AshaView

User Instructions

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1. Introduction

AshaView is a free, easy-to-use android mobile app, created by Ashametrics, that enables viewing and recording of physiology data from the Ashametrics wearable sensor bands.

Ashaview supports all types of Ashametrics LifeBands and displays various sensor parameters including:

- EDA (skin conductance)

- 3-axis accelerometer

- Temperature

- Heart Rate

- Heart Rate Variability

This User Manual will instruct you on how to install and use AshaView on your Android device along with an Ashametrics sensor band.

2. Installing AshaView

AshaView is available for free through Google Play (formally known as the Android Marketplace). In the future, the Ashaview app may also be available from other distributors, such as Amazon.

To install AshaView to your Android device:
1) Go to the Google Play web site (https://play.google.com/store) and select "Android apps."
2) Search for Ashametrics or Ashaview
3) Select AshaView and select Install

3. Bluetooth Pairing

If your Android device has never been used with a specific Ashametrics LifeBand, then it is necessary to pair your new LifeBand with your Android phone or tablet. Pairing essentially gives permission and creates a record on your Android device which is used to for connecting to the Bluetooth device at a later time.

To pair your LifeBand with your Android device, follow these steps:

- Open the BlueTooth menu on your Android device

- Make sure that both BlueTooth and the LifeBand sensor band are turned on

- Select "Search for Devices"

- You should see the name "Lifeband" appear on the list, followed by 4 digits. The numbers correspond to the last 4 digits of the MAC address of the Ashametrics LifeBand Sensor

- Select the LifeBand you wish to pair with from the list. The Sensor will pair automatically (no pairing code required).

You are now ready to use the AshaView App with your LifeBand.

4. Which versions of Android are Supported?

The AshaView application works on all versions of Android 2.2 or higher. Android v2.1 works for the most part, but cannot pair with multiple Bluetooth devices.

All of the screen shots in this document are taken from Android version 2.2, unless otherwise noted. The screens, menus, and buttons for Android 4.x will appear slightly different but very similar.

5. Starting Ashaview

1) Make sure that the sensorband has already been paired with the phone.
2) Select the AshaView App in your Apps menu. AshaView will launch with a screen the resembles the following:
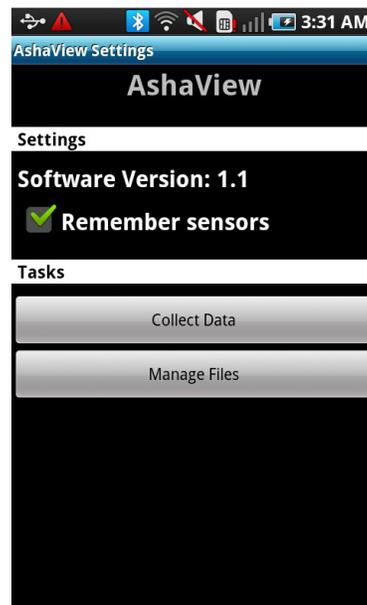
3) If the checkbox "Remember Sensors" is checked, then the application will store the Bluetooth ID of any sensorband that is used. All the previously used sensor bands will be automatically listed in the sensorband selection drop-down list. This is sometimes convenient when working with many sensor bands and running repeated experiments with the same sensor bands.

4) If you want to view the list of any data files that have been previously recorded, you can select "Manage Files." To view real-time data or to record new data, select "Collect Data" and you will be taken to the following screen:
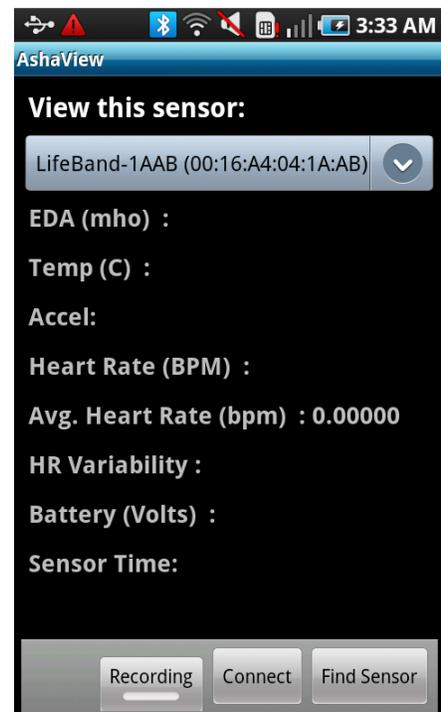
5) If this is the first time connecting to a new sensor, select "Find Sensor," wait a few moments to locate the band, and then select the LifeBand to which you would like to connect. (FYI, the 4 digits next to the name correspond to the last 4 digits of the MAC address of the Bluetooth radio module, which can be found on the back of the LifeBand circuit board).

