

# AZA-OAD Operating Manual

*Version 1.0.6.5 and higher*



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## Contact Data

Company

F.A.S.T. GmbH

Boessingerstr. 36

D-74243 Langenbeutingen

Germany

Contact: Mr Behrmann

Tel.: +49 - 7946-92100-25

Fax: +49 - 7946-7153

E-mail: [info@fastgmbh.de](mailto:info@fastgmbh.de)

[Behrmann@fastgmbh.de](mailto:Behrmann@fastgmbh.de)

Web: [www.FastGmbH.de](http://www.FastGmbH.de)

# 1 Preamble

## NOTICE:

This device complies with Part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

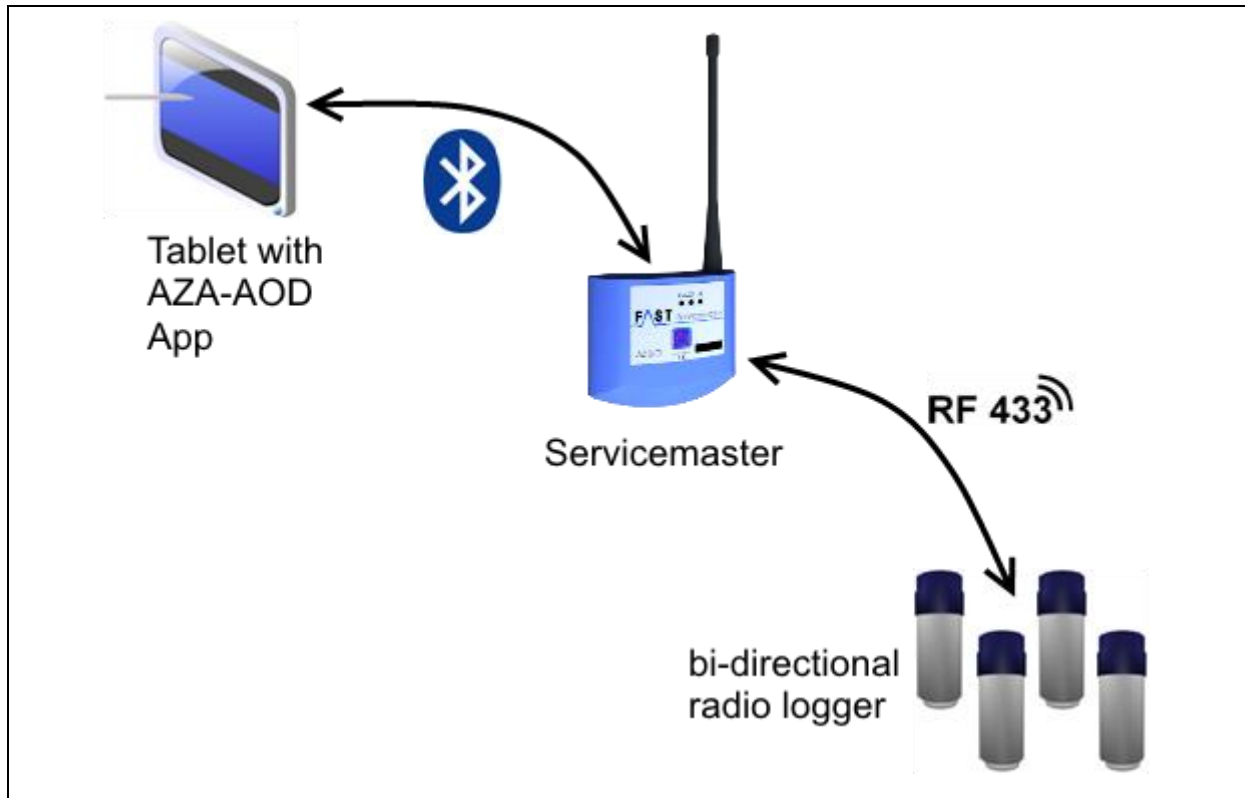
- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## Attention

Changes or modifications made to this equipment not expressly approved by (manufacturer name) may void the FCC authorization to operate this equipment.

## 1.1 Overview

The AZA-OAD program offers a wide range of functions and requires a certain hardware setting at full operational level. In comparison to the unidirectional AZ system, this new system is a bi-directional system with a two-component radio logger receiver. One part is a so-called Servicemaster, the other part is a device with android features to run the AZA-OAD program.



**Illustration 1-1: AZA-OAD schematic**

Illustration 1-1 is to give an overview of the technical structure of the receiver system and schematically displays the single hardware components and the interactions. The AZA-OAD program controls a so-called Servicemaster. This Servicemaster processes the orders issued by the programme and forwards them to the single radio loggers. For data exchange between the AZA-OAD program and the Servicemaster, a Bluetooth connection is applied. Data exchange between the Servicemaster and the individual radio logger is implemented through a 433Mhz band radio connection.

## 1.2 Tablet specifications

The tablet, which is to host the AZA-OAD program, needs to meet certain software and hardware requirements for installation via the Play Store. The required software specification

is related to the tablet operating system, which needs to be any android version between 4.0 and 7 to run the current AZA-OAD version (1.0.6.5). Concerning hardware, the following components are required for programme installation on the tablet:

- Bluetooth receiver
- WiFi or 3G / 4G network (optional)
- Rear or front camera (optional)
- GPS receiver (optional)
- Internal free memory capacity

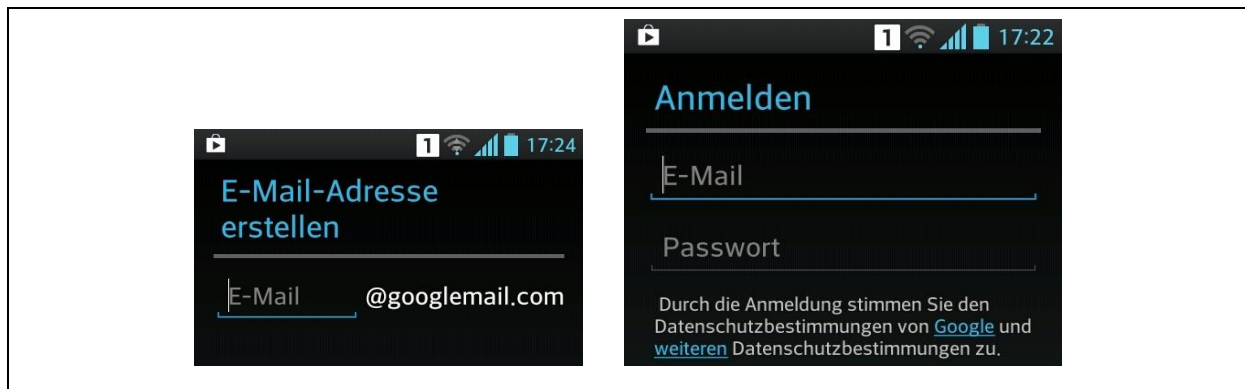
### **1.3 Installing the AZA-OAD program**

Before you can download the AZA-OAD programme to your android tablet, you need to install a free Play Store account. If you already have a Play Store account, please activate it on your tablet so that you can download the AZA-OAD programme from the Play Store. If you do not have any Play Store account yet, please proceed as described below:

1. Call the "Settings" programme on your tablet.
2. Select "Accounts & Synchronization" and then "Add account" at the lower edge of the screen.
3. Please select "Google" as the type of account. You will now be asked if you intend to add an already existing account or if you wish to create a new account. Click on "New".
4. Now you need to enter your first name and your surname into the corresponding boxes, then click on "Continue".
5. The next step is to enter the requested e-mail address. Please note that you can only choose the part before the "@" symbol. This newly created e-mail address will be your log-in e-mail address for the Play Store from now on. Once you have finalized your e-mail address, click on "Continue".



6. Now please select a password for your new account. This password needs to consist of at least eight characters. The system will request you to enter your password again in the second box for verification purposes.
7. Now enter an already existing e-mail address (e.g. with GMX, Yahoo, or WEB.DE) you have access to. Please also select a security question and enter the appropriate answer in the corresponding box.
8. The system will now ask you if you also wish to register with Google+. Please note that it is not required to register with Google+ to operate the AZA-OAD app. So if you do not wish to register with Google+, click on "Not now".



**Illustration 1-2: Play Store account**

As a final step, you can now activate the web protocol for your account. This web protocol function assimilates search results on the basis of your search requests and of the visited websites. If you do not wish to activate this function, please remove the corresponding tick. Click on "I agree" to accept the Google terms of use and the Google data privacy policy.

