

# eSense Skin Response FAQ

(effective 04/28/2020)

**Please consider these tips and tricks before you write Mindfield with a technical question!**

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## General FAQ and Troubleshooting

### **Question 1: How do I perform effective biofeedback-training?**

**How does the App work?**

**How do I use my own audio or video?**

**How should I interpret the measurements?**

Please see our extensive tutorial online at [www.mindfield.de/en/](http://www.mindfield.de/en/) on our pages for eSense products:

<https://www.mindfield.de/en/Biofeedback/Products/Mindfield%C2%AE-eSenseSkinResponse.html>

Read the guidelines inside the app, when tapping the “I” button.

For data files which you can load as own media into the eSense App, the general limitations by Android and iOS apply. We have successfully tested the following:

- Images: PNG and JPG (GIF can be loaded but isn't animated)
- Audio: MP3, WMA and WAV (Android) and MP3, WAV and AAC (iOS)
- Videos: MOV, MP4 and 3GP (Android) and MOV, MP4 and M4V (iOS)
- If your audios or images are in other formats you simply can convert the files on your computer. Just use a free tool like [Free Audio Converter](#) or [Free Video Converter](#)

Another tip: You can also directly download videos from YouTube and format them to suitable format (MP4) with tools like

- <https://notube.net/en> (Desktop)
- <https://snaptube-video.en.softonic.com/android> (Android)
- <https://apps.apple.com/de/app/video-saver-pro-cloud-drive/id1297144302?l=en> (iOS)
- If you already use the messenger Telegram, you can also download YouTube videos with a Telegram bot [https://blog.getphp.ir/en\\_US/2019/09/youtube-downloader-with-telegram-bot/](https://blog.getphp.ir/en_US/2019/09/youtube-downloader-with-telegram-bot/) (Android and iOS)

More additional information:

<https://developer.android.com/guide/appendix/media-formats.html>

<https://www.macxdvd.com/mac-dvd-video-converter-how-to/iphone-6s-supported-audiovideoformats.htm>

<https://www.macxdvd.com/mac-dvd-video-converter-how-to/iphone-7-supported-video-formats.htm>

**Question 1b: Which App do I need and where can I download it?**

You need the eSense Universal App which is available for free for Android and iOS.

You can download the App here:

Android: <https://play.google.com/store/apps/details?id=com.mindfield.esense>

iOS: <https://itunes.apple.com/us/app/mindfield-esense/id1141032160?mt=8>

Amazon: <https://www.amazon.com/dp/B073VPZ97R>

**Question 2: The values for the eSense Skin Response are very small (below 1.0  $\mu$ S). What can I do to improve the quality of measurement?**

If you have dry or calloused hands, it is a good idea to use skin lotion before using the eSense. If you do this, make sure to do this every time so that the measurements are comparable. You can also try to slightly moisten your hands with water.

In some rare cases the values can remain very low (1.0 $\mu$ S), in spite of the measurement working in principle, displaying at least very small changes in value. In this case we recommend using one-way ECG electrodes. They provide a much stronger contact with the skin. You can apply these electrodes to multiple locations of your hands as displayed in the pictures.



You can purchase 50 disposable gel electrodes (size suitable for adults and children) for € 12.90. You can order on our online shop at <https://mindfield-shop.com/accessories/electrodes/emg-ecgedasingle-use-electrodes-for-adults-with-comfortable-breathable-fabric-pre-gel-50-pieces.html>.

If this produces no changes, or the measured value is completely constant, please proceed with question 6.

**Question 3: Can I use the eSense with my device?**

Please see the pdf document on our products pages (see question 1), under "[eSense Compatibility \(sample list\) \(PDF\)](#)".

**Question 3b: My eSense does not work with iOS 9 (or higher).**

The eSense works through the microphone port. From iOS 9 or higher you have to allow explicitly that the eSense app may use the microphone port, otherwise it will not work. You are asked for this during installation, please answer with "Yes" or "Allow". After installation you can make this setting manually: Allow the eSense app to use the microphone port in the system settings of your iOS device: Settings -> Privacy -> Microphone.