MAC Address

6) Once you find a sensor band select it, the Ashaview software will add that band ID to your list of sensor bands which is stored in its internal memory, so you do not need to search for it again. (this is assuming that the "Remember Sensors" checkbox is checked as mentioned previously in step #3 above.) Note that adding the sensor band to your list of sensors will not connect to the sensor band. This step is only to add sensors to your sensor band list.
Why was the software designed this way? This list of sensor bands was created so that when you are working in an environment that has many Bluetooth devices (such as other cell phones and computers), the software will only list those sensor bands which are valid candidates for connecting to, and you don't need to sift through a few dozen bluetooth device ID's to find the Ashametrics bands.

Note that if your phone is not yet paired with a given LifeBand, then it will not appear on the screen during the "Find sensor" operation.

6. Selecting and Connecting to a LifeBand Sensor Band

Once you have added one or more LifeBands to your list of sensor bands, this list of sensor bands will appear as a drop down list on the phone screen shown below. (as mentioned in the previous section, you only need to do this one time, given that the "remember sensors" checkbox is checked).

Once you have added one or more sensor bands to your list, your screen should look like the following:
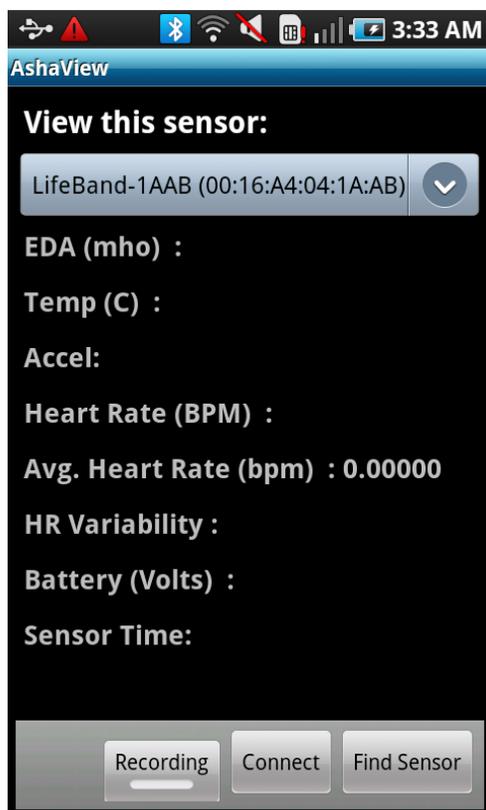
If you press this drop down list, you will see all of the sensor bands you have added to your list. You can then select the LifeBand to which you wish to connect and view data.

Once a specific LifeBand is selected, press "Connect" and the data fields will start updating.

Notice that if you view the drop down list again, you will see that once a sensor band is connected via Bluetooth to the phone, its name and ID will become **BOLD** font.

Once you connect to a sensor band and data is flowing, the screen should appear as shown below:
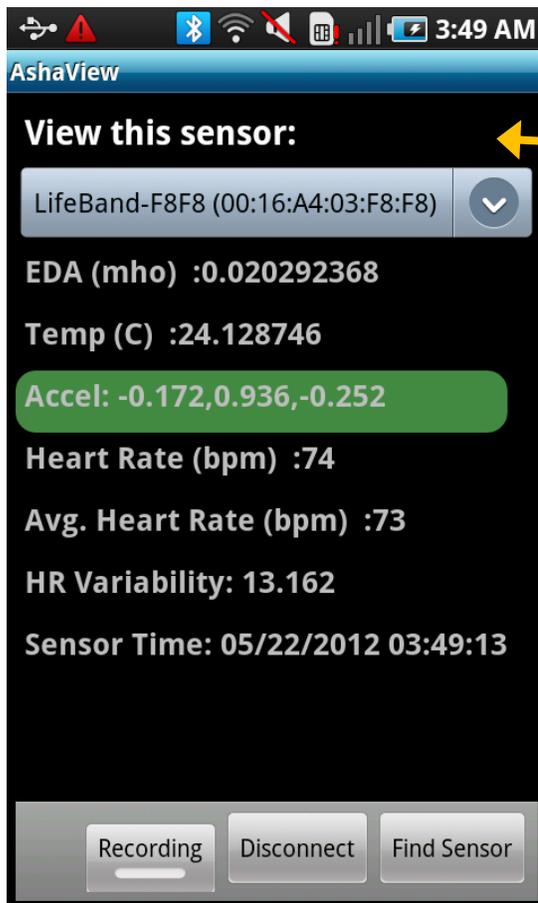
A red **Low Battery** icon will appear here when the battery is getting low.

