

# AliveCor® Kardia Mobile User Manual for iOS

NOTE: For the current information on your product, visit <http://www.alivecor.com/user-manual>.

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## 1. PRODUCT DESCRIPTION

The Kardia Mobile by AliveCor® (Kardia Mobile) is a mobile, clinical-quality electrocardiogram (EKG or ECG) recorder. The duration of the recording established by the AliveCor Kardia Phone App (Kardia phone app) with a default setting of 30 seconds and a maximum time of 5 minutes. The software application can store thousands of recordings on your smartphone or tablet and these recordings are also accessible to authorized users on AliveCor, Inc. (AliveCor) servers ([www.alivecor.com](http://www.alivecor.com)).

Patients with known or suspected heart conditions and health conscious individuals can use Kardia Mobile to record an EKG daily or whenever they are feeling symptoms and share their recordings with their physician. Medical professionals can use Kardia Mobile to quickly assess rate and rhythm, screen for arrhythmias, and remotely monitor and manage patients who use Kardia Mobile.

The device consists of three components:

1. The Kardia Mobile, which attaches to your compatible smartphone or tablet and has electrodes to transmit EKG rhythms to the smartphone or tablet.
2. The Kardia phone app is used to collect, view, save, and wirelessly transmit recordings to the AliveCor server.
3. A user-supplied compatible smartphone or tablet.

**CAUTION:** The Kardia Mobile has features that are only available to those users who are under the care of a physician. These features are available to prescription users only.

The Kardia Mobile enables users to:

- Collect and store single-channel EKG recordings using the smartphone or tablet.
- Record voice memos that are automatically transcribed to notes.
- Edit user information data associated with the recording.
- Wirelessly transmit EKG recordings to the AliveCor server.
- Access EKG recordings stored on the AliveCor server.
- Print or save the recording in PDF format.
- Request professional clinical interpretation and analysis of your EKG recordings.
- Track events that may impact your heart health, such as symptoms, activities, diet, etc.

After a user has created an account on the Kardia phone app and received an EKG analysis, Kardia Mobile enables a user to:

- View EKG recordings in real-time and after the recording.
- View the output of the Atrial Fibrillation, Normal, and Unreadable Detectors.

### 1.1. Indications for Use – U.S.

Kardia Mobile by AliveCor is intended to record, store and transfer single-channel electrocardiogram (ECG or EKG) rhythms. Kardia Mobile by AliveCor also displays EKG rhythms and detects the presence of atrial fibrillation and normal sinus rhythm (when prescribed or used under the care of a physician). Kardia Mobile by AliveCor is intended for use by healthcare professionals, individuals with known or suspected heart conditions and health conscious individuals. The device has not been tested for and it is not intended for pediatric

use.

### **1.2. Indications for Use – Outside of U.S.**

Kardia Mobile by AliveCor is intended to record, display, store and transfer single-channel electrocardiogram (ECG or EKG) rhythms. Kardia Mobile by AliveCor also detects the presence of atrial fibrillation and normal sinus rhythm in each recording. Kardia Mobile by AliveCor is intended for use by healthcare professionals, patients with known or suspected heart conditions and health conscious individuals.

### **1.3. Contraindications**

There are no known contraindications for Kardia Mobile, although care should be taken when considering using the device according to the warnings and precautions below.

## **2. GENERAL SAFETY PRECAUTIONS**

- The device should not be used near water, or in a wet environment.
- Do not use this device in locations subject to high or low temperatures or humidity. It should be used within the temperature and humidity range according to the product label.
- Do not sterilize this device with an autoclave or glass sterilizer.
- Audio and video products and similar equipment may cause interference. Please stay away from such equipment when you are recording.
- Do not take recordings in a location where the device will be exposed to strong electromagnetic forces, such as near an arc welder, high-power radio transmitter, etc.
- Signal quality may degrade by detecting signals from other ultrasonic acoustic sources. Do not use the device in close vicinity to other equipment emitting ultrasonic acoustics such as espresso machines, some ventilation systems or another Kardia Mobile.
- Power adapters may degrade signal detection. Do not use Kardia Mobile while charging the smartphone or tablet.
- Disperse any static electricity from your body before using the device.
- Do not take recordings in a moving vehicle.
- Do not expose the device to strong shocks or vibrations.
- Do not disassemble, repair, or modify the device.
- Do not insert battery with polarity reversed.
- Do not use batteries of a type other than that specified for use with the device.
- Do not take a recording if the electrodes are dirty. Clean them first.
- Do not use for any purpose other than obtaining an electrocardiogram.
- If the portion of the body where the electrode is applied has too much body fat, body hair or very dry skin, a successful recording may not be possible.
- Some children and adults with very sensitive auditory ability may hear a high-pitched hum or buzz emitting from the device when activated. This is due to normal device function.

## **3. STORAGE, HANDLING AND MAINTENANCE**

Do not store the device in:

- Locations exposed to direct sunlight,
- Locations subject to high temperatures and high humidity,
- Wet or damp locations where water may get on the device,
- Dusty locations,
- Near fires or open flames,
- Locations exposed to strong vibration, or
- Locations exposed to strong electromagnetic fields.

No maintenance of this system is required, except:

- The battery should be replaced when necessary.
- The electrodes should be cleaned using an alcohol-based sanitizer before each use.
- To prevent potential cross-infection of diseases between users, clean the device using alcohol prior to each use.