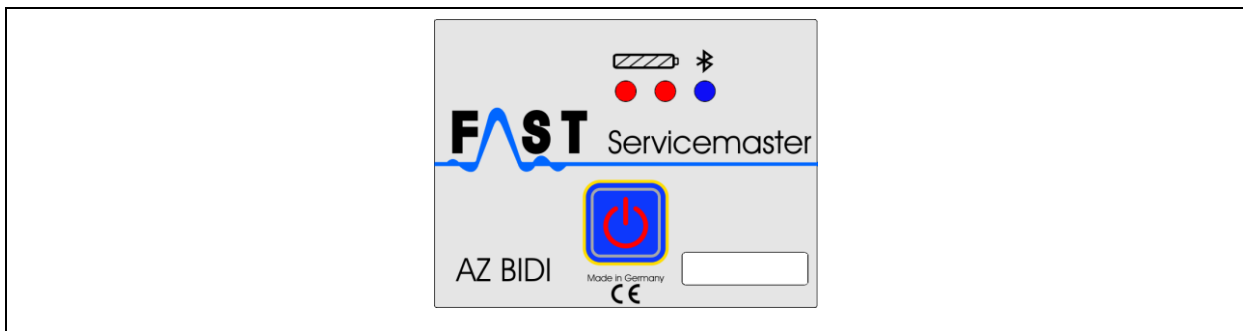
As soon as the account has been activated on your tablet, you can start the Play Store programme on your tablet. The corresponding icon of this programme looks like a little shopping bag. The Play Store search function is activated by tapping on the magnifying lens, which is usually located in the upper right corner. Enter "AZA-OAD" and tap again on the lens. After a while the system should display our programme as the search result. Now tap on the image of our programme in order to be directed to the Description section, where you will have to tap on the "Install" button to install the programme on your tablet. Once the programme has been installed, close the Play Store programme. The AZA-OAD programme can now be started and is ready for operation.

## 1.4 Servicemaster

The AZA-OAD program can process the data received from the loggers as soon as the Servicemaster device has been connected with the tablet via Bluetooth. So the Servicemaster receives the radio signals issued by the loggers at one end, and at the other end it forwards this information to the AZA-OAD program via Bluetooth and vice versa respectively.

### 1.4.1 Visual device status indication and user interface

The Servicemaster has three status indicating LEDs to visualize its operating status. Two of these LEDs indicate the charge state of the Servicemaster battery and are located directly beneath the battery symbol (see Illustration 1-3). As soon as the Servicemaster has been switched on, these two LEDs should be constantly lit in red. If the battery is running out of power, the LEDs will start flashing to indicate that the Servicemaster needs to be recharged (see Chapter 1.4.2). The third LED is located under the Bluetooth symbol, which is the symbol to the right of the battery symbol, and indicates the status of the Bluetooth connection between the Servicemaster and the tablet. If the Servicemaster has not yet been interconnected with the tablet after the Servicemaster was switched on, this third LED flashes red every second. As soon as the connection between the two devices has been established (see Chapter 2.1.1), this third LED is illuminated in blue and data exchange can commence.



**Illustration 1-3: Servicemaster user interface**

It may occasionally happen that the connection between the Servicemaster and the tablet is cut without any operator's input. This is indicated through the Bluetooth LED, which in such case starts flashing in red. Data exchange between the two devices is interrupted now and a new connection needs to be established before the exchange of data can be continued. One reason for such an unintended interruption of the connection may be an excessive distance between the Servicemaster and the tablet. The longest possible distance between the Servicemaster and the tablet is usually around 5 meters. Please note that an excessive distance may cause data exchange failure.

The On/Off switch for the Servicemaster device is located in the center of the user interface. Pressing this switch for approximately one second activates the Servicemaster. Once the Servicemaster has been switched on, the LEDs are illuminated. Pressing the switch again for approximately one second deactivates the Servicemaster, and the LEDs go out.

### **1.4.2 Charging the battery**

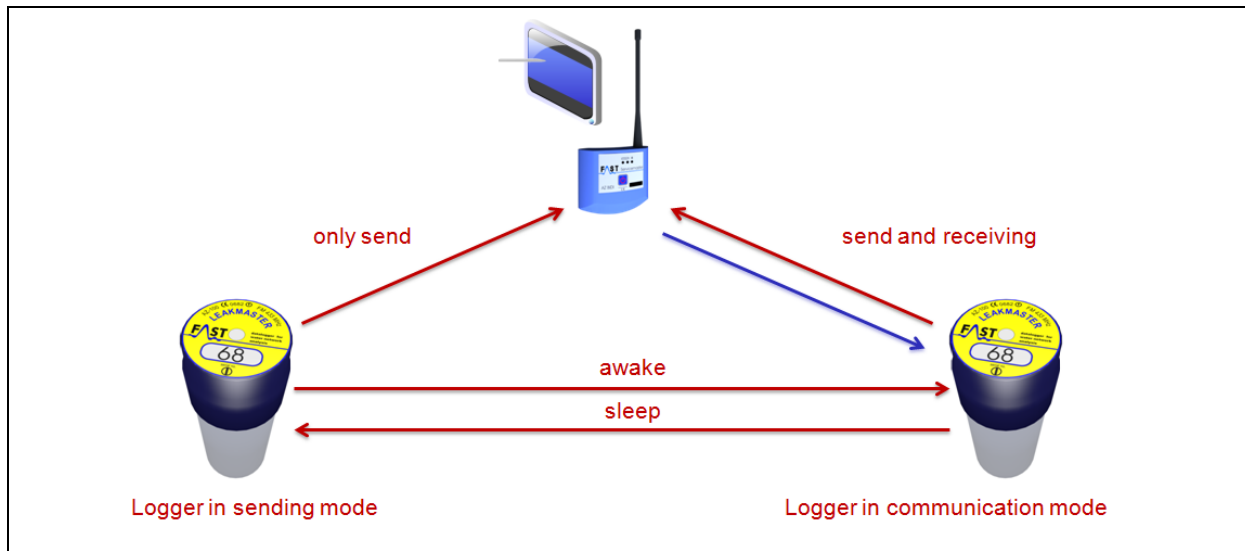
The Servicemaster device is equipped with a battery which allow approximately 7 to 8 hours of operation before it needs to be recharged. As soon as the battery is running low, the battery LEDs start flashing once every second. This indicates that the Servicemaster needs to be connected to the charger with the enclosed USB cable as soon as possible. When the charging cable has been plugged in on the upper side of the Servicemaster, the battery LEDs are illuminated in orange indicating that the battery is being recharged. The battery can be charged when the Servicemaster is switched off and also while operating the Servicemaster. When the recharging process has been completed, the battery LEDs are illuminated in green and the charging cable can be unplugged and removed. Please note that the Servicemaster can be operated without any limitation while being recharged.

## **1.5 Radio logger**

Another component of the BIDI logger system is the radio logger itself. The logger cap of the radio logger hosts the status LED and a solenoid switch. This switch is located under the circular icon beneath the serial number. Here the magnet has to be moved to initiate a switch in mode. The radio logger can be switched to communication mode or to measurement data transmission mode through the solenoid switch. Positioning the magnet at the solenoid switch permanently results in enforced measurement data transmission.

### **1.5.1 Operation modes**

As already stated before, the radio logger has two different modes of operation (see Illustration 1-4), namely the data transmission mode (sending mode) and the communication mode. The standard mode of the radio logger is the data transmission mode. If the radio logger has been set to communication mode, it will automatically be reset to its sending mode after approximately 5 minutes unless there is any data exchange with the tablet. With the radio logger being set to data transmission mode, it transmits only the saved noise level values subject to the set data transmission times. If no particular transmission times have been set (see Chapter 2.4.3), the radio logger turns to idle and sends no data.



**Illustration 1-4: Operation modes**

Please note that the radio logger must be set to communication mode to allow the AZA-OAD program to send any data to the radio logger through the Servicemaster or to receive any data from the radio logger. There are two options to set the radio logger to communication mode: either manually with the magnet or automatically through the AZA-OAD program.

If you wish to activate the radio logger manually, move the magnet along the logger cap and thus above the integrated solenoid switch. The corresponding position of the solenoid switch is indicated on the cap label. As soon as the solenoid switch inside the radio logger has been activated, the radio logger starts flashing according to its particular mode. Three flashes means that the radio logger has been activated and is now ready for communication with the AZA-OAD program. A single flash indicates that the radio logger has been switched off. It no longer interacts with the AZA-OAD program.

If the radio logger is to change to communication mode automatically, certain data transmission times need to be set beforehand, the operation mode (see Chapter 2.4.3) needs to be set to „Wake-up“, and the radio module of the logger (see Chapter 2.4.4) needs to be activated. Please note that the radio logger can only be contacted during the set data transmission times, i.e. if the data transmission time has been set to 8am – 4pm as an example, the radio logger can switch to communication mode automatically in this period and thus interact with the AZA-OAD program. Any interaction of the radio logger with the AZA-OAD program outside this time window requires prior manual switching to communication mode with the magnet.