Note: if no data appears after 10 seconds, you can try pressing "connect" once more. If nothing appears, it is possible that the sensor band is not turned on or the battery needs to be recharged.

7.   Connecting to Multiple Sensor Bands Simultaneously

If you are using multiple sensor bands simultaneously, you can repeat Step #6 above to connect to each sensor band in turn.   Ashaview provides the ability to connect to up to 7 separate sensor bands simultaneously.   You will notice that the drop down list provides a quick way to see which bands are connected and which are not, because the font is changed to **bold** when connected.

  When the phone is connected to multiple bands, to view the data from a specific band, you simply select the band from the drop down list. There is no need to press any other button or reconnect.

8. Viewing Real-Time Sensor Plots

To view a real-time plot, select a parameter from the list, and then turn the phone screen sideways.
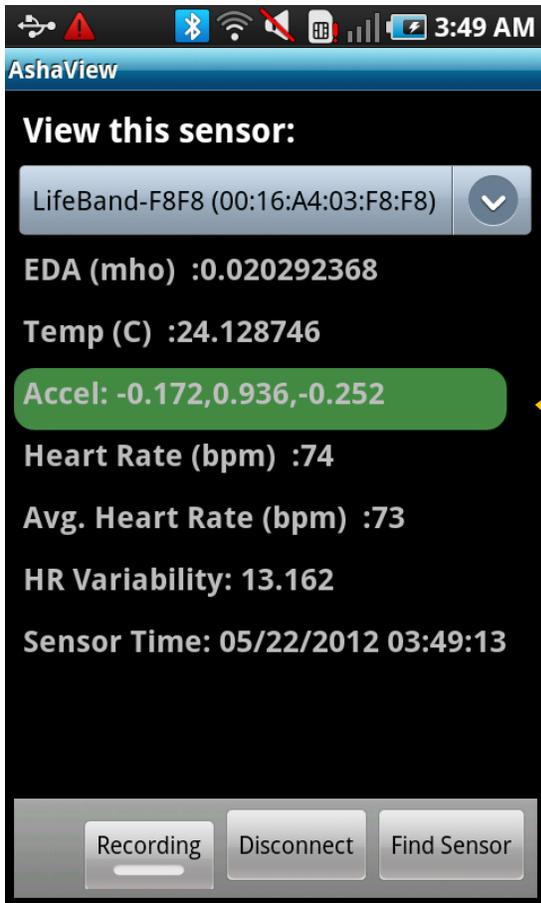
In this case the accelerometer is selected. This is the parameter that will be plotted.

When the phone is turned sideways, you should see a real time plot similar to the following:
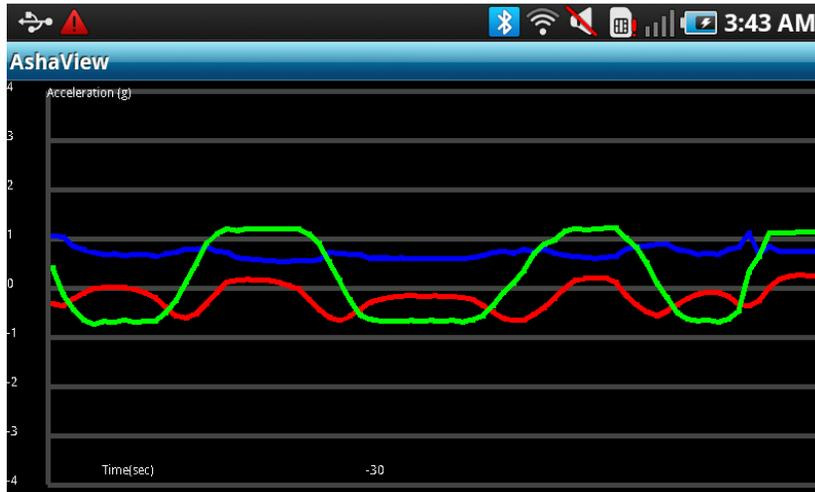
Green = z-axis motion
Red = y-axis motion
Blue = x-axis motion

9. Viewing AshaView Time Stamp and LifeBand Battery Status

To view the AshaView real-time clock settings, press the Android Menu button, select "Information," then select "Get Sensor Time."