#### **4. WARNINGS**

- This device is not designed or intended for complete diagnosis of cardiac conditions. This device should never be used as a basis for starting or modifying treatment without independent confirmation by medical examination.
- This device records heart rate and heart rhythm only.
- This device does not detect or measure all heart rate, heart rhythm and heart waveform changes, especially those related to ischemic heart conditions.
- Do not attempt self-diagnosis or self-treatment based on the recording results and analysis. Self-diagnosis or self-treatment may lead to deterioration of your health.
- Interpretations made by this device are potential findings, not a complete diagnosis of cardiac conditions. All interpretations should be reviewed by a medical professional.
- Users should always consult their physician if they notice changes in their health.
- Do not use in the presence of flammable anesthetics, drugs or pressurized oxygen (such as in a hyperbaric chamber, ultraviolet sterilizer or oxygen tent).
- Do not use this device during an MRI scan.
- Keep out of reach of infants, small children, or anyone incapable of using the device properly.
- The device has not been tested for use on infants weighing less than 10kg. AliveCor does not recommend using on humans less than 10kg.
- It is not recommended to place a mobile phone directly next to a pacemaker on the chest.
- Do not use this device with a defibrillator.
- AliveCor does not recommend using on individuals with a cardiac pacemaker, ICDs or other implanted electronic devices.
- Do not attempt EKG data acquisition while there is an external microphone plugged in to the smartphone or tablet.
- EKG reports viewed or printed at any magnification other than 100% may appear distorted and could lead to misdiagnosis.
- The heart rate is based on the heart rhythm; therefore the rate is only valid if there is a valid rhythm (QRS complex visible).

- The Unreadable Detector may incorrectly identify ventricular flutter, ventricular bigeminy and ventricular trigeminy as unreadable. If you have been diagnosed with one or more of these arrhythmias, we recommend turning off the Unreadable Detector in your Settings.
- AliveCor cannot guarantee that you are not experiencing an arrhythmia or other health condition when labeling an EKG as normal. You should notify your doctor of a possible change in your health.

## 5. SET UP THE KARDIA MOBILE AND TAKE THE FIRST EKG RECORDING

### 5.1. Decide which smartphone or tablet to use

Your Kardia Mobile is compatible with all of the smartphones and tablets listed on AliveCor's website: <http://www.alivecor.com/compatibility>, including:

- iPhone 4/4s, 5/5s, 5c, 6/6s, 6 Plus/6s Plus
- iPad Air, iPad Mini
- iPod Touch 5G

The Kardia phone app is compatible with iOS versions 5.1 – 9.2

You can use Kardia Mobile on all compatible smartphones or tablets as listed on the Compatibility Chart.

The Kardia Mobile for iPhone 5/5s and iPhone 6 can also be used on all compatible smartphones or tablets by removing Kardia Mobile from its case:

1. If Kardia Mobile is currently attached to an iPhone 5/5s, remove it and its case from your iPhone 5/5s (press gently on the phone camera through the case cutout and peel back from that corner of Kardia Mobile).
2. Face the electrodes of Kardia Mobile away from you.
3. AC-007: Gently push the left side of Kardia Mobile toward you while at the same time gently pulling the left edge of the case away from the device itself.
4. Kardia Mobile should then “pop out” of its case.

### 5.2. Unpack Kardia Mobile

1. Remove Kardia Mobile from the box.
2. Choose Kardia Mobile placement.
  - a) For Kardia Mobile cases, place Kardia Mobile on your phone as you would any standard phone case.
  - b) The Kardia Mobile can be attached directly to the smartphone or tablet or to the case of your choosing (the surface should be smooth and flat).
    - a. AC-001 - AC-007: With the AliveCor logo right side up, the top of the smartphone or tablet should be on the right.
    - b. AC-009: With the AliveCor logo right side up, the top of the smartphone or tablet should be at the top.
  - c) For use with an iPad, AliveCor does not recommend attaching Kardia Mobile to your iPad. Instead, rest Kardia Mobile in both hands or place it on a flat surface less than one foot away from the iPad to record EKGs.

**Caution: The Kardia Mobile must be less than 1 foot from the smartphone or tablet to ensure communication between devices.**

### **5.3. Download the Kardia phone app**

1. Using your smartphone or tablet, search for *Kardia* in the App Store.
2. Download and install the Kardia phone app.

### **5.4. Set up an AliveCor Account**

You will use your AliveCor account to access, print and save your EKG recordings stored on the Kardia phone app and the AliveCor server. Follow the instructions presented when you open the Kardia phone app for the first time. You can go back later and change your information if necessary. Signing up for an AliveCor account also enables you to send an EKG for analysis. EKG analysis can be used any time you want a medical professional to interpret your EKG recording and is required if you would like to view your recordings or utilize Kardia's Detectors.

## **6. RECORD EKG RHYTHMS USING THE KARDIA MOBILE**

Before taking each recording:

- Disconnect headphones, charger cables, or any other connected devices.
  - Clean the two electrodes with alcohol-based sanitizer.
  - Using your smartphone or tablet, launch the Kardia phone app.
1. Rest two or more fingers (it doesn't matter which fingers) on Kardia Mobile; your right hand should contact the electrode closest to the bottom of the smartphone or tablet, and your left hand should contact the electrode closest to the top of the smartphone or tablet. This is a Lead I EKG.
  2. While recording your EKG, speak your symptoms (e.g. "I'm feeling palpitations. Maybe due to anxiety") into the smartphone. Any voice memo recorded will be transcribed to text and added to the Notes section for that EKG recording.

You may also choose from two other placements:

- For a Lead II ECG, the left knee should contact the electrode closer to the top of the smartphone or tablet and the right hand should contact the electrode closer to the bottom of the smartphone or tablet.
- For an Anterior Precordial Lead, the device can be placed on the lower left side of the chest, just below the pectoral muscle. The bottom of the smartphone or tablet should be pointing towards the center of the body.