**Question 3c: Which iOS devices are supported? Does the eSense work with an iPhone 7, iPhone 8 or iPhone X?**

The eSense-devices work with the Apple iPhone from 4S, the Apple iPad from 2<sup>nd</sup> generation, the iPad Pro (in combination with a [USB-C to 3.5 mm Headphone Jack Adapter](#)), the Apple iPod touch from 5<sup>th</sup> generation and with the iPhone 7, iPhone 7 Plus, iPhone 8, iPhone 8 Plus, iPhone X, iPhone XR and iPhone XS (in combination with a [Lightning to 3.5 mm Headphone Jack Adapter](#)).

**Question 3d: Which Android Devices are Supported?**

Android smartphones and tablets from Android 6.0 (Marshmallow). Your Android device requires a 3,5mm jack (headphone jack) for external microphones. If you plan on purchasing a device for using the eSense, we suggest the [Amazon Fire 7](#) as an affordable tablet.

**Question 3e: I have an older device which does not work with the eSense App. What can I do?**

If your Android version is below of 4.1 or your iOS version is below of 9.0, you can use our former apps for the Skin Response or Temperature:

eSense Skin Response for Android:

<https://play.google.com/store/apps/details?id=de.bottledsoftware.esenseskinresponse>

eSense Skin Response for iOS:

<https://itunes.apple.com/us/app/esense-skin-response/id496503504?mt=8>

eSense Temperature for Android:

<https://play.google.com/store/apps/details?id=de.bottledsoftware.esensetemperature>

eSense Temperature for iOS:

<https://itunes.apple.com/us/app/esense-temperature/id502971352?mt=8>

### **Question 3f: Can I also use (Bluetooth-)speakers instead of headphones with the eSense?**

The (Bluetooth-)Speakers are blocked by Android and iOS when the eSense is plugged into the smartphone or tablet. There are two solutions to use external speakers:

You can simply plug in normal speakers via cable into the headphone jack of the eSense. We recommend the [Bose<sup>®</sup> Companion 2 Series III Multimedia Speakers](#).

You can also plug in a [Bluetooth Transmitter](#) into the headphone jack of the eSense and hence connect Bluetooth speakers. We recommend the [Bose<sup>®</sup> SoundLink Mini Bluetooth Speaker II](#).

This solution has been tested by us with the named products and works for 100% without latency.

### **Question 3g: My procedures are not synchronized correctly**

This is usually due to two reasons:

Android: You need a Google account (Gmail account) which can't be a cooperative account. The same Google account must be used on all devices. Attention: It is not possible to load procedures from a device with a higher Android version to a device with a lower Android version.

iOS: You must have activated iCloud Backup and ensure that the eSense app is in the backup list. On some devices, you can also force the backup so you don't have to wait for the backup to take place.

### **Question 4: How can I process the measured values further, e.g. with Excel?**

Please note the PDF-document on our pages (see Question 1):

[„eSense Streaming and Analysis \(CSV, eSense Dashboard, OSC\)“](#)

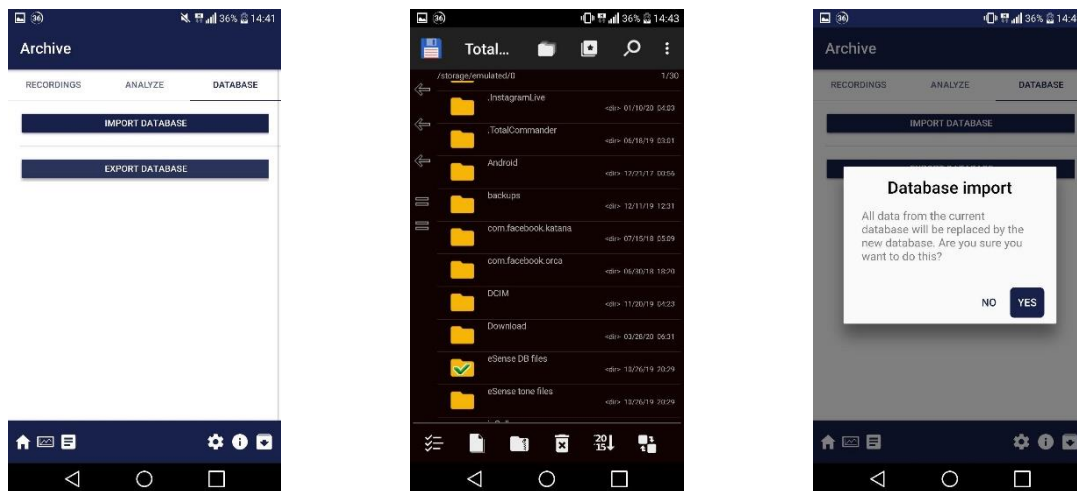
You can also [create your own apps with our SDK](#). We have also developed the [eSense Dashboard which allows you to stream your measurement data directly to a PC](#).