### **1.5.2 Enforcing data transmission**

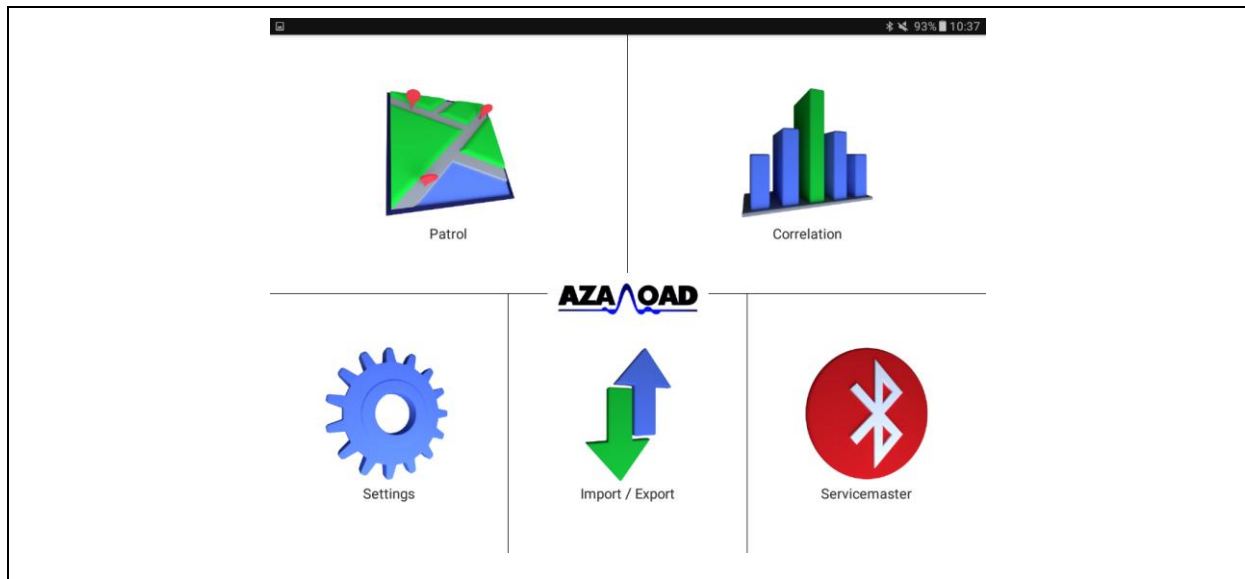
If the radio module has been deactivated, it does not send any information to the Servicemaster and to the AZA-OAD program. The same applies to any point of time outside the set data transmission time window. However, the radio logger can be “forced” to send its saved noise level values to the Servicemaster device by placing the magnet at the particular position on the logger cap. After approximately 5 seconds, the status LED of the radio logger starts flashing. The logger now sends the saved noise level values each time the device flashes until the magnet is removed from the logger cap.

### **1.5.3 Factory settings**

In general, the radio logger is delivered with a de-activated radio module! This means the radio logger signals cannot be received, and the logger has to be set to communication mode manually (see 1.5.3). Once this has been done, the radio module can be activated as described in Chapter 2.4.3, section “Radio status”.

## 2 AZA-OAD program

The start screen shows five tiles which lead to specific program functions. With the “Patrol” tile, the mask to receive the noise level values issued by the logger(s) as described in more detail in Chapter 2.2 can be called. The “Correlation” tile hosts the functions relevant for logger correlation. For further details on how to program and to read out a correlation, please refer to Chapter 2.3.



**Illustration 2-1: Start screen**

The settings of the program or of the radio logger can be reached through the “Settings” tile. For further details, please refer to Chapter 2.4. The “Import/Export” tile hosts functions which allow data export from the tablet to the Watercloud and vice versa, as described in detail in Chapter 2.5.

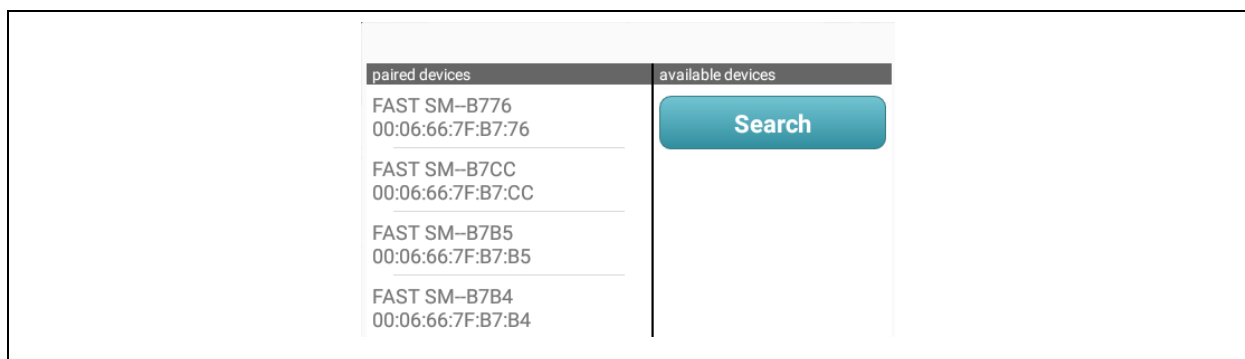
### 2.1 Servicemaster

Tapping on the “Servicemaster” tile opens a menu containing the functions relevant for communication via Bluetooth. The first menu item (“Connecting”) is to establish a Bluetooth connection between the tablet and the Servicemaster. The “Disconnect” menu item then cuts this Bluetooth connection between the tablet and the Servicemaster. If any Servicemaster system-related information needs to be read out, tap on the third menu item: “Servicemaster info”. Please note that the tablet and the Servicemaster have to be interconnected in order to allow system-related information read-out.

An established connection between the tablet and the Servicemaster is indicated both through the Bluetooth-LED located on the Servicemaster device (see Illustration 1-3) and through the icon in the “Servicemaster” tile (see Illustration 2-1). If both elements are displayed in red, there is no connection between the tablet and the Servicemaster (no exchange of data). If both the Bluetooth LED and the icon are indicated in blue, data can be exchanged between the AZA-OAD program and the tablet. If the system issues a message during the data exchange process that data exchange is no longer possible, the connection can be re-established through the “Connecting” menu item.

### 2.1.1 Connecting

Tapping on this menu item opens the dialog as shown in Illustration 2-2. The “paired devices” dialog shows all devices paired with the tablet so far, i.e. all devices which have already been applied and whose connection IDs have already been entered. Tapping on the particular device in this dialog will close the dialog and the system will try to establish a connection between the tablet and the Servicemaster. As soon as the connection has been established, the “Servicemaster” tile turns blue.

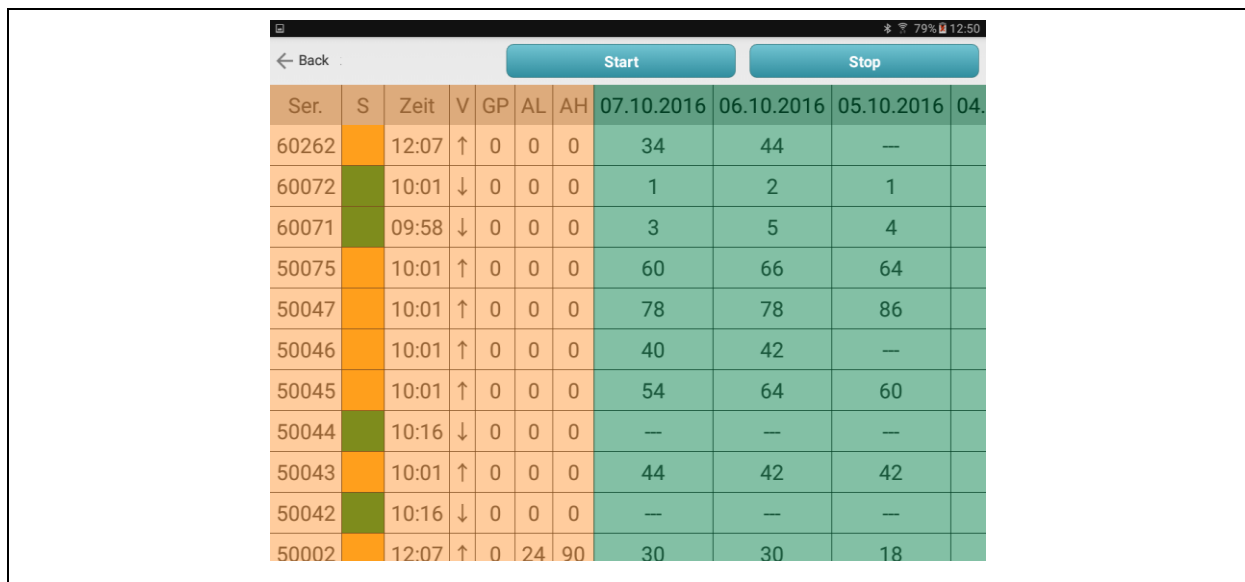


**Illustration 2-2: Bluetooth connection**

The “available devices” section shows all the devices located in the vicinity of the tablet. When the dialog is displayed, this section is empty. Tapping on the “Search” button then lists all devices located nearby. Selecting a particular device terminates the searching process, and the system is trying to establish a connection to the selected device. Establishing this initial connection to a device may take up to one minute. After this initial process, the Servicemaster should be interconnected with the tablet and the icon in the “Servicemaster” tile turns blue. If the tile color does not change, please repeat the process until the tile becomes blue.

## 2.2 Patrol

Tapping on the “Patrol” tile opens the mask as shown in Illustration 2-3 is displayed. This mask can be left by tapping on “Back”, and the system returns to the start screen (see Illustration 2-1). Tapping on “Start” switches the Servicemaster to the mode in which it receives the data issued by the radio logger(s). As soon as the Servicemaster is switched to data reception mode, the data reception symbol (📶) in the lower right corner of the program starts flashing. Now the noise level values transmitted by the radio loggers can be received and will be added to the logger table (see Chapter 2.2.1). Furthermore, the logger reception dialog as described in Chapter 2.2 is displayed for each radio logger received. The data receiving process can be terminated by tapping on “Stop” or “Back”.