NOTE: You will not be able to view your recordings or utilize any of Kardia's Detectors until you are under the care of a physician. To gain access to these features, you must create an account on the Kardia phone app. Your first recording will then be automatically sent for a free analysis by a cardiologist (US customers only). Once you have received the EKG analysis, you will have access to view that recording and subsequent recordings.

Additionally, you may add notes or tags to the recording. Tags include symptoms, activities, diet, etc. that are relevant to heart health:

- When your recording is complete, you will arrive at the Data Entry screen where you may add notes or tags such as symptoms, activities, diet, etc.
- Alternatively, you may go to the Journal screen, and tap the dropdown arrow to the right of the EKG recording, then tap Edit. This will also take you to the Data Entry screen where you may add or edit notes and tags.

**NOTES:**

- The Kardia Mobile does not require a Wi-Fi or mobile connection to record an EKG and save it to the smartphone or tablet; however, it does require a connection to sync automatically with the AliveCor server, email, or print directly from the Kardia phone app. If you do not have a Wi-Fi or mobile connection at the time of the EKG recording, you may email or print the data later when you have such a connection and the sync will happen automatically at that time.
- The Kardia Mobile may be used up to a distance of 30 cm (1 ft.) from the smartphone or tablet. Using Kardia Mobile at a distance greater than 30 cm (1 ft.) may lead to communication issues between the devices and your recording may not be successful.
- To reduce muscle noise, rest your arms on a flat surface to increase stability while you are recording.
- You must maintain contact with the electrodes for at least 10 seconds for the recording to be saved. If you remove contact after 10 seconds, but before the selected recording duration is complete, the EKG will be saved and you will be able to review it.
- The recording must be at least 30 seconds long for the Detectors to work.

**7. ONCE THE RECORDING IS FINISHED**

- Immediately after recording, you will be shown an analysis of your EKG if it is available.
- After a recording, you are also prompted to add tags such as symptoms, activities, diet, etc. to the Data Entry screen. You may also enter personalized tags or notes, and you may also edit the transcribed voice memo. After making your choices, tap “Save” to continue.
- You will be asked if this recording was a Guest recording or yours. You may edit the Guest name by tapping on “Guest” for the EKG recording on the Journal screen at any time.
- You may review the EKG in the Journal screen, or go to Insights and view the trending of your EKGs, heart rate, symptoms, activities, etc. You may also tap the EKG on the Journal screen for a larger view of the EKG on the EKG Review screen. EKGs can be starred, emailed, shared, or sent for analysis from the Journal screen, or on the EKG Review screen.

**8. ENTER AN EVENT WITHOUT AN EKG**

You may enter a tag or note without an EKG at anytime. This may help you track your symptoms, activities, diet, etc. either before or after an EKG:

- Tap Journal, then tap the blue “Plus” icon at the top left.



- In the Data Entry screen, you may enter notes, or select tags such as symptoms, activities, diet, etc., or create personalized tags.
- In the Data Entry screen, you may also select a different date/time for the event you are logging, for example alcohol from the previous evening, or a meal from a couple days ago.
- All of your events will appear in the Journal screen in chronological order, and may be edited anytime by selecting the dropdown arrow to the right of the event on the Journal screen.

## 9. SETTINGS AND ADJUSTMENTS

### 9.1. Recording Adjustments

- **Paper Speed.** Paper speed of the EKG in the PDF report can be set to 12.5mm/s, 25mm/s, or 50mm/s. This option is only available to health professionals. These changes can be made prior to the recording. Alternately, you can pinch and zoom when viewing the recording as a PDF (tap “SHARE” and tap “PDF”).
- **Gain.** Gain of the EKG in the PDF report may be set to 5mm/mV, 10mm/mV or 20mm/mV. This option is only available to health professionals. These changes can be made prior to the recording. Alternately, you can pinch and zoom when viewing the recording as a PDF (tap “SHARE” and tap “PDF”).
- **Enhanced Filter.** The Enhanced Filter suppresses noise in the EKG. The filter may be toggled on a particular EKG from the EKG Review screen. To enable or disable the Enhanced Filter, tap “MORE” at the bottom of the EKG Review screen, and then tap the “ENHANCED” switch to toggle the filter ON or OFF.
- **Invert the EKG Recording.** In the event that Kardia Mobile was oriented improperly when the EKG was recorded, it may appear inverted. The orientation may be toggled on a particular EKG from the EKG Review screen. Tap “MORE” at the bottom of the EKG Review screen, and then tap the “INVERT” switch to toggle it ON or OFF.

### 9.2. Adjustable Settings

To access the Settings, tap the “More” icon at the upper right and then tap “Settings”.

- **Duration.** Recording Duration is the maximum length of time the Kardia phone app will record a single EKG recording. For example, if the recording duration is set to 30 seconds, the Kardia phone app will automatically stop recording after 30 seconds of data has been collected.
- **Mains Filter.** The Mains Filter removes any mains interference from the EKG; it should be set to match the frequency of the alternating current (AC) used in your location. For the United States, Canada and Mexico, this is 60 Hz; in most other countries, it is 50 Hz.
- **Paper Size.** Paper Size of the PDF report can be changed to accommodate Letter and A4 paper sizes.
- **Reminders.** Reminders allow the EKG analysis reminder to be turned on or off. It also allows you to turn on or off the EKG reminder, set the frequency, and time for the reminder. You can also turn the AF Detector on or off, and modify your medication reminders.

- **Mode.** Tap to modify device transmission settings. Normal mode is recommended for most users. If your facility or location limits wireless communication, the Airplane/ICU setting may be selected.