**Question 4a: How can I export and import the measurements?**

Android: The measurements are saved in the background in an SQL database on your device. A SQL dump file is saved in the 'eSense DB Files' folder on your device. This contains your measurements.

You can export the measurements by copying this SQL dump file from the folder and sending it (for example via email) to another device on which you want to import the measurements.

You must then import the SQL dump file into the same path ('eSense DB Files') on the new device. The measurements imported in this way are automatically loaded into the eSense app.

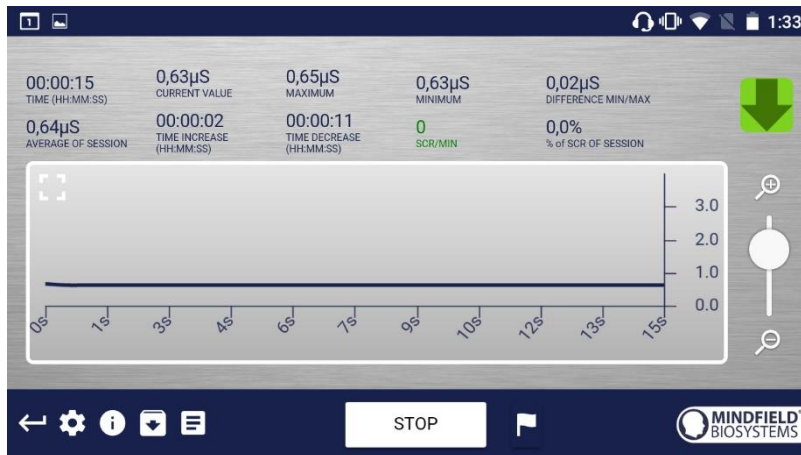


iOS: Unfortunately, it is not possible to import and export the measurements under iOS.

**Question 5: A correctly connected sensor is not recognized by my Android device. The message "Please buy the sensor" is shown.**

Please use the adapter cable that came with the sensor. Please also see the pdf document on our product pages (see question 1), under the section "[eSense Compatibility \(sample list\) \(PDF\)](#)". The adapter cable is necessary only in very few cases. Restart the app or your smartphone again if necessary, if the sensor is not correctly recognized.

**Question 6:** The app displays very low (well below 1.0  $\mu\text{S}$ ) and very constant values (without changes). The values do not react at all on stimuli like sudden very deep breathing.



Picture: eSense electrodes have no contact to each other

Sometimes the Velcro electrodes can have a bad contact with the snap buttons. Please turn and move the electrodes in the snap buttons, and press your fingers strongly against the electrodes to make a good contact. **Try replacing the electrodes with new ones, turn and press to see if you get a signal. Try another type of electrodes (e.g. [gel electrodes](#))**

Try to press the electrodes directly one against another short circuit). This should produce high values of 7 $\mu\text{S}$  and more. This shows that the eSense device is working correctly. If this is the case, please proceed with question 2.

**Question 7:** The app displays strongly fluctuating or senseless values.

Please lower the headphone volume of your device. If it is too high, it can disturb the measurement. Lower it until to the minimum and restart the app. If the problem still occurs, please continue with question 8.

**Question 8:** The app displays a screen telling me that I need a sensor, but the sensor is plugged in.

Please apply the answers to the question above (Question 4 & 6). If this does not help, please apply the answer of the question below (Question 8).

**Question 9: The app still displays strongly fluctuating or senseless values. Touching or releasing the sensor skin contact does not make a difference.**

The sense is apparently not sending any measurements to the app. In this case, the app will show fluctuating, inaccurate values. Does your device have a 3.5mm headset (including microphone and headphone) bush? Some Android tablets only have a 3.5mm headphone bush with no microphone included. Please check the technical specifications of your device.

Please shut down the app. **Important:** Shutting down the app does not mean only closing it. You also must also end running program processes in your device's settings and delete current settings (empty the cache).

Please install the newest version of the app. Plug in the sensor and restart the app.

