. But, even if the markets are viewed in the alternative as more broadly defined—*i.e.*, as  
14 relevant markets for wearable device heartrate analysis apps, ECG-capable wearable devices  
15 generally, and/or smartwatches generally—Apple still possesses (and has abused) monopoly power in  
16 each. Each market is discussed in further detail below.

17 **1. Apple Has Monopoly Power in the Relevant Markets for ECG-Capable  
18 Smartwatches and watchOS Heartrate Analysis Apps**

19 (i) ECG-capable smartwatches

20 29. ECG-capable smartwatches constitute their own relevant market, but in order to  
21 understand why, one must first understand the separate nature of the broader product category to  
22 which they belong: smartwatches.

23 30. A smartwatch is a mobile computing device with a touchscreen display that is typically  
24 worn on the wrist. As the name implies, the device acts as a digital watch, but also provides  
25 substantial additional functionality that effectively renders it an extension of a user’s smartphone  
26 (although it is not a replacement for a smartphone, given that smartwatches are more limited in terms  
27 of functionality than a smartphone, and because their much-smaller size makes them impracticable as  
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1 a replacement for such devices).<sup>15</sup> Smartwatches’ broad functionality (including the ability to use  
2 multiple types of apps and easily select between them), as well as their touchscreen capabilities are the  
3 main driver of demand for the devices, because those features provide users with smartphone-like  
4 capabilities in a wearable device that is also able to, *inter alia*, monitor health characteristics.

5         31. Other types of wearable devices are not reasonably interchangeable with smartwatches  
6 because they neither constrain pricing nor demand for such devices. Traditional wristwatches, for  
7 example, do not provide any “smart” characteristics, such as app-based functionality, the ability to act  
8 as both an extension of and sensor for smartwatches, a touchscreen, or health monitoring capabilities.  
9 Users looking for a device to perform the sorts of tasks a smartwatch can perform thus would not seek  
10 out a traditional wristwatch instead. Similarly, fitness trackers, such as those sold by Fitbit and  
11 Garmin (among others), are not reasonably interchangeable with smartwatches because, although  
12 fitness trackers offer some health monitoring and, in limited cases, touchscreen functionality, they do  
13 not offer the broad array of other functions a smartwatch provides. Put differently, although  
14 smartwatches and fitness trackers both provide some level of health monitoring, smartwatch users  
15 want a device that provides *more* than just health monitoring and therefore would not switch to fitness  
16 trackers instead if a hypothetical monopolist of smartwatches raised prices on all smartwatches by a  
17 small but significant, non-transitory amount.

18         32. There are numerous other practical indicia indicating that smartwatches are a separate  
19 relevant market. The industry plainly recognizes smartwatches’ unique and separate nature. *Apple*, for  
20 example, recently noted in a filing with the International Trade Commission that “replacement  
21 products” for the Apple Watch included only other smartwatches (and made no mention of fitness  
22 trackers). Similarly, industry analysts regularly distinguish between smartwatches, fitness trackers,  
23 and traditional watches. Indeed, even manufacturers that sell both fitness trackers and smartwatches  
24 distinguish between the two types of products, specifically naming or categorizing devices as either  
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27         <sup>15</sup> In economic terms, smartwatches are a complement to smartphones, in that their value to  
28 the user increases when used in conjunction with a smartphone.

1 “trackers” or “smartwatches.”<sup>16</sup> This is unsurprising, given that, as noted above, smartwatches have  
2 peculiar characteristics and uses, in that they effectively act as extensions and expansions of a  
3 smartphone. Fitness trackers provide some of that functionality, but not nearly all, and demand for  
4 smartwatches is therefore independent of fitness trackers as a result. Smartwatch prices similarly are  
5 not sensitive to prices from other types of wearable device; for example, fitness trackers are typically  
6 sold for far less than smartwatches and those lower prices do not affect demand for smartwatches.

7 33. As most relevant to this case, within the broader smartwatch market there is a sub-  
8 category for smartwatches capable of taking ECGs. As noted previously, an ECG is a recording of the  
9 electrical signals in one’s heart. It is a common test used to quickly detect heart problems and monitor  
10 heart health. In order to advertise the ability to take an ECG, a manufacturer must first obtain  
11 clearance from the FDA.

12 34. For smartwatch users, the ability to record an ECG adds a level of heart health-related  
13 functionality that, when combined with a smartwatch’s other functionality, provides a unique  
14 combination of uses not available on any other type of wearable or mobile computing device.  
15 Specifically, a user concerned with the ability to meaningfully diagnose any heartrate issues in real  
16 time can only choose a device that is capable of taking ECG readings; otherwise, beyond the most  
17 obvious situations, they will be unable to medically determine whether they are experiencing a heart-  
18 related event requiring medical assistance. With the exception of a few ECG-specific wearable  
19 devices, AliveCor is unaware of any other wearables that provide ECG functionality *besides*  
20 smartwatches (*e.g.*, no fitness trackers allow users to take ECGs). ECG-capable smartwatches thus  
21 constitute their own relevant market, because users looking for a device to serve that purpose would  
22 not switch in meaningful enough numbers to other types of device to make a small but significant  
23 increase in price for all ECG-capable smartwatches unprofitable. Indeed, in a recent filing with the  
24 International Trade Commission, Apple conceded that “the Apple Watch Series 4-6 occupy a unique  
25 space in the competitive landscape” (from other smartwatches) because they are capable of taking an  
26 ECG reading and performing heartrate analysis. Adding to this is that the same sorts of practical

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28 <sup>16</sup> See, *e.g.*, <https://www.fitbit.com/global/us/products>

1 indicia discussed in Paragraph 32 above with respect to smartwatches generally demonstrate that  
2 ECG-capable smartwatches are a relevant market of their own. There is industry recognition that such  
3 smartwatches are a unique product group;<sup>17</sup> they provide peculiar characteristics and uses (*i.e.*,  
4 smartwatch capabilities with added ECG functionality);<sup>18</sup> are not sensitive to prices from other types  
5 of wearable device, including smartwatches that are unable to take ECG readings (*i.e.*, ECG-capable  
6 smartwatches typically have higher prices, due to their added functionality); and have distinct users  
7 (*i.e.*, smartwatch customers who also want or need the ability to record an ECG).

8         35. As discussed below, however, even if one defined the relevant market more broadly,  
9 such as all smartwatches or all ECG-capable wearable devices, Apple still has dominant market share  
10 and monopoly power. Thus, if one applied such alternative market definitions (which AliveCor adopts  
11 in the alternative for its claims), then Apple's conduct still violates the antitrust laws for the reasons  
12 discussed herein.

13         36. Heartrate analysis apps (described more fully below) are currently only available for  
14 ECG-capable smartwatches and ECG-capable wearable devices. This is because, although heartrate  
15 analysis apps can provide strong predictions that a user is experiencing some sort of problematic heart  
16 health event, the gold standard to confirm that fact is by recording an ECG. There is thus little demand  
17 for heartrate analysis apps if the user is not also able to record an ECG to confirm or diagnose any  
18 irregular heartrate condition. Heartrate analysis apps are thus a complement to ECG-capable  
19 smartwatches and ECG-capable wearable devices.

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23         <sup>17</sup> See <https://www.wareable.com/health-and-wellbeing/ecg-heart-rate-monitor-watch-guide-6508>.

25         <sup>18</sup> For example, during this year's NFL conference final games, Apple aired a commercial  
26 devoted entirely to the Apple Watch's ability to take an ECG reading anytime, anywhere.  
27 Presumably, that ad was focused on football viewers whose heart health may be in question,  
28 making the Watch's ECG functionality of paramount concern to them. Given the expense of ad  
time on such well-watched, important games, it is clear that Apple believes that advertising ECG  
functionality above all else on the Apple Watch will distinguish the Watch from other types of  
smartwatches and lead to increased sales.