## 10. EMAIL, PRINT OR DELETE RECORDINGS

NOTE: If you are not enrolled in Kardia’s EKG Analysis service, you will not be able to view the recording. AliveCor will unlock this feature if you are under the guidance of a physician.

You may email/print recordings from either the Kardia phone app or your account on the server ([www.alivecor.com](http://www.alivecor.com)).

To email a recording from the Kardia phone app, you must have an email account set up on your smartphone or tablet. If you need assistance setting up an email account or troubleshooting your email account, contact your smartphone or tablet provider for assistance.

1. Tap the “Share” icon next to the EKG you would like to email/print on the Journal screen. Alternatively, you may tap the EKG in the Journal screen, then select “Share” on the EKG Review screen
2. Tap Email. The PDF version of the EKG recording will then be attached to a new email in whatever email account you have set up on your smartphone or tablet.

To print a recording from the Kardia phone app, you must have an AirPrint compatible printer set up on your smartphone or tablet. If you need assistance setting up an AirPrint compatible printer or troubleshooting your AirPrint compatible printer, contact your smartphone or tablet provider for assistance.

1. Tap the “Share” icon next to the EKG that you would like to email/print on the Journal screen. Alternatively, you may tap the EKG in the Journal screen, then select “Share” on the EKG Review screen
2. Tap Print.

To print a recording from the website:

1. Go to [www.alivecor.com](http://www.alivecor.com)
2. Click the “SIGN IN” and enter your email address and password
3. Select the desired recording by clicking the appropriate “View EKG” button on the right
4. Click the “View PDF” link.
5. Print from your computer as you would any PDF.

To delete a recording:

1. Go to the Journal screen
2. Tap the dropdown icon to the right of the EKG that you want to delete
3. Tap “Delete”.

## 11. VIEW PREVIOUSLY RECORDED EKG RECORDINGS ON YOUR SMARTPHONE OR TABLET

NOTE: If you are not enrolled in Kardia’s EKG Analysis service, you will not be able to view the recording. AliveCor will unlock this feature if you are under the guidance of a physician.

- Launch the Kardia phone app

- Tap Journal at the top of the screen to see a list of all EKG recordings on your smartphone or tablet (excluding any previously deleted)
- Tap the EKG recording you wish to view.

NOTE: You may listen to the voice memo associated with the EKG by tapping the Play button.

## 12. SEARCH OR FILTER RECORDINGS

You may search or filter the events in the Journal screen by using the search icon on the top right of the screen.

To filter:

1. Tap the search icon on the top right
2. Select one of the existing filters. The filters allow you to choose one of the following: Custom Search..., Starred, Atrial Fibrillation, Analysis Reports, My EKGs, and Guest EKGs
3. Your Journal screen will show you EKGs that meet the filter criteria until you disable the filter
4. You may disable the filter by tapping the “x” icon next to the filter name at the upper right of the Journal screen.

To search:

1. Tap the search icon at the top right
2. Tap “Custom Search” at the top of the search menu
3. Type in the term you are searching for in your events using the keyboard. For example, you may be looking for “Caffeine” or “Walked the dog” in your tags and notes
4. Tap outside of the keyboard area if you would like to remove the keyboard for better scrolling through your records
5. You may disable the search view by tapping “Cancel” on the top right of the screen or edit your search term by tapping in the search bar and entering another term.

## 13. VIEW AN EKG RECORDING ON THE ALIVECOR WEBSITE

NOTE: If you are not enrolled in Kardia’s EKG Analysis service, you will not be able to view the recording. AliveCor will unlock this feature if you are under the guidance of a physician.

- On your web browser, go to [www.alivecor.com](http://www.alivecor.com) and click on “SIGN IN”
- Enter your email address and the password you created when you set up your AliveCor account. Click “Sign In”.
- The EKG recordings you collected were automatically synced to the AliveCor server and will appear in list form, and each transmission is stored as an Adobe Acrobat PDF file and can also be viewed in HTML. Click on the “View EKG” button.
- Click the back button in your browser to return to your AliveCor account homepage.

## 14. EKG ANALYSIS

The Kardia phone app includes the ability to request professional clinical interpretation and analysis of your EKG recordings. Due to telemedicine restrictions, your location may restrict your ability to use this service. AliveCor does not know your location; it is your responsibility to ensure this service is legal according to your local telemedicine laws. This service is not intended to replace medical advice, please seek professional medical assistance if you are suffering from any medical problem.

To request an EKG Analysis Report:

1. Tap Journal and find the EKG you would like to send for analysis. Tap “Share” to the right of the recording, then “EKG Analysis”. Alternatively, you may tap the EKG in the Journal screen, and then tap “Analysis” at the top right of the EKG Review screen
2. Select one of the listed Analysis Report options
3. If you haven’t already entered your name, date of birth and gender, you will be prompted to enter these details. Enter the required details and tap “Next”
4. You will be prompted to select or enter your credit card information. Enter your card details and tap “Next”
5. Confirm that the purchase order is correct and tap "PURCHASE" to place the order.

Your order is then processed and you will be sent an email confirmation. Another email will be sent when the report is available.

NOTE: The “Analysis” option is only visible if the analysis service is available in your country.

To view an EKG Analysis Report:

1. Tap “Journal”
2. Tap the desired report below the EKG

Alternatively, you may access EKG Analysis Reports from the EKG Review screen by tapping “Analysis”.

## 15. DETECTORS (ATRIAL FIBRILLATION, NORMAL, UNREADABLE)

NOTE: If you are not enrolled in Kardia’s EKG Analysis service, you will not be able to view the recording. AliveCor will unlock this feature if you are under the guidance of a physician.