To view the LifeBand Battery Status, press the Android Menu button, select "Information," then select "Get Battery Status." The battery voltage will appear momentarily on the bottom of the screen (this brief message is called a "toast" message) The battery voltage should be in the range of 3.7 volts when fully charged. 3.4 or lower means it needs to be charged.

10.   Setting the Real-Time Clock on the Sensor Band

All the data collected from the Ashametrics LifeBand Sensor is time-stamped with milli-second precision. The LifeBand contains an internal real-time clock--however, when you turn on the sensor, <u>you must set the time</u> on the sensor band clock in order for your data to be time stamped correctly.

To set the time on the sensor band, press the Android menu button. The following screen will be displayed:
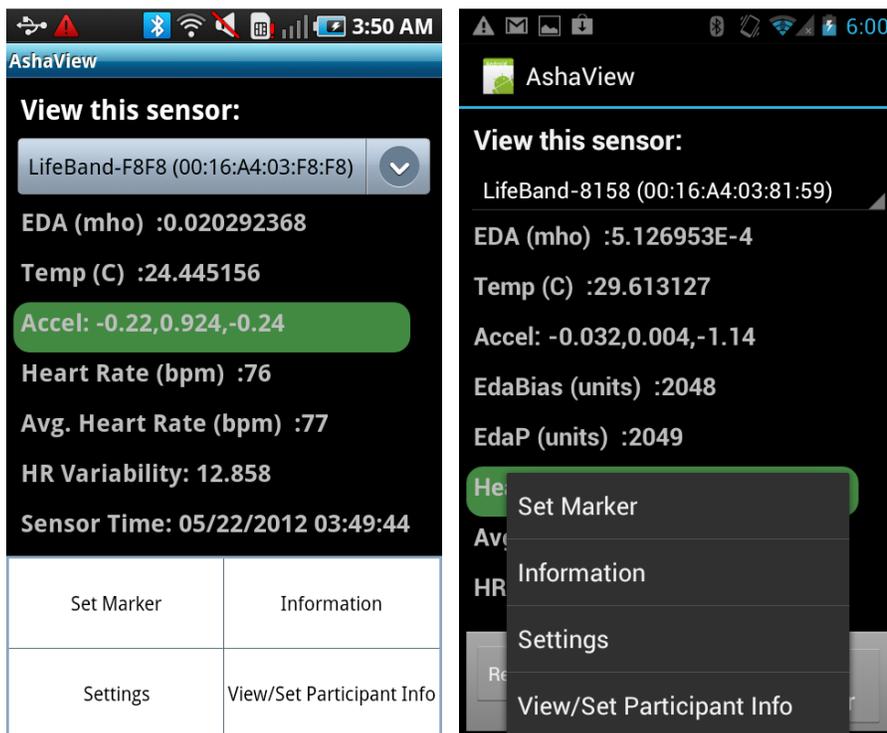
(left) Android 2.2 screen and (right) Android 4.1
Notice the difference in appearance between the different
versions of Android.

Select "Settings," then select "Set Sensor Time." AshaView will confirm that the time was successfully set. This will appear in a "toast" message.   When you set the time, the time and date from the Android device will be copied to the LifeBand. Therefore, you should verify that the time/date on your Android device is what you want it to be, otherwise the time/date will be incorrect on the sensor band as well.

Note: if you set the sensor band to sleep after use, you do not need to set the time. See section 9 below)

11.   Setting the Sensor Band ID

The Ashametrics LifeBand contains a set of registers that can be used to store certain parameters or data fields. A common parameter is the sensor band ID. This data filed can also be used to indicate the patient ID if desired.