1           37.     The relevant geographic market for ECG-capable smartwatches or, in the alternative,  
2 ECG-capable wearable devices is the United States. The companies providing such apps are located in  
3 the U.S. and the devices must be cleared by the U.S. FDA.

4                                   (ii)     watchOS heartrate analysis apps

5           38.     An application is a program or group of programs designed for end-users of a  
6 computing device. Different types of apps allow a computing device to perform different types of  
7 functions; *e.g.*, taking pictures, word processing, playing a game, booking dinner reservations, etc.  
8 Users looking for a certain type of functionality thus only have a finite set of reasonably  
9 interchangeable alternatives from which to choose—a user, for example, looking for a video  
10 conferencing app would not choose a news app, and vice versa.

11           39.     As discussed in further detail below, a computing device user is further constrained in  
12 app selection by their device’s operating system (“OS”). Apps are written to work on a specific OS  
13 and can only work on that OS. Thus, iOS device users can only use iOS apps, Android users can only  
14 use Android apps, and so on. As most relevant here, this means that Apple Watch users can only use  
15 apps written for watchOS. An Apple Watch user looking for certain functionality on their device may  
16 therefore only choose between apps that both offer that specific functionality *and* are written for  
17 watchOS.

18           40.     A heartrate analysis app, as the name implies, analyzes the user’s heartrate in real time,  
19 typically using a PPG sensor in close proximity to the user’s wrist. The app determines whether the  
20 user’s heartrate is normal (and thus likely healthy) or irregular (and thus likely indicating that the user  
21 should seek medical aid). Such an app is different than one, like the Kardia app, that records and  
22 interprets an ECG—a recording that must be collected using specialized hardware and multiple  
23 physical contacts with electrodes on the device (*e.g.*, the user placing the finger of their other hand on  
24 the device to close an electrical circuit, rather than relying on a single PPG sensor in proximity with  
25 the wrist on which the device is worn), and it provides medically-accurate data to a doctor for further  
26 analysis. Although an app (*e.g.*, Kardia) can interpret irregular rhythms, like AFib, from an ECG,  
27 those interpretations are only available if the user specifically decides to record an ECG. In contrast, a  
28 heartrate analysis app is one designed to run constantly while the device is worn and alert a user when

1 they are likely in a situation requiring an ECG recording and medical analysis. Apple itself delineates  
2 between the two types of app, noting their different purposes.<sup>19</sup>

3 41. A heartrate analysis app is also different than a heartrate *tracking* app, which is  
4 designed simply to keep track of certain aspects of a user’s heartrate (usually, beats per minute) in  
5 order to assess general fitness and/or progress toward certain fitness goals. Indeed, Apple itself  
6 delineates between the two types of app, noting in a recent filing, for example, that its ECG app and  
7 Irregular Rhythm Notification “feature” (*i.e.*, Apple’s name for the heartrate analysis app it preloads  
8 on Apple Watches)—which it states focus on “heart rhythm health”—are different than and distinct  
9 from “monitoring for unusually high or low heart rates (unrelated to AFib detection).” Today, the vast  
10 bulk of heart-related apps on smartwatches are *tracking* apps.

11 42. Given its medical nature, a heartrate analysis app must be reliable enough that it  
12 provides medically-useful information to the user. Such information goes beyond tracking and noting  
13 basic observations about the user’s heartrate; as the name of the product type implies, the app must not  
14 only monitor, but also provide qualitative *analysis* about the user’s heartrate to alert them regarding  
15 potentially problematic medical situations. Moreover, if a heartrate analysis app provides the user with  
16 a diagnosis (*i.e.*, informs the user they have a particular illness or other problem after analyzing the  
17 user’s symptoms), it must be cleared by the FDA. All of this is in contrast to heartrate tracking apps,  
18 which do not similarly require medically-analytical information and do not require FDA clearance.

19 43. Given heartrate analysis apps’ unique nature, no other type of app is reasonably  
20 interchangeable with them. As noted, an ECG app does not provide monitoring and analysis, and does  
21 not alert a user to the times when they should likely record an ECG. An ECG app therefore has a  
22 different purpose and use than a heartrate analysis app. As also noted, heartrate tracking apps have a

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24 <sup>19</sup> See <https://www.apple.com/healthcare/apple-watch/> (discussing the “irregular rhythm  
25 notifications” app on the Apple Watch—*i.e.*, the heartrate analysis app—and, separately, the  
26 “ECG app,” and noting for the latter that it is for users that, *inter alia*, “receive the irregular  
27 rhythm notification” and therefore can “capture an ECG and record their symptoms” and use  
28 “[t]his real world data [to] enable you to make more informed and timely decisions regarding  
further evaluation and care”); see also <https://support.apple.com/en-us/HT208955> (separately  
instructing users how to utilize the “ECG app” on the Apple Watch, which requires specific  
action, and noting that “By looking at an ECG, a doctor can gain insights about your heart rhythm  
and look for irregularities.”).



1 different purpose and, although, a heartrate analysis app might keep track of a user’s heartrate in  
2 somewhat similar ways as a tracking app (*e.g.*, by keeping track of beats per minute and keeping track  
3 of heartrate during different types of activity), the purpose for doing so is different, in that an analysis  
4 app keeps track of such data for analytical and/or diagnostic purposes whereas a tracking app does so  
5 for other purposes—generally monitoring fitness goals and simply keeping a record of heart activity  
6 during different points of a user’s day without any other sort of substantive analysis.

7 44. There are also practical indicia indicating that heartrate analysis apps are a separate  
8 relevant market. Industry participants, for example, recognize that apps capable of analyzing heart rate  
9 irregularities in real time are distinct from other types of app.<sup>20</sup> Such apps similarly have peculiar  
10 characteristics that others types of app and device do not (*i.e.*, analyzing and interpreting heartrate data  
11 on a wearable device to determine irregular heartrate situations). Customers seeking out these apps are  
12 those who need or wish to have access to ready analysis of their heart health, so they can seek medical  
13 attention as necessary. This is in contrast to users who simply wish to track their heartrate for fitness  
14 or other purposes (rather than obtain substantive feedback on their heartrate and/or a diagnosis based  
15 on their heartrate). Heartrate analysis app prices also are not sensitive to price changes for other types  
16 of apps, given the unique functionality they provide. And vendors of heartrate analysis apps that  
17 provide diagnoses must obtain FDA clearance for the apps, which is a unique legal requirement.

18 45. For Apple Watch users, the only heartrate analysis apps are those written for watchOS.  
19 Thus, the only reasonably interchangeable heartrate analysis app alternatives an Apple Watch user can  
20 select are watchOS apps. This means watchOS heartrate analysis apps constitute a relevant product  
21 market.

22 46. As discussed below, however, even if one defined the relevant market more broadly,  
23 such as all heartrate analysis apps for wearable devices, Apple still has dominant market share and  
24

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25 <sup>20</sup> *See, e.g., id.* (noting the difference between Apple Watch’s irregular rhythm notifications  
26 and its ECG app); <https://www.cnet.com/health/apple-watch-ecg-app-what-cardiologists-want-you-to-know/> (same); *see also* <https://www.mobihealthnews.com/news/fitbit-releases-new-smartwatch-ecg-app-stress-management-features-skin-temperature-sensor-and> (noting distinction  
27 between Fitbit Sense’s “ECG app” and “heart rate tracker,” the latter of which is the function that  
28 alerts the user when their heartrate appears abnormal; *i.e.*, is a heartrate analysis app).

1 monopoly power. Thus, if one applied such an alternative market definition (which AliveCor adopts in  
 2 the alternative for its claims), then Apple’s conduct still violates the antitrust laws for the reasons  
 3 discussed herein.