Please check if directly touching the skin contact (eSense Skin Response) or the temperature sensor (eSense Temperature) with your hand makes a difference in measurements. If this is not the case, please continue with question 6 or 10.

**Question 10: Which electrodes are working with the eSense?**

We offer 4 types of electrodes. Those have different advantages depending on the intended use. There are Velcro electrodes, Fingerclips (without gel), Gel electrodes and EDA Gel electrodes.

The Velcro electrodes are suitable for the beginning since they are inexpensive, re-usable and easy to use. The Fingerclips are suitable for the beginning as well, but more comfortable. The Gel electrodes have a better signal quality due to the gel, but are not re-usable. The EDA Gel electrodes are offering the most precise measured values and are re-usable, but require more effort in use and maintenance.

You can find a summary of the different types of electrodes here: [Overview electrodes \(PDF\)](#).

**Question 11: Is there a way to extend the cord of the eSense?**

If you wish to use a longer cord between the eSense and your smartphone or tablet, you can extend the original cord of the eSense with a common, 4-pin, 3,5mm jack headset extension cord. We have tested 3 cords that have worked:

2m cord: <http://amzn.to/2kJwqBM>

0,5m cord: <http://amzn.to/2kKEONs>

110cm cord: <http://amzn.to/2jJg1LZ>

All three suggested cords cost between £ 6-8 and are available f.i. from Amazon. Alternatively you should be able to use other 4-pin cords as well.



**Question 12: My eSense is still not working. It does not respond if I touch the electrodes or the thermometer or not. I have turned, pressed and changed the Velcro electrodes without any resulting improvement in the measurement. I have followed the instructions in question 1 and taken all other questions in this FAQ into account.**

Please check with at least one other smartphone or tablet device to see if your device is specific for your problem. Please test on an iOS device if possible, as they are known to work fine. For a list of compatible devices please see the pdf document on our products pages (see question 1), under "[eSense Compatibility \(sample list\) \(PDF\)](#)".

If the eSense fails on other devices too (strong fluctuation of values with no reactions) and none of the above questions helps to generate a good signal, you can exchange the eSense at the retailer where you purchased your eSense. Please ask the retailer to send the defect device back to the manufacturer.

If you bought the eSense directly at Mindfield, please follow the [return procedure](#), which you find on our website at „Support“ => „Return procedure“.

## Smart Bulb FAQ (Magic Blue Bluetooth bulb and Philips™ Hue™ products)

The FAQ for both smart bulbs, the “Magic Blue” and “Philips Hue” in combination with the Mindfield eSense sensors. **Please consider these tips and tricks before you contact Mindfield with a technical question!**



Image 1: Magic Blue Smart Bulb in a round lamp



Image 2: Magic Blue beside retail packing

### Magic Blue FAQ

#### Question 1: How do I connect to the Magic Blue?

You connect to the Magic Blue from inside the eSense app. To connect to the Magic Blue, open the eSense app and follow these steps:

1. Choose the eSense sensor you want to use
2. Choose the ‘settings’ (cogwheel symbol)
3. Enable the ‘Smart bulb feedback’ and choose ‘Magic Blue’ as the bulb type
4. Tab on the ‘Choose A Bulb’ button and select the bulb from the list that you want to connect to
5. (You can also test the chosen bulb by tapping on the ‘Connection Test’ button. If the color of the bulb changes by this, the bulb is connected.)

After you have followed these steps, the app will remember the Magic Blue you have chosen (you usually don’t need to follow these steps again, unless you want to use another Magic Blue).

You should not pair the Magic Blue by the device generic Bluetooth settings. (Attention: If you pair your bulb that way, you won't be able to find and select the Magic Blue from inside the eSense app. If you did so by accident, simply un-pair the Magic Blue from the generic Bluetooth settings and follow the steps above).

**Question 2: What can I do, if connecting to Bluetooth fails or the Magic Blue is not found?**

Restart the Magic Blue (switch the switch of your lamp off and on again). Especially if the Magic Blue is already switched on more than 1 minute, the Magic Blue stops sending the Bluetooth signal to connect. Restarting activates the signal again and the Magic Blue can be found.

**Question 3: Why can't I find the device when scanning for Bluetooth devices?**

Check the light from the Magic Blue to make sure the Magic Blue is switched on. If there is metal around the Magic Blue (for example a lampshade around the Magic Blue), it could shield the Magic Blue and block the signal.