To set the sensor band ID, Select the Android Menu button, select "Settings." Ashaview will display the following screen:

Next select "View/Set ID." Press the field under the instructions to display the keypad and enter the new Device ID. The ID must be exactly 8 hex bytes (16 characters). 0-9 and A-F are permitted. When you have finished entering the new ID, press the Android Back button, then select "Update." Ashaview will confirm that the device ID was successfully set.

Once the LifeBand ID is changed, the new ID will be stored permanently on the sensor band internal memory, even if the sensor band is turned OFF.

12. Recording Data

Once a sensor band is connected and data is flowing into the Ashaview application, you can select the RECORD button on the lower left corner of the screen. Once pressed, the record button will change color slightly. (The effect is slightly different depending on the version of Android you have)

To STOP recording, press the same RECORD button again and the colored indicator on the button will revert back.

If you have more than one sensor band connected, the data from all of the sensor bands will be recorded (not just the one that is displayed).

The phone records data in .CSV file format, which can be opened in Microsoft Excel or many other data processing and plotting programs. **Note: In the .CSV file, the column headings are given by the following: Epoch time, human time stamp, version number, raw data packet, EDA-bias, EDA-P, EDA total, accel-X, accel-Y, accel-Z, temp, N/A, N/A, Sensorband ID, Bluetooth MACID.**

After recording one or more files, you can verify that your data files are being recorded successfully by going back the main Ashaview screen and selecting the "Manage Files" button instead of "Collect Data."

13. Disconnecting from a LifeBand and Quitting AshaView

To Disconnect from a LifeBand, select the "Disconnect" button before turning off the sensor band.

To exit the application, you can press the Android back arrow a couple times to return to the home screen or you can simply press the Android home button on your phone to return to the main screen. (unfortunately, Android does not provide a simple QUIT button, like you have on Windows PCs or iPhone OS).

Important note: if you exit the Ashaview app, or if you press the back arrow to exit the screen, this will automatically stop recording and close all Bluetooth connections. We are considering to add an "are you sure you want to exit?" screen to avoid stopping a recording if you accidentally press the back button.

Note about time settings on the sensor band: some people find it annoying to have to reset the time every time the sensor band is used. (Actually in some other Ashametrics apps, the phone will automatically set the time on the sensor band when it connects to the band; however, some people do not want this feature) it is also possible to just leave the internal clock on the sensor band running; but this reduces battery life.

As a compromise, Ashametrics has provided the following solution: to turn off the sensor band completely (including the clock), you must press and hold the power button of the sensor band for at least 10 seconds. However, if you wish to turn OFF only the electronics but leave the clock running, you just need to hold down the power button until you see the sensor band flash, and then immediately let go of the button. This will put the sensor band in SLEEP mode. You can turn it back ON again by pressing the power button briefly.

14. Setting Markers and Annotations

For many experiments and research applications, it is useful to insert markers into the data stream as data is being collected. In order to set a marker, select the Android Menu button and the following screen will display:
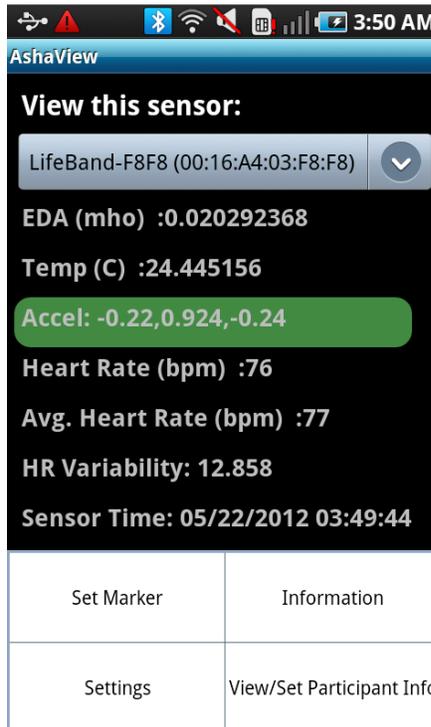
Note the screen will looks slightly different depending on which version of Android you are running.

1) Select "Set Marker"
2) You will then see a "toast" message box appear briefly on the bottom of the screen confirming that a marker has been set.

In the recorded .CSV data file, the marker will appear as a single line of data with a time stamp.