4 47. The relevant geographic market for watchOS heartrate analysis apps or, in the  
 5 alternative, heartrate analysis apps for wearable devices is the United States. The companies providing  
 6 such apps are located in the U.S. and any apps that provide diagnoses must be cleared by the U.S.  
 7 FDA.

8 (iii) Monopoly power

9 48. Apple possesses monopoly power in the U.S. market for ECG-capable smartwatches  
 10 (or, in the alternative, ECG-capable wearable devices), and in the U.S. market (or aftermarket) for  
 11 watchOS heartrate analysis apps (or, in the alternative, heartrate analysis apps for wearable devices).  
 12 Customers in each market are consumers purchasing ECG-capable devices. Apple’s monopoly power  
 13 in each market is discussed in further detail below.

14 A) ECG-capable smartwatches

15 49. Although some smartwatches existed before the Apple Watch, that device came to  
 16 define the product category shortly after its introduction. In the U.S., Apple quickly obtained massive  
 17 market share for smartwatches and has since continued to dominate that market despite other  
 18 manufacturers’ efforts. Today, Apple commands over 55% of the worldwide smartwatch market<sup>21</sup>—  
 19 with Asian brands such as Huawei and Samsung much more popular overseas—and, on information  
 20 and belief, over 68% of the U.S. smartwatch market.<sup>22</sup>

21 \_\_\_\_\_  
 22 <sup>21</sup> <https://9to5mac.com/2020/05/07/smartwatch-sales-grow/>

23 <sup>22</sup> In Q2 2020, for example, Apple shipped approximately 37.6% of all wearable devices in  
 24 North America, a category that includes both smartwatches and fitness trackers.  
 25 <https://canalys.com/newsroom/canalys-north-american-wearables-market-Q2-2020>. Its closest  
 26 competitors were Fitbit, Garmin, and Samsung, all of which sell a mix of smartwatches and fitness  
 27 trackers, unlike Apple, which only sells smartwatches. (The “Others” category in this report  
 28 mainly consists of sub-\$50 wearables, which are almost exclusively fitness trackers. *See*  
<https://www.sammobile.com/news/samsung-smartwatch-market-share-drops-north-america-q2-2020/>.) Analysts estimate that fitness trackers dominated sales for Apple’s competitors in the  
 reporting time period, indicating that more than 50% of their shipments were not smartwatches.  
*See* <https://www.imore.com/north-american-wearables-market-still-belongs-apple>. Adjusting these  
 competitors’ reported shipments to 50% smartwatches and 50% fitness trackers, as well as

1 50. As noted above, the sub-category of ECG-capable smartwatches is an even smaller  
2 niche in the U.S. As industry analysts have observed, “[a]s all major vendors set their sights on 2021,  
3 medical-oriented devices will move certain products into an elevated tier, creating stronger  
4 differentiation between casual fitness and advanced health tracking.”<sup>23</sup> Apple’s closest competitors  
5 only offer ECG functionality on a subset of their smartwatches (and not on their fitness trackers), so  
6 Apple’s market share is even higher for ECG-capable smartwatches—on information and belief, well  
7 over 70%. If one broadens the market to include all ECG-capable wearables, that market share does  
8 not appreciably change (*i.e.*, does not dip below 70%), because non-smartwatch ECG-capable  
9 wearables constitute only a very small portion of sales in such an alternatively-defined market.

10 51. In addition to this high market share, there also exist extremely high barriers to new  
11 entry. A new entrant hoping to sell ECG-capable wearable devices of any type must expend extremely  
12 high startup costs in the form of cash outlay, but also substantial research & development, as well as  
13 specialized technical and medical knowhow. Once they have designed a product, a new entrant must  
14 then obtain FDA clearance for the device and any algorithms it uses to diagnose heartrate issues—as  
15 Apple itself conceded in a recent filing with the International Trade Commission. Another barrier to  
16 new entry is the need for substantial and specialized manufacturing capabilities, much of which is  
17 controlled by the current major participants in the market. As discussed below, given the amount of  
18 time smartwatches have now been in the market, there are high switching costs to a new entrants’  
19 devices, making it even more difficult to gain any sort of substantial share away from existing  
20 participants.

21 B) watchOS heartrate analysis apps

22 52. Given its complete control over both watchOS and distribution for watchOS apps, as  
23 well as due to its efforts (described herein) to exclude all competition for heartrate analysis apps on  
24 watchOS devices, Apple has unrivaled monopoly power in this market and has erected  
25 insurmountable barriers to entry for new (or even existing) market participants. To this point, Apple  
26 \_\_\_\_\_  
27 excluding the other low-end fitness trackers, therefore indicates that Apple made over 68% of  
28 North America smartwatch sales in 2020.

<sup>23</sup> <https://canalys.com/newsroom/canalys-north-american-wearables-market-Q2-2020>

1 has the absolute power to exclude competitors from the market, because it has positioned itself as  
2 gatekeeper for watchOS devices due to its control over watchOS distribution (*i.e.*, all watchOS apps  
3 must be distributed through Apple’s App Store). Apple also has the ability to sabotage its rivals—as it  
4 did here—by changing how watchOS works. Due to its anticompetitive conduct, Apple has obtained  
5 and maintained nearly 100% market share in watchOS heartrate analysis apps, and its monopoly  
6 power is protected by high barriers to new entry, including the watchOS distribution and competitor  
7 sabotage capabilities described above, as well as the scale necessary to achieve cost efficiencies and  
8 Apple’s other exclusionary and anticompetitive conduct described herein. Furthermore, just as with  
9 ECG-capable wearable devices overall, heartrate analysis apps providing diagnoses must be cleared  
10 by the FDA, so that is an additional legal barrier to new entry.<sup>24</sup>

11       53. For the reasons described above, if the market is defined more broadly as heartrate  
12 analysis apps for all wearable devices, Apple still has over 70% of such a market (due to its  
13 dominance of wearable devices capable of providing heartrate analysis), and the barriers to new entry  
14 remain the same, because Apple still acts a gatekeeper to the vast majority of that market and entrants  
15 must still overcome the other entry barriers described above.

16       54. App developers cannot constrain Apple’s anticompetitive conduct in the watchOS  
17 heartrate analysis market or alternative heartrate analysis app for wearable devices market by  
18 declining to develop heartrate analysis apps for watchOS. If a developer does not develop apps for  
19 watchOS, the developer must forgo *all* of the more than one hundred million watchOS users. No  
20 developer has sufficiently important or attractive apps to overcome the network effects and switching  
21 costs associated with watchOS to entice enough watchOS users to leave watchOS, such that  
22 developing heartrate analysis apps solely for other platforms would affect Apple’s anticompetitive  
23 conduct.

24       55. Similarly, competition in the sale of ECG-capable wearables (whether smartwatches or  
25 all such devices) does not constrain Apple’s power in the watchOS heartrate analysis app market (or  
26

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27       <sup>24</sup> As noted above, not all heartrate analysis apps provide diagnoses. However, to the extent  
28 they wish to provide such a feature, they must overcome this legal barrier.

1 aftermarkets) because, as discussed below, watchOS device users face substantial switching costs and  
2 lock-in to the Apple ecosystem. Further, regardless of competition in the sale of wearable devices,  
3 competition at that level would not constrain Apple's power in the watchOS heartrate analysis app  
4 market (or even a broader heartrate analysis app for wearable devices market) because consumers  
5 cannot adequately account for and therefore constrain Apple's anticompetitive conduct through their  
6 purchasing behavior.