Ser.	S	Zeit	V	GP	AL	AH	07.10.2016	06.10.2016	05.10.2016	04.
60262	Orange	12:07	↑	0	0	0	34	44	---	
60072	Green	10:01	↓	0	0	0	1	2	1	
60071	Green	09:58	↓	0	0	0	3	5	4	
50075	Orange	10:01	↑	0	0	0	60	66	64	
50047	Orange	10:01	↑	0	0	0	78	78	86	
50046	Orange	10:01	↑	0	0	0	40	42	---	
50045	Orange	10:01	↑	0	0	0	54	64	60	
50044	Green	10:16	↓	0	0	0	---	---	---	
50043	Orange	10:01	↑	0	0	0	44	42	42	
50042	Green	10:16	↓	0	0	0	---	---	---	
50002	Orange	12:07	↑	0	24	90	30	30	18	

Illustration 2-3: “Patrol” mask

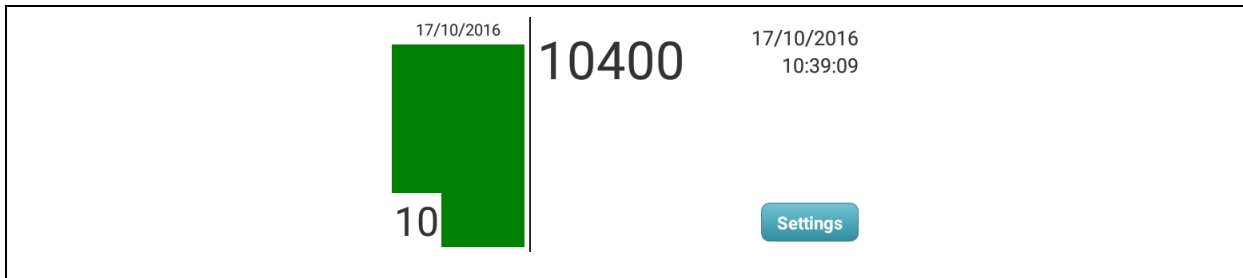
### 2.2.1 Radio logger list

The left area (see Illustration 2-3, orange area) of the table provides information on the particular radio logger (e.g. serial number, leakage status, data reception time, noise level amplification, and basic noise level) as well as on its settings. The measurement values saved by the radio logger are listed in the right part of the table (see Illustration 2-3, green area). One column always indicates the noise level measured on the day stated on the table head. If the radio logger has not acquired any noise level data on the particular day, this is indicated with “---”. Wiping your finger horizontally across the display will call previous noise levels in the right part of the table. The current programme version shows the last 14 days provided the particular radio logger has transmitted any data during this period.



## 2.2.2 Receiving data from a radio logger

For each radio logger received, the dialog as shown in Illustration 2-4 will be displayed. The dialog disappears after 8 seconds unless a new radio logger is received. If a new radio logger is received, the dialog automatically shows the information received from the new radio logger.

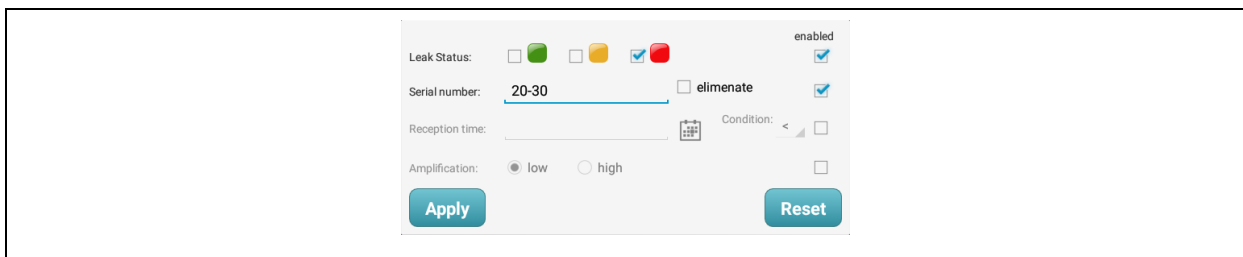


**Illustration 2-4: "Receiving data from a radio logger" dialog**

The left dialog part indicates by color the leakage status detected by the radio logger, with green indicating no leakage, yellow indicating a possible leakage, and red indicating a leakage. The date of the leakage level value acquired last by the logger is shown above the leakage status indication, and the numerical level value is stated in the lower left corner. Tapping on the "Settings" menu item leads the operator to the "Logger settings" mask, where the settings of the radio logger can be changed. For further details on changing the settings of the radio logger or reprogramming the device, please refer to Chapter 2.4.3.

## 2.2.3 "Filter" dialog

Tapping on the table head in the left (orange) area of the radio logger table (see Illustration 2-3) for a while activates and displays the filter dialog as shown in Illustration 2-5. This filter dialog enables the operator to block the indication of radio loggers on the list. Four different filters can be selected and also combined with each other for this purpose.



**Illustration 2-5: "Filter" dialog**

The particular filter to be applied needs to be activated beforehand by tapping on the corresponding tick box at the end of the particular line. If the box shows a blue tick, the filter

is activated. If the tick can be removed by tapping on it again, and the particular filter line is blocked and cannot be applied.

The first filter is the leakage status filter, which determines the radio loggers indicating a certain leakage status and which are to be shown on the list. Only those radio loggers will then be listed whose indicated leakage status complies with the status activated in the filter dialog.

The "Serial number" filter allows the operator to display radio loggers with a certain serial number or to exclude such loggers if "eliminate" has been ticked. Please note that a range of serial number can be defined by using the "-" character and also individual serial numbers can be entered separated with a comma.

The "Reception time" filter is to display those radio loggers on the list which feature the particular time set through the filter. The date can be selected, and also the condition to compare dates by pressing the corresponding button can be activated. Possible options for the reception date of the radio logger signal are the same date, an earlier date, or a later date including or excluding the set date.

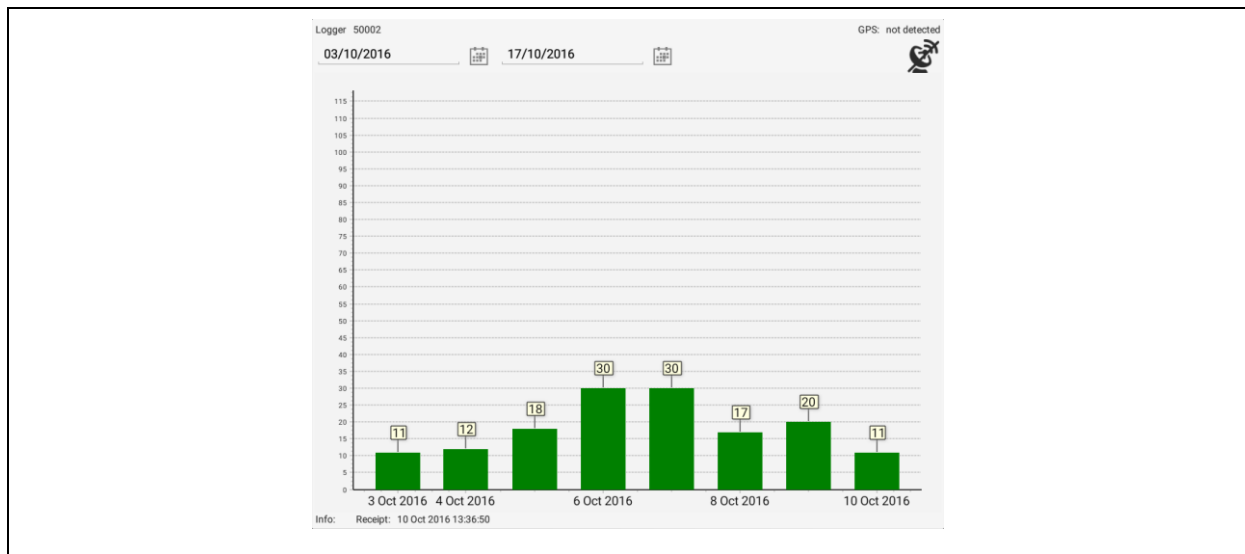
The final filter option is the amplification. This function determines if loggers set to a small amplification or loggers set to a major amplification are to be indicated on the list.

As soon as all filters have been set, the filters can be used for the list by tapping on "Apply". Furthermore, the dialog closes as soon as this button has been tapped on. If filtering the table data is no longer requested or if the filter settings are to be deleted or changed, tap on the table head again for a little while to display the filter dialog. If only the filter settings need to be changed, such change can be made now. Tapping again on the "Apply" button activates the new filter settings again. If the filters need to be deleted and thus all data on the radio logger list is to be displayed, tap on "Reset". Now all filters are deleted and the radio logger table displays all radio loggers whose signals have ever been received.

#### **2.2.4 Value chart**



The operator can open the value chart (see Illustration 2-6) for a specific radio logger by tapping briefly on the particular radio logger table line. This, however, works only in the orange area (see Illustration 2-3) of the table. Tapping on a line in the green table area does not make the dialog open. The central area of this dialog displays the noise level values of a

particular radio logger in a bar chart, with the oldest measurement value being displayed at the left end and the latest measurement value being displayed at the right end of the chart.



**Illustration 2-6: Value chart**

In general, the level values of the past 14 days (if applicable) are displayed on the chart. The time interval for the display of the level values on the chart can be changed with the calendar buttons. With this option, also older level values which are only available in the tablet database can be displayed.

The last reception time of the signal of a particular radio logger is indicated below the bar chart. The area above the bar chart displays the serial number and the network number of the chosen radio logger. Also, GPS coordinates can be assigned to the radio logger by tapping on the  symbol. Please note that the GPS receiver of the tablet has to be activated before the coordinates can be assigned. The  symbol can also be used to delete the GPS coordinates. The operator can close the dialog by tapping on the display next to the dialog or by tapping on the "Back" button of the tablet.

