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Release History

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V 01	26.10.2015	Bia	Set-up of document structure.
V02	10.12.2015	Bia/Grf	Initial test cases / test report template
V03	16.12.2015	Bia	Final tests. Approval of tests. Note: Due to technical problems, some tests were repeated up to the 18th Dec.

Trans.Safe Consortium

Trans.Safe (AAL-2013-6-064.) is a project within the AAL Joint Programme Call 6
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Abbreviations

Abbrev.	*Description*
usw.:	und so weiter

Executive Summary

Test cases have been defined. They are part of the system integration and therefore high-level tests verifying the whole system (for module tests it is referred to the documentation of the developers). The underlying idea behind the test cases is ensuring to be able to provide a functional system for tests with end users (esp. simulator tests).

An extra chapter is dedicated to the test execution, where the test cases are realized and judged.

The test result is: Prototype 1 has passed. It can be utilized to conduct tests with end users.

1 About this Document

1.1 Role of the deliverable

Prototype 1 of the system is tested. The question to be answered by the tests is: Is the system capable to acquire and store the data needed for further developments of the system - i.e. whether the system can be used with end users in the lab/simulator.

1.2 Relationship to other Trans.Safe deliverables

The deliverable is related to the following Trans.Safe documents:

Deliv:	*Relation*
D2.4	Report on system requirements and architecture
Addendum D3.3	Requirements & Specification related to acquisition of physiological signals
Addendum D3.4	Requirements & Specification related to light intervention device
Addendum D4.3	Requirements & Specification related to server module
Addendum D4.4	Requirements & Specification related to stress detection and response algorithm
Addendum D4.5	Requirements & Specification related to biofeedback smartphone app

2 System integration tests

2.1 Introduction to this chapter

A complete set of tests is given below. Each test case occupies one table. Please note that new test cases should be appended at the end as the tables use the automatic numeration of WORD, to avoid a change of IDs of existing test cases.

2.1.1 Start-up

Table 1: Test case start-up 1.1

Title of test case	**Shimmer start-up test**
Module name	Shimmer
Test description	Starting of the Shimmer sensor and initial connection with the laptop in the test setup.
Preconditions	• Shimmer is charged • Laptop is running.
Test steps	• Turn the Shimmer sensor on • Search for new Bluetooth devices on the laptop • When the Shimmer with its serial number is found, initiate a connection between the Shimmer and the laptop (Pairing ID: 1234). • Ensure the connection was successfully established by the operating system.
Expected result	• Successfully started • Successfully connected
Note	

Table 2: Test case start-up 1.2

Title of test case	**MindWave classic start-up test**
Module name	MindWave classic
Test description	Starting of the MindWave classic and initial connection with the laptop in the test setup.
Preconditions	• MindWave classic has a fresh battery • Laptop is running • No other MindWave is connected to the laptop.
Test steps	• Turn the MindWave classic on (LED should be solid red). • Attach the receiver USB stick to the laptop. • Make sure the driver got installed / loaded successfully. • Start the Blink/zone app to test if there is a connection. • Ensure the LED on the MindWave classic is solid blue.

Expected result	• Successfully started • Successfully connected
Note	

Table 3: Test case start-up 1.3

Title of test case	**MindWave mobile start-up test**
Module name	MindWave mobile
Test description	Starting of the MindWave mobile and initial connection with the laptop in the test setup.
Preconditions	• MindWave mobile has a fresh battery • Laptop is running • No other MindWave is connected to the laptop
Test steps	• Turn the MindWave mobile on (LED should be blinking blue or solid red). • Search for new Bluetooth devices on the laptop. • Push the MindWave mobile connection button (about 3 seconds) until the blue LED starts blinking rapidly. • When the MindWave mobile with its serial number is found, initiate a connection between the MindWave mobile and the laptop (Pairing ID: 0000). • Ensure the connection was successfully established by the operating system and the drivers got loaded. • Start the Blink/zone app to test if there is a connection. • Ensure the LED on the MindWave mobile is solid blue.
Expected result	• Successfully started • Successfully connected
Note	

Table 4: Test case start-up 1.4

Title of test case	**BioHarness start-up test**
Module name	BioHarness
Test description	Starting of the BioHarness and initial connection with the laptop in the test setup.
Preconditions	• BioHarness is charged • Laptop is running.
Test steps	• Turn the BioHarness on. • Search for new Bluetooth devices on the laptop. • When the BioHarness with its serial number is found, initiate a connection between the BioHarness and the laptop (Pairing ID: 1234).

	• Ensure the connection was successfully established by the operating system and the drivers got loaded. • Ensure the Bluetooth LED on the BioHarness is solid blue.
Expected result	• Successfully started • Successfully connected
Note	

Table 5: Test case start-up 1.5

Title of test case	**Environmental gateway start-up test**
Module name	Environmental gateway
Test description	Starting of the environmental gateway and initial connection with the laptop in the test setup.
Preconditions	• Display is connected to the environmental gateway.
Test steps	• Connect the power cable with the environmental gateway. • Monitor the start-up of the system on the display. • Ensure the desktop got loaded and the gateway started up.
Expected result	• Successfully started
Note	

2.1.2 Basic tests

Table 6: Test case basic 2.1

Title of test case	**Shimmer basic test**
Module name	Shimmer
Test description	Test of basic measurements with the Shimmer sensor. Will it send any values and store them properly.
Preconditions	• Shimmer sensor is fully charged • Laptop is running • Wearable gateway is installed on the laptop • Shimmer sensor is paired with the laptop
Test steps	• Start the wearable gateway on the laptop • Start the Shimmer module in the wearable gateway • Configure the storage of the data as CSV • Select the COM port associated with the Shimmer sensor • Connect to the sensor • Run a short (ca. 1 min) measurement
Expected result	• Measurement is started successfully

	• The current data is shown in the user interface • Data is stored in the configured directory
Note	

Table 7: Test case basic 2.2

Title of test case	**MindWave basic test**
Module name	MindWave
Test description	Test of basic measurements with the MindWave sensor. Will it send any values and store them properly.
Preconditions	• MindWave sensor has a fresh battery • Laptop is running • Wearable gateway is installed on the laptop • MindWave is paired with the laptop
Test steps	• Start the wearable gateway on the laptop • Start the MindWave module in the wearable gateway • Select the COM port associated with the Shimmer sensor • Enabled blink mode • Configure the storage of the data • Run a short (ca. 1 min) measurement
Expected result	• Measurement is started successfully • The current data is shown in the user interface • Data is stored in the configured directory
Note	

Table 8: Test case basic 2.3

Title of test case	**BioHarness basic test**
Module name	BioHarness
Test description	Test of basic measurements with the BioHarness sensor. Will it send any values and store them properly.
Preconditions	• BioHarness sensor is fully charged • Laptop is running • Wearable gateway is installed on the laptop • BioHarness is paired with the laptop
Test steps	• Start the wearable gateway on the laptop • Start the BioHarness module in the wearable gateway • Enter a file name for the data storage • Search for the BioHarness sensor • Select and connect to the BioHarness sensor after it was found

	• Run a short (ca. 1 min) measurement
Expected result	• Measurement is started successfully • The current data is shown in the user interface • Data is stored in the default directory with the set name
Note	

Table 9: Test case basic 2.4

Title of test case	**Environmental gateway basic test**
Module name	Environmental gateway
Test description	Test of basic measurements with the environmental gateway sensors. Will the gateway send any values and the wearable Gateway store them properly.
Preconditions	• Environmental gateway is up and running • Environmental gateway is in the same network as the laptop • Laptop is running • Wearable gateway is installed on the laptop
Test steps	• Start the wearable gateway on the laptop • Enter the correct URL (http://host:port/path) for the environmental gateway • Start an short (ca. 1 min) environmental measurement
Expected result	• Measurement is started successfully • The current data is shown in the user interface • The data is stored in the default directory
Note	

Table 10: Test case basic 2.5

Title of test case	**Hue lights basic test**
Module name	Hue lights
Test description	Test of basic control over the hue lights through the wearable gateway and the environmental gateway.
Preconditions	• Environmental gateway is up and running • Environmental gateway is in the same network as the laptop • The hue light system is running • The hue light system is connected to the same network as the environmental gateway • Laptop is running • Wearable gateway is installed on the laptop
Test steps	• Start the wearable gateway on the laptop • Enter the correct URL (http://host:port/path) for the environmental

	gateway • Turn the lights on and off five times
Expected result	• The lights are turned on successfully five times • The lights are turned off successfully five times
Note	

2.1.3 Shutdown

Table 11: Test case shutdown 3.1

Title of test case	**Shimmer shutdown**
Module name	Shimmer
Test description	The shutdown procedure for the Shimmer sensor is tested.
Preconditions	• Finished successful measurement with Shimmer sensor
Test steps	• Close wearable gateway • Power off Shimmer sensor • Shutdown laptop • Startup laptop • Power on Shimmer sensor • Start wearable gateway • Connect Shimmer sensor
Expected result	• The connection could be reestablished without pairing • No errors occurred during power off of the sensor or shutdown of the laptop
Note	

Table 12: Test case shutdown 3.2

Title of test case	**MindWave shutdown**
Module name	MindWave
Test description	The shutdown procedure for the MindWave sensor is tested.
Preconditions	• Finished successful measurement with MindWave sensor
Test steps	• Close wearable gateway • Power off MindWave sensor • Shutdown laptop • Startup laptop • Power on MindWave sensor • Start wearable gateway • Connect MindWave sensor

Expected result	• The connection could be reestablished without pairing • No errors occurred during power off of the sensor or shutdown of the laptop
Note	

Table 13: Test case shutdown 3.3

Title of test case	**BioHarness shutdown**
Module name	BioHarness
Test description	The shutdown procedure for the BioHarness sensor is tested.
Preconditions	• Finished successful measurement with BioHarness sensor
Test steps	• Close wearable gateway • Power off BioHarness sensor • Shutdown laptop • Startup laptop • Power on BioHarness sensor • Start wearable gateway • Connect BioHarness sensor
Expected result	• The connection could be reestablished without pairing • No errors occurred during power off of the sensor or shutdown of the laptop
Note	

Table 14: Test case shutdown 3.4

Title of test case	**Environmental gateway shutdown**
Module name	Environmental gateway
Test description	The shutdown procedure for the Environmental gateway is tested.
Preconditions	• Finished successful measurement with the environmental gateway
Test steps	• Close wearable gateway • Unplug power cable from environmental gateway • Shutdown laptop • Startup laptop • Plug in power cable into environmental gateway • Start wearable gateway • Connect to environmental gateway
Expected result	• The connection could be reestablished without problems • No errors occurred during power off of the gateway or shutdown of the laptop

Note	

2.1.4 Range coverage

Table 15: Test case range coverage 4.1

Title of test case	**Shimmer 5m range coverage test**
Module name	Shimmer
Test description	The Shimmer sensor is placed about five meters (± 30cm) away from the laptop. The quality of the connection is tested by looking at the amount of data that was lost or any connection instability issues.
Preconditions	• Shimmer sensor is fully charged • Laptop is running • Wearable gateway is installed on the laptop • Shimmer sensor is paired with the laptop • The Shimmer sensor is setup about five meters from the laptop
Test steps	• Start the wearable gateway on the laptop • Start the Shimmer module in the wearable gateway • Configure the storage of the data as CSV • Select the COM port associated with the Shimmer sensor • Connect to the sensor • Run a measurement for five minutes
Expected result	• No connectivity issues • All measured data is available with no gaps
Note	

Table 16: Test case range coverage 4.2

Title of test case	**Shimmer 15m range coverage test**
Module name	Shimmer
Test description	The Shimmer sensor is placed about 15 meters (± 30cm) away from the laptop. The quality of the connection is tested by looking at the amount of data that was lost or any connection instability issues.
Preconditions	• Shimmer sensor is fully charged • Laptop is running • Wearable gateway is installed on the laptop • Shimmer sensor is paired with the laptop • The Shimmer sensor is setup about 15 meters from the laptop
Test steps	• Start the wearable gateway on the laptop • Start the Shimmer module in the wearable gateway

	• Configure the storage of the data as CSV • Select the COM port associated with the Shimmer sensor • Connect to the sensor • Run a measurement for five minutes
Expected result	• No connectivity issues • All measured data is available with no gaps
Note	

Table 17: Test case range coverage 4.3

Title of test case	**MindWave 5m range coverage test**
Module name	MindWave
Test description	The MindWave sensor is placed about 5 meters (± 30cm) away from the laptop. The quality of the connection is tested by looking at the amount of data that was lost or any connection instability issues.
Preconditions	• MindWave sensor has a fresh battery • Laptop is running • Wearable gateway is installed on the laptop • MindWave is paired with the laptop • The MindWave is positioned about five meters away from the laptop
Test steps	• Start the wearable gateway on the laptop • Start the MindWave module in the wearable gateway • Select the COM port associated with the Shimmer sensor • Enabled blink mode • Configure the storage of the data • Run a measurement for five minutes
Expected result	• No connectivity issues • All measured data is available with no gaps
Note	

Table 18: Test case range coverage 4.4

Title of test case	**MindWave 15m range coverage test**
Module name	MindWave
Test description	The MindWave sensor is placed about 15 meters (± 30cm) away from the laptop. The quality of the connection is tested by looking at the amount of data that was lost or any connection instability issues.
Preconditions	• MindWave sensor has a fresh battery • Laptop is running • Wearable gateway is installed on the laptop

	• MindWave is paired with the laptop • The MindWave is positioned about 15 meters away from the laptop
Test steps	• Start the wearable gateway on the laptop • Start the MindWave module in the wearable gateway • Select the COM port associated with the Shimmer sensor • Enabled blink mode • Configure the storage of the data • Run a measurement for five minutes
Expected result	• No connectivity issues • All measured data is available with no gaps
Note	

Table 19: Test case range coverage 4.5

Title of test case	**BioHarness 5m range coverage test**
Module name	BioHarness
Test description	The BioHarness sensor is placed about 5 meters (± 30cm) away from the laptop. The quality of the connection is tested by looking at the amount of data that was lost or any connection instability issues.
Preconditions	• BioHarness sensor is fully charged • Laptop is running • Wearable gateway is installed on the laptop • BioHarness is paired with the laptop • The BioHarness sensor is positioned about five meters away from the laptop
Test steps	• Start the wearable gateway on the laptop • Start the BioHarness module in the wearable gateway • Enter a file name for the data storage • Search for the BioHarness sensor • Select and connect to the BioHarness sensor after it was found • Run a measurement for five minutes
Expected result	• No connectivity issues • All measured data is available with no gaps
Note	

Table 20: Test case range coverage 4.6

Title of test case	**BioHarness 15m range coverage test**
Module name	BioHarness
Test description	The BioHarness sensor is placed about 15 meters (± 30cm) away from the

	laptop. The quality of the connection is tested by looking at the amount of data that was lost or any connection instability issues.
Preconditions	• BioHarness sensor is fully charged • Laptop is running • Wearable gateway is installed on the laptop • BioHarness is paired with the laptop • The BioHarness sensor is positioned about 15 meters away from the laptop
Test steps	• Start the wearable gateway on the laptop • Start the BioHarness module in the wearable gateway • Enter a file name for the data storage • Search for the BioHarness sensor • Select and connect to the BioHarness sensor after it was found • Run a measurement for five minutes
Expected result	• No connectivity issues • All measured data is available with no gaps
Note	