7 56. Apple is also an attempted monopolist in the U.S. market for watchOS heartrate  
8 analysis apps (or, alternatively, heartrate analysis apps for wearable devices). Given that the facts  
9 alleged herein amply support a finding that Apple has wrongfully obtained and maintained monopoly  
10 power in this market, they support a finding that Apple is attempting to monopolize the market by  
11 improper, intentional means.

## 12 2. Apple Has Monopoly Power Over Locked-In Apple Watch Users

13 57. In designing iOS and the iPhone, which respectively acted as conceptual precursors to  
14 watchOS and the Apple Watch, Apple was faced with a problem that previously plagued its desktop  
15 and laptop computers throughout the 1980s and 1990s. In that era, Apple took an almost entirely  
16 proprietary approach to its hardware and software. That approach, however, severely limited the scope  
17 of Apple's software offerings and put it at a decided competitive disadvantage against others, such as  
18 Microsoft and OEMs that used the Windows operating system, who took a much more open approach  
19 to software. Apple thus carved out only a very small, niche market share during that era, and in fact  
20 almost went bankrupt as a result. Indeed, it was not until Apple relented and stopped trying to prevent  
21 third party developers from operating in its software application markets that its fortunes turned  
22 around.

23 58. Guided by this historical lesson and by early innovators' success and popularity with  
24 third party iOS apps, Apple realized soon after introducing the iPhone that it needed to offer at least  
25 the appearance of broad choice of software to use on its new smartphone. This was particularly so  
26 because other companies—notably, Google, Microsoft, and Blackberry—were developing their own  
27 smartphones and had a much more open history regarding third parties' ability to create and sell  
28 applications for their respective platforms. Apple therefore introduced the App Store in July 2008 and

1 thereafter actively tried to encourage the appearance of a robust market for iOS apps. Touting the  
2 choice and breadth of apps the App Store presumably enabled, Apple has consistently used the  
3 availability of third party applications to fuel the demand for the iPhone and its iOS operating system.  
4 Indeed, Apple promoted the iPhone by heavily advertising third party applications and stating,  
5 “there’s an app for that.” Those efforts succeeded in driving demand for its iOS devices, including the  
6 iPhone, in competition with devices running other operating systems.

7         59. When it released the Apple Watch, Apple sought to repeat the iPhone’s success by  
8 similarly touting the availability of third party apps for the device. As noted above, Apple advertised  
9 the highly-innovative offerings from third parties, such as AliveCor, in an effort to establish in users’  
10 minds that this new wearable smart device was revolutionary, but also highly useful and worth their  
11 additional money. Users could search for Watch apps on their iPhones via the App Store app and then  
12 download the apps to their Watch directly. Later, in 2019 with the watchOS 6 update, Apple  
13 introduced an App Store app directly onto Apple Watches themselves.<sup>25</sup>

14         60. Just as with the iPhone, Apple’s advertising efforts regarding third party apps helped  
15 drive demand for Apple Watches in competition with smartwatch devices running other operating  
16 systems. Every Apple Watch that Apple sells runs watchOS and comes with a number of preinstalled  
17 apps, despite the ability to install third party apps that Apple approves for distribution through the App  
18 Store.

19         61. High switching costs prevent users from switching from one operating system to  
20 another operating system after they initially purchase a mobile device. These switching costs increase  
21 over time for a variety of reasons, including, among other things, the cost of the mobile device (for  
22 smartwatches, hundreds, if not over a thousand, dollars); the user’s familiarity with the operating  
23 system and unwillingness to learn a different operating system; the user’s familiarity with apps on that  
24 operating system; the users’ costs sunk into purchased applications that are not compatible with other  
25 operating systems, which is amplified by the restrictions on the App Store and the inability of App  
26 Store developers to communicate freely with their users; and the costs of hardware purchased to

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27  
28 <sup>25</sup> <https://www.pcmag.com/how-to/how-to-use-the-new-app-store-on-your-apple-watch>.

1 support the mobile devices utilizing that operating system (*e.g.*, power cords, wireless  
2 mouse/keyboards, wireless headphones, other device-specific peripherals), which would have to be  
3 incurred anew if the user switched to a different type of device. Moreover, switching costs for mobile  
4 devices—particularly for watchOS devices, due to Apple’s typically extreme practices—have  
5 increased dramatically in recent years with the advent of cloud computing, which, *inter alia*, allows  
6 users to store their files on the “cloud” (*i.e.*, not directly on their device). As specifically relevant to  
7 Apple, iOS and watchOS users’ photos, videos, music files, and other personal files (such as health  
8 data collected by the Apple Watch) are often stored on iCloud and only accessible on other Apple  
9 devices. Although users may obtain copies of some of those files, Apple has made doing so neither  
10 easy nor intuitive, and thus made it very difficult for users to effectuate this kind of transition. This  
11 means that Apple device users become more and more locked into Apple devices, because they wish  
12 to have continued access to their personal files—and this is a switching cost they have little ability to  
13 understand or appreciate before purchasing an Apple device.

14         62. Apple Watch users face an additional switching cost in that Apple Watches, by design,  
15 can only be used with an iPhone. The Apple Watch’s capabilities therefore cannot be used to their  
16 fullest extent unless paired with an iPhone, which further locks users into the Apple ecosystem by  
17 entrenching the user with both an Apple smartphone *and* smartwatch, and makes switching to another  
18 mobile ecosystem—or mixing and matching devices from different manufacturers—difficult-to-  
19 impossible.

20         63. Yet another switching cost is Apple’s ability to completely control and push over-the-  
21 air (*i.e.*, through the internet) updates for watchOS on both preexisting and new Apple Watches. Users  
22 purchasing an Apple Watch cannot control what Apple does with those OS updates and Apple is thus  
23 able to change functionality on the Watch at its whim. Practically speaking, this means that apps a  
24 user selects before an update can suddenly not work after Apple updates watchOS, and users cannot  
25 go back to an earlier version of the OS after updating. This all gives Apple control over the options  
26 and functionality available to Apple Watch users long after they buy their Watch.

27         64. These high switching costs, which were (and are) not readily apparent to the vast  
28 majority of Apple Watch users before they purchase their devices, were nevertheless apparent to

1 Apple early on. This led it to realize that it could make enormous additional profits if it exerted  
2 complete control over the various aftermarkets into which Apple Watch users were locked once they  
3 purchased their device. One of the ways it did so that is relevant to this case was by ensuring that it  
4 controlled every aspect of watchOS app distribution, including by requiring that app developers, like  
5 AliveCor, use the App Store app as the sole marketplace and distributor for watchOS apps instead of  
6 more traditional channels, such as developers' websites, general websites, competing electronic  
7 marketplaces, and even brick and mortar stores. Apple exerted this control because, once it forced its  
8 way into that gatekeeper role, Apple was able to completely control the aftermarket for watchOS apps  
9 (via its power over watchOS app developers who wanted to sell to Apple Watch users) and  
10 accordingly increase its profits at an exponential rate. As discussed herein, Apple's initial efforts to  
11 exclude competition for heartrate analysis apps initially stemmed from its control over watchOS app  
12 distribution. It was only after those efforts failed to dissuade AliveCor from competing that Apple  
13 then turned to more drastic measures involving watchOS itself.

14 65. All of this is highly problematic because, as also noted above, apps must be designed to  
15 run on a specific operating system. A device running watchOS can only run apps designed for  
16 watchOS. Thus, once a user selects watchOS as their operating system by purchasing an Apple Watch,  
17 that user can only run applications designed for watchOS on their device. This means that, for Apple  
18 Watch users, apps written for other operating systems besides watchOS are not interchangeable at all  
19 with watchOS apps, because they cannot be used on an watchOS device, and the user is thus beholden  
20 to Apple for the options available on the Apple Watch. Put differently, watchOS apps exist in an  
21 aftermarket, much the same as Windows apps exist in their own aftermarket and Android apps exist in  
22 their own aftermarket. The operating system on a user's device, once they purchase that device,  
23 defines and limits the universe of apps from which they can choose any alternatives (let alone  
24 reasonable alternatives).