Make also sure that the Magic Blue is not connected to another phone or tablet already since the Magic Blue can just be connected to one phone or tablet at a time (see also next question).

**Question 4: How many Magic Blue bulbs can I control at the same time?**

You can control one Magic Blue at the same time.

**Question 5: How far can the distance between Magic Blue and phone or tablet be?**

Usually the range is 18 to 30 meters without any objects in between. It will be less with objects between the Magic Blue and your phone or tablet (for example a wall between the Magic Blue and the smartphone or tablet can decrease the range).

**Question 6: Where can I buy the Magic Blue Bulb?**

We suggest our shop at <https://mindfield-shop.com/en/magic-blue-led-esense.html>

## Philips™ Hue™ FAQ

### **Question 1: Which products from Philips Hue can I use with the eSense app?**

In general, all Philips Hue products are compatible with our eSense App and therefore can be used together with the eSense. We tested the most common products:

- Philips Hue White
- Philips Hue White Ambiance
- Philips Hue White and Color Ambiance
- Philips Hue Go (very nice!)
- Philips Hue LightStrips White and Color Ambiance

For the best experience, we recommend the Philips Hue White and Color Ambiance, because with the colors, the feedback can be enhanced more than with only white colors. Especially we recommend using the Philips Hue Go, as it is mobile with battery and a very nice, complete lamp.

### **Question 2: How do I connect to the Philips Hue?**

You connect to the Philips Hue products from inside the eSense app. As usual with the Philips Hue products, you need to connect to the Philips Bridge first and then you can choose the individual bulbs.

To connect to the Philips Hue products, open the eSense app and follow these steps:

1. Choose the sensor you want to use
2. Choose the 'settings' (cogwheel symbol)
3. Enable the 'Smart bulb feedback' and choose 'Philips Hue' as the bulb type
4. Tab on the 'Change Hue settings' button
5. Choose the 'Find Hue Bridge' tab in the upper right and then choose the plus icon in the lower right. Follow the instructions.
6. Next you can choose the lamp(s) under 'Hue lamps' in the upper left. You see a list of available lamps and you can choose each with the tick right next to it. Selected lamps light up, deselected turn off.
7. (You can also test the chosen bulb by tapping on the 'Test' button. If the color of the bulb changes by this, the bulb is connected)
8. When you have chosen the bridge and the lamp(s), you can leave the menu by tapping on the tick in the upper right corner. The settings are now saved.

After you have followed these steps, the app will remember the Philips Bridge and Hue bulb you have chosen. You usually don't need to follow these steps again unless you want to use another Bridge or another bulb(s).

**Question 3: How many Philips Hue bulbs/products can I use with the eSense app?**

We have successfully tested up to 9 products/bulbs (mixture of different type of bulbs, Hue Go and LightStripe). However, from 3 products and more the reaction time of the products/bulbs slows down significantly (Philips enables a maximum transfer speed of 100ms per signal and per bulb).

Especially if you use several bulbs, a short distance to the Philips Bridge, the bulbs and your smartphone or tablet becomes more relevant. See also the next question about this.

**Question 4: How far can the Philips Hue, the Hue Bridge and the smartphone or tablet be away?**

Usually the range is between 30 and 100 meter, depending on the environment. The range is less with objects in between (for example a wall in between can decrease the range). Also, if the Hue Bridge and your modem should be in another floor level, it can influence the range.

However, the transmission of the signal by Philips is good enough so that there weren't any problems with our tests in normal households with the signal. Just from 4 (and more) bulbs at the same time a recognizable lag can occur, see also the question above about this.

**Question 5: Where can I buy the Philips Hue products?**

You should find the Philips Hue products in every well-sorted electronic store. You can also order online. A list of the on- and offline-merchants can be also found on the page of the Philips Hue: <https://www2.meethue.com/en-us>

We suggest one of the starter kits from Philips for the use with the eSense. This also contains a colored bulb ('White and Color Ambience'): <https://www.amazon.com/dp/B06Y3QXSGX>

We recommend the "Hue White and Color Ambience" for the best experience because with the colors, the feedback can be enhanced more than with only white colors.