2.1.5 Single Sensor runs

Table 21: Test case single sensor run 5.1

Title of test case	**Shimmer single sensor run**
Module name	Shimmer
Test description	The Shimmer sensor on its own is used during a short measuring run to see if the components necessary for this sensor will work together.
Preconditions	• Shimmer sensor is fully charged • Laptop is running • Wearable gateway is installed on the laptop • Shimmer sensor is paired with the laptop • A test person is wearing the fully attached Shimmer sensor
Test steps	• Start the wearable gateway on the laptop • Start the Shimmer module in the wearable gateway • Configure the storage of the data as CSV • Select the COM port associated with the Shimmer sensor • Connect to the sensor • Run a measurement for five minutes • Ensure the test person isn't moving much
Expected result	• The Shimmer sensor data has been collected successfully
Note	

Table 22: Test case single sensor run 5.2

Title of test case	**MindWave single sensor run**
Module name	MindWave
Test description	The MindWave sensor on its own is used during a short measuring run to see if the components necessary for this sensor will work together.
Preconditions	• MindWave sensor has a fresh battery • Laptop is running • Wearable gateway is installed on the laptop • MindWave is paired with the laptop • A test person is wearing the fully attached MindWave sensor
Test steps	• Start the wearable gateway on the laptop • Start the MindWave module in the wearable gateway • Select the COM port associated with the Shimmer sensor • Enabled blink mode • Configure the storage of the data • Run a measurement for five minutes • Ensure the test person isn't moving much
Expected result	• The MindWave sensor data has been collected successfully
Note	

Table 23: Test case single sensor run 5.3

Title of test case	**BioHarness single sensor run**
Module name	BioHarness
Test description	The BioHarness sensor on its own is used during a short measuring run to see if the components necessary for this sensor will work together.
Preconditions	• BioHarness sensor is fully charged • Laptop is running • Wearable gateway is installed on the laptop • BioHarness is paired with the laptop • A test person is wearing the fully attached BioHarness
Test steps	• Start the wearable gateway on the laptop • Start the BioHarness module in the wearable gateway • Enter a file name for the data storage • Search for the BioHarness sensor • Select and connect to the BioHarness sensor after it was found • Run a measurement for five minutes • Ensure the test person isn't moving much
Expected result	• The BioHarness sensor data has been collected successfully

Note	

Table 24: Test case single sensor run 5.4

Title of test case	**Environmental gateway single sensor run**
Module name	Environmental gateway
Test description	The Environmental gateway on its own is used during a short measuring run to see if the components necessary for this sensor will work together.
Preconditions	• Environmental gateway is up and running • Environmental gateway is in the same network as the laptop • Laptop is running • Wearable gateway is installed on the laptop
Test steps	• Start the wearable gateway on the laptop • Enter the correct URL (http://host:port/path) for the environmental gateway • Run a measurement for five minutes
Expected result	• The environmental gateway data has been collected successfully
Note	

2.1.6 Portability

Table 25: Test case portability 6.1

Title of test case	**Shimmer portability test**
Module name	Shimmer
Test description	Basic movements with the hand while wearing the Shimmer sensor are conducted. The target is to find out how portable the sensor is and what impact movements have on the measurements.
Preconditions	• Shimmer sensor is fully charged • Laptop is running • Wearable gateway is installed on the laptop • Shimmer sensor is paired with the laptop • A test person is wearing the fully attached Shimmer sensor
Test steps	• Start the wearable gateway on the laptop • Start the Shimmer module in the wearable gateway • Configure the storage of the data as CSV • Select the COM port associated with the Shimmer sensor • Connect to the sensor • Start the measurement • Monitor the internal ADC A13 Raw (pulse)

	• Instruct the test person to scratch himself with the hand wearing the sensor • Instruct the test person to write something on a paper • Instruct the test person to use a keyboard • Stop the measurements
Expected result	• The movements shouldn't disturb the pulse signal
Note	

Table 26: Test case portability 6.2

Title of test case	**MindWave portability test**
Module name	MindWave
Test description	Basic movements with the head while wearing the MindWave sensor are conducted. The target is to find out how portable the sensor is and what impact movements have on the measurements.
Preconditions	• MindWave sensor has a fresh battery • Laptop is running • Wearable gateway is installed on the laptop • MindWave is paired with the laptop • A test person is wearing the fully attached MindWave sensor
Test steps	• Start the wearable gateway on the laptop • Start the MindWave module in the wearable gateway • Select the COM port associated with the MindWave sensor • Enabled blink mode • Configure the storage of the data • Start the measurement • Monitor the output on the interface • Instruct the test person to look around • Instruct the test person to stand up • Instruct the test person to sit back down • Stop the measurements
Expected result	• The movements shouldn't disturb the measurements
Note	

Table 27: Test case portability 6.3

Title of test case	**BioHarness portability test**
Module name	BioHarness
Test description	Basic movements with the upper part of the body while wearing the BioHarness sensor are conducted. The target is to find out how portable the sensor is and what impact movements have on the measurements.

Preconditions	• BioHarness sensor is fully charged • Laptop is running • Wearable gateway is installed on the laptop • BioHarness is paired with the laptop • A test person is wearing the fully attached BioHarness
Test steps	• Start the wearable gateway on the laptop • Start the BioHarness module in the wearable gateway • Enter a file name for the data storage • Search for the BioHarness sensor • Select and connect to the BioHarness sensor after it was found • Start the measurements • Instruct the test person to stand up • Instruct the test person to move around • Instruct the test person to sit back down • Stop the measurements
Expected result	• The movements shouldn't disturb the measurements
Note	

2.1.7 Combined Sensor runs

Table 28: Test case combined sensors 7.1

Title of test case	**Combined sensors no movements test**
Module name	Shimmer, MindWave, BioHarness, Environmental gateway, Wearable gateway
Test description	All sensors are used during a short test run where the test person isn't allowed to make any or at least any major movements.
Preconditions	• Laptop is running • Wearable gateway is installed on the laptop • Shimmer sensor is fully charged • Shimmer sensor is paired with the laptop • A test person is wearing the fully attached Shimmer sensor • MindWave sensor has a fresh battery • MindWave is paired with the laptop • A test person is wearing the fully attached MindWave sensor • BioHarness sensor is fully charged • BioHarness is paired with the laptop • A test person is wearing the fully attached BioHarness Environmental gateway is up and running • Environmental gateway is in the same network as the laptop
Test steps	• Start the wearable gateway on the laptop

	• Start the Shimmer module in the wearable gateway • Configure the storage of the data as CSV • Select the COM port associated with the Shimmer sensor • Connect to the sensor • Start the Shimmer measurement • Start the BioHarness module in the wearable gateway • Enter a file name for the data storage • Search for the BioHarness sensor • Select and connect to the BioHarness sensor after it was found • Start the BioHarness measurements • Start the MindWave module in the wearable gateway • Select the COM port associated with the MindWave sensor • Enabled blink mode • Configure the storage of the data • Start the MindWave measurement • Monitor the MindWave output on the interface • Start the environmental gateway module in the wearable gateway • Enter the correct URL (http://host:port/path) for the environmental gateway • Start the environmental measurement • Instruct the test person to remain seated • Finish the test run after five minutes
Expected result	• All data was collected successfully in the configured way • The connection of the sensors was stable during the test
Note	

Table 29: Test case combined sensors 7.2

Title of test case	**Combined sensors small movements test**
Module name	Shimmer, MindWave, BioHarness, Environmental gateway, Wearable gateway
Test description	All sensors are used during a short test run where the test person will make basic movements to see how the sensors will react to those movements and if any problems rise from this.
Preconditions	• Laptop is running • Wearable gateway is installed on the laptop • Shimmer sensor is fully charged • Shimmer sensor is paired with the laptop • A test person is wearing the fully attached Shimmer sensor • MindWave sensor has a fresh battery • MindWave is paired with the laptop • A test person is wearing the fully attached MindWave sensor • BioHarness sensor is fully charged

	• BioHarness is paired with the laptop • A test person is wearing the fully attached BioHarness Environmental gateway is up and running • Environmental gateway is in the same network as the laptop
Test steps	• Start the wearable gateway on the laptop • Start the Shimmer module in the wearable gateway • Configure the storage of the data as CSV • Select the COM port associated with the Shimmer sensor • Connect to the sensor • Start the Shimmer measurement • Start the BioHarness module in the wearable gateway • Enter a file name for the data storage • Search for the BioHarness sensor • Select and connect to the BioHarness sensor after it was found • Start the BioHarness measurements • Start the MindWave module in the wearable gateway • Select the COM port associated with the MindWave sensor • Enabled blink mode • Configure the storage of the data • Start the MindWave measurement • Monitor the MindWave output on the interface • Start the environmental gateway module in the wearable gateway • Enter the correct URL (http://host:port/path) for the environmental gateway • Start the environmental measurement • Instruct the test person to remain seated • After two minutes instruct the person to stand up • After two minutes instruct the person to sit down • After fifteen minutes instruct the person to stand up • After fifteen minutes instruct the person to sit down • Finish the measurements
Expected result	• All data was collected successfully in the configured way • The connection of the sensors was stable during the test
Note	

Table 30: Test cases combined sensors 7.3

Title of test case	**Combined sensors large movements test**
Module name	Shimmer, MindWave, BioHarness, Environmental gateway, Wearable gateway
Test description	All sensors are used during a test run where the test person will make larger movements to see how the sensors will react to those movements and if any problems rise from this.

Preconditions	• Laptop is running • Wearable gateway is installed on the laptop • Shimmer sensor is fully charged • Shimmer sensor is paired with the laptop • A test person is wearing the fully attached Shimmer sensor • MindWave sensor has a fresh battery • MindWave is paired with the laptop • A test person is wearing the fully attached MindWave sensor • BioHarness sensor is fully charged • BioHarness is paired with the laptop • A test person is wearing the fully attached BioHarness Environmental gateway is up and running • Environmental gateway is in the same network as the laptop • Mattress ready for test user
Test steps	• Start the wearable gateway on the laptop • Start the Shimmer module in the wearable gateway • Configure the storage of the data as CSV • Select the COM port associated with the Shimmer sensor • Connect to the sensor • Start the Shimmer measurement • Start the BioHarness module in the wearable gateway • Enter a file name for the data storage • Search for the BioHarness sensor • Select and connect to the BioHarness sensor after it was found • Start the BioHarness measurements • Start the MindWave module in the wearable gateway • Select the COM port associated with the MindWave sensor • Enabled blink mode • Configure the storage of the data • Start the MindWave measurement • Monitor the MindWave output on the interface • Start the environmental gateway module in the wearable gateway • Enter the correct URL (http://host:port/path) for the environmental gateway • Start the environmental measurement • Instruct the test person to lie down on the mattress • After fifteen minutes instruct the person to stand up as fast as possible • After two minutes instruct the person to sit down on a chair • Instruct the person to read something • After fifteen minutes instruct the person to stand up again • Finish the measurements after another two minutes
Expected result	• All data was collected successfully in the configured way • The connection of the sensors was stable during the test

Note	

2.1.8 Long term runs

Table 31: Test case long term run 8.1

Title of test case	**Shimmer long term run**
Module name	Shimmer
Test description	The Shimmer sensor is used during a test run for five hours. Testing the ability of all involved components to keep up for a long term test run.
Preconditions	• Shimmer sensor is fully charged • Laptop is running • Wearable gateway is installed on the laptop • Shimmer sensor is paired with the laptop
Test steps	• Start the wearable gateway on the laptop • Start the Shimmer module in the wearable gateway • Configure the storage of the data as CSV • Select the COM port associated with the Shimmer sensor • Connect to the sensor • Run a measurement for five hours
Expected result	• The sensor has enough battery charge • The sensor stays connected • All data is collected
Note	

Table 32: Test case long term run 8.2

Title of test case	**MindWave long term run**
Module name	MindWave
Test description	The MindWave sensor is used during a test run for five hours. Testing the ability of all involved components to keep up for a long term test run.
Preconditions	• MindWave sensor has a fresh battery • Laptop is running • Wearable gateway is installed on the laptop • MindWave is paired with the laptop
Test steps	• Start the wearable gateway on the laptop • Start the MindWave module in the wearable gateway • Select the COM port associated with the Shimmer sensor • Enabled blink mode • Configure the storage of the data

	• Run a measurement for five hours
Expected result	• The sensor has enough battery charge • The sensor stays connected • All data is collected
Note	

Table 33: Test case long term run 8.3

Title of test case	**BioHarness long term run**
Module name	BioHarness
Test description	The BioHarness sensor is used during a test run for five hours. Testing the ability of all involved components to keep up for a long term test run.
Preconditions	• BioHarness sensor is fully charged • Laptop is running • Wearable gateway is installed on the laptop • BioHarness is paired with the laptop
Test steps	• Start the wearable gateway on the laptop • Start the BioHarness module in the wearable gateway • Enter a file name for the data storage • Search for the BioHarness sensor • Select and connect to the BioHarness sensor after it was found • Run a measurement for five hours
Expected result	• The sensor has enough battery charge • The sensor stays connected • All data is collected
Note	

Table 34: Test case long term run 8.4

Title of test case	**Environmental gateway long term run**
Module name	Environmental gateway
Test description	The Environmental gateway is used during a test run for five hours. Testing the ability of all involved components to keep up for a long term test run.
Preconditions	• Environmental gateway is up and running • Environmental gateway is in the same network as the laptop • Laptop is running • Wearable gateway is installed on the laptop
Test steps	• Start the wearable gateway on the laptop • Enter the correct URL (http://host:port/path) for the environmental gateway

	• Run a measurement for five hours
Expected result	• The environmental gateway keeps running • The environmental gateway stays connected • All data is collected
Note	

2.2 Test execution log

In the following the test cases from the previous section are executed. With tests not passed, it is attempted to isolate the failure and to repeat the test with the new information.

Please note that new test log tables should be appended at the end as the tables use the automatic numeration of WORD, to avoid a change of IDs of existing logs.

2.2.1 Start-up

Table 35: Execution log test case start-up 1.1 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 36: Execution log test case start-up 1.1 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 37: Execution log test case start-up 1.2 (main system)

Description of test procedure	Test procedure according to test case specification.

Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	It is important that the right drivers are installed on the laptop. The MindWave classic system needs special drivers to make the USB stick for the connection work properly. It also ensures that the MindWave classic is paired with this USB stick.

Table 38: Execution log test case start-up 1.3 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	The MindWave mobile is much easier to use than the MindWave classic, since it uses existing drivers and technologies over Bluetooth. A smaller issue was found that the MindWave mobile only can pair with up to three other devices. If an additional device wants to pair itself with the MindWave mobile it is not possible. To enable this pairing the pairing cache needs to be cleared by pushing the pairing button for about six seconds.

Table 39: Execution log test case start-up 1.4 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	It seems it can take quite some time to find the BioHarness sensor over Bluetooth (took over 4 minutes).

Table 40: Execution log test case start-up 1.4 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None

Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	In contrast to the main system the BioHarness was found much faster (about 2 minutes), but still much slower than other sensors.

Table 41: Execution log test case start-up 1.5 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 42: Execution log test case start-up 1.5 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

2.2.2 Basic tests

Table 43: Execution log test case basic 2.1 (main system)

Description of test procedure	There were some problems finding out which COM port is associated with the sensor. Everything else went according to the test case specifications.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	It seems there is a need for a listing of the sensors and their corresponding COM ports. Also it is to note that the overall graphical interface seems to need some improvements regarding usability.