25 66. App developers, such as AliveCor, face a similar reality. The existence of other mobile  
26 device operating systems is meaningless to developers who program apps and in-app products for use  
27 on the Apple Watch, because it does not change the markets into which those apps are sold and  
28 developers cannot take a one-size-fits-all approach to app development. Developers may learn to code



1 in the Swift or Objective-C programming languages—*i.e.*, the two main programming languages for  
2 watchOS apps—and they and their employees, if any, may not know how to code in a different  
3 programming language applicable to devices running on a different operating system. Regardless of  
4 what programming languages they know, however, developers cannot simply run a program to  
5 convert watchOS applications to the code used for a different operating system environment in the  
6 way that one might convert a Word document to a PDF; instead, the apps must be written anew in the  
7 code for that device or system.

8           67.       Based on these differences, a move away from the watchOS system would mean that a  
9 developer could no longer offer its watchOS apps or in-app products to tens of millions of consumers  
10 (who would have no other way to buy these products for their devices), and the developer would have  
11 no substitute available, because it could not sell its watchOS app(s) into a different market for  
12 wearable apps, such as for the Tizen or Android Wear operating systems. And, even if one engaged in  
13 the time and expense to reprogram an watchOS app for those other operating systems, distributing it  
14 through an app distribution service geared toward apps written for that other operating system would  
15 have (and has) no effect on Apple’s power or practices with respect to watchOS apps.

16           68.       In previously-filed legal actions regarding Apple’s app-related anticompetitive conduct,  
17 Apple has argued that consumers sometimes have multiple devices running different operating  
18 systems, and that this somehow means there is not a market (or aftermarket) for apps written  
19 specifically for Apple devices. Such an argument, however, is factually incorrect. As an initial matter,  
20 different types of computing devices are not reasonable substitutes for one another, due to both  
21 switching costs and imperfect information. (A user will not buy a laptop, for example, if they want a  
22 smartwatch. They purchase the laptop because of its unique form factor and the computing purposes  
23 to which the user wants to put the device. The same goes for a smartwatch, as discussed above.) But,  
24 even if this were not the case, consumers typically purchase and use just one smartwatch device at a  
25 time. The same goes for other types of computing devices, such as smartphones, tablet computers, or  
26 laptops. The apps available to a consumer are therefore typically confined to the operating system on  
27 each device; *i.e.*, they can only run apps written for that device’s operating system. Thus, if a  
28 consumer has an Apple Watch and a Windows laptop, they will need apps written for watchOS and

1 Windows, respectively, even if those apps perform the same essential functions (*e.g.*, email, web  
2 browsing, etc.). Furthermore, it is clear that some types of computing devices simply *cannot* replicate  
3 functionality on other types of computing devices, such as monitoring health on a smartwatch.

4 69. For all these reasons, Apple Watch users are locked into their purchase and Apple has  
5 complete control—and, thus, monopoly power—over the aftermarket for watchOS apps (among  
6 others) in which Apple Watch users can select and obtain apps for their device.

### 7 **3. Apple’s Anticompetitive Conduct and AliveCor’s Antitrust Injury**

8 70. Apple has harmed competition by excluding competitors for watchOS heartrate  
9 analysis apps (or, alternatively, heartrate analysis apps for wearable devices) through a variety of  
10 unreasonable, exclusionary, and predatory means. When it first introduced the Apple Watch, Apple  
11 did not exclude such competition. However, given the numerous benefits Apple realized it could reap  
12 both in that market and adjacent markets (based on, *inter alia*, the data Apple obtains through the  
13 heartrate analysis it now provides to Apple Watch users), it not only entered that market, but then  
14 unfairly cornered it by excluding nearly all competition to the clear detriment of consumers and  
15 competitors alike.

16 71. It was not always this way. As noted above, when AliveCor first began developing its  
17 products for the Apple Watch, Apple embraced AliveCor as an innovator and explicitly used  
18 AliveCor’s innovations to sell the Apple Watch. AliveCor’s Kardia app (which users utilize to record  
19 an ECG via the KardiaBand) was accepted for distribution through the App Store easily. The initial  
20 version of SmartRhythm similarly breezed through the App Store acceptance process and Apple  
21 initially did not seek to hinder AliveCor in any meaningful way.

22 72. All of that changed, however, when AliveCor finally received FDA clearance on its  
23 KardiaBand product and told Apple it was ready to imminently announce that product’s release. As  
24 previously discussed, Apple tried to undercut AliveCor publicly by suddenly pre-announcing its heart  
25 initiative, which was a marked departure from Apple’s typical policy of not pre-announcing efforts  
26 like that. But, more insidiously, Apple also began to use its power over the watchOS ecosystem to  
27 obstruct AliveCor’s competitive opportunities.

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1           73.       Shortly after AliveCor released and began distributing SmartRhythm through the App  
2 Store, Apple informed AliveCor that SmartRhythm allegedly violated various App Store guidelines.  
3 This was the same app that Apple previously accepted for distribution without objection—a decision  
4 that meant Apple believed the app complied with all applicable guidelines. Nevertheless, Apple  
5 suddenly found “problems” with the app that it demanded AliveCor “fix,” else face expulsion from  
6 the App Store. Given that Apple had positioned itself as the sole distributor for watchOS apps—a  
7 practice that is the focus of other, currently-pending antitrust lawsuits—AliveCor had no choice but to  
8 comply with Apple’s demands. If it did not, then AliveCor faced exclusion from its entire core market.

9           74.       Over the next several weeks and months, AliveCor made several rounds of changes to  
10 SmartRhythm to accommodate Apple’s complaints and went back and forth with Apple multiple times  
11 over these changes. It soon became clear that Apple’s concerns were largely pretextual. For example,  
12 Apple complained that SmartRhythm utilized the Watch’s “workout mode,” which was supposedly  
13 problematic because SmartRhythm was not a workout app. (SmartRhythm operated in “workout  
14 mode” to access the Watch’s heartrate algorithm, which was a critical input for monitoring a user’s  
15 heartrate, in an uninterrupted manner.) When AliveCor pointed out there was no rule against doing so,  
16 Apple just rewrote the App Store guidelines to include a rule against using workout mode. Other  
17 complaints were similarly baseless and confusing, but AliveCor, having no choice, worked to satisfy  
18 Apple in each instance.<sup>26</sup>

19           75.       Eventually, Apple appeared to run out of pretextual complaints, because, several  
20 months in, it finally conceded that the updated SmartRhythm complied with all App Store guidelines.  
21 In this respect, AliveCor was lucky. Apple’s practice of mining an innovator for details about their  
22 product and then excluding the competitor from the Apple ecosystem is so common that it has  
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27           <sup>26</sup> Of course, all of these discussions proceeded under the cloud that Apple had pre-  
28 announced its heart initiative and was at some point soon likely to announce its own heart-focused  
apps on the Apple Watch.

1 obtained a nickname, “sherlocking”—so named from the first-known instance of this Apple tactic,  
2 which involved Apple’s Sherlock tool in the early 2000s.<sup>27</sup>

3         76. Parallel to and after these discussions, Apple also began making undocumented  
4 changes to watchOS that would suddenly create massive technical problems for SmartRhythm. These  
5 changes were, on information and belief, little acts of sabotage Apple used to manufacture technical  
6 problems with SmartRhythm, such that it became “buggy” at inopportune times. The changes most  
7 often included sudden, undocumented modifications to the permissions the app had to different  
8 aspects of watchOS or the hardware and were of the type that, if typical practice held, would have  
9 been documented in release updates ahead of time, so AliveCor could update SmartRhythm to adjust  
10 for them. By releasing these changes without documentation, Apple made it so SmartRhythm would  
11 just suddenly not work, requiring AliveCor (multiple times over the period of months) to suddenly  
12 drop all else to fix the app, typically within hours or a day. Given SmartRhythm’s medical nature,  
13 such manufactured outages were not only damaging to AliveCor’s brand; they were potentially life  
14 threatening to its users, who used the app along with KardiaBand to monitor their hearts.