NOTE: Your EKG must be at least 30 seconds long to use the Atrial Fibrillation and Normal Detectors. If an EKG is recorded that is less than 30 seconds, neither the Atrial Fibrillation nor the Normal Detector will display a result.

### **Atrial Fibrillation Detector**

The Atrial Fibrillation (AF) Detector in the Kardia phone app detects atrial fibrillation in an EKG tracing. After you take an EKG, if atrial fibrillation is detected you will be notified within the app. This finding is not a diagnosis, it is only a potential finding. You should contact your physician to review any EKG recording in which atrial fibrillation was detected, or send it to EKG Analysis. If you are experiencing any symptoms or concerns contact a medical professional.

The AF Detector monitors for atrial fibrillation (AF) only. It will not detect other potentially life threatening arrhythmias, and it is possible that other cardiac arrhythmias may be present.

The AF Detector only monitors for AF while you are taking a recording. It does not continuously monitor your heart and therefore cannot alert you if AF happens at any other time.

### **Normal Detector**

The Normal Detector in the Kardia phone app notifies you when a recording is “normal”. This means that the heart rate is between 50 and 100 beats per minute, there are no or very few abnormal beats, and the shape, timing and duration of each beat is considered normal. It is important to remember that there is a wide range of normal variability among different individuals. Changes in the shape or timing of an EKG might be normal for a single individual, but since Kardia Mobile is used by a large and diverse population, the Normal Detector has been designed to be conservative with what it detects as normal.

If you have been diagnosed with a condition that affects the shape of your EKG (e.g., intraventricular conduction delay, left or right bundle branch block, Wolff-Parkinson-White Syndrome, etc.), experience a large number of premature ventricular or atrial contractions (PVC and PAC), are experiencing an arrhythmia, or took a poor quality recording it is unlikely that you will be notified that your EKG is normal.

It is also important to note that the Normal Detector looks at the entire signal before determining if it can be declared to be normal. If you experience a small number of PACs or PVCs in a recording of otherwise normal beats in normal rhythm, the Normal Detector will likely declare this recording to be normal.

**WARNING:** AliveCor cannot guarantee that you are not experiencing an arrhythmia or other health condition when labeling an EKG as normal. You should notify your doctor of a possible change in your health.

### **Unreadable Detector**

The Unreadable Detector in the Kardia phone app determines whether a recording can be accurately interpreted or not. After you take an EKG, if interference is detected you will be notified within the app that your recording is “Unreadable” and given some suggestions for acquiring the best quality EKG recording. You subsequently have the option to Save the recording, or Try Again. If the recording can be analyzed, the AF and Normal Detectors will run on the EKG and inform you as described above.

**WARNING:** The Unreadable Detector may incorrectly identify ventricular flutter, ventricular bigeminy and ventricular trigeminy as unreadable. If you have been diagnosed with one or more of these arrhythmias, we recommend turning off the Unreadable Detector in your Settings.

### **15.1. What is Atrial Fibrillation?**

The most common type of non-sinus tachyarrhythmia is atrial fibrillation. In this case, disorganized electrical impulses that originate in the atria and pulmonary veins initiate the electrical activity in the conduction system of the heart. This causes what are commonly termed as “irregularly irregular” heart beats.

When a heart is in atrial fibrillation, its two upper chambers, the right and left atria essentially quiver, instead of beating efficiently. This does not allow for complete emptying of the atria and thus, blood may become stagnant and create blood clots. This can lead to major problems, namely, strokes, transient ischemic attacks (TIAs), and pulmonary emboli (PEs); depending which chamber of the heart has the blood clot in it.

Approximately 15 percent of strokes occur in people with atrial fibrillation. As age increases in a population, so too does the incidence of atrial fibrillation, which peaks at about 3-5% in people over the age of 65.

The most common presenting symptoms of atrial fibrillation are palpitations, dizziness, fast pulse rate, irregularly irregular rhythm, an abnormal heart sound (S1), chest pain, chronic shortness of breath, abnormal jugular venous pressure, fatigue, and impaired exercise tolerance. Other symptoms related to TIAs and strokes may be the initial symptoms of atrial fibrillation.

Some of the most common causes of atrial fibrillation are long-standing hypertension, congestive heart disease, cardiac valvular lesions, myocardial infarctions, history of coronary artery bypass grafts, hyperthyroidism, alcohol abuse, smoking, diabetes mellitus, and electrolyte imbalances.

### **15.2. AF, Normal, Unreadable, and Unclassified Recordings in EKG review screen and Journal**

All tracings analyzed as positive for atrial fibrillation, normal, or unreadable will have a tag for future review. The Kardia phone app may display the “Unclassified” message for a tracing that is not Normal and not AF, and interference was not detected. An example of an unclassified tracing is one where tachycardia is observed. These tags will be visible in the Journal screen, Data Entry screen, and the EKG review screen.

### **15.3. Activation of the Detectors**

The Unreadable and Unclassified Detectors can be turned on or off in the settings of the Kardia phone app.

### **15.4. Detector Usage**

Note that the detectors have been trained and tested on Lead I recordings only. Due to the difference in the waveform from Lead II or Anterior Precordial Lead recordings, reliance on the analysis messages (e.g. “Normal”, “Unreadable”, etc.) of these recordings is not recommended.

## 16. MEDICATIONS

You may track your medications with the Kardia phone app. To access and edit the medications:

- Tap “Insights” in the Menu at the bottom of the screen. Scroll to the bottom of the Insights screen and tap “Log Medications”. You may edit your medications or select those taken that day.
- Alternatively, tap the medication push notification that is sent to you by default at 9:00am every day. You may then edit your medications or select those taken that day.
- You may also edit your medications by accessing your Profile. Tap “. . .”, “Profile”, “Medications”.
- You may view medications selected on the Insights screen.
- You may select a medication more than once per day by tapping “Medications Logged” at the bottom of the Insights screen, and tapping the specific medication again. The number to the right of the medication will update.