15. Viewing the Real-time ECG Heart Waveform

If your LifeBand supports Heart Rate measurement, it is often useful to view the real-time heart waveform in order to see if the sensor band is operating properly and to check that the electrodes are making proper contact with the skin. It is also often very useful to see if there is any interference in the signal caused by nearby electronic devices such as a power supply or a laptop computer screen.

You can view the real-time waveform of your heart by setting the sensor band to a different operating mode. To do this, press the Android settings menu on the main data screen. You should see the screen shown below:
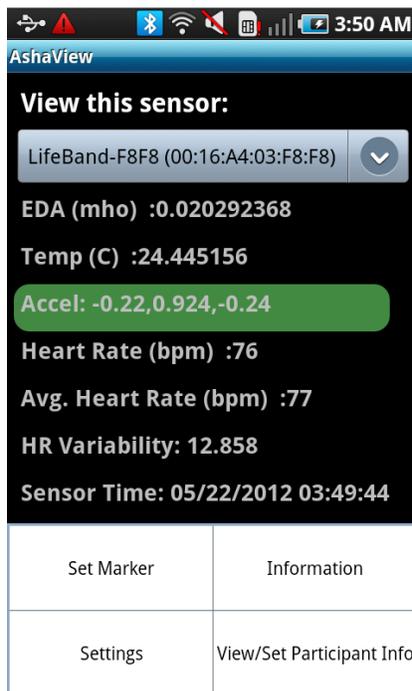
Select "Settings," then select "Set Sensor Mode" from the screen below:

Select this.
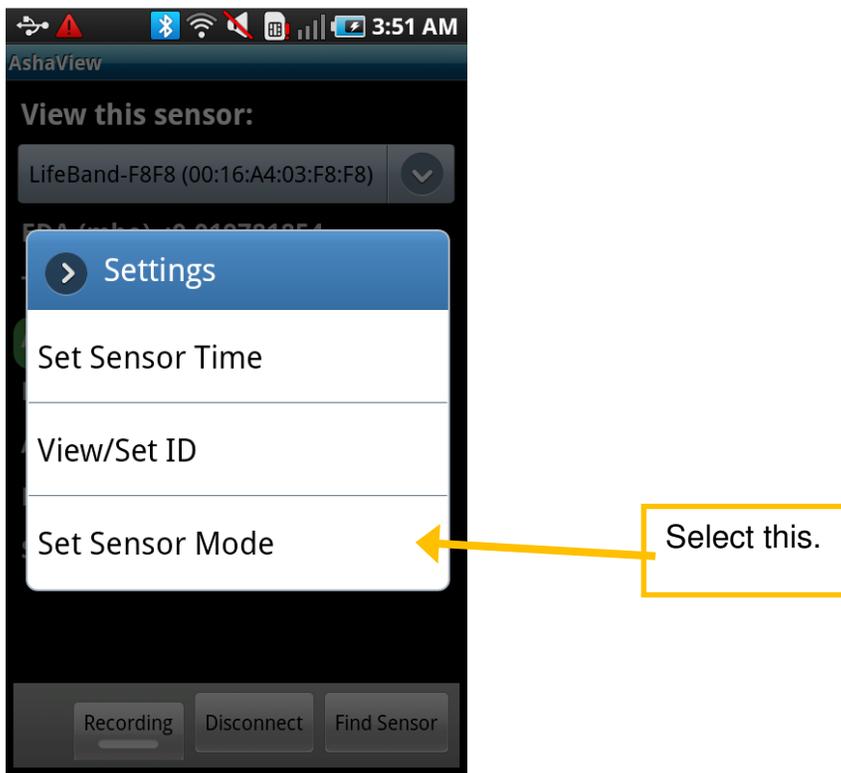
In the next screen, select "V3: ECG Waveform"
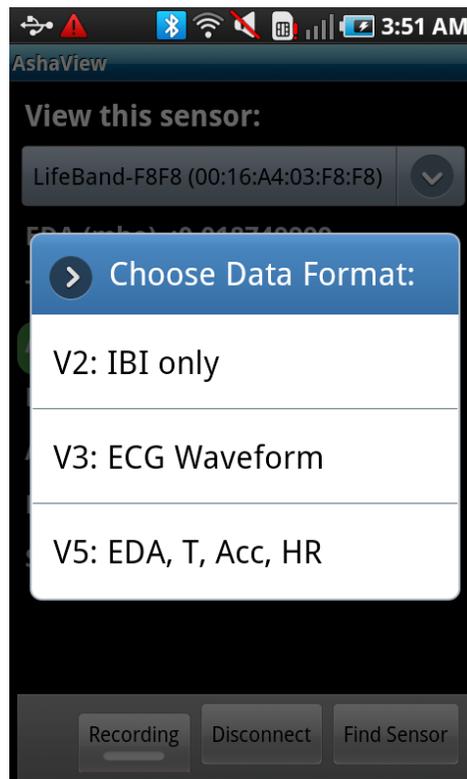
A toast message will be displayed confirming that the SET MODE command was sent.