15         77. But, despite all of these initial efforts to hamper its success, AliveCor persisted. Each  
16 time Apple threw it a curveball, AliveCor adapted by updating SmartRhythm. That allowed AliveCor  
17 to keep providing the heart health monitoring its innovations enabled on the Apple Watch, at a time  
18 when Apple clearly had no competitive product available. That changed, however, with Apple’s  
19 update to watchOS5.

20         78. As the name implies, a heartrate analysis app requires access to the user’s heartrate. On  
21 the Apple Watch, Apple utilizes an algorithm to convert readings taken from the device’s  
22 photoplethysmography (“PPG”) sensors into a reported heartrate. Apple does not permit third party  
23 developers access to the data from the PPG sensors directly, so they must use the heartrate algorithm  
24 for anything heartrate-related. This complicates third parties’ task somewhat, because raw data from  
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27 <sup>27</sup> <https://appleinsider.com/articles/19/06/06/developers-talk-about-being-sherlocked-as-apple-uses-them-for-market-research>  
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1 the PPG sensors would be much more useful for heartrate-related tasks, but they have made do, since  
2 those are restrictions Apple places on their use of the Apple Watch device.

3 79. For the first four overarching versions of watchOS, the heartrate algorithm stayed  
4 roughly the same, and was in fact quite good at estimating a user's heartrate. Although the full  
5 technical details are not necessary for this complaint, the most relevant points to understand about the  
6 initial version of the heartrate algorithm are that it reported spikes and dips in heartrate and, more  
7 importantly, reported heartrate in an irregular fashion if the user's heartrate was in fact generating  
8 erratic data. For example, if a user's heart beat quickly for two seconds, then slow for seven seconds,  
9 then beat quickly again for three seconds, the watchOS1-OS4 version of the heartrate algorithm would  
10 report heartrates in roughly similar bursts.

11 80. One of AliveCor's innovations was to train SmartRhythm how to assess when these  
12 irregularities likely indicated the user should record an ECG to check on their heart health. Even  
13 though raw PPG data would have been better for this task, the initial version of the heartrate algorithm  
14 on watchOS1-OS4 provided enough information on when heartrates were irregular, along with enough  
15 data about the actual spikes and dips in heartrates, that SmartRhythm was able to accurately predict  
16 conditions like atrial fibrillation ("AFib") (which the user could confirm by recording an ECG via the  
17 KardiaBand) over 95% of the time. It was this accuracy that helped catapult AliveCor to the forefront  
18 of heartrate analysis on wearable devices and which indicated to Apple how valuable this sort of  
19 analysis could be to smartwatch users.

20 81. In September 2018, Apple released its Series 4 Apple Watch, which included the  
21 ability to record an ECG standard on the device. The Series 4 Apple Watch also (for the first time  
22 ever) included an Apple-developed heartrate analysis app that not only indicated when a user should  
23 consider taking an ECG reading, but also was FDA-cleared to provide diagnoses of heart conditions  
24 such as AFib. On information and belief, Apple was able to provide this diagnostic aspect to its  
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1 heartrate analysis app because, unlike with competitors, it granted itself full access to the raw data  
2 from the device's PPG sensors.<sup>28</sup>

3 82. Although this new competition was skewed in Apple's favor (given that Apple made its  
4 heartrate analysis app and ECG reading functionality defaults on the Apple Watch), AliveCor could  
5 have continued to compete but for a simultaneous change Apple made to watchOS, the fifth version of  
6 which it released with the Apple Watch Series 4 (and which preexisting Apple Watch owners were  
7 able to implement on their Series 1-3 devices). That update effectively killed all competition for  
8 heartrate analysis apps on the Apple Watch by changing the heartrate algorithm in two core ways that  
9 sabotaged all existing and potential third party competition.

10 83. The first change watchOS5 made to the heartrate algorithm was to "smooth" heartrate  
11 data so that it reported irregular heartrates with far less frequency. By smoothing the heartrate in this  
12 way (but not imposing the same limitation on itself), Apple made it so third party developers were less  
13 able to detect the sorts of heartrate fluctuations that could indicate heart problems and were thus less  
14 able to provide meaningful medical analysis for users. This surreptitiously reduced the quality of  
15 Apple's competitors' offerings.

16 84. The second change was to report heartrate on a consistent basis without variation—  
17 approximately every five seconds. To a lay person, such a change might appear innocuous, but its real  
18 (and only) effect was to completely sabotage competing products. As previously noted, one of the key  
19 indicators of heart problems is *irregularities*, which can include, *inter alia*, erratic beat patterns,  
20 unexpected changes in the speed of beats, and a heartrate that is clearly out of sync with one's activity  
21 levels. The way to detect such irregularities is to report them as they occur; *i.e.*, on a basis that is just  
22 as irregular as the irregularities themselves. By changing the heartrate algorithm to consistently report  
23 heartrate every five seconds, Apple made it so competing heartrate analysis app providers could no  
24 longer detect irregularities and, thus, could not provide effective heartrate analysis. This alone  
25 crippled apps like SmartRhythm.

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27 <sup>28</sup> AliveCor's review of Apple's submissions to the FDA also indicates that Apple misled the  
28 FDA regarding the accuracy of its app's diagnoses, thus paving the way to clearance on sham  
submissions.

1           85. As noted above, Apple did not similarly constrain itself. On information and belief  
2 (which is substantiated by, *inter alia*, the fact that Apple was able to obtain FDA clearance for its  
3 heartrate analysis app, meaning the app was deemed reliable enough to diagnose heart conditions),  
4 Apple gave itself access to the raw data collected by the Apple Watch’s PPG sensors. That data is the  
5 best information available to detect and diagnose a user’s heart problems, and to indicate to them  
6 when they should take a confirmatory ECG. This meant that Apple had access to the best and most  
7 suitable data, but changed watchOS to deprive third party developers of anything even remotely  
8 resembling the same quality data. Thus, with a single update to watchOS—which, again, coincided  
9 with Apple releasing the first version of the Apple Watch that came standard with the ability to record  
10 an ECG—Apple eliminated all heartrate analysis competition on the Apple Watch. Indeed, after trying  
11 to adapt SmartRhythm to the revised heartrate algorithm, AliveCor concluded that, at best, it could  
12 only predict situations in which a user should take an ECG about 50% of the time. Given that  
13 SmartRhythm was meant to alert those potentially suffering from a heart condition to confirm that fact  
14 and seek medical advice as appropriate, AliveCor could not offer its users the effective equivalent of a  
15 coin flip on that lifesaving task. AliveCor was therefore forced to pull SmartRhythm from the market  
16 and, it understands, other heartrate analysis app competitors were either forced to do the same or  
17 remove their heartrate analysis features and instead pivot to just providing heartrate tracking.

18           86. Notably, the changes Apple made to the heartrate algorithm with watchOS5 were not  
19 improvements. Users did not receive more accurate heartrate data as a result of the changes; nor did  
20 they receive any other qualitative benefits. Indeed, Apple did not claim in its promotional materials for  
21 the Series 4 Apple Watch that it had improved or otherwise changed the heartrate algorithm; Apple  
22 instead focused on its new ECG reading capabilities and its heartrate analysis app.<sup>29</sup> Thus, Apple  
23 Watch Series 4 purchasers were not drawn to the purchase by any suggestions that heartrate  
24 information was more accurate, or any other supposed improvement. This confirms that the only real  
25 effect—and the clear intent—of the algorithm changes was to exclude competition.