	For later tests a program was created giving access to the information about which COM port is used for which connected sensor (Appendix B.2).

Table 44: Execution log test case basic 2.1 (backup system)

Description of test procedure	Same problems as in test case basic 2.1 (main system). But since this test case was executed after the other test it was easier. Everything else went according to the test case specifications.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	Same as in basic 2.1 (main system). It seems there is a need for a listing of the sensors and their corresponding COM ports. Also it is to note that the overall graphical interface seems to need some improvements regarding usability.

Table 45: Execution log test case basic 2.2 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 46: Execution log test case basic 2.2 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 47: Execution log test case basic 2.3 (main system)

Description of test procedure	Test procedure according to test case specification. MindWave classic is used on the main system.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 48: Execution log test case basic 2.3 (backup system)

Description of test procedure	Test procedure according to test case specification. MindWave mobile is used on the backup system.
Outcome/result	Passed
Incidences	Connection wasn't possible at first because the listed COM ports had Chinese characters in them and thus no connection was possible. A restart of the laptop fixed the problem.
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	Later research showed that there might be a bug with some Windows Bluetooth drivers creating wrongly named COM ports. A fix for this bug was added to the program listing the associated COM ports for the sensors (Appendix B.2).

Table 49: Execution log test case basic 2.4 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 50: Execution log test case basic 2.4 (backup system)

Description of test procedure	Test procedure according to test case specification.

Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 51: Execution log test case basic 2.5 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 52: Execution log test case basic 2.5 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

2.2.3 Shutdown

Table 53: Execution log test case shutdown 3.1 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08

Notes/lessons learned	None

Table 54: Execution log test case shutdown 3.1 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 55: Execution log test case shutdown 3.2 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 56: Execution log test case shutdown 3.2 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 57: Execution log test case shutdown 3.3 (main system)

Description of test procedure	Test procedure according to test case specification.

Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 58: Execution log test case shutdown 3.3 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 59: Execution log test case shutdown 3.4 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

Table 60: Execution log test case shutdown 3.4 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-08
Notes/lessons learned	None

2.2.4 Range Coverage

Table 61: Execution log test case range coverage 4.1 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-09
Notes/lessons learned	None

Table 62: Execution log test case range coverage 4.1 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-09
Notes/lessons learned	None

Table 63: Execution log test case range coverage 4.2 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Failed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-09
Notes/lessons learned	It seems fifteen meters is too much for the range. Thus it seems the wearable gateway has to stay close to the sensors or connection problems are possible.

Table 64: Execution log test case range coverage 4.2 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Failed

Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-09
Notes/lessons learned	It seems fifteen meters is too much for the range. Thus it seems the wearable gateway has to stay close to the sensors or connection problems are possible.

Table 65: Execution log test case range coverage 4.3 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-09
Notes/lessons learned	None

Table 66: Execution log test case range coverage 4.3 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-09
Notes/lessons learned	None

Table 67: Execution log test case range coverage 4.4 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	Connection seemed to drop from time to time.
Tester (Name)	Martin Biallas
Date of test	2015-12-09
Notes/lessons learned	The connection seems a bit unstable but there were no severe data loss.

Table 68: Execution log test case range coverage 4.4 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Failed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-09
Notes/lessons learned	No stable connection could be established. It seems that fifteen meters is too much for the range. Interestingly the classic MindWave sensor on the main system had fewer problems with the range. It seems necessary to keep the wearable gateway close to the MindWave sensor.

Table 69: Execution log test case range coverage 4.5 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-09
Notes/lessons learned	None

Table 70: Execution log test case range coverage 4.5 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-09
Notes/lessons learned	None

Table 71: Execution log test case range coverage 4.6 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Failed
Incidences	None

Tester (Name)	Martin Biallas
Date of test	2015-12-09
Notes/lessons learned	Like it was already the case with the Shimmer and the MindWave mobile sensor no stable connection could be established. The BioHarness sensor needs to be close to the wearable gateway to work properly.

Table 72: Execution log test case range coverage 4.6 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Failed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-09
Notes/lessons learned	Like in the test for the main system the BioHarness sensor needs to be close to the wearable gateway to work properly.

2.2.5 Single Sensor runs

Table 73: Execution log test case single sensor run 5.1 (main system)

Description of test procedure	Test procedure according to test case specification. The Shimmer sensor was attached to the person's left hand. The heart rate measurement was done on the pinkie and the GSR with electrodes on the middle and ring finger.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-10
Notes/lessons learned	None

Table 74: Execution log test case single sensor run 5.1 (backup system)

Description of test procedure	Test procedure according to test case specification. The Shimmer sensor was attached to the person's left hand. The heart rate measurement was done on the pinkie and the GSR with electrodes on the middle and ring finger.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-10

Notes/lessons learned	None

Table 75: Execution log test case single sensor run 5.2 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-10
Notes/lessons learned	None

Table 76: Execution log test case single sensor run 5.2 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-10
Notes/lessons learned	None

Table 77: Execution log test case single sensor run 5.3 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	The test person had to sneeze about 60 seconds into the test.
Tester (Name)	Martin Biallas
Date of test	2015-12-10
Notes/lessons learned	Even though the person sneezed and thus moved quite a bit the measurement was kept going. The sensor seemed still attached very well.

Table 78: Execution log test case single sensor run 5.3 (backup system)

Description of test procedure	Test procedure according to test case specification.

Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-10
Notes/lessons learned	None

Table 79: Execution log test case single sensor run 5.4 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-10
Notes/lessons learned	None

Table 80: Execution log test case single sensor run 5.4 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-10
Notes/lessons learned	None

2.2.6 Portability

Table 81: Execution log test case portability 6.1 (main system)

Description of test procedure	Test procedure according to test case specification. The Shimmer sensor was attached to the person's left hand. The heart rate measurement was done on the pinkie and the GSR with electrodes on the middle and ring finger.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-11

Notes/lessons learned	Movements have quite some impact on the measurements. Also the test person reports an uncomfortable feeling with the sensor attached to their hands. Writing had a major impact on the measurements whereas scratching and writing on the keyboard wasn't that major but still could be seen in the monitoring of the sensor values.

Table 82: Execution log test case portability 6.1 (backup system)

Description of test procedure	Test procedure according to test case specification. The Shimmer sensor was attached to the person's left hand. The heart rate measurement was done on the pinkie and the GSR with electrodes on the middle and ring finger.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-11
Notes/lessons learned	Movements have quite some impact on the measurements. Also the test person reports an uncomfortable feeling with the sensor attached to their hands. Writing had a major impact on the measurements whereas scratching and writing on the keyboard wasn't that major but still could be seen in the monitoring of the sensor values.

Table 83: Execution log test case portability 6.2 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-11
Notes/lessons learned	The MindWave is attached quite firmly. The grip is that strong that the test person actually mentions that it is uncomfortable. Longer test runs might results in some discomfort with the sensor. The movements didn't provide any problems with the measurements.

Table 84: Execution log test case portability 6.2 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-11

Notes/lessons learned	The MindWave is attached quite firmly. The grip is that strong that the test person actually mentions that it is uncomfortable. Longer test runs might results in some discomfort with the sensor. The movements didn't provide any problems with the measurements.

Table 85: Execution log test case portability 6.3 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-11
Notes/lessons learned	None

Table 86: Execution log test case portability 6.3 (backup system)

Description of test procedure	Test procedure according to test case specification. The BioHarness was tested with a person having some overweight. An extension to the belt was necessary to attach the sensor to the person.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-11
Notes/lessons learned	While testing the belt wasn't attached firmly enough. Moving around made the belt move and on the monitoring system it showed errors of the measurements. The belt had to be readjusted.

2.2.7 Combined Sensor runs

Table 87: Execution log test case combined sensors 7.1 (main system)

Description of test procedure	Test procedure according to test case specification. The Shimmer sensor was attached to the person's left hand. The heart rate measurement was done on the pinkie and the GSR with electrodes on the middle and ring finger.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-11
Notes/lessons	None

learned	

Table 88: Execution log test case combined sensors 7.1 (backup system)

Description of test procedure	Test procedure according to test case specification. The Shimmer sensor was attached to the person's left hand. The heart rate measurement was done on the pinkie and the GSR with electrodes on the middle and ring finger.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-11
Notes/lessons learned	None

Table 89: Execution log test case combined sensors 7.2 (main system)

Description of test procedure	Test procedure according to test case specification. The Shimmer sensor was attached to the person's left hand. The heart rate measurement was done on the pinkie and the GSR with electrodes on the middle and ring finger.
Outcome/result	Passed
Incidences	The test had to be restarted after the MindWave lost connection for unknown reasons.
Tester (Name)	Martin Biallas
Date of test	2015-12-11
Notes/lessons learned	Except the incident and the thus needed restart everything went fine. It is unknown what the problem with the connection lost has caused.

Table 90: Execution log test case combined sensors 7.2 (backup system)

Description of test procedure	Test procedure according to test case specification. The Shimmer sensor was attached to the person's left hand. The heart rate measurement was done on the pinkie and the GSR with electrodes on the middle and ring finger. As it was already the case with the portability test case the person used in this test case had some overweight. A belt extender was used to attach the BioHarness to the person. This time the belt was fixed more firmly to ensure it wouldn't move around while the person is moving.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-11
Notes/lessons learned	The more firmly fixation of the belt made sure the collected measurements

	were good. It is very important that the sensors are attached firmly.

Table 91: Execution log test case combined sensors 7.3 (main system)

Description of test procedure	Test procedure according to test case specification. The Shimmer sensor was attached to the person's left hand. The heart rate measurement was done on the pinkie and the GSR with electrodes on the middle and ring finger.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-11
Notes/lessons learned	The test person reported a highly discomfort with the MindWave sensor. It is attached very firmly to the head and starts to cause small pain because of the firm grip. Everything else went on fine. There were some blurry measurements when the person was standing up from the mattress but only for a very short period (1-2 seconds).

Table 92: Execution log test case combined sensors 7.3 (backup system)

Description of test procedure	Test procedure according to test case specification. The Shimmer sensor was attached to the person's left hand. The heart rate measurement was done on the pinkie and the GSR with electrodes on the middle and ring finger.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-11
Notes/lessons learned	The test person reported a highly discomfort with the MindWave sensor. It is attached very firmly to the head and starts to cause small pain because of the firm grip. There were some blurry measurements when the person was standing up from the mattress but only for a very short period (1-2 seconds). After the person stood up and later sit back down there were some times some smaller problems with the measurements. But the system was able to catch back up after about a second.

2.2.8 Long term runs

Table 93: Execution log test case long term run 8.1 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None

Tester (Name)	Martin Biallas
Date of test	2015-12-15
Notes/lessons learned	None

Table 94: Execution log test case long term run 8.1 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-15
Notes/lessons learned	None

Table 95: Execution log test case long term run 8.2 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-15
Notes/lessons learned	None

Table 96: Execution log test case long term run 8.2 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-15
Notes/lessons learned	None

Table 97: Execution log test case long term run 8.3 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-16
Notes/lessons learned	None

Table 98: Execution log test case long term run 8.3 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-16
Notes/lessons learned	None

Table 99: Execution log test case long term run 8.4 (main system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas
Date of test	2015-12-17
Notes/lessons learned	None

Table 100: Execution log test case long term run 8.4 (backup system)

Description of test procedure	Test procedure according to test case specification.
Outcome/result	Passed
Incidences	None
Tester (Name)	Martin Biallas

Date of test	2015-12-17
Notes/lessons learned	None

2.3 Test report

The criterion for passing the complete set of tests is the adequacy of the system for tests with end users. However not all tests have been passed, the system is capable to server its purpose. Therefore the over all result of the tests is: PASSED.

2.4 Test approval

Table 101: Approval

Date	18.12.2015
Signature	
Print name	Martin Biallas

The undersigned acknowledge they have reviewed the **Trans.Safe D4.2 Test Report** and agree with the approach it presents. Changes to this **Test Report** will be coordinated with and approved by the undersigned or their designated representatives.

3 System manual

3.1 Purpose

The personnel executing the test cases gains detailed insight about the handling of the system. However, the trials in the environments of OCC and simulator are conducted by other personnel, which is not familiar with the system. Therefore a manual is prepared for them. As those tests are conducted by German partners, the language of the manual is German. The version to be used for tests will be in the documentation of work-package 5 (D5.3).

Appendix A Environment Gateway Installation

A.1. Sensor set up

How often shall we exchange batteries on what device?

Here you can find information of the devices:

Mindwave: 8-hour AAA battery life

Zephyr BioHarness: Battery life: 26 Hours per charge.

Empatica: Battery life: - Streaming mode: 20 h

- Memory mode: 36+ h

How much time do we need to plan for recharging the Empatica E4?

Charging time: < 2 h

Is it OK to clean all non-disposable electrodes/parts in contact with the skin with disinfectant? (We have an Ethanol solution 850 mg/g here)

Honestly, we don't know. Maybe only water could be sufficient.

What kind of disposable electrodes shall we purchase for the Shimmer? Self-adhesive Ag/AgCl electrodes? (We have never bought something for the shimmer up to know. I have really no clue ☺)

We used the electrodes that are normally used for ECG applications, or physiological applications;

On which hand should the shimmer measure?

The Shimmer sensor should be put on the not-controlling hand.

Is it a good idea to expect the test subject to hold the shimmer sensor in his/her hand? Is there a special reason/requirement for that? How shall a person in the driving simulator hold the steering wheel, when one Shimmer needs to be in the hand?
Our Shimmer sensors came with a wristband (see attached pictures). Can we use them like shown in the pictures (but with your recommended electrodes instead of ours)?

We used Shimmer sensor, provided by Telecom Italia, that did not have the wristband. We have never used the kind of electrodes that are provided with your sensor, but if the kit is composed in this way, you can use it.

A.1.1. HOW TO WEAR THE TRANS SAFE KIT'S DEVICES

A.1.1.1. ZEPHYR BIOHARNESS:

The chest belt has to be wore with the sensor on the left side of the chest. When the subject puts it, you can press the sensor and the chest belt to turn on the chest. To clean it, it would be better to leave the belt 5 minutes open, in order to let the body sweat, eventually present on it, to go away. Anyway, the indication to wash the belt are reported on the tag which is on it, so you can check it. It can be washed but no using wash machine. It is possible to run on the belt a humid towel and then let it dry.

A.1.1.2. MIND WAVE:

The device is put on the head of the subject, while the electrode has to be put on the forehead, above the left eye. The little clothespin has to be attach on the left ear lobe. If you want you can clean and scrub the skin area where the electrode is, before wearing the device.

A.1.1.3. EMPATICA:

The subject has to put the bracelet on the wrist of the not-controlling hand, as showed in figure. When the recording phase is complete, it is sufficient to clean the sensor with a paper hand towel, especially in the area which has been in contact with the skin of the subject.

A.1.1.4. SHIMMER SENSOR:

It is suggested to use conductive gel electrodes, as the ones in the picture (in which the gel is a little bit ruined):

The electrodes with conductive gel have to be put on fingertips of index and medium fingers. The subject has to hold the device in his palm.

It would be better to use the electrodes once for each subject. If it is not possible, it is recommended to put them on their plastic layer, in order to preserve the conductive gel.

A.2. Environmental Sensor Gateway Installation Guide

In the Trans.Safe system the Environmental Sensor Gateway has the primary role to collect data from the enviroment for the stress detect algorithm and to perform interventions on the environment whem request by the user.