## 2.2.5 Deleting a radio logger

If a radio logger has to be deleted from the table and from the entire program, tap on the corresponding table row in the orange front area (see Illustration 2-3, orange area) of the table to open a context menu displaying a confirmation dialog. Pressing on "Yes" will finally delete the logger data from the program, whereas pressing on "No" will deactivate the deleting process, i.e. the data remains in the system and will not be deleted.

## 2.3 Correlation

This section of the program hosts all the functions relevant for the correlation procedure. Tapping on the “Correlation” menu item opens the mask as shown in Illustration 2-7. Reversing this process (going back to the start screen) is done by tapping on “Back”. A correlation can be programmed by tapping on the “Create correlation” (see Chapter 2.3.1) button. If a correlation has already been created in the radio loggers, this correlation can be read out by tapping on “Read out correlation” (see Chapter 2.3.2). Correlations which have already been read out are saved automatically in the AZA-OAD program, and any correlation created previously can be called and opened by tapping on “Load correlations”(see Chapter 2.3.3).

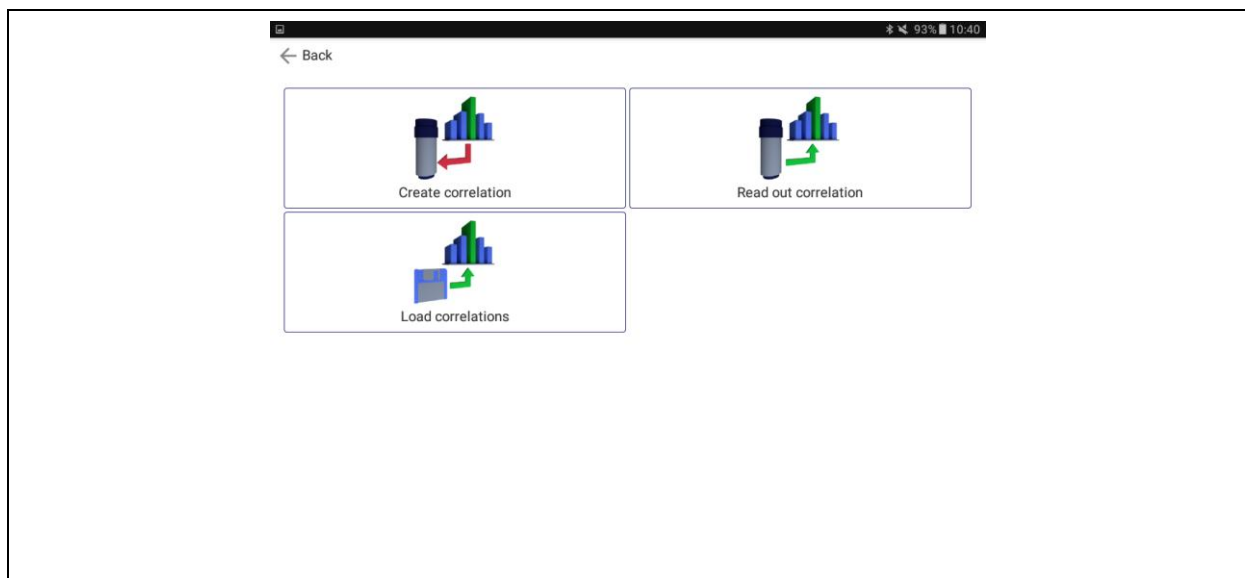
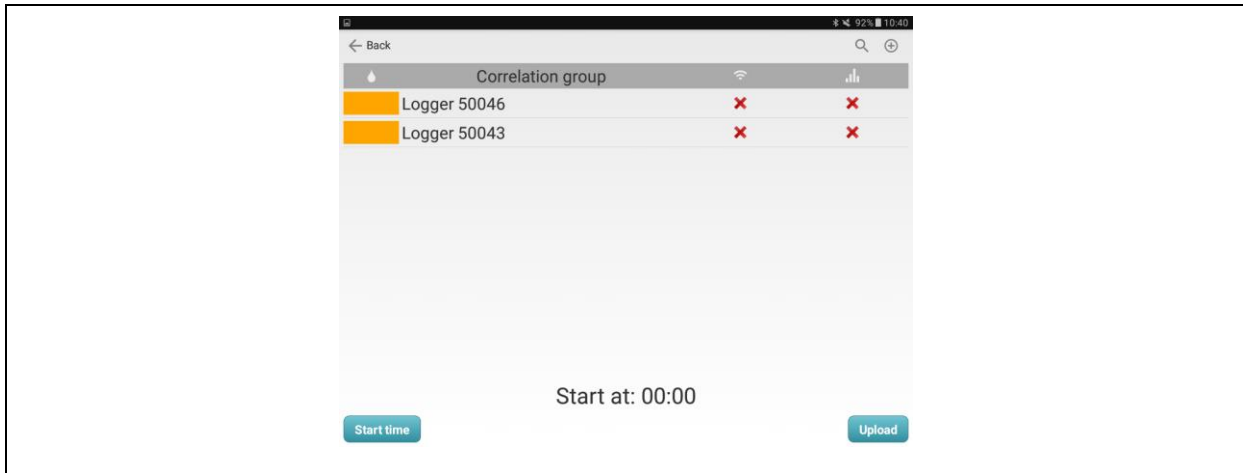


Illustration 2-7: “Correlation” mask

Please note that the radio logger does not conduct any correlation itself. Instead it records a file which contains leakage-borne noise levels, and this file is then read out with a tablet. The correlation conducted by the AZA-OAD program uses these noise level files for calculation.

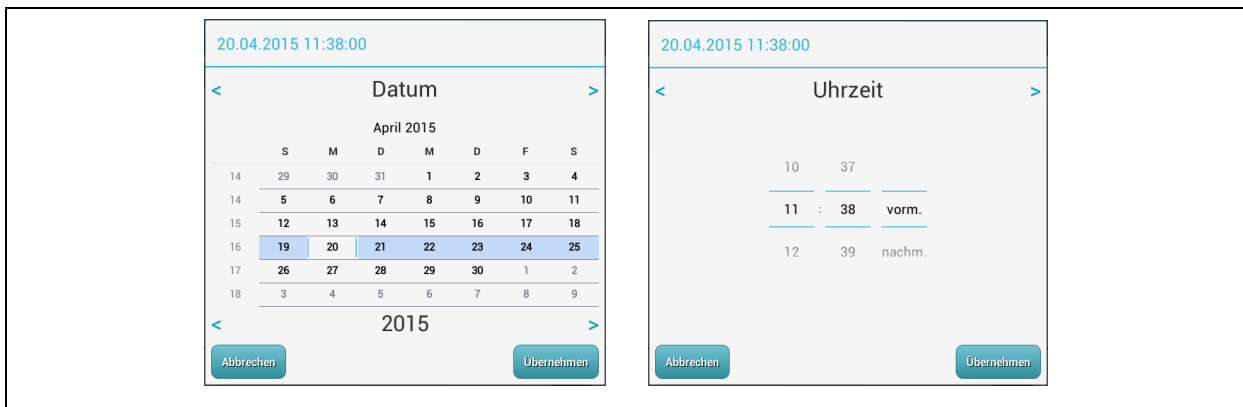
### 2.3.1 Creating a correlation

As soon as the “Create correlation” button has been tapped on, the mask as shown in Illustration 2-8 is displayed. The upper right corner of the mask hosts two buttons. With these buttons, the radio loggers required to conduct a correlation can be assigned to the correlation process. The lens allows searching for radio loggers located in the vicinity of the tablet and subsequently adding these loggers to the list, if requested. Any logger contained in the logger list (see Chapter 2.2.1) can be added to this list with the “+” symbol.



**Illustration 2-8: Creating a correlation**

There are two buttons in the lower part of the screen: "Start time" and "Upload". Please note that before a correlation can be programmed in a radio logger, the time to start the correlation needs to be entered. This input requires a certain dialog, which appears as soon as the "Start time" button has been tapped on. The headline of this dialog displays an overview of the start times set (see Illustration 2-9). The buttons "<" and ">", located below the dialog headline, allow switching between time and date. If the dialog is closed by tapping on "Upload" and a point of time or a date has not been entered, the program automatically sets the start for the next correlation to 5 minutes.



**Illustration 2-9: Correlation start time**

As soon as the start time has been set, programming the loggers can be started. After the first logger has been programmed for correlation, the "Start at" timer starts counting down to zero. When the countdown is completed, correlation will start in the particular loggers. Please note that additional loggers can be added to the list during countdown. These additional radio loggers can be programmed for a correlation via the "Upload" button.

The list also indicates whether or not a radio logger has been programmed successfully. Each radio logger is combined with two icons. The first icon indicates if the logger is set to communication mode (see Chapter 1.5.1), i.e. whether the AZA program managed to communicate with the particular radio logger. In case of successful communication, the icon holds a green tick. If communication failed, the icon holds an "x" (see Illustration 2-8). The second icon indicates if the correlation could be programmed into the logger. Here as well, a green tick means "successful programming of the correlation". Please note that only those loggers can be used for subsequent correlation which have two green ticks and which were listed during programming.