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27           <sup>29</sup> [https://www.apple.com/newsroom/2018/09/redesigned-apple-watch-series-4-](https://www.apple.com/newsroom/2018/09/redesigned-apple-watch-series-4-revolutionizes-communication-fitness-and-health/)  
28 [revolutionizes-communication-fitness-and-health/](https://www.apple.com/newsroom/2018/09/redesigned-apple-watch-series-4-revolutionizes-communication-fitness-and-health/)

1           87.       These changes were also nefarious in that they did not just affect new Series 4 Apple  
2 Watches, which came standard with watchOS5 and were the first—and, at that point, only—Apple  
3 Watches to incorporate the ability to record ECGs through the Apple Watch hardware itself. Apple  
4 also pushed the OS5 update wirelessly to Series 1-3 Watch users. If and when those users updated to  
5 OS5 (which the vast majority of them did), it instantly sabotaged third party heartrate analysis app  
6 providers on those devices, even though Apple could not itself provide the ability to record an ECG on  
7 those devices. Apple thus made it so existing AliveCor users were unable to continue to obtain reliable  
8 analyses from SmartRhythm, putting their health at risk, which was particularly problematic given  
9 they were locked into their Apple Watch purchase for the reasons discussed above (and, of course,  
10 could not have predicted that Apple would change policies with respect to third party heartrate  
11 analysis apps in this way).

12           88.       Given Apple’s previous history of attempts to exclude AliveCor from the market  
13 through complaints about App Store guidelines and more surreptitious, undocumented changes to  
14 watchOS4, its simultaneous release of ECG functionality on the Series 4 Apple Watch, and the very  
15 targeted nature of the watchOS5 heartrate algorithm changes, it was clear that Apple intended to  
16 exclude competition through its OS update. And its adherence to those changes to this day confirms its  
17 ongoing intent to exclude competition for heartrate analysis apps on the Apple Watch.

18           89.       Unfortunately, Apple Watch users (and, more broadly, ECG-capable  
19 smartwatch/wearable users) are unable to constrain Apple’s anticompetitive activities in the relevant  
20 market (or aftermarket) for heartrate analysis apps because (a) much of Apple’s behavior is behind the  
21 scenes and invisible to them; (b) they have little ability to learn about Apple’s behavior before they  
22 make an Apple Watch purchase; (c) they become locked into their smartwatch purchase at the time of  
23 purchase, due to the cost, investment, and longevity of the purchase and associated service contract;  
24 and (d) they even become more locked into watchOS (and the broader Apple mobile device  
25 ecosystem) over time, for the reasons previously discussed. Similarly, watchOS app developers are  
26 unable to constrain Apple’s anticompetitive activities because (a) they cannot control how Apple  
27 designs and updates watchOS, and (b) if they push back on it in any meaningful way, they risk being  
28 unable to sell into the watchOS app market at all. Accordingly, Apple’s power has only grown over



1 the heartrate analysis app market over time, and both Apple Watch users and developers are less and  
2 less able to act as a brake on Apple's power and anticompetitive activities.

3 90. Unfortunately, the inability to discipline Apple's misbehavior means that it has been  
4 able to harm competition and competitors in all-too-predictable ways. By excluding competing  
5 heartrate analysis app developers, Apple has, first and foremost, removed constraints on its pricing  
6 behavior, particularly given that it already had (and retains) monopoly power in the U.S. market for  
7 ECG-capable smartwatches (or, alternatively, the U.S. market for ECG-capable wearable devices and  
8 even the broader U.S. market for smartwatches). This has led to Apple imposing even higher prices  
9 for Apple Watches due to including its heartrate analysis app and associated hardware on the device  
10 without competition from third party developers.<sup>30</sup> Apple has also used its anticompetitive exclusivity  
11 over health data on the Apple Watch to partner with large manufacturers and medical institutions in  
12 various health studies (including, notably, heart health studies),<sup>31</sup> which it presumably intends to use  
13 to monetize new products following research results from those studies. By limiting competitors'  
14 access to Apple Watch users, Apple has made it so those competitors cannot similarly partner with  
15 other interested researchers to proliferate and expand on health research generated from wearable  
16 devices, thus decreasing output—the only research allowed now is that which Apple permits, usually  
17 to its financial benefit above all else. Another anticompetitive effect of Apple's conduct is to reduce  
18 market output (including by, *inter alia*, reducing overall product quality in the market), reduce market  
19 innovation, and plainly reduce watchOS user choice, despite obvious demand for competition to  
20 Apple's default heartrate analysis app. These negative competitive effects impact competing  
21 developers and end users directly, because Apple is able to offer lower-quality products at  
22 supracompetitive prices with impunity, and because it has no fear that doing so will cause it to lose  
23 market share or power.

24 \_\_\_\_\_  
25 <sup>30</sup> Apple now uses its unchallenged heartrate analysis app as a central selling point for the  
26 Apple Watch, both for individual users and for doctors looking to make suggestions for ways for  
27 patients to monitor their heart health. *See* <https://www.apple.com/healthcare/apple-watch/>.

27 <sup>31</sup> *See, e.g.*, <https://www.apple.com/newsroom/2019/09/apple-announces-three-groundbreaking-health-studies/>; <https://www.cnet.com/news/johnson-and-johnson-apple-team-up-on-new-ios-based-heart-study/>.



1 (c) In furtherance of the anticompetitive scheme alleged herein, Apple employees  
2 have traveled between states and have exchanged communications through interstate wire  
3 communications and via U.S. mail; and

4 (d) The anticompetitive scheme alleged herein has affected billions of dollars of  
5 commerce. Apple has inflicted antitrust injury by artificially excluding AliveCor and other  
6 competitors and causing the other antitrust injuries described herein.

7 **COUNT I**

8 **Sherman Act Section 2 – Monopolization (15 U.S.C. § 2)**

9 94. The foregoing paragraphs are incorporated by reference as though fully set forth herein.

10 95. Apple has willfully acquired and maintained monopoly power in the relevant market  
11 for watchOS heartrate analysis apps or, in the alternative, heartrate analysis apps for wearable devices.

12 96. Apple possesses monopoly power in the relevant market for watchOS heartrate analysis  
13 apps or, in the alternative, heartrate analysis apps for wearable devices.

14 97. Apple has nearly 100% market share in the relevant market for watchOS heartrate  
15 analysis apps, and at least 70% market share in the alternative relevant market for heartrate analysis  
16 apps for wearable devices.

17 98. Apple has willfully acquired and maintained monopoly power in the relevant market,  
18 by means of predatory, exclusionary, and anticompetitive conduct, including but not limited to  
19 technological tying arrangements / exclusionary design changes, “implicit” tying arrangements,  
20 aftermarket monopolization, raising rivals’ costs, and leveraging, as alleged herein.

21 **Technological tying / exclusionary design changes**

22 99. Apple Watches are sold in the U.S. ECG-capable smartwatch market (or, in the  
23 alternative, the U.S. ECG-capable wearable devices markets or U.S. smartwatch market), but, as  
24 described above, Apple obtains lock-in monopoly power over Apple Watch users once they select an  
25 Apple Watch for purchase.

26 100. Apple has sufficient economic power over ECG-capable smartwatches (or, in the  
27 alternative, ECG-capable wearable devices or smartwatches in general) to enable it to restrain trade in  
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1 the relevant market for watchOS heartrate analysis apps (or, in the alternative, heartrate analysis apps  
2 for wearable devices).