In this chapter the components of the Environmental Gatey, both the hardware and the software, will be described.

A.2.1. Components:

- **Environmental sensors:**
  - Luminance sensor (http://www.seeedstudio.com/wiki/Grove_-_Luminance_Sensor)
  - Temperature and humidity sensors (http://www.seeedstudio.com/wiki/Grove_-_Temperature_and_Humidity_Sensor_Pro)
  - Sound Sensor (http://www.seeedstudio.com/wiki/Grove_-_Sound_Sensor)
  - Grove Base Shield V2 (http://www.seeedstudio.com/depot/Base-Shield-V2-p-1378.html)

- **Udoo Quad** (http://shop.udoo.org/eu/product/udoo-quad.html)
  - EU starter kit (http://shop.udoo.org/eu/accessories/starter-kit-eu.html)

Other Components needed for the setup:

- Mouse and keyboard usb or wireless (linux compatible)
- A monitor with a HDMI input
  - Or, a monitor with VGA input and a HDMI adapter
- Internet connection (Eth or wifi)
- A PC or a laptop with a SD card reader or an external card reader
- A micro SD card and an SD adapter

A.2.2. Installation Walkthrough

A.2.2.1. System Requirements

For the Environmental Sensor Gateway these software components are needed (in parenthesis the remote resource if availabe):

- UDOOBuntu operating system for the Udoo Quad (http://download.udoo.org/files/UDOO_Unico/Quad_img/UDOObuntu_img/UDOObuntu_quad_v1.1.zip) (Update 04/08/2015, new versin of the OS in beta testing)
- Java 1.7 for linux (guide to install it in the following sections)
- OpenHab Core 1.7 (https://bintray.com/artifact/download/openhab/bin/distribution-1.7.1-runtime.zip)
- Win32 Disk Imager (if using Windows http://sourceforge.net/projects/win32diskimager/files/latest/download)
- The Trans.Safe binding for OpenHab (Provided by the partner)
- The Philips hue binding for the intervention (Available on the internet, but provided by the partner)
- DTH22 libraries for the ArduinoDue (provided by the partner but original source: https://github.com/RobTillaart/Arduino/tree/master/libraries/DHTstable)
- The Arduinodue Sketch (Provided by the partner)
- The configuration files for OpenHab (Provided by the partner)

Regarding the hardware, a micro sd card of at least 8 gigabyte, a power supply, a HDMI cable and a mouse and keyboard are required. (http://shop.udoo.org/eu/catalog/product/view/id/35/s/starter-kit-eu/category/3/)

A.2.2.2. Board Preparation

In order to get familiar with the board it is possible to watch this brief tutorial in which the connectivity of the board is explained: http://www.udoo.org/tutorial/connectivity-walkthrough/

In order to get familiar to the Grove system, this video show how to plug the shield to the Udoo board and some sensors to the shield: https://www.youtube.com/watch?v=hE_y2oCbqSI

The sensors must be plugged on the Shield in this precise order:

- Sound sensor: A0 socket
- Luminance sensor: A1 socket
- Temperature and Humidity sensor: D4 socket
- Led (for debugging purposes, not a requirement): D8

Remember that the switch on the board must be on 3.3V

A.2.2.3. OS Installation

The tutorial for the installation of the operating system from windows can be found here: http://www.udoo.org/tutorial/creating-a-bootable-micro-sd-card-using-windows-from-image/

For other operating system the instructions can be found here: http://www.udoo.org/docs/Getting_Started/Create_A_Bootable_MicroSD_card_for_UDOO

Now, you can boot the board by inserting the micro sd in the slot and plugging-in the power supply.

A.2.2.4. Installation of Java 1.7

The operating system comes with an installation of the Java JDK based on Open JDK. For the correct functioning of the Trans.Safe program we suggest to use the official Oracle Java. The easiest way to do it is using the apt-get utility.

These are the steps to install Java 7 on the board.

1) Open the terminal
2) Use the command:
   ```
   sudo add-apt-repository ppa:webupd8team/java
   sudo apt-get update
   sudo apt-get install oracle-java7-installer
   ```
3) Follow the instructions on the terminal
4) Control the java version installed using:
   ```
   java -version
   ```
5) If the current java version is not the Oracle 1.7, use the following command to chose the right version:
   ```
   sudo update-alternatives --config java
   ```

A.2.2.5. Installation of the Serial Libraries

To use the serial communication between the UDOObuntu operating system and the ArduinoDue it is necessary to configure the serial serial libraries on the board.
The instructions to do it can be found here under the Java section:
http://www.udoo.org/tutorial/udoo-serial-libraries-examples/?portfolioID=1394
There are some minor changes to the procedure due to the changes in the ArduinoIde version and the use of the Oracle Java runtime.

The proper commands are:

```
sudo cp /opt/arduino-1.5.8/lib/librxtxSerial.so /usr/lib/jvm/java-7-oracle/jre/lib/arm/
sudo cp /opt/arduino-1.5.8/lib/RXTXcomm.jar /usr/share/java/
```

The last two commands are not longer required.
More ref and the source code of the example can be found here:
https://github.com/UDOOboard/serial_libraries_examples/tree/master/java

A.2.2.6. Installation of the DHT22 libraries for the ArduinoDue

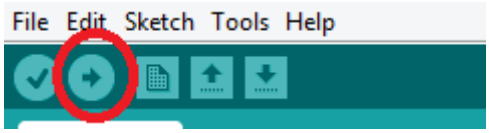
The Temperature and Humidity sensor require specific libraries for the ArduinoDue. These libraries can be found here: https://github.com/RobTillaart/Arduino/tree/master/libraries/DHTstable

These files will be provided by the partner with the other software. To install them on the ArduinoIDE follow these steps:

1) Open the ArduinoIDE already installed on the operating system
2) Go to the menù Sketch -> Import Library -> Add Library
3) Navigate to the folder provided with the file and click Ok
4) Now the libraries are ready to be used

A.2.2.7. Installation of the ArduinoSketch

To allow the reading of the sensors, the program for the ArduinoDue must be installed before the launch of the rest of the software. To do so, the following steps must be done:

1) Open the ArduinoIDE
2) Go to File -> Open
3) Navigate to the folder with the provided file: “UdooSensorSerialReadTransSafe.ino”
4) Once the file is open on the IDE click on the upload icon to compile the program and send it to the processor 

After this steps, locate the voltage switch on the side of the grove shield and quickly switch from 3.3V to 5V and back to 3.3V. It is important that the switch stays at 3.3V, the other setting could damage the board.

A.2.2.8. Installation of the add-ons and config files for OpenHab

The core part of OpenHab must be downloaded from the provided link and unzipped in a folder. After that, the folder structure will look like this:

addons	25/05/2015 21:28	File folder	
configurations	25/05/2015 21:28	File folder	
contexts	25/05/2015 21:28	File folder	
etc	25/05/2015 21:28	File folder	
server	25/05/2015 23:42	File folder	
sounds	25/05/2015 21:28	File folder	
webapps	25/05/2015 21:28	File folder	
LICENSE	25/05/2015 21:28	Text Document	11 KB
README	25/05/2015 21:28	Text Document	1 KB
start	25/05/2015 21:28	Windows Batch File	1 KB
start	25/05/2015 21:28	Shell Script	1 KB
start_debug	25/05/2015 21:28	Windows Batch File	2 KB
start_debug	25/05/2015 21:28	Shell Script	2 KB

Copy the provided add-ons .jar into the “addons” folder then open the “configurations” folder. Once inside the folder you must:

1. Delete the openhab_default.cfg file
2. Copy the provided openhab.cfg file
3. Open the items folder and copy the provided transsafe.items file inside
4. Go back to config, open the sitemaps folder and copy the provided transsafe.sitemap file inside

After these operations, go back to main folder and open the openhab.cfg file.
The configuration for the Trans.Safe binding will look like this:

########################## Trans.Safe Binding ###################################

```
transsafe:refresh=10000
transsafe:uid=0000000001
#transsafe:serialPort=COM14
```

The serialPort should remain as a comment, since the binding already knows the right address inside the executed code, the refresh setting must be setted to the desired interval between readings. In the example above there is a reading each 10000 microseconds (10 seconds). If this line is commented, the program will use a refresh time of 60 seconds. The uid is the unique identifier of the gateway. It can be set as desired.

A.2.2.8.1. Installation and configuration of the Philips Hue for intervention

In order to use the Philips Hue for the intervention the Hue's Hub must be plugged on the same local network as the Udoo. Take note of the IP address of the Hub because it will be necessary to configure the program.
Open the openhab.cfg file with leafpad and go to the Philips hue section.

Once there, write the ip address of the Hub on the Ip section, and the secret pairing key on the secret section, finally, save the file.

More information can be found here: https://github.com/openhab/openhab/wiki/Hue-Binding

A.2.2.9. Start the services

With all the elements in place now it is possible to start the actual program.
Open the terminal and go to the go to the main folder of the openHab runtime (the same of 1.3.7). Depending on where you saved it the path could change accordingly.
Once the terminal is on the right folder, simply write: `./start.sh` and the runtime will start the loading.

Wait for a couples of minutes that all the modules are loaded.

To check if everything is running smoothly, open the browser (chromium) and navigate to this address: http://localhost:8080/openhab.app?sitemap=transsafe

Then, click on "sensors" to see if the values are present and they are updated accordingly with the chosen refresh time. (note that the system has no memory so you have to wait for the first reading in order to see the values)

A.2.3. Known issues

A.2.3.1. Sound Sensor

The sound sensor used seems not very reliable. The causes of this issue are not fully clear, the main hypotheses are:

1) The sensor is broken
2) The Vcc provided by the shield is not enough (the ArduinoDue should be able to provide 5V, but without a multimeter is not possible to determine the actual Vcc of the sensor)

Right now the reading of the ambient noise is therefore quite aleatory and no really reliable.

A.2.3.2. OS stability

The official OS provided for the board showed some signs of instability during the coding and preliminary testing of the software.

On the 04/08/2015 Udoo announced the release of a new operating system:
http://www.udoo.org/the-powerful-udoobuntu-2-beta-is-now-available/

The new OS is still in beta testing, but the preliminary tests show an improved stability. For future versions of the Trans.Safe solution the new OS would probably be the best choice.

A.2.3.3. Alternative Setup

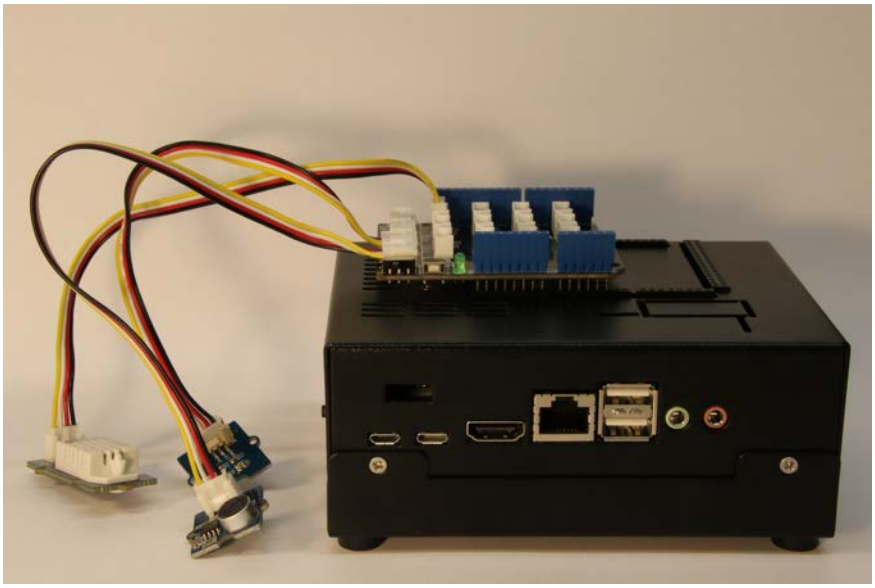
The fastest way to perform the software setup on the Environmental Gateway is to directly create the SD card with the OS from a given image of the Env. Gateway software already configured and ready to start.

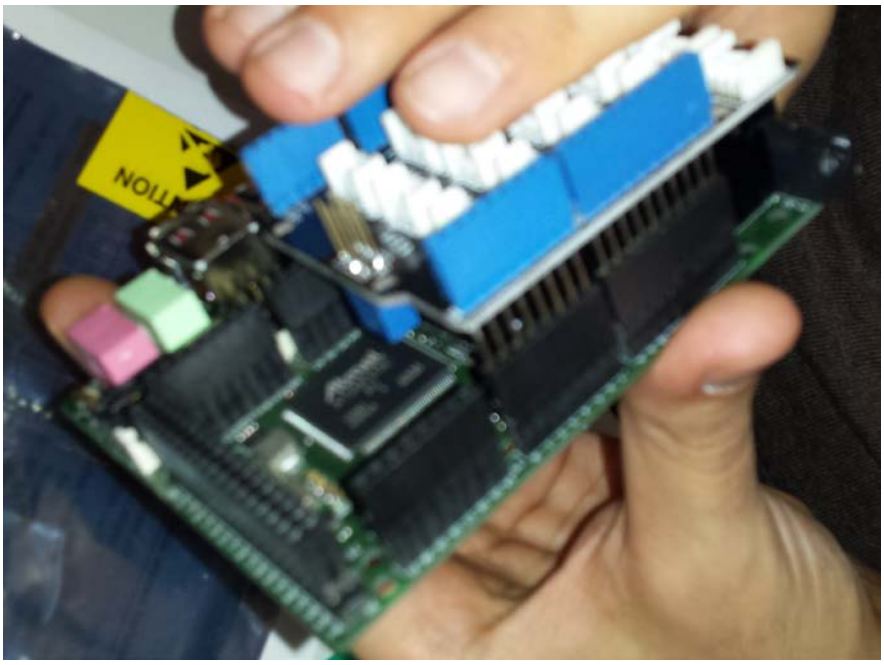
The instructions can be found here, the procedure is the same as for the Raspberry pi software:
http://lifehacker.com/how-to-clone-your-raspberry-pi-sd-card-for-super-easy-r-1261113524

A.3. Installation Guide setting up TransSafe system

A.3.1. Board Preparation

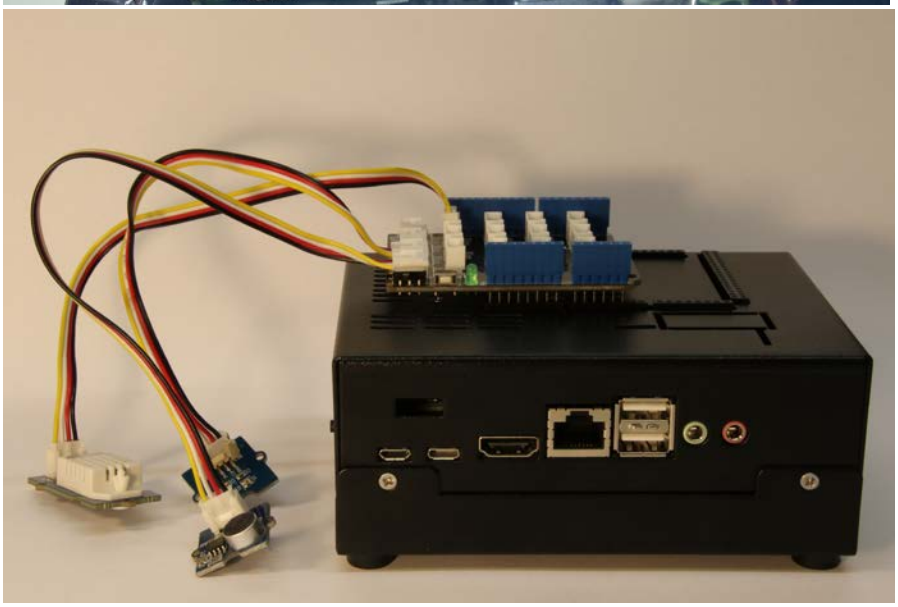
- Place the shield board on the UDOO like shown in the picture