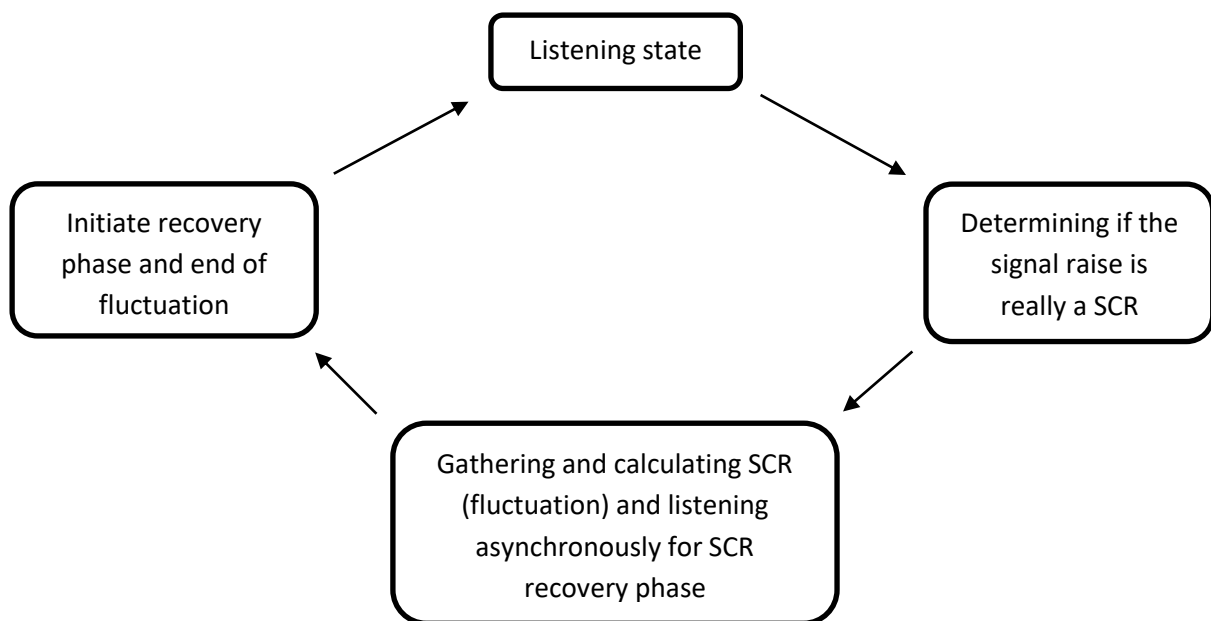
## SCR explained

This is an explanation how the Mindfield eSense App measures and calculates the SCR (Skin Conductance Response) for the eSense Skin Response.

## Overview

The whole process of detecting and calculating the SCR is a cycle of four steps:

1. Listening state
2. Determining if the signal raise is really a SCR
3. Gathering and calculating SCR and listening asynchronously for SCR recovery phase
4. Initiate recovery phase and end of fluctuation



## The 4 Steps in detail

### 1. Listening state

The cycle starts in the first step, the listening state. This is the standard default state.

### 2. Determining signal raise

There are two ways for detecting the start of an SCR start. The values could either raise slowly with a small step or very fast with a big amplitude. This creates the following two conditions:

1. The signal is constantly rising for 2 seconds
2. The difference between the current signal and the pretended base value (the value that is considered to be the first value in the rising signal. But on this stage, it is not confirmed yet as a base value) is greater than 0.5 micro siemens. In simple words the app will react to a sudden signal raise and confirm it as the fluctuation start and will not wait for 2 seconds (as in the first condition above)

If the signal will fall just even 0.1 micro siemens during a raise, the app will drop out of this second step and return to the first step (the listening state) again. Otherwise it will continue with the next two steps 3 and 4.

### 3. Gathering and calculating SCR (fluctuation)

If one of the two conditions from the second step above are met, the app enters this third step, the fluctuation. The first signal of the fluctuation period is the base value of a fluctuation signal. During the whole fluctuation period, the app is detecting the amplitude which is constantly changing. Then the app starts to calculate the SCR events globally and within a one-minute time window. This results in the SCR/min value.

### 4. Initiate recovery phase

The fluctuation is considered to enter the recovery phase (the end of fluctuation) when the signal falls for more than 50% of the greatest amplitude of the fluctuation period.

This is also the step where the color in the graph is changed (based on the quantity of SCR events that were occurring). The colors for the SCR background are also calculated (by dividing time intervals into equal segments and getting the sum of the SCR events from each segment).