3 101. Apple has sufficient economic power over locked-in Apple Watch users to enable it to  
4 restrain trade in the relevant market for watchOS heartrate analysis apps (or, in the alternative,  
5 heartrate analysis apps for wearable devices).

6 102. Apple implemented design changes to watchOS that were not improvements, but were  
7 instead meant to, and did, exclude competition in the relevant market for watchOS heartrate analysis  
8 apps (or, in the alternative, heartrate analysis apps for wearable devices).

9 103. Apple's conduct has affected a not insubstantial amount of interstate commerce in  
10 watchOS heartrate analysis apps (or, in the alternative, heartrate analysis apps for wearable devices).

11 104. Apple's conduct has had an anticompetitive effect in the relevant market for watchOS  
12 heartrate analysis apps (or, in the alternative, heartrate analysis apps for wearable devices).

13 "Implicit" tying arrangements

14 105. Apple Watches are sold in the U.S. ECG-capable smartwatch market (or, in the  
15 alternative, the U.S. ECG-capable wearable devices markets or U.S. smartwatch market), but, as  
16 described above, Apple obtains lock-in monopoly power over Apple Watch users once they select an  
17 Apple Watch for purchase.

18 106. Apple Watches and heartrate analysis apps are two separate services or products, or, in  
19 the alternative, complementary products.

20 107. Apple has implicitly conditioned the sale of an Apple Watch to the use of its heartrate  
21 analysis app.

22 108. Apple has implicitly conditioned the use of an Apple Watch to the user not using a  
23 third party developer's heartrate analysis app.

24 109. Apple has sufficient economic power over ECG-capable smartwatches (or, in the  
25 alternative, ECG-capable wearable devices or smartwatches in general) to enable it to restrain trade in  
26 the relevant market for watchOS heartrate analysis apps (or, in the alternative, heartrate analysis apps  
27 for wearable devices).

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1 110. Apple has sufficient economic power over locked-in Apple Watch users to enable it to  
2 restrain trade in the relevant market for watchOS heartrate analysis apps (or, in the alternative,  
3 heartrate analysis apps for wearable devices).

4 111. Apple's conduct has affected a not insubstantial amount of interstate commerce in  
5 watchOS heartrate analysis apps (or, in the alternative, heartrate analysis apps for wearable devices).

6 112. Apple's conduct has had an anticompetitive effect in the relevant market for watchOS  
7 heartrate analysis apps (or, in the alternative, heartrate analysis apps for wearable devices).

8 Aftermarket monopolization

9 113. Due to the information and switching costs described above, Apple Watch purchasers  
10 become locked in to their purchase after making their initial purchase, and then become more locked  
11 into the watchOS and broader Apple mobile device ecosystem over time.

12 114. Once users were locked into watchOS devices and the Apple mobile device ecosystem,  
13 Apple utilized the power that lock-in conferred in order to exclude competition in the relevant market  
14 (or aftermarket) for watchOS heartrate analysis apps or, in the alternative, relevant market (or  
15 aftermarket) for heartrate analysis apps for wearable devices.

16 115. Apple's actions, based on the lock-in it obtained has impeded its competitors' ability to  
17 compete in the relevant market (or aftermarket) for watchOS heartrate analysis apps or, in the  
18 alternative, relevant market (or aftermarket) for heartrate analysis apps for wearable devices.

19 Raising rivals' costs

20 116. Apple has monopoly power in the U.S. ECG-capable smartwatch market (or, in the  
21 alternative, the U.S. ECG-capable wearable devices markets or U.S. smartwatch market).

22 117. Apple obtains lock-in monopoly power over Apple Watch users once they select an  
23 Apple Watch for purchase.

24 118. By changing watchOS's heartrate algorithm to prevent accurate reporting of  
25 irregularities in a user's heartrate to a third party developer, Apple raised those competitors' costs to  
26 do business. It did so by completely preventing them from obtaining the data they needed to provide  
27 heartrate analysis reliably on the Apple Watch.

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1           119. Apple’s heartrate analysis app competitors had no choice in the face of their raised  
2 costs (*i.e.*, the dramatic reduction in the quality of their services) but to either substantially reduce the  
3 scope or quality of their app’s services/functionality, or cease providing their app entirely.

4           120. Apple’s conduct has affected a not insubstantial amount of interstate commerce in the  
5 relevant market for watchOS heartrate analysis apps (or, in the alternative, heartrate analysis apps for  
6 wearable devices).

7           121. Apple’s conduct has had an anticompetitive effect in the relevant market for watchOS  
8 heartrate analysis apps (or, in the alternative, heartrate analysis apps for wearable devices).

9                   Leveraging

10           122. Apple has monopoly power over locked-in Apple Watch users, as well as monopoly  
11 power in the U.S. ECG-capable smartwatch market (or, in the alternative, the U.S. ECG-capable  
12 wearable devices markets or U.S. smartwatch market).

13           123. Apple has used its lock-in monopoly power over Apple Watch users in a predatory,  
14 exclusionary, and anticompetitive manner to monopolize the relevant market for watchOS heartrate  
15 analysis apps (or, in the alternative, heartrate analysis apps for wearable devices), and its monopoly  
16 power in the U.S. ECG-capable smartwatch market (or, in the alternative, the U.S. ECG-capable  
17 wearable devices markets or U.S. smartwatch market) in a predatory, exclusionary, and  
18 anticompetitive manner to monopolize the relevant market for watchOS heartrate analysis apps (or, in  
19 the alternative, heartrate analysis apps for wearable devices).

20           124. Apple’s conduct is not justified, because its conduct is not intended to enhance overall  
21 efficiency and to make the relevant markets more efficient.

22           125. Apple’s conduct has had a substantial effect on interstate commerce.

23           126. AliveCor has been or will be injured in its property as a result of Apple’s conduct.

24           127. AliveCor has suffered and will suffer injury of the type that the antitrust laws were  
25 intended to prevent. AliveCor has been and will be injured by the harm to competition as a result of  
26 Apple’s conduct.

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1 **COUNT II**

2 **Sherman Act Section 2 – Attempted Monopolization**

3 128. The foregoing paragraphs are incorporated by reference as though fully set forth herein.

4 129. In the relevant market for watchOS heartrate analysis apps (or, in the alternative,  
5 heartrate analysis apps for wearable devices), Apple has engaged in predatory, exclusionary, and  
6 anticompetitive conduct, including but not limited to technological tying arrangements / exclusionary  
7 design changes, “implicit” tying arrangements, aftermarket monopolization, raising rivals’ costs, and  
8 leveraging, as alleged herein.

9 130. Apple’s conduct has had an anticompetitive effect in the relevant market for watchOS  
10 heartrate analysis apps (or, in the alternative, heartrate analysis apps for wearable devices).

11 131. Apple’s conduct has no legitimate business purpose or procompetitive effect.

12 132. Apple has engaged in that conduct with the specific intent of monopolizing the relevant  
13 market for watchOS heartrate analysis apps (or, in the alternative, heartrate analysis apps for wearable  
14 devices).

15 133. Apple has engaged in that conduct with a dangerous probability of monopolizing the  
16 relevant market.

17 134. Apple’s conduct has had a substantial effect on interstate commerce.

18 135. AliveCor has been or will be injured in its property as a result of Apple’s conduct.

19 136. AliveCor has suffered and will suffer injury of the type that the antitrust laws were  
20 intended to prevent. AliveCor has been and will be injured by the harm to competition as a result of  
21 Apple’s conduct.

22 **COUNT III**

23 **Unfair Competition – California Business & Professions Code § 17200 et seq.**

24 137. AliveCor restates and incorporates the foregoing paragraphs as though fully set forth  
25 herein.

26 138. Absent injunctive relief, AliveCor will suffer loss of money or property and an  
27 economic injury in fact, and thus has standing to seek relief under section 17200.

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