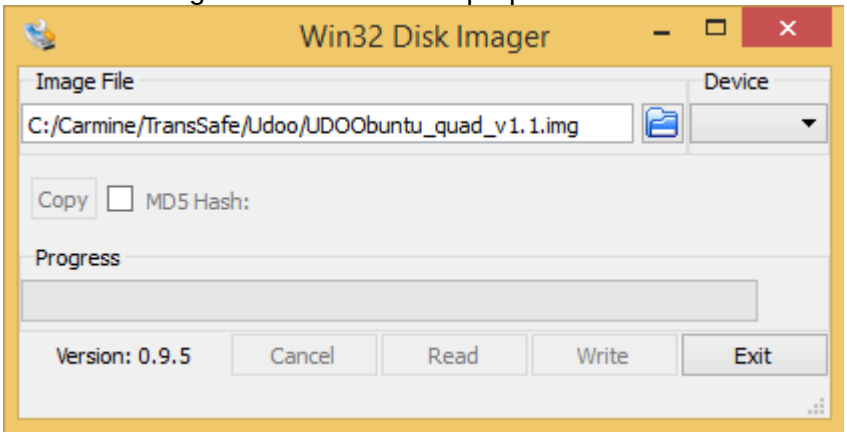
- The sensors must be plugged on the Shield in this precise order:
  - Sound sensor: A0 socket
  - Luminance sensor: A1 socket
  - Temperature and Humidity sensor: D4 socket
  - Led (for debugging purposes, not a requirement): D8
  - Picture with box

- If the switch on the shield board is not on 3.3V, switch it to 3.3V



A.3.2. Flash SD card with Image

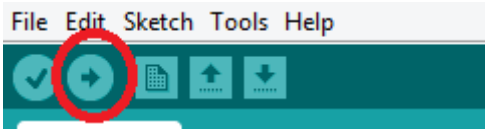
- Installed Win32 Disk Imager
- Get the newest Image file from xxx
- Select the image file and select the proper SD card Device



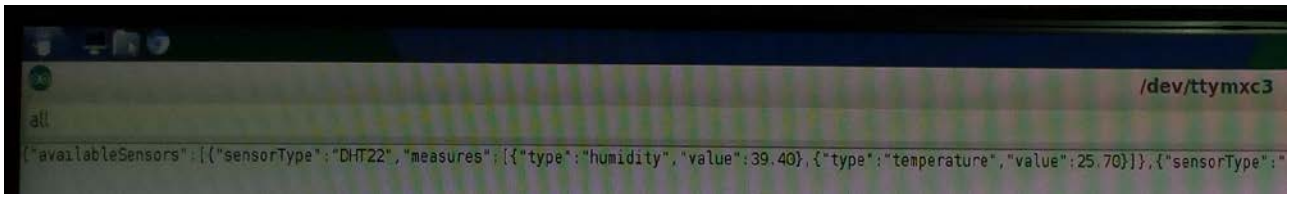
- Click Write
- Wait till finished and on the pop up click on OK
- Plug the SD card into the UDOO
- Power up UDOO

A.3.3. Installation of the ArduinoSketch

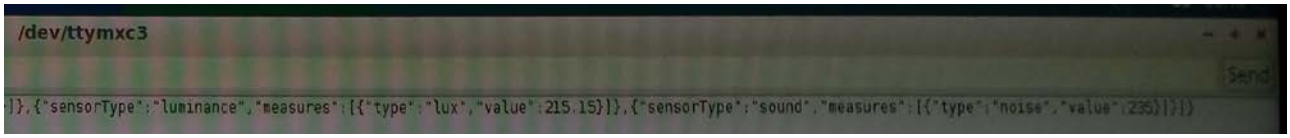
If a new ArduinoSketch is together with the used image version or you have a fresh UDOO board, then follow those steps. Otherwise you can skip this chapter.

- Open the ArduinoIDE
- File -> Open
- Open the ArduinoIDE
- Select the File: Desktop/TransSafe/Env_Gateway_Software-2015-11-16/Env Gateway Software/Arduino sketch/UdooSensorSerialReadTransSafe/UdooSensorSerialReadTransSafe.ino (probably this path will change with the new versioning system)
- Once the file is open on the IDE click on the upload icon to compile the program and send it to the processor 

- After this steps, locate the voltage switch on the side of the grove shield and quickly switch from 3.3V to 5V and back to 3.3V. It is important that the switch stays at 3.3V, the other setting could damage the board.
- Tools->SerialMonitor
- Right bottom corner->Change the Baud Rate to 115200buad
- Enter : all->press on Keyboard “Enter”
- The following result should be shown



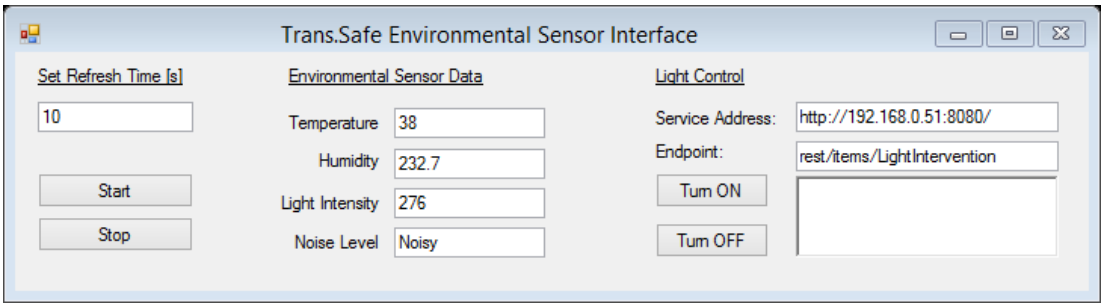
(above and below pictures are originally one. Cut because of readability)



- Do a reboot of the UDOO

A.3.4. Environmental gateway connecting with wearable gateway

- On the Laptop open TransSafe.exe
- Click on “Open Env Sensors and Light Intervention”
- In the field “Service Address” enter: http://192.168.0.xx:8080/ (the correct IP address is in the Appendix chapter
- Set Refresh Time from 1s to x (field empty default is 3 second)
- Press Start

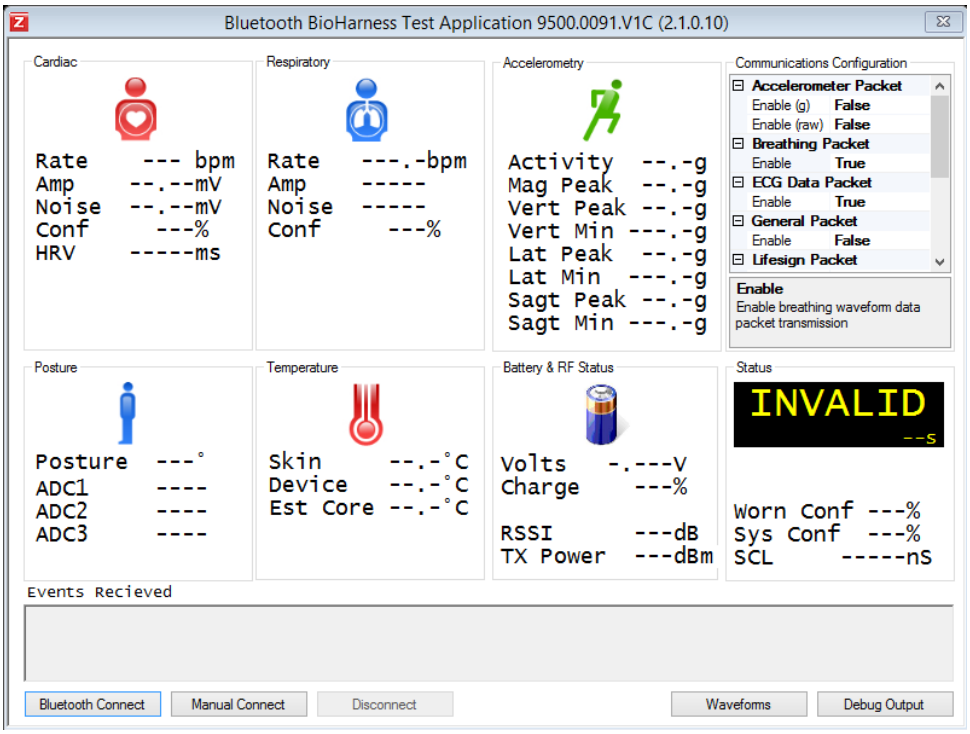


-
- Now it logs into the file envLog.txt (located in TransSafe.exe->Folder DatiEnv)

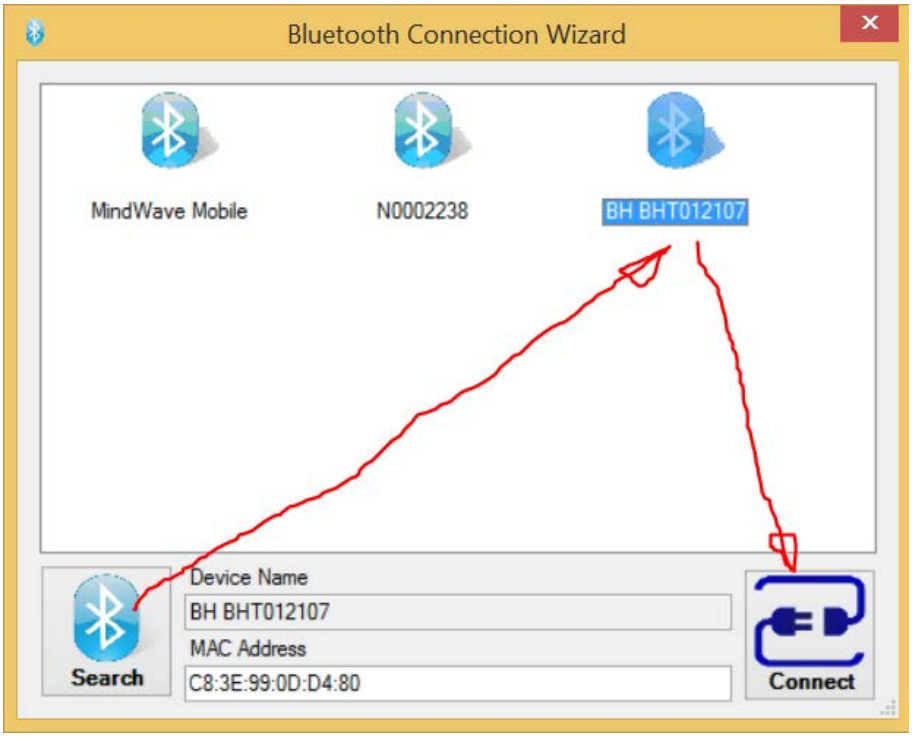
A.3.5. BioHarness connecting with wearable gateway

- Bluetooth has to be enabled on Laptop
- Switch on BioHarness
- Change File path.txt (in same folder as TransSafe.exe) with the correct user (https://jira.ihomelab.ch/browse/TRAN-94)
- Create Folder in your user account C:\Users\xxx\Documents\BioHarness Test Logs (https://jira.ihomelab.ch/browse/TRAN-95)
- Create Folder “TEST_FASCIA” where TransSafe.exe is (https://jira.ihomelab.ch/browse/TRAN-96)
- Connect BioHarness with USB to the Laptop (for DLL installation) (https://jira.ihomelab.ch/browse/TRAN-97)
- Start TransSafe.exe -> Press “Open BioHarness ECG Interface”
- Enter File_Name -> Press on the BioHarness picture

- Press “Bluetooth Connect”



- Press “Search” -> select the correct BioHarness -> Press “Connect”



- Immediately when it is connected it starts to log in the background in the path specified in Path.txt
- When you finished measuring -> Press “Disconnect” -> Now the log files will be created in the folder TEST_FASCIA
- According the document deliverable 3.2 it should create 3 txt files in the folder TEST_FASCIA: ECG_xxx.txt, RR_xxx.txt, SUM_xx.txt
  At the moment the RR_xxx.txt in TEST_FASCIA is not created. See: https://jira.ihomelab.ch/browse/TRAN-93
- To switch off the BioHarness press >3s hard hard strong strong the middle button

A.3.6. Appendix

A.3.6.1. Philips HUE LightIntervention, HSL

If the bulbs can't be switched on/off by the wearable gateway:

- In environmental gateway go to the folder: /home/Ubuntu/Desktop/Trans.Safe/OH/configurations
- Open file openhab.cfg
- Change the IP address to one off Philips HUE intervention, HSL

A.3.6.2. Passwords and IP addresses

Default User: ubuntu
Default Password: Ubuntu

Philips HUE intervention, HSL

- IP address 192.168.0.20

UDOO1 (Bottom scratch with Mars symbol):

- IP address ethernet: 192.168.0.21
- IP address wireless: 192.168.0.22

UDOO2 (Bottom scratch with Venus symbol):

- IP address ethernet: 192.168.0.23
- IP address wireless: 192.168.0.24

A.3.6.3. Start the services manually

The service should start automativaly by booting up. To start manually:

- Open a Terminal
- Type: cd Desktop/Trans.Safe/OH
- Type: ./start.sh
- Enter

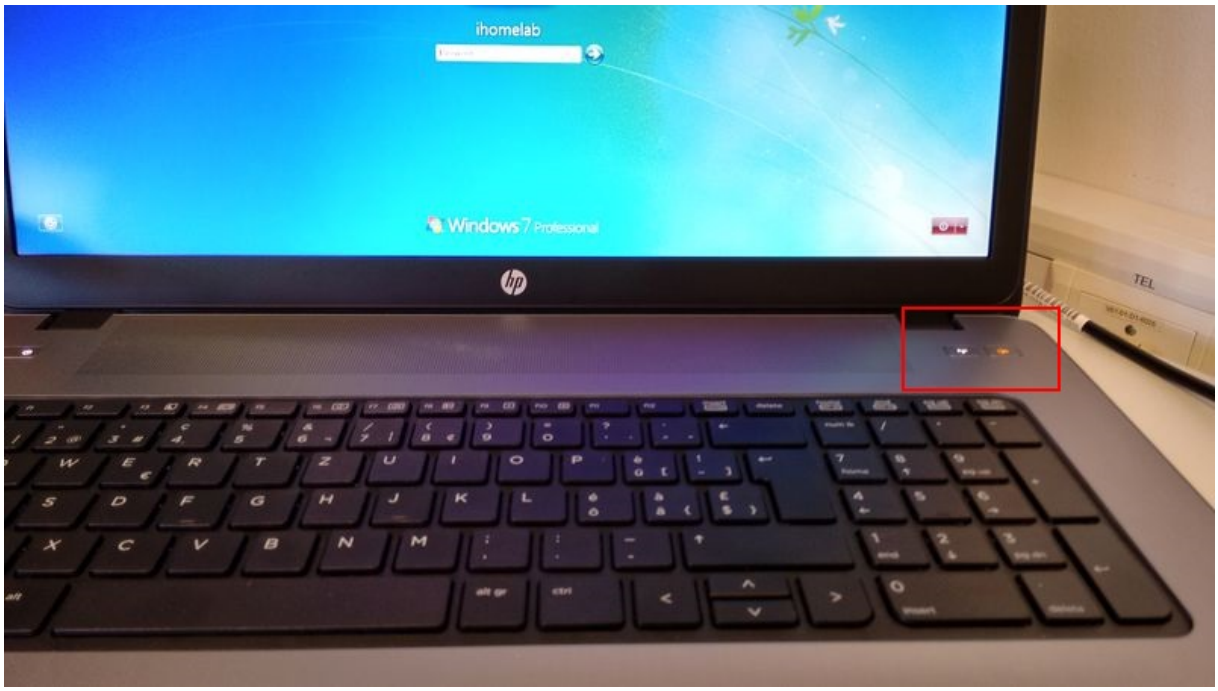
A.3.6.4. Access files on UDOO

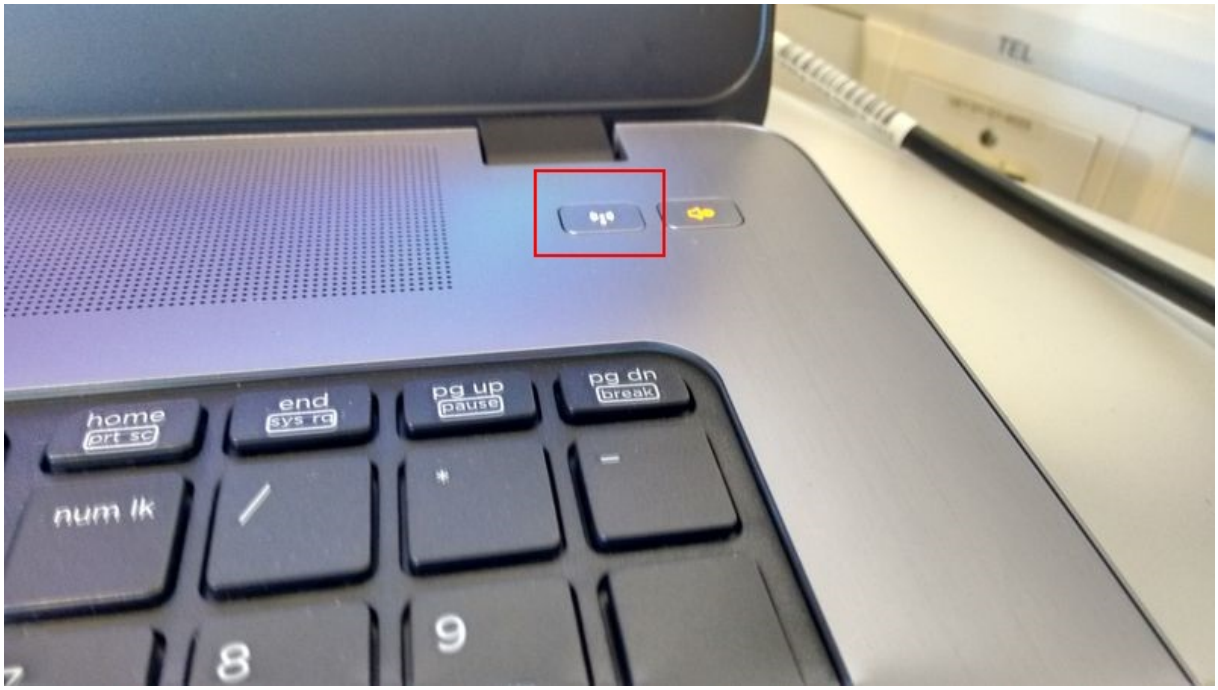
In the laptops browser enter for example the address
http://IPoffUDOO:8080/rest/items

Appendix B Test Manual (German)

B.1. Laptop mit D-Link verbinden

- Stelle sicher, dass das W-LAN am Laptop eingeschaltet ist (oben rechts bei der Tastatur ist ein kleiner Funkmast, die Taste muss Weiß leuchten)

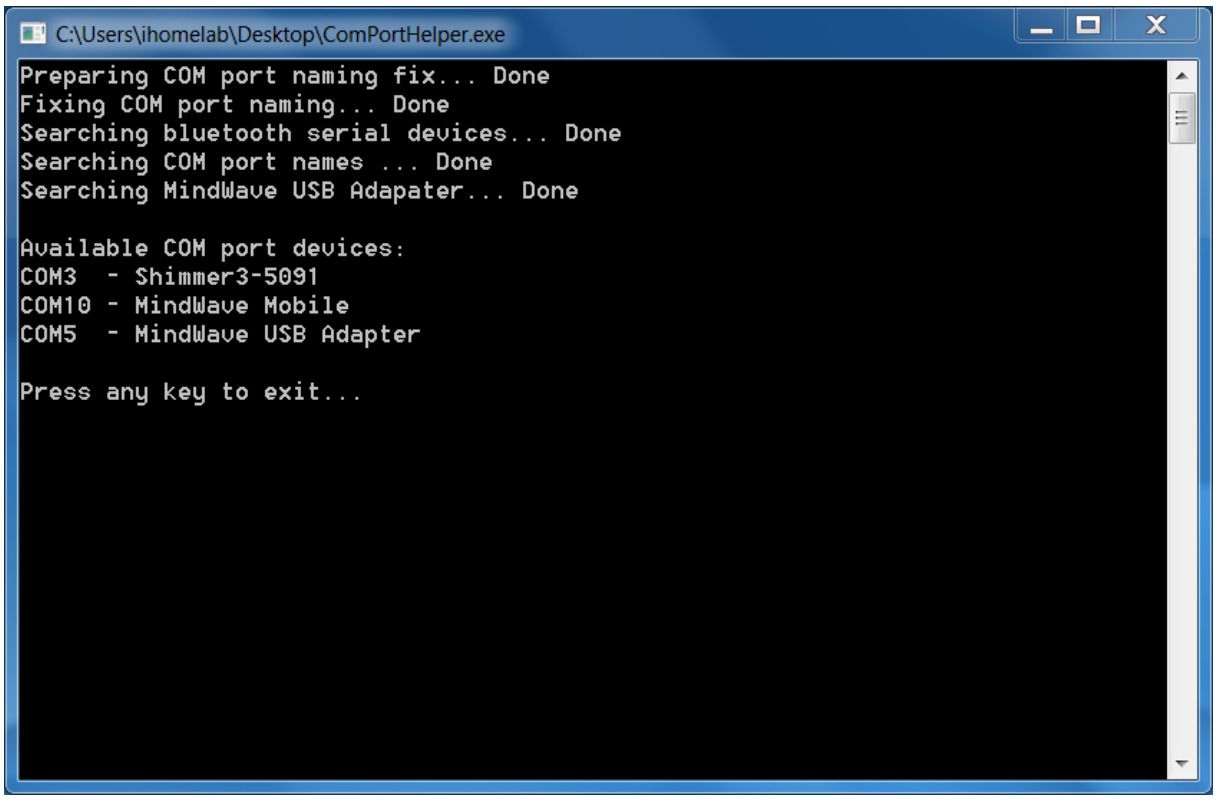




- Netzwerk verbinden: “TStest” mit Passwort: Trans.Safe

B.2. Sensoren einzeln einschalten

- ComPortHelper.exe starten nachdem alle Sensoren betriebsbereit und mit dem PC verbunden sind
- Danach erst Trans.Safe starten



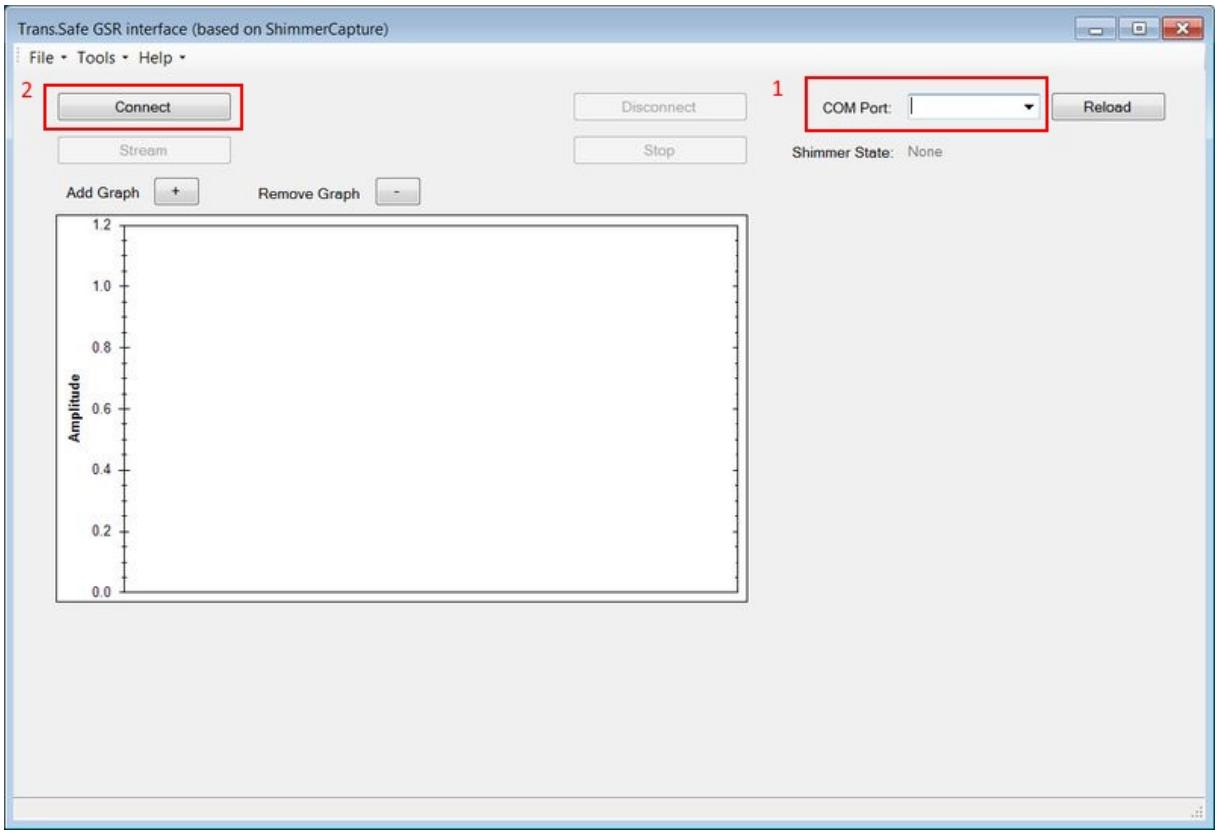
- Der ComPortHelper kann wiederholt gestartet werden. Insbesondere wenn bei der COM Port Auswahl chinesische oder sonstige unnötige Zeichen (z.B. eine ‚0' zu viel) auftauchen. Dann das entsprechende Fenster schließen, den ComPortHelper erneut starten und es nochmals versuchen.

B.3. Sensoren an Trans.Safe Gateway (Laptop) anschließen

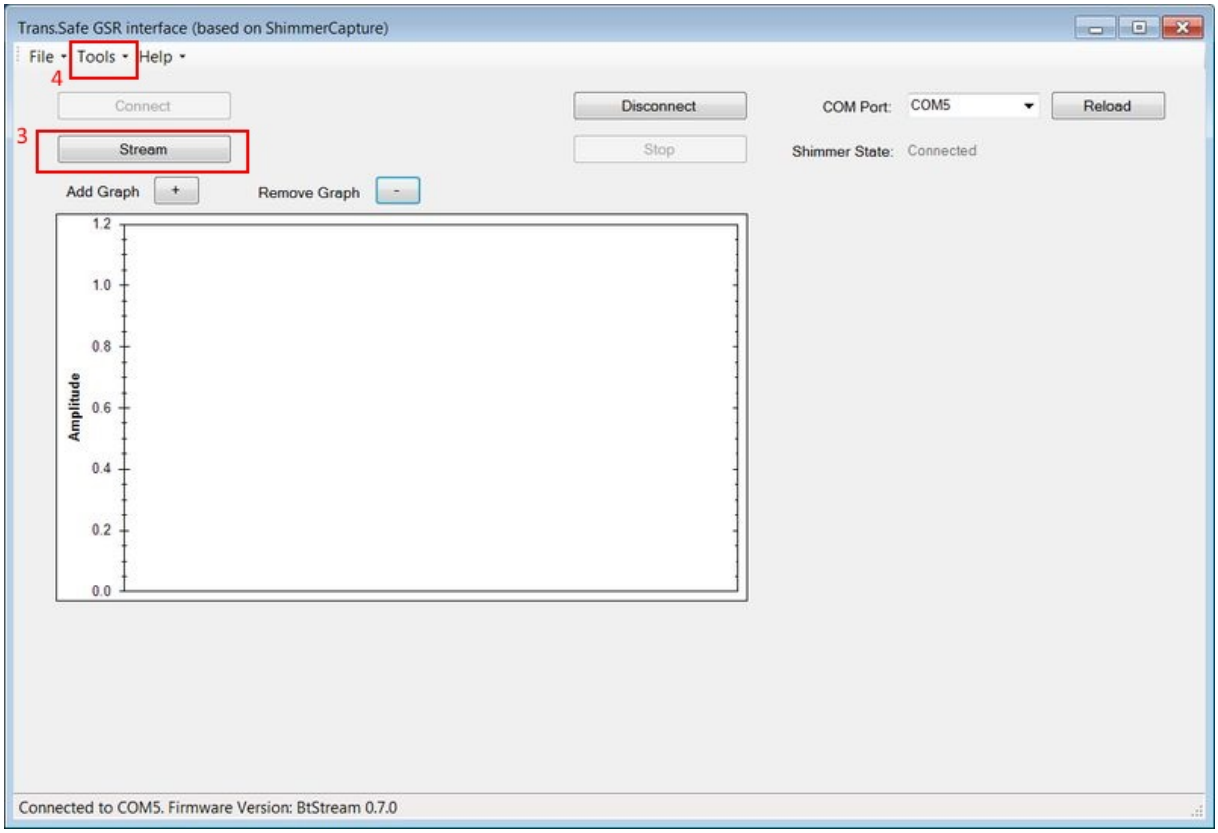
- Shimmer (Handsensor)
- BioHarness (Brustgurt)
- Mindwave (EEG)
- Environmental Gateway (schwarzer Kasten)

B.4. Trans.Safe Gateway:

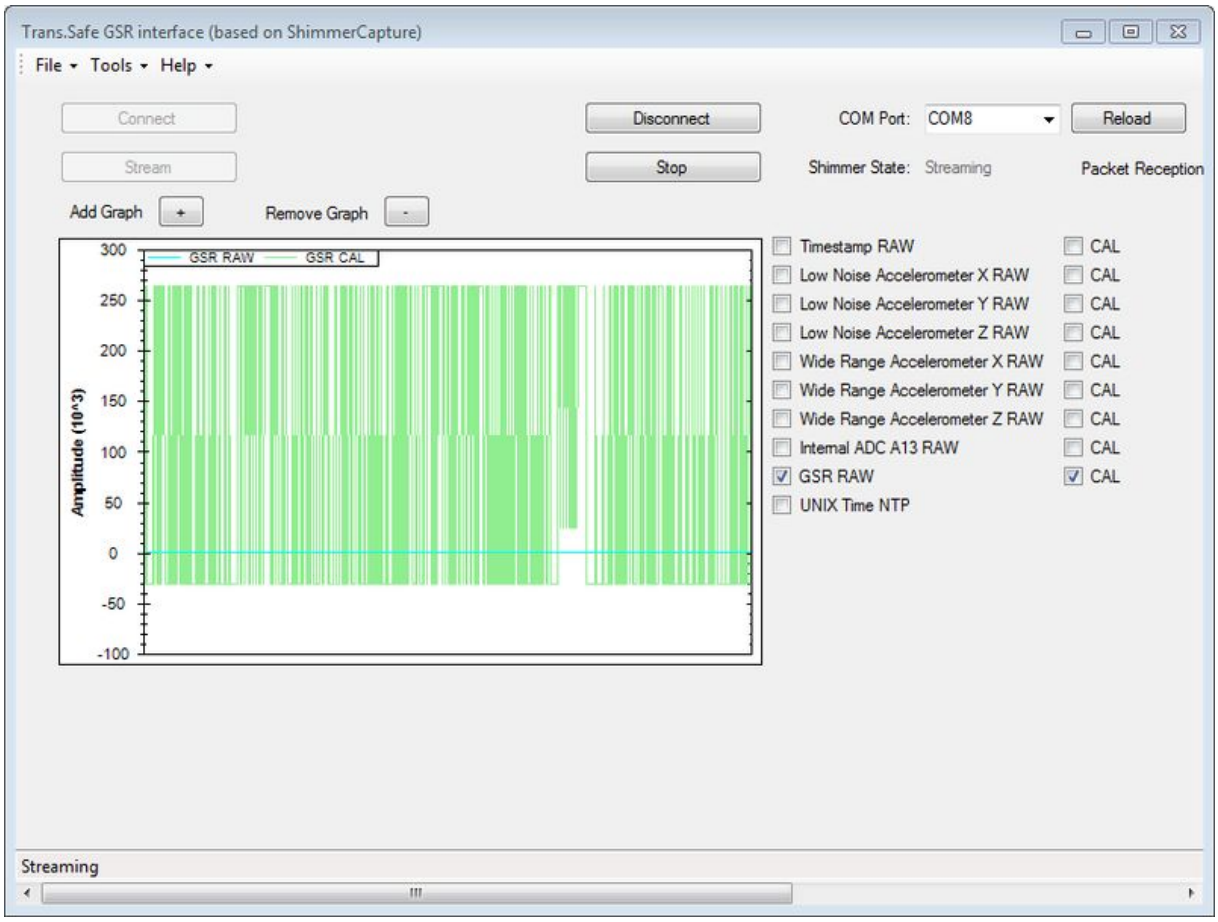
- Sensor Shimmer anklicken
- Aufnahmeoberfläche öffnet sich



- COM Port auswählen
- Connect anklicken



- Stream anklicken → Sensor zeichnet auf
- Tools → Save to CSV
- Abspeichern mit Dateinamen: 20160107_xxx_xxx

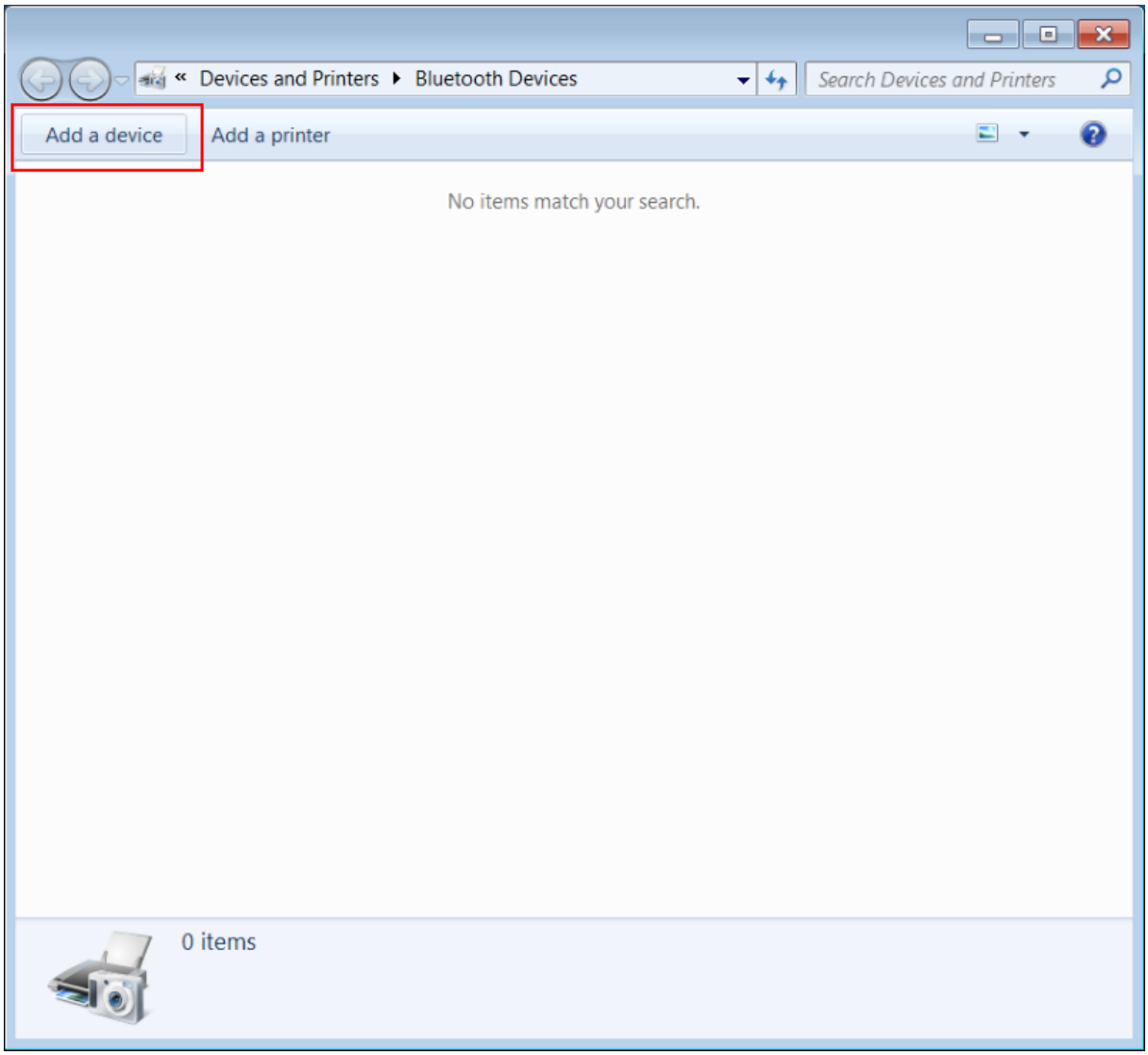


B.5. Shimmer anlegen

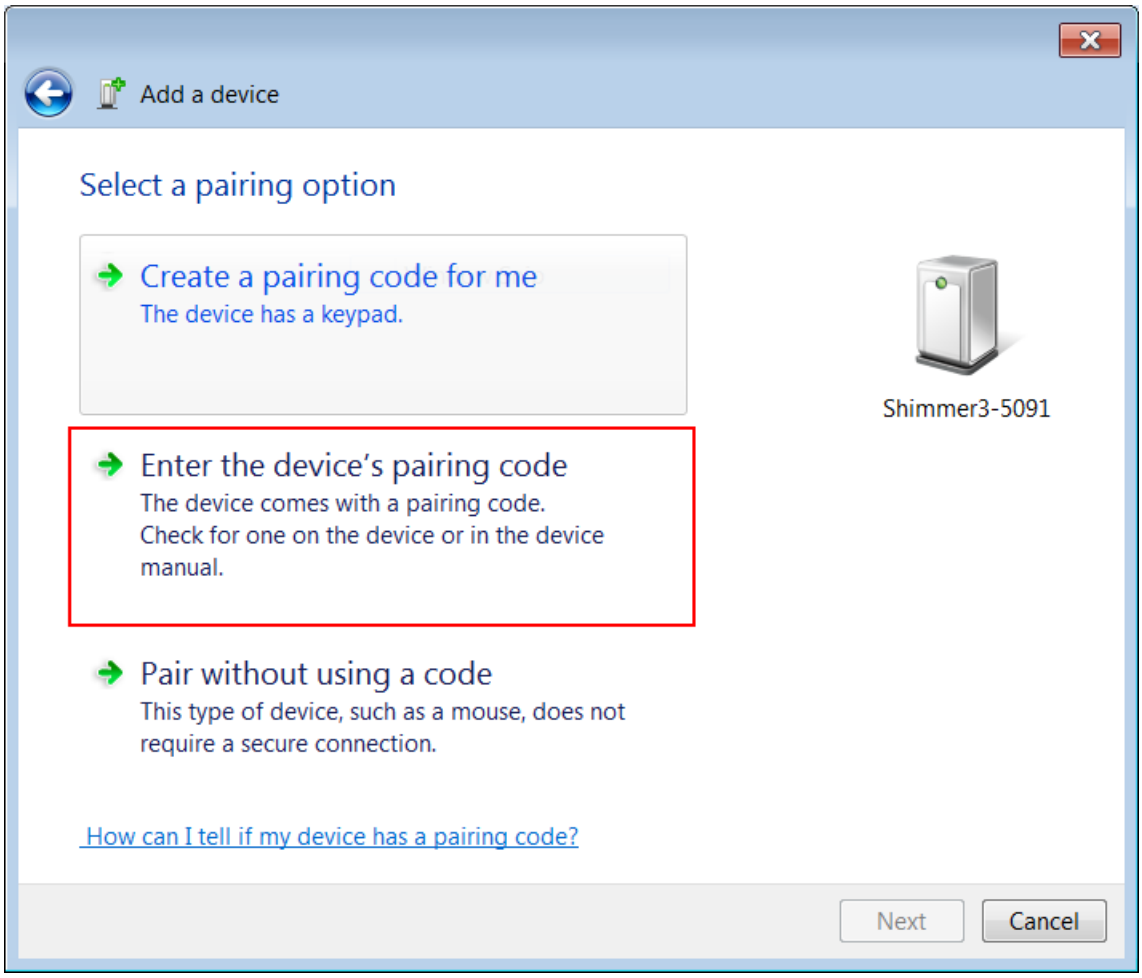
- Gerät am Unterarm befestigen, damit es sich bei Bewegungen nicht löst
- PPG (Lichtsensor) am linken kleinen oberen Finger
- 2 Sensoren am mittleren und Ringfinger (mittleres Glied)
- Anklicken: Internal ADC A13 RAW (Puls) + CAL

B.6. Shimmer bekannt machen (falls von ComPortHelper.exe nicht gefunden)

- Rechts unten auf dem PC-Monitor: Bluetooth-Symbol rechte Maustaste
- Show Bluetooth Devices



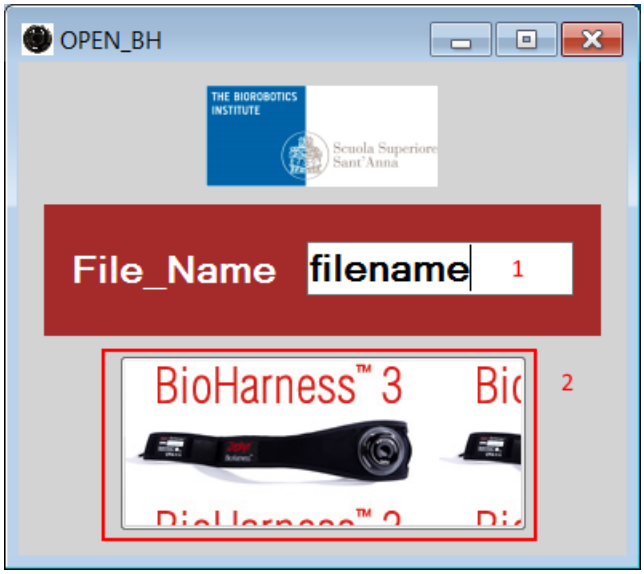
- Links oben: Add Device
- Shimmer auswählen mit richtiger Seriennummer anklicken (Kann etwas dauern, bis er auftaucht)
- Unten rechts: Next anklicken



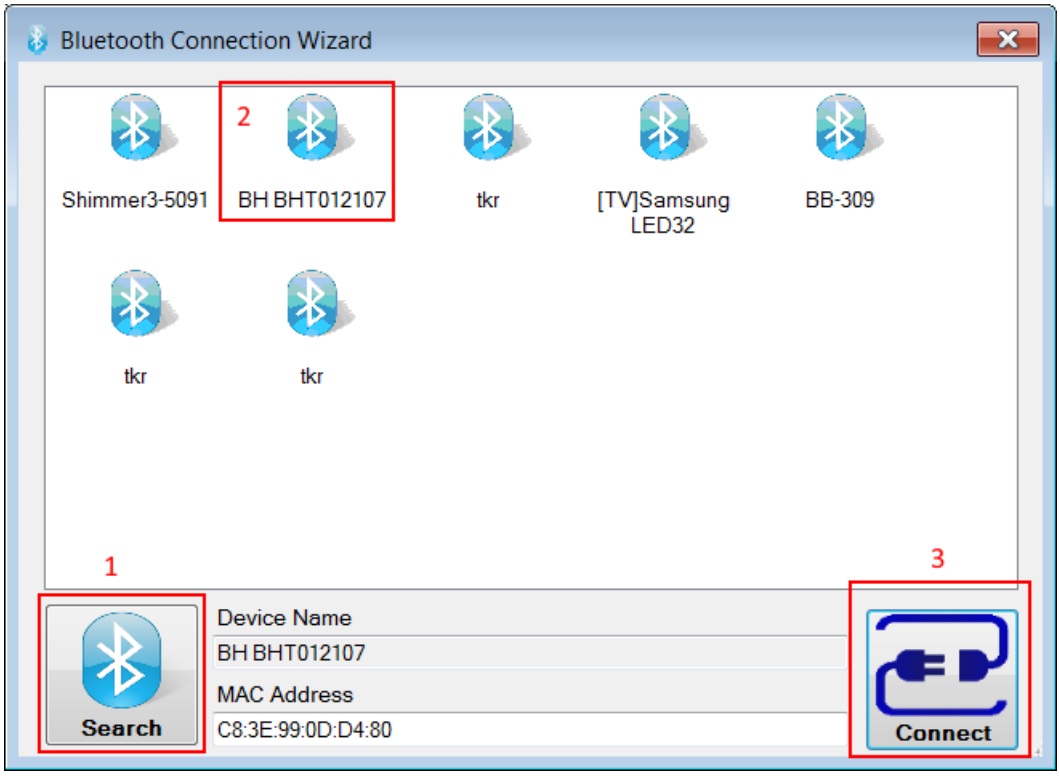
- Device Pairen anklicken mit Code 1234
- Next und Close