If the time to start a correlation has been set to a very short point and the timer has counted down, a dialog is displayed which leads the operator to the "Read out correlation" function. If, however, the start time for the correlation is set to the next day, the mask can be closed with "Back" as soon as all radio loggers have been programmed.

### **Obsolete firmware**

All radio loggers listed in this *group element* cannot be used for a correlation. Radio loggers intended for correlation processes must feature firmware version 1.06 or higher.

### **Obsolete hardware**

All radio loggers arranged in this *group element* cannot be used for correlation. Radio loggers intended for correlation processes must feature a hardware platform version 1.30 or higher. If you have a radio logger which does not meet the above stated requirements, please contact F.A.S.T. GmbH as the logger hardware needs to be modified.

### **Deleting a logger**

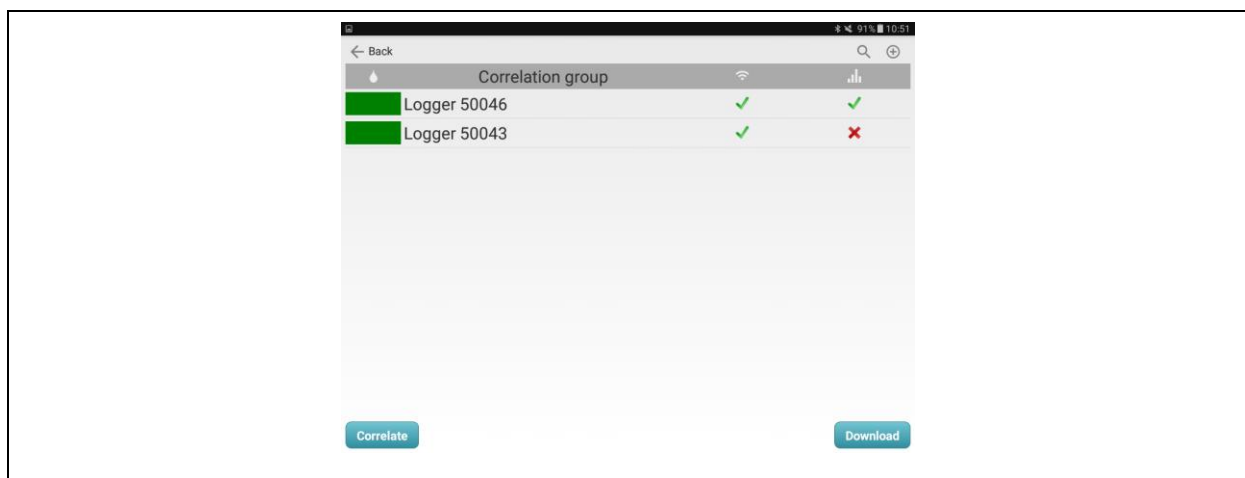
If an inappropriate logger has been added to the list, this particular logger can be deleted from the list by tapping for a few seconds on the corresponding line to open a context menu. This context menu offers a "Delete" button which allows the removal of the chosen radio logger from the list.

## **2.3.2 Reading out a correlation**

The operator will reach this mask either by tapping on "Read out correlation" (see Illustration 2-7) or if a correlation has been completed and the operator is still in the mask

used to program a correlation (see Chapter 2.3.1). If the operator reaches this mask from the correlation creation mask, the particular radio loggers prepared for the read-out process have already been added to this list. However, additional radio loggers can also be added to the list.

This mask also allows adding additional loggers via the lens symbol and the “+” symbol (see also Chapter 2.3.1). The read-out process can be started with the “Download” button. As already described in Chapter 2.3.1 above, the two icons behind the particular logger number indicate if communication with the radio logger was successful (green tick) and if reading out the logger was successful (another green tick). Any communication failure or read-out failure is indicated with an “x”.

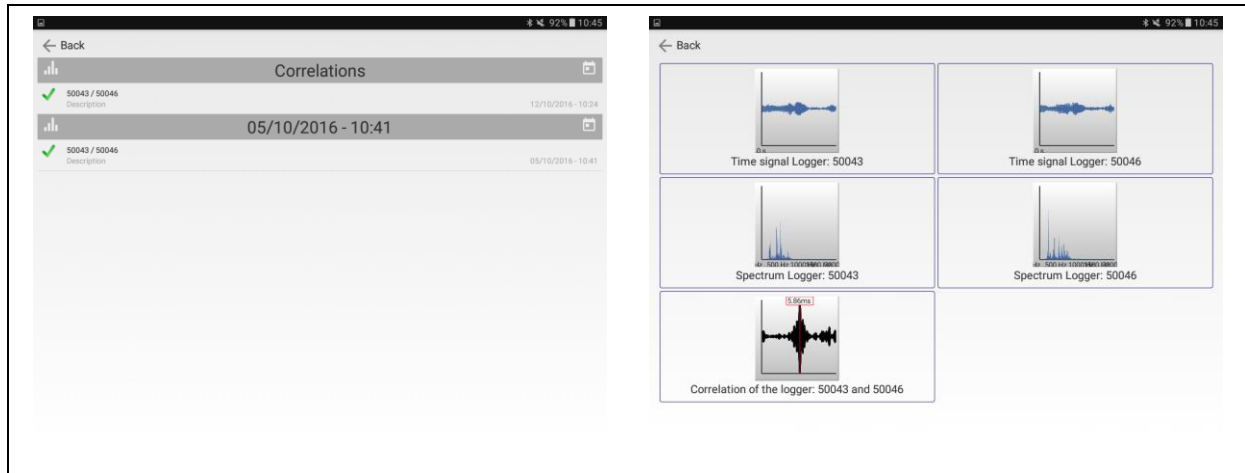


**Illustration 2-10: Reading out a correlation**

If two or several loggers have been read out successfully, the correlation process can be started by tapping on “Correlate”. The program will then switch to the “Load correlations” mask. For further details, please refer to Chapter 2.3.3 below.

### 2.3.3 Loading correlations

You will reach the mask as shown in Illustration 2-11 (left part) by tapping on “Load correlations” (see Illustration 2-7) or on “Correlate” (see Illustration 2-10). If there are any correlations saved on the tablet, these correlations will be displayed on the list. The icon at the beginning of a line indicates the status of the corresponding correlation. A green tick indicates a successful calculation of the correlation including the provisions of a certain result, whereas an ”x“ symbolizes that a correlation calculation has been conducted but a leakage has not been found. In the latter case, subsequently changing the filters may provide a reasonable result.



**Illustration 2-11: “Load correlations” mask 1 / 2**

If a rotating gear is displayed at the beginning of a line, the tablet is currently calculating the result of the corresponding correlation procedure. The completion of the calculation process is indicated with a green tick, a red ”x“, or an idle gear. The idle gear indicates that the calculation of the correlation could not be executed, i.e. an error has occurred. If the tick or the ”x“ is displayed, the mask as shown in Illustration 2-11 (right part) can be opened by tapping on a row. This mask states the two time signals as well as the spectra and the correlogram. Tapping on a file makes the program open the corresponding diagram.

### **Time signal indication diagram**

The time signal read out for a certain correlation is 12 seconds long. This period, however, is not displayed in one block in the diagram but cut into sections of 0.5 seconds each. So the time signal needs to be shifted in order to be able to look at the entire time signal data. The signal is shifted in the diagram by wiping with the finger to the right and to the left respectively across the display. The time signal can be reproduced and the leakage-borne noise can be listened to by tapping on “Play”. It may happen that the leakage-borne noise features a very low volume. This can be counterbalanced by increasing the volume of the tablet accordingly. The “E-mail” button allows the creation of noise level file, which can be sent as an attachment to an e-mail. Once the operator has tapped on “E-mail”, a dialog is displayed where the e-mail address of the intended receiver of the e-mail needs to be entered. The e-mail can then be sent off by tapping on “Sending”. Please note that an e-mail can be sent off only if the tablet has been connected to the internet beforehand and a valid e-mail account has been established on the tablet.

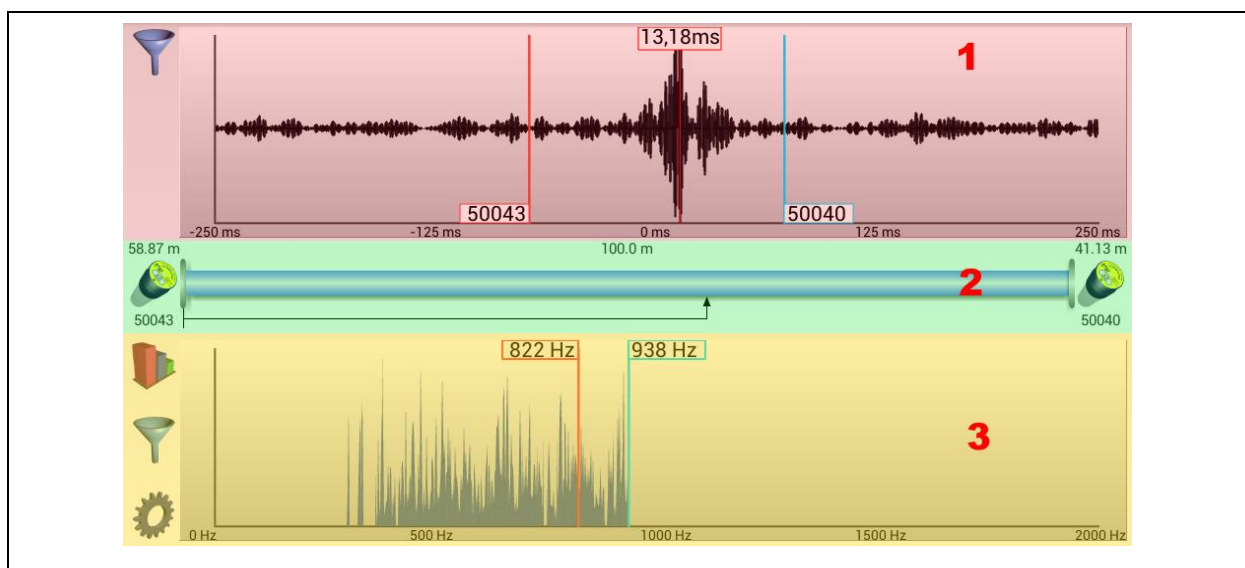


## “Spectrum” diagram

Tapping on the “Spectrum...” tile opens up the diagram which displays the frequency spectrum of the corresponding time signal. The lowest frequencies are displayed on the left, whereas the highest frequencies are displayed on the right part of the diagram.