The waveform will then start displaying on the screen:

Note that the plot is actually "upside down" compared to a conventional ECG plot. (this is an artifact of the plotting library used). If you are trying to record and analyze the ECG waveform itself, the Sensor Mode 2 can be used, or you can simply record data on the internal sensor band memory card and download the data later into a proper software package.

Note that you cannot record data while in Mode 3 (streaming ECG waveform). (however data is being recorded on the sensor band SD card) This sensor mode is intended simply as a tool to allow you to debug and test the quality of the raw ECG signal before you start recording.

To return to the previous screen, select the Android Menu button again and select "Settings" then "Set Sensor Mode" then "V5: EDA, T, Acc, HR" (or "Version 5" in android 4.1). You may need to turn the Android device sideways then back upright for your Android device to update properly.

16.   Downloading Data From Your Android Device

To download data from your Android Device to your PC, plug your Android Device into your computer's USB port with the cable provided. Make sure you have the appropriate USB drivers loaded on your computer; otherwise your computer will not be able to recognize the phone. You can usually obtain the drivers from your phone manufacturer's website. Some of the most common drivers can be found on the Android developer's web site.

Once connected, you will need to turn on "USB Mass Storage" on your phone screen. The files on the phone will then appear as a memory stick (Mass storage device) on your PC. (for further information see the user manual for your Android phone)

The Ashaview application stores data in a folder called "Ashaview". You will notice that each .CSV file contains the data-time-stamp in the title of the file.
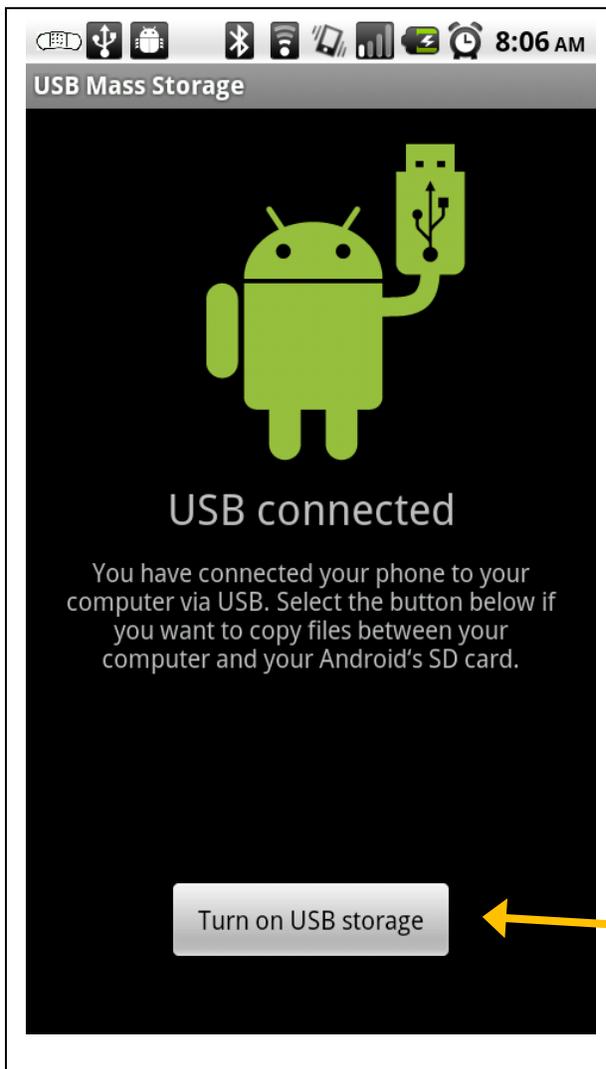
Don't forget to press this button which will mount the USB memory onto your computer.