## 17. INSIGHTS

Your data will be graphed in the Insights section of the Kardia phone app. To access it, tap the “Insights” icon in the menu at the top of the screen. The following items are graphed in Insights over a 7-day period, and over a 14-day period when the Kardia phone app is turned to landscape view:

- Number of EKGs recorded, including the number of AF recordings and Normal Recordings.
- Heart rate (bpm) in each EKG recording
- Symptoms, activities, diet, etc.
- Medications that were selected

NOTE: Your Insights are also available by logging into your account on [www.alivecor.com](http://www.alivecor.com). Insights data is available in 30-day increments, from when you first created your account. Note that this feature is available for individual users only, not for medical professionals.

## 18. HEALTH APP INTEGRATION

The Kardia phone app is integrated with the Apple Health app. Information about your activities and vitals helps us provide you with a monthly (premium) Personal Report. You have the option of turning off the integration within the Apple Health app; however, doing so will limit the information available in your Premium Report. The Kardia phone app shares the following pieces of information with the Apple Health app:

- Heart Rate
- Height
- Weight

The Kardia phone app collects the following pieces of information from the Apple Health app:

- Active Energy
- Blood Glucose
- Diastolic Blood Pressure
- Flights Climbed

- Heart Rate
- Height
- Oxygen Saturation
- Resting Energy
- Sleep Analysis
- Steps
- Systolic Blood Pressure
- Walking + Running Distance
- Weight
- Workouts

## 19. PERSONAL REPORT

The Personal Report is a monthly report that displays any associations between your AliveCor data and your activity data. The Personal Report provides you with analysis, insights, and actionable advice to help you care for your heart. The report quality improves as you share more of your activity data through the Apple Health app.

## 20. ACCESSING HELP

Learn more about using your AliveCor Kardia Mobile by tapping “. . .” at the top right. Tap “HELP” to see all the options available.

- **Tutorials.** Review these tutorials to learn about to navigate all the features of the app
  - Quick Tutorial
  - Recording an EKG
  - AF Detection
  - Sending for EKG analysis
  - Retrieving EKG analysis
  - Alternate positions
- **Other Documentation.** Learn about EKG analysis; access the user manual, feedback and privacy and terms.
  - What is EKG analysis
  - User Manual
  - Feedback
  - Privacy and terms

## 21. EDITING USER PROFILE

- Launch the Kardia phone app.
- Tap “. . .” at the top right.
- Tap “Profile”.
- All user details can be edited.



## 22. ACCESSING EDUCATION

- Launch the Kardia phone app.
- Tap “. . . ” at the top right.
- Tap “Education”. Users have the ability to learn about:
  - Cardiac Anatomy
  - What is an EKG
  - Arrhythmia Library
  - External Resources

NOTE: The information contained within this section is for educational purposes only. This information has been written and verified by medical professionals.

Do not attempt to use this information to interpret your own EKG. This information is not intended to replace medical advice, please seek professional medical assistance if you are suffering from any medical problem.

## 23. PROVIDER DASHBOARD

The Provider Dashboard allows medical professionals the ability to view their patients’ recordings automatically from their own account. To create a medical professional account, download the Kardia phone app and follow the prompts to create a new account.

To view a patient’s future recordings, you must send them an invite via email. To send an email invite:

1. Go to [www.alivecor.com](http://www.alivecor.com)
2. Click on “SIGN IN” and enter your email address and password
3. Click “PATIENT MANAGEMENT”
4. Click on “Invite a Patient”
5. Type in the patient’s email address (this must be the email address they use for their AliveCor account)
6. Click “Send Email”

## 24. ELECTRONIC HEALTH RECORD (EHR) INTEGRATION

Send to EHR: If you are a physician and your AliveCor account has been setup for integration with an Electronic Health Record system (EHR) you can send EKG recordings to your EHR. You can see the option if you tap the bottom left corner of the review screen and choosing this option.

**25. TROUBLESHOOTING**

Problem	Solution
<p>My Kardia Mobile is not working.</p>	<p>If you're taking your first recording, ensure that your Apple iPhone "Portrait Orientation Lock" is not on as you must be able to turn your phone to landscape orientation (bottom of the iPhone in your right hand) in order to take a recording.</p> <p>If you're using iOS 7 or greater, ensure that the Kardia phone app has access to the iPhone microphone:</p> <ol style="list-style-type: none"> <li>1. Tap on iPhone "Settings"</li> <li>2. Tap on "Privacy"</li> <li>3. Tap on "Microphone"</li> <li>4. Ensure that "Kardia" is turned on (the background of the slider is green)</li> </ol> <p>Change the battery</p> <ol style="list-style-type: none"> <li>1. Expose the battery door at the back of Kardia Mobile:           <ol style="list-style-type: none"> <li>a. Remove the case from the smartphone or tablet by pushing the iPhone through the camera cutout, while peeling back Kardia Mobile from this corner.</li> </ol> <p>OR</p> <ol style="list-style-type: none"> <li>b. Remove Kardia Mobile from the attachment plate:               <ol style="list-style-type: none"> <li>1. AC-001 - AC-007: Place your thumbs on the electrodes and press down firmly. Turn counterclockwise about 45 degrees to "unlock" Kardia Mobile. Once it's "unlocked", Kardia Mobile can then be lifted out of the plate.</li> <li>2. AC-009: Use your thumbs to slide Kardia Mobile toward the open end of the plate.</li> </ol> </li> </ol> </li> <li>2. Remove the battery door:           <ol style="list-style-type: none"> <li>a. AC-001 - AC-007: Use a 1.6mm Phillips screwdriver, press down firmly and turn counterclockwise to remove the screw in the battery door.</li> <li>b. AC-009: Insert a pen, pencil or other similarly shaped object into the cutout next to the battery door to pop the battery door off.</li> </ol> </li> <li>3. Remove the used battery and replace it with a new 3V coin cell battery matched to your model.</li> <li>4. Orient the battery with the positive terminal up, so that you can see the writing. Remove the protective sticker from the battery, as applicable.</li> </ol>