## “Correlation” diagram

Postprocessing a correlation is started by tapping on the corresponding tile. Subsequently, the processing mask as shown in Illustration 2-12 opens up. In the first (red) area of this mask, there is a correlation diagram and a button for analogue filtering. The correlation diagram shows the limits of the measuring section with a red vertical line and a vertical blue line subject to sound velocity and to the length of the set pipe section. At the lower end of each line, the serial number of the particular radio logger is displayed. The longer the set measuring section and the smaller sound velocity, the longer becomes the distance between the limits. In some cases, the limits may disappear from the correlation diagram and the limits of the correlation diagram then constitute the limits of a correlation.

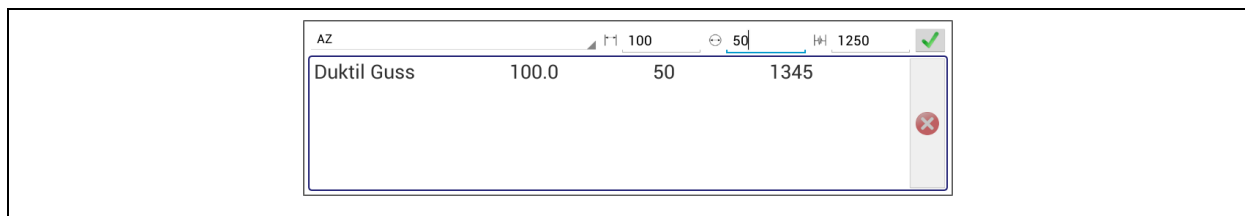


**Illustration 2-12: Postprocessing of a correlation**


With the menu item in area 1 displayed as a filter in the Illustration above the high-pass and low-pass filters can be changed. Tapping on this menu item opens a little window in the correlation diagram where the settings for the two filters can be adjusted. The analogue filters are used to filter undesired frequencies (disturbing noises) from the time signal. Therefore, the high-pass filter of the programme does not filter or damp those frequencies which are above the frequency displayed. The lower frequencies are damped with this filter. The low-pass





filter, in contrast, does not filter or damp those frequencies which are below the frequency displayed and damps those frequencies which are above the frequency displayed. Consequently you should make sure that the filter settings do not interfere with each other as otherwise the programme will not be capable of acquiring any signal required to calculate the leakage. Furthermore, please make sure that an appropriate frequency range for the leakage can be processed unfiltered by the programme. As soon as the filters have been set, the little window will be closed automatically. Please note that if the analogue filter settings are changed, the correlation will be calculated again. This will require a bit of time. Once the new calculation has been completed, the entire data in the mask will be initialized again.

In the second part of Illustration 2-12 (green area) the leakages are indicated on the pipe and with a numerical value. The symbol of a radio logger is displayed to the right and to the left of the displayed pipe. The corresponding serial number of the particular radio logger is indicated beneath the particular logger symbol. The positions of the radio logger symbols constitute the limits in the correlation diagram. If the programme has detected a leakage, the distance between the leakage and a radio logger is indicated above the particular the radio logger symbol. The central part of this section (area 2, see Illustration 2-12) displays the measuring section, and the total length of the measuring section is displayed as a numerical value above the pipe symbol.




**Illustration 2-13: “Pipe input” mask**

Tapping on the pipe symbol opens the input dialog as shown in Illustration 2-13. With this input dialog, the settings of the measuring section can be changed. The lower part of the dialog shows all pipe sections defined so far. The system is capable of defining a total of four different partial sections of a measuring section. One line hosts the settings of one partial section of the entire pipe. Besides the material designation, also the pipe length, the pipe diameter, and the sound velocity are displayed. Tapping on the particular pipe section in this area will mark the partial section. You can also delete the partial section from the list later on by tapping on the delete button  on the right-hand side. If you intend to enter a new pipe section, you first need to select the pipe material in the upper part of the dialog. Then enter the length of the pipe section in metre (*if you set the language in your Android to English(USA)*,

then the program use the imperial system units, also feet) by tapping on the input box at the  symbol. Then the diameter of the pipe needs to be entered in millimetres (if the imperial units are used, then in inches) by tapping on the input box at the  symbol. It is usually not necessary to enter speed velocity as the programme automatically calculates the speed. If, however, a sound velocity other than calculated by the programme is requested, tap on the input box at the  symbol. As soon as all information has been entered, the pipe section can be added to the list by tapping on . As soon as all partial sections of the measuring section have been entered, the dialog can be closed by tapping on the display next to the dialog. All settings will be accepted and the leakage position is calculated again.


The third area of the postprocessing dialog (yellow area in Illustration 2-13) is used for digital filtering. The main component of this section is the diagram used to set the digital filter for the correlation. Digital filtering requires a high-pass limiter and a low-pass limiter. The high-pass limiter is visualized with a red vertical line, the low-pass limiter is marked as a blue line. Any signal-related information occurring between these two limiters will be applied for correlation purposes. Therefore, more signal-related information is used for correlation if the distance between the filter lines is quite long. A short distance between the filter lines reduces the amount of signal-related information the system uses for a correlation.


The filters can be shifted by tapping on the diagram. The filter limiter line next to your finger is shifted. So if you tap on the display near the blue filter line, the blue filter line will be shifted. If you tap on the display near the red filter line, the red filter line will be shifted. Please note that the lines are shifted by tapping on the display, not by wiping across the display. As soon as the filter limiters have been shifted, the programme will start on calculating a new correlation result and then displays the result.

Displaying coherence is one option, but tapping on  offers other kinds of display as well. As soon as the button has been tapped on, a selection window opens up, which closes again automatically after 5 seconds. The following display options can be chosen:

- Coherence
- Spectrums A + B
- Spectrum A / Spectrum B
- Time signal A / Time signal B

The digital filters can be changed with any display option time except when the time signal is displayed. The "Spectrums A + B" display option (when activated) shows the spectrums of the two loggers superimposed. The "Spectrum A" display option and "Spectrum B" display option respectively shows the spectrum of the particular radio logger, with "A" designating the radio logger which is left of the pipe in area two (yellow area, see Illustration 2-12) and "B" stands for the radio logger right of the pipe.

Automatic setting the digital filters can be started by tapping on . As soon as the button has been tapped on, the programme starts calculating the new filter positions. This process may take a little while.

The  menu item allows switching between the "Filter" function mode and the "Zoom" function mode. Please note that, as a standard setting, the "Filter" mode is activated, where the filters in the diagram can be adjusted. If the "Zoom" has been selected. In order to do so, press your finger on the display. This initial touch constitutes the upper left corner of the so-called zoom window. Do not remove your finger from the display but wipe your finger from the current position to the right and down. As soon as you remove your finger from the display after the wiping process (marking the zoom window), the lower right corner of the zoom window has been determined and the programme will display the area concerned in more detail. If you wish to reset or delete the zoom window, proceed vice versa by starting in the lower right corner of the diagram and wipe your finger in an upward direction to the left. The diagram will then display the entire measurement data.

## 2.4 Settings

This tile opens the "Settings" mask. All program-related settings can be changed through the "Program settings" button as described in Chapter 2.4.1 below. Concerning the settings affecting communication with the Watercloud, please refer to Chapter 2.4.2. With the "Logger settings" button, the parameters of the selected radio logger can be changed as described in Chapter 2.4.3. Extended functions provided by the radio logger additionally are referred to in Chapter 2.4.4. For further information on how to use the "Firmware Update" function, please refer to Chapter 2.4.5.