B.7. BioHarness anlegen

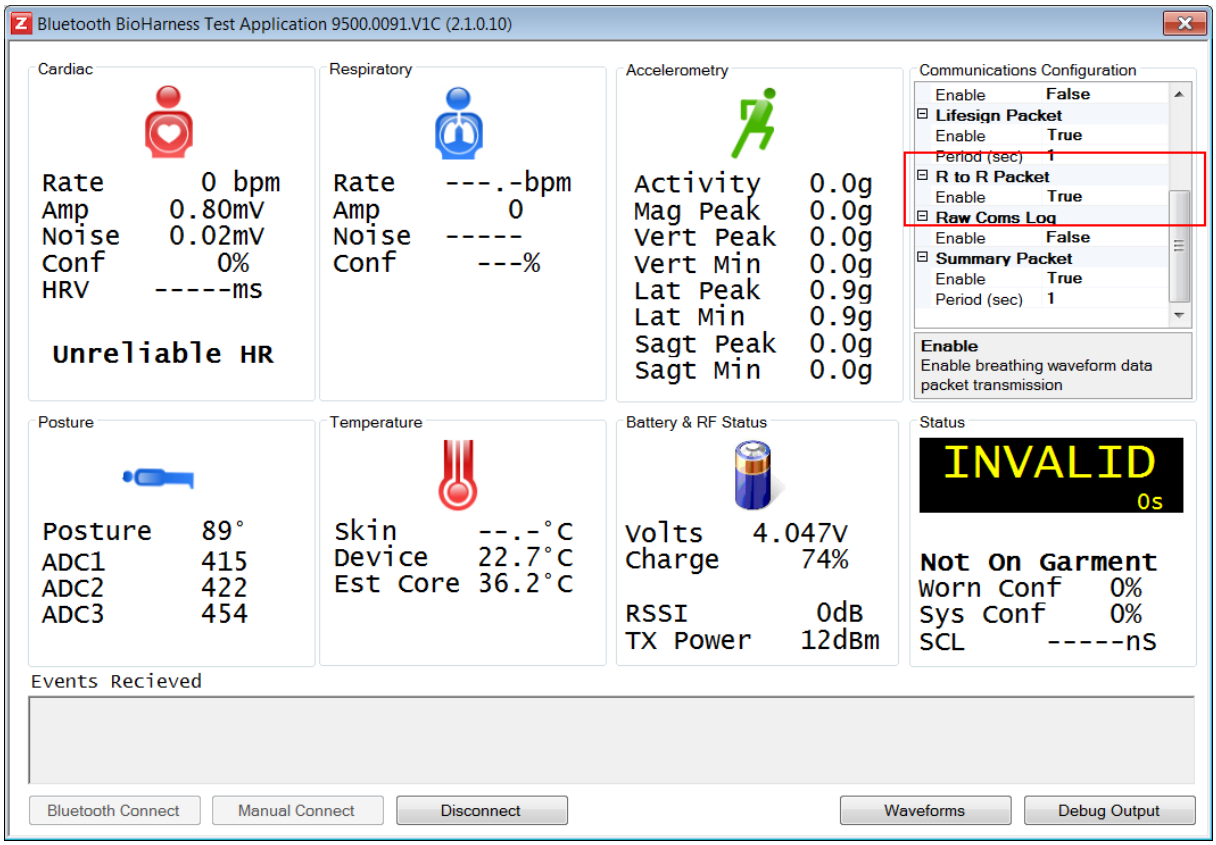
- In der Mitte einschalten
- Open Bioharness anklicken



- Filename anklicken und eingeben
- Bild darunter anklicken
- Messoberfläche öffnet sich
- Bluetooth connect anklicken und danach auf Search

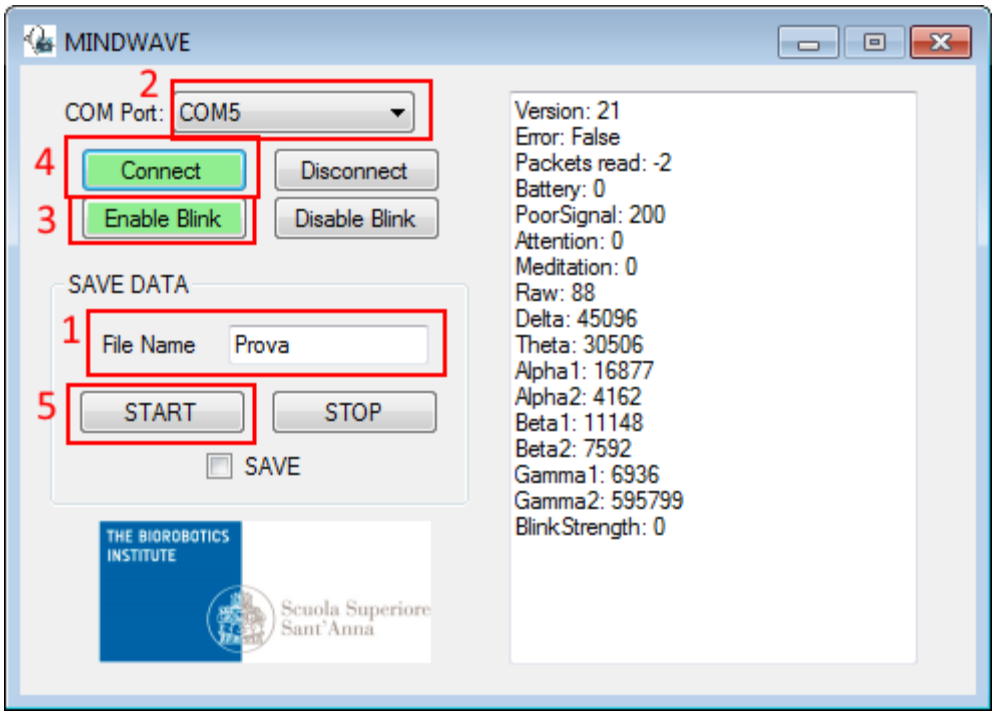


- Gerät auswählen (BH BHT0xxxxx, wobei xxxxx für die Seriennummer steht, welche auf der Rückseite des BioHarness Gerätes gefunden werden kann)
- Connect anklicken
- Messwerte werden angezeigt
    - Status sollte green oder red sein, der Status sollte möglichst nie länger als 30 Sekunden auf invalid stehen.
    - Cardiac: Amp sollte wesentlich größer (10 x) als Amp sein
    - Configuration: R to R Packet muss auf true stehen



B.8. Mindwave anlegen

- USB-Stick an PC stecken
- Gerät auf Kopf setzen und Klipp ans Ohrläppchen stecken
- Darauf achten, dass keine Haare zwischen der Stirn und dem Sensor auf der Stirn liegen. Auch muss der Sensor auf der Stirn gut anliegen.
- Trans.Safe oberfläche: Mindwave anklicken
- COM Port auswählen aus COMPOrtHelper



- Bei File Name Dateinamen eingeben
- Enable Blink anklicken
- Connect anklicken
- START anklicken (Haken bei SAVE setzt sich)

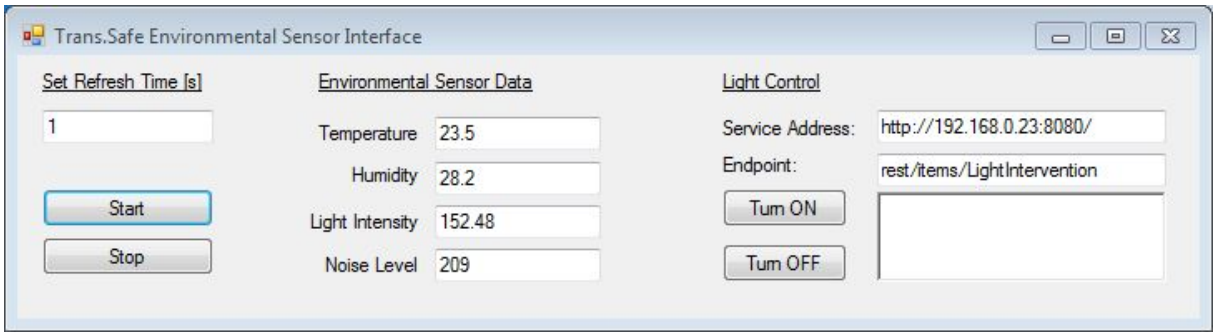
B.9. Inbetriebnahme schwarzes/neues Mindwave

(heisst Mindware Mobile, theoretisch nur einmal nötig, muss für die restlichen Tests nicht wiederholt werden, falls es bereits verbunden wurde)

- Rechtsklick auf Bluetooth-Icon in unterer Leiste
- Klick auf „Add a device“
- Wenn Gerät nicht gefunden wird (kann ca. 5 Min dauern) > An Mindwave-Gerät auf Pairing-Taste drücken bis es schnell blinkt (ca. 3 Sek)
- Hinweis: Wenn Taste am Mindwave rot leuchtet, dann schlecht > neu starten
- Auf „Next“ klicken > Warten bis man „Close“ drücken kann
- Taucht in ComPortHelper als „MindWave Mobile“ auf

B.10. Environmental Gateway anschließen

- WLAN am PC auswählen TStest, Passwort Trans.Safe
- Trans.Safe Oberfläche: Environmental Gateway anklicken
- Service Address eingeben: http://192.168.0.21:8080/ (beschriftetete Box) oder http://192.168.0.23:8080/ (unbeschriftete Box)
- Refresh Time: 1 s
- START klicken



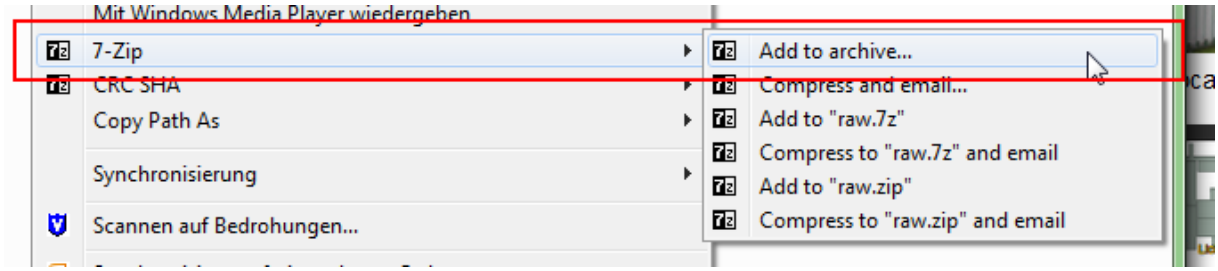
B.11. Messungen beenden

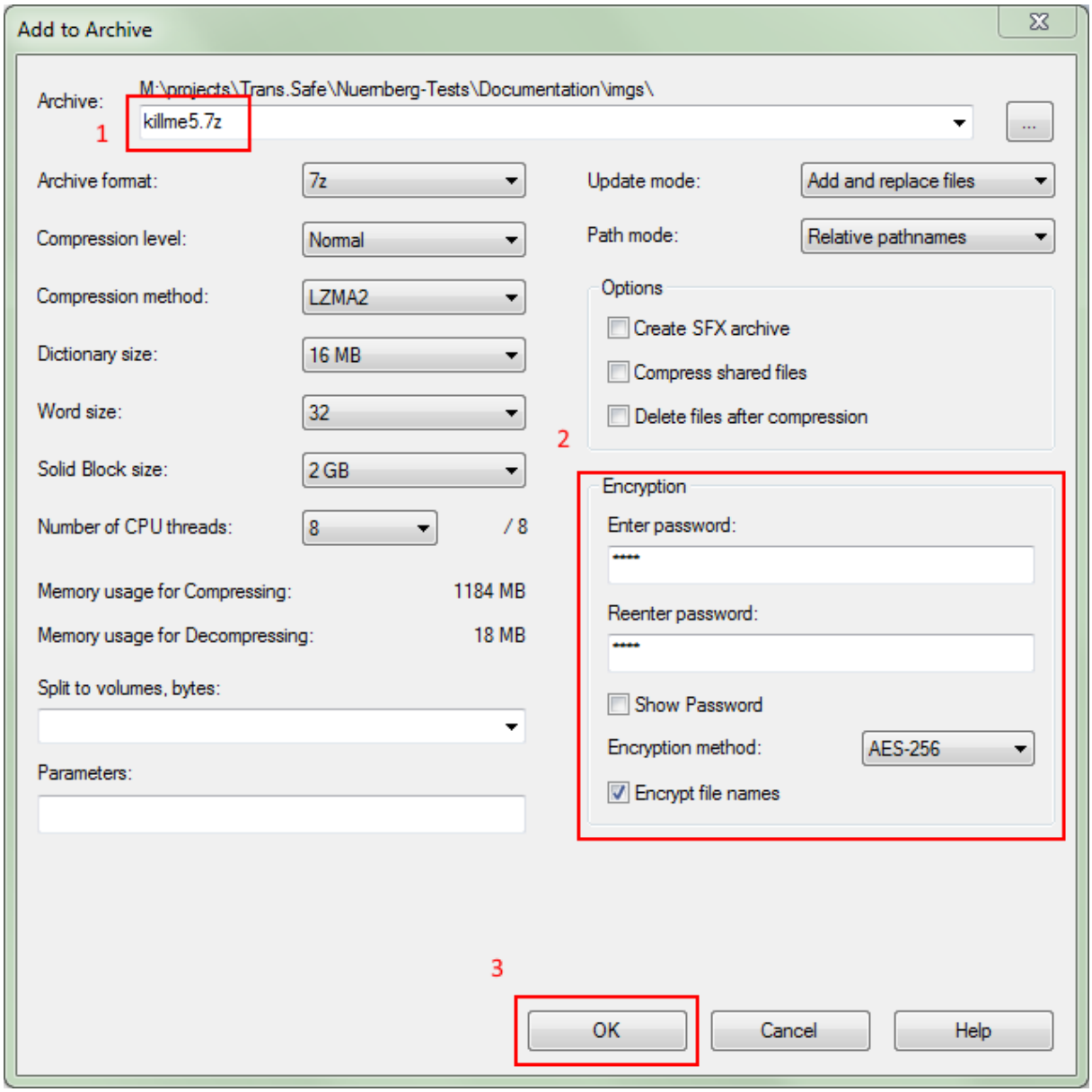
- Bioharnes: Disconnect
- Mindwave: Stop und Disconnect
- Shimmer: Stop und Disconnect

B.12. Dateiablage

PW für Archivierung Daten: Rechtsklick auf Ordner

- 7-zip -> Add to archive…
- Archivformat = 7z oder zip
- Passwort festlegen = Trans.Safe_Probandencode





B.13. Fortlaufendes Protokoll

Uhrzeiten für Phasenbeginn und –ende, Auffälligkeiten, besondere externe Ereignisse

B.14. EWING Test

- Dauer für Liegen: 15 Minuten
- Licht aus
- Jalousien schließen
- Kurzzeitwecker leiser
- Keine Gespräche
- Aufforderung zum Aufstehen durch Testleiter und Kurzzeitwecker
- Dauer für Stehen: 3 Minuten
- Regelmäßig überprüfen, ob die Messwerte noch sinnvoll sind

B.15. Einweisung der Testteilnehmer

- Zielsetzung erläutern für das Projekt und der nächsten 4 Stunden
- Was wird von den Teilnehmern erwartet?
- Teilnehmer sollen sich auf den Test einlassen
- Datenschutz erklären und auch praktisch zeigen
- Allgemeinen Ablauf erklären
- Dokumente erläutern
- Nicht sofort auf den Fragebogen eingehen

Die drei Sensoren kurz erläutern