Problem	Solution
I have a lot of artifact, noise or interference in my recording.	<p>Try the following tips for acquiring the best quality EKG recording:</p> <ul style="list-style-type: none"> <li>• Ensure that the “Enhanced Filter” is on.</li> <li>• Clean the electrodes on Kardia Mobile with an alcohol-based sanitizer.</li> <li>• If hands are very dry, use a water-based lotion before recording.</li> <li>• When recording from the hands, relax the arms and hands to reduce muscle noise. Rest the forearms and hands on a flat surface and let Kardia Mobile rest on the hands. Do not squeeze Kardia Mobile.</li> <li>• Ensure that your smartphone or tablet is not charging/syncing and you are not using headphones with your smartphone or tablet during the recording.</li> <li>• Make sure that both the smartphone or tablet and the user remain still during EKG recordings. Movement during recordings will cause noise in the tracing.</li> <li>• Make sure Mains Filter is set appropriately for your geographical location. This can be adjusted under the Kardia phone app Settings.</li> </ul>
The EKG rhythms appear upside down.	<p>In the future, ensure that the left hand contacts the electrode closer to the top of the smartphone or tablet, and the right hand contacts the electrode closer to the bottom of the smartphone or tablet. To invert a recording on your smartphone or tablet, see “Invert the EKG recording” under “Recording Adjustments”.</p>
I forgot my password and I’m unable to reset it.	<p>To reset your password, go to <a href="http://www.alivecor.com">www.alivecor.com</a> and click on "SIGN IN" in the upper right corner and click on the "Forgot your password?" link below the Password field. On the Forgot Password screen, enter your email address and click Submit.</p> <p>Follow the reset instructions in the email. Please note the reset link contained in the email is only active for a short while.</p>
The PDF Report looks slightly different on the Web and in my App	<p>There is a 2.5 millisecond (thousandth of a second) difference in where the PDF starts for the Web Application and the Mobile Application. There is no difference in the recording and it will not impact how your EKG is interpreted.</p>
My personal information (name, DOB, etc.) disappears when I’m trying to create an account.	<p>If you navigate backwards when creating your account, the personal information you entered on the previous page is deleted and will have to be re-entered.</p>

<b>Problem</b>	<b>Solution</b>
The HUD symbol is covered up when I rotate my phone.	The HUD symbol can sometimes be partially obstructed when you rotate your phone while it's busy. This isn't a concern; the HUD symbol is just letting you know that the app is working. This doesn't impact your recording or any of your information.
I see large spikes at the start of my recording	Large amounts of noise/artifact can be seen for the first few milliseconds of a recording when the Enhanced Filter is looking for your heartbeat. This is a very rare problem that lasts until your first heartbeat is seen in the app and doesn't affect the rest of your recording.
The real-time display of my EKG recording is lagging and jumps	If you are using an iPhone 4 and syncing a large amount of recordings from the server the real-time display of your EKG may be slow. This is an issue that has been reported for iPhone 4 and occurs after an update or after a new install of the application on a new phone. This does not impact the EKG recording itself. Waiting for sync to complete (can take up to 30 minutes) after re-installing the application will prevent this error from occurring.
I need a printed version of the manual	Contact <a href="mailto:support@livecor.com">support@livecor.com</a> for a printed copy of this manual.
Is the manual available in another language?	This manual is available in English and French.

## 26. ALIVECOR KARDIA MOBILE SPECIFICATIONS

### Performance Characteristics

EKG Channel .....	Single Channel
Input Dynamic Range .....	10mV Peak-to-Peak
Memory length .....	Practically Unlimited
Recording Format .....	Continuous
Shelf Life .....	Estimated 2 years

### Circuitry

Frequency Response .....	0.5 Hz to 40 Hz
CMRR.....	76 dB
Input Impedance .....	> 100 MOhm
Differential Range .....	+/- 5 mV
A/D Sampling Rate .....	300 samples/second
Resolution .....	16 bit
DC Offset Correction .....	+/- 300 mV

### Output

Modulation .....	Frequency Modulated Ultrasonic Audio Tone
Center Frequency .....	19 kHz
Frequency Deviation .....	200 Hz/mV

### Power Requirements

Battery Type .....	3V Coin Cell
Battery life .....	min. 200 Hours Operational Time, 12 months typical use

### Physical Characteristics

AC-001 (for iPhone 4/4s) .....	40 grams	118 x 62 x 15 mm	9 cm <sup>2</sup> Electrode
AC-003 (for iPhone 5/5s) .....	41 grams	128 x 62 x 15 mm	9 cm <sup>2</sup> Electrode
AC-004 & AC-007-I5-A (for iPhone 5/5s).....	33 grams	126 x 62 x 11 mm	10cm <sup>2</sup> Electrode
AC-004 & AC-007-UA-A (w/Attachment Plate).	28 grams	89 x 48 x 9 mm	10cm <sup>2</sup> Electrode
AC-009 .....	18 grams	82 x 32 x 3.5 mm	9 cm <sup>2</sup> Electrode
AC-009-DI-A .....	18 grams	82 x 32 x 3.5 mm	9 cm <sup>2</sup> Electrode

### Environmental Specifications

Operational Temperature .....	+10 to +45 degrees C
Operational Humidity .....	10% to 95% (non-condensing)
Operational Altitude .....	based on your smartphone or tablet specification
Storage Temperature .....	-20 to +60 degrees C
Storage Humidity .....	10% to 95% (non-condensing)

### User Interface

Two stainless-steel electrodes are exposed on the back of Kardia Mobile. These electrodes make contact with the user's skin.

**27. EUROPEAN AUTHORIZED REPRESENTATIVE**

Obelis SA

BD General Wahis 53

1030, Brussels

Belgium

Tel: [+\(32\) 2. 732.59.54](tel:+3227325954)

Fax: [+\(32\) 2.732.60.03](tel:+3227326003)

E-Mail: [mail@obelis.net](mailto:mail@obelis.net)

**28. ALIVECOR CONTACT INFORMATION**

AliveCor, Inc.

30 Maiden Lane, Suite 600

San Francisco, CA 94108

United States

[www.alivecor.com](http://www.alivecor.com)

## 29. ELECTRICAL SAFETY

<b>Guidance and manufacturer's declaration - electromagnetic emissions</b>		
Kardia Mobile by AliveCor is intended for use in the electromagnetic environment specified below. The customer or the user of Kardia Mobile by AliveCor should assure that it is used in such an environment.		
<b>Emissions test</b>	<b>Compliance</b>	<b>Electromagnetic environment - guidance</b>
RF emissions CISPR 11	Group 1	Kardia Mobile by AliveCor uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	Kardia Mobile by AliveCor is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	N/A	
Voltage fluctuations / flicker emissions IEC 61000-3-3	N/A	

**Guidance and manufacturer’s declaration—electromagnetic immunity**

Kardia Mobile by AliveCor is intended for use in the electromagnetic environment specified below. The customer or the user of Kardia Mobile by AliveCor should assure that it is used in such an environment.


<b>Immunity test</b>	<b>IEC 60601 test level</b>	<b>Compliance level</b>	<b>Electromagnetic environment - guidance</b>
Electrostatic Discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions, and voltage variations on power supply input lines IEC 61000-4-11	<5 % $U_T$ (>95 % dip in $U_T$ ) for 0.5 cycle 40 % $U_T$ (60 % dip in $U_T$ ) for 5 cycles 70 % $U_T$ (30 % dip in $U_T$ ) for 25 cycles  <5 % $U_T$ (>95 % dip in $U_T$ ) for 5 sec	<5 % $U_T$ (>95 % dip in $U_T$ ) for 0.5 cycle 40 % $U_T$ (60 % dip in $U_T$ ) for 5 cycles 70 % $U_T$ (30 % dip in $U_T$ ) for 25 cycles  <5 % $U_T$ (>95 % dip in $U_T$ ) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of Kardia Mobile by AliveCor requires continued operation during power mains interruptions, it is recommended that Kardia Mobile by AliveCor be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE—  $U_T$  is the a.c. mains voltage prior to application of the test level.



**Guidance and manufacturer’s declaration—electromagnetic immunity**

Kardia Mobile by AliveCor is intended for use in the electromagnetic environment specified below. The customer or the user of Kardia Mobile by AliveCor should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 V	<p>Portable and mobile RF communications equipment should be used no closer to any part of Kardia Mobile by AliveCor, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p><b>Recommended separation distance</b></p> $d = \left[ \frac{3.5}{V_1} \right] \sqrt{P}$ $d = \left[ \frac{3.5}{E_1} \right] \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = \left[ \frac{7}{E_1} \right] \sqrt{P} \quad 800 \text{ MHz to } 2.5 \text{ GHz}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	<p>where <math>P</math> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and <math>d</math> is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,<sup>a</sup> should be less than the compliance level in each frequency range.<sup>b</sup></p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 

NOTE 1—At 80 MHz and 800 MHz, the higher frequency range applies.









NOTE 2—These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people

<sup>a</sup> Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which Kardia Mobile by AliveCor is used exceeds the applicable RF compliance level above, Kardia Mobile by AliveCor should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating Kardia Mobile by AliveCor.

<sup>b</sup> Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

<b>Recommended separation distances between portable and mobile RF communications equipment and Kardia Mobile by AliveCor</b>			
Kardia Mobile by AliveCor is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of Kardia Mobile by AliveCor can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and Kardia Mobile by AliveCor as recommended below, according to the maximum output power of the communications equipment.			
<b>Rated maximum output power of transmitter W</b>	<b>Separation distance according to frequency of transmitter m</b>		
	<b>150 kHz to 80 MHz</b> $d = [\frac{3.5}{V_1}] \sqrt{P}$	<b>80 MHz to 800 MHz</b> $d = [\frac{3.5}{E_1}] \sqrt{P}$	<b>800 MHz to 2.5 GHz</b> $d = [\frac{7}{E_1}] \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
For transmitters rated at a maximum output power not listed above, the recommended separation distance $d$ in meters (m) can be determined using the equation applicable to the frequency of the transmitter, where $P$ is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
NOTE 1—At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.			
NOTE 2—These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.			

**30. SYMBOLS USED SYSTEM OR PACKAGE LABELING**

	Type CF Applied Part
	European Conformity Mark
	WEEE – Properly Dispose of Electronic Waste
	Consult Instructions for Use / User Manual
	Manufacturer
	Temperature Limits (Operational)
	Relative Humidity Limits (Operational)
<b>REF</b>	Model Number
<b>SN</b>	Serial Number
	Direct Current Power Source