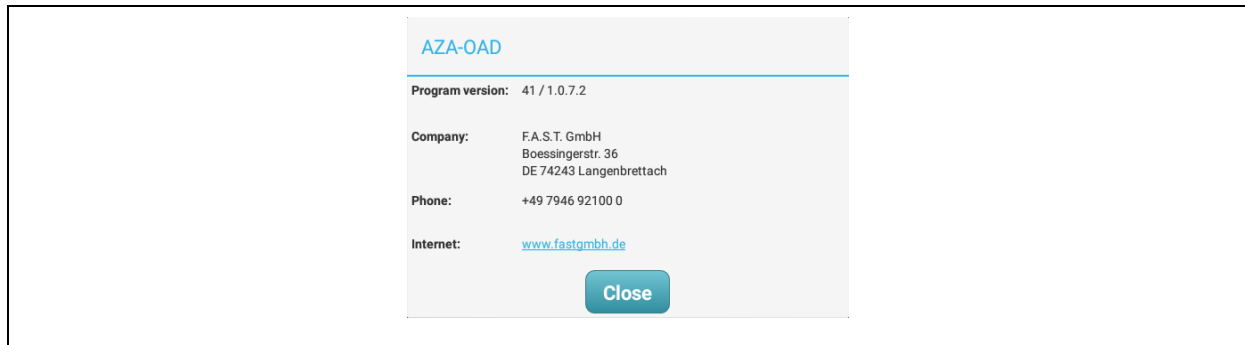
### 2.4.1 Program settings

This part of the program offers a number of changes on the AZA-OAD program settings. The settings of the radio loggers are not affected in this menu item.



## Program

Selecting “Program” makes a dialog as shown in Illustration 2-14 appear on the screen. The dialog shows the program version installed on the tablet as well as F.A.S.T. GmbH contact data. The dialog can be closed by tapping on “Close”.



**Illustration 2-14: “Program version” dialog**



## Clear list

Tapping on “Clear list” deletes all data from the AZA-OAD database. However, the system issues a confirmation dialog before finally deleting the data. Tapping on “Yes” in this confirmation dialog irreversibly deletes the data. Tapping on “No” in the confirmation dialog cancels the deleting process, and the data will remain in the system.



## Leakage status

The calculation of the leakage status can be changed through this tile. Usually, a period of 14 days is set, i.e. all level values received by a radio logger and required to calculate the leakage status are used for the status calculation. If, however, the radio loggers are deployed at another location for example after three days already and read out before being positioned at the new location, the leakage status can be calculated correctly by using only the data received at the first location during the initial three days. This requires a reduction of the number of days allowed for the calculation of the leakage status to three days as otherwise an incorrect leakage status will be calculated by the logger.



### **Environmental noise**

Sometimes it may be necessary to correct the calculation of the leakage status by readjusting the basic noise level setting. This particularly applies in cases where permanent environmental noise disturbs the leakage-borne noise level measurement process. Such environmental noise may distort the calculated result. Therefore, the “Environmental noise” tile has been integrated into the system. This function allows the selection of individual radio loggers in a selection window. Every ticked radio logger is then subject to a change in the basic noise level setting. Tapping on “Apply” makes a dialog appear where the basic noise level can be changed and set to a numerical value of between 0 and 99. So the “Apply” button allows a correction of the basic noise level setting for the particular radio loggers. Tapping on “Cancel” makes the system ignore any change made in the basic noise level setting.



### **Adding a logger manually**

With this function, a new radio logger can be added manually. As soon as the tile has been tapped on, a dialog appears where either the serial number or a range of serial numbers can be entered. The loggers are accepted by the program as soon as the “Apply” button has been tapped on and are now listed in the logger table (see Chapter 2.2.1). Tapping on the “Cancel” button aborts this process.



### **Reception blocked**

The “Reception blocked” tile offers a function that allows the operator to shield the reception of any logger which has not been received previously. If this reception ban function is activated, the system only receives and displays the measurement data transmitted by those radio loggers which have already been added to the radio logger table (see Chapter 2.2.1). If the any data received comes from a radio logger which has not yet been added to the list, the program ignores such data and does not save it.



### **Patrol**

The current AZA-OAD version 1.0.6.1 does not yet offer this function.

## 2.4.2 Watercloud settings

One option to process the signals transmitted by the radio loggers is to transfer the data to the Watercloud. The Watercloud system itself is a web-server based data processing system which allows saving, analysing, and storing the collected measurement data at a central location for years.

If you wish the data to be sent to your user account on the Watercloud server, you need to establish access at [www.Water-Cloud.de](http://www.Water-Cloud.de), and you also need a valid nexus of your user account and the applied tablet. If you apply several tablets to receive the AZ logger measurement values, all devices need to be interconnected with the Watercloud server. Please note that there is no limitation for the number of tablets to be connected with the Watercloud server. If you have not yet been provided with user access, please contact F.A.S.T. GmbH. We will be happy to activate your access.



### Interconnecting your tablet

If you wish to interconnect the tablet with the Watercloud user account, please log in to the Watercloud system with your user name and your password. If your log-in has been successful, the menu as shown in Illustration 2-15 on the left will appear.

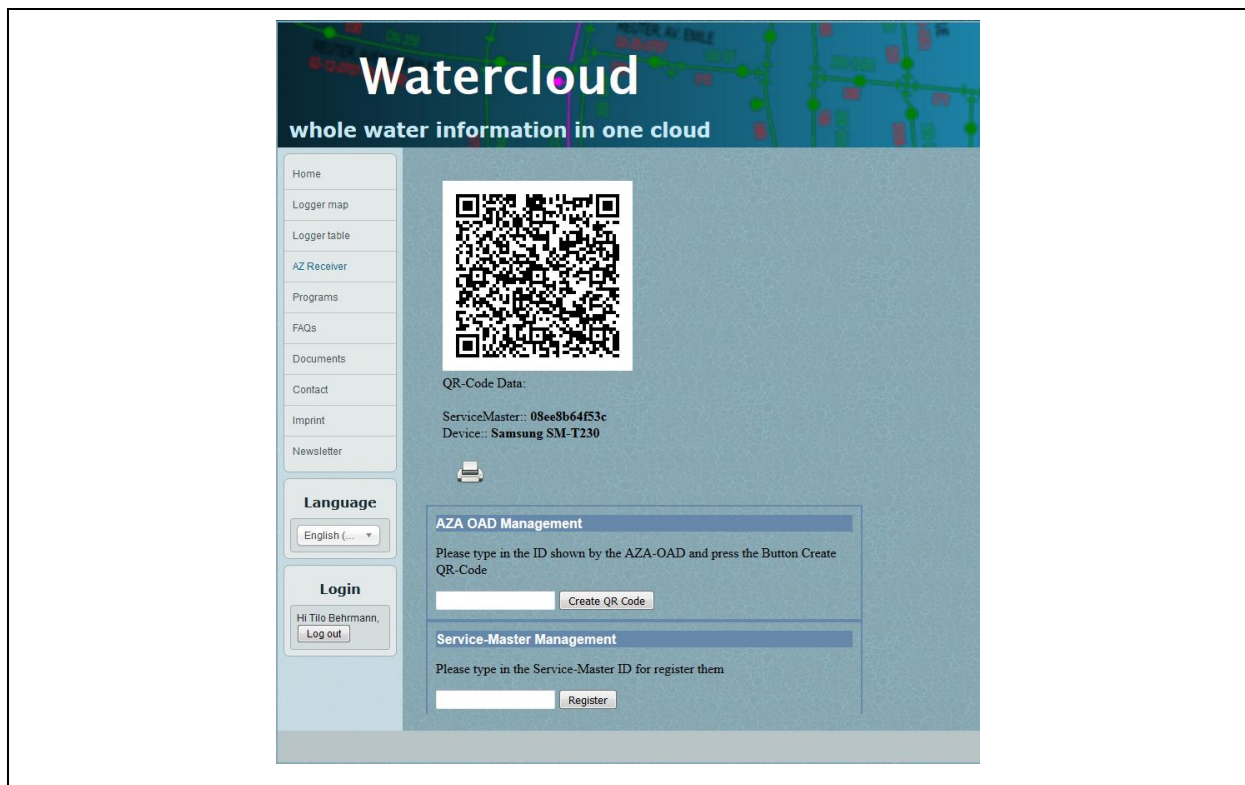


Illustration 2-15: Watercloud

Please click on "AZ Receiver" in this menu to open the page as shown in Illustration 2-15. Now enter the "Device ID" of your tablet in the box left of the "Create QR Code" field.

The "Device ID" of your tablet can be obtained by opening the dialog shown in Illustration 2-16 through the "Watercloud settings" menu item (in the AZA-OAD program). The letter-number combination stated in red is the device ID of your tablet and needs to be entered in the input box on the Watercloud page. Now tap on "Create QR Code", and the server will generate a so-called QR code, which contains the coupling-related information required to connect with your tablet.



**Illustration 2-16: Watercloud interconnection with AZA-OAD**

You can either hold the tablet in front of the monitor so that the tablet camera can acquire the QR code, or you print out the QR code and hold the printed-out code in front of the tablet camera. Please make sure that your tablet is connected with the internet before the QR code is acquired by the tablet camera. The Internet connection is required to validate the information contained in the QR code and to confirm the activated connection of the device to the Watercloud server.

As soon as the AZA-OAD programme has accepted the QR code, the tablet issues a short beep and the received data such as "User ID" and "Host name" is displayed in the dialog. Your tablet is now connected with the user account on the Watercloud server. If you press on "Update page" on the Watercloud page, the interconnected tablet is now listed on the device list on the Watercloud page.

### Backup

The current AZA-OAD version 1.0.6.1 does not yet offer this function.

### Restore

The current AZA-OAD version 1.0.6.1 does not yet offer this function.



### 2.4.3 Logger settings

Tapping on “Logger settings” opens the input mask to change the radio logger settings. Especially the data transmission times, the time of day, the date, the radio module settings, and sensor sensitivity can be adapted in this mask. Tapping on the tile makes the mask as shown in the left part of Illustration 2-17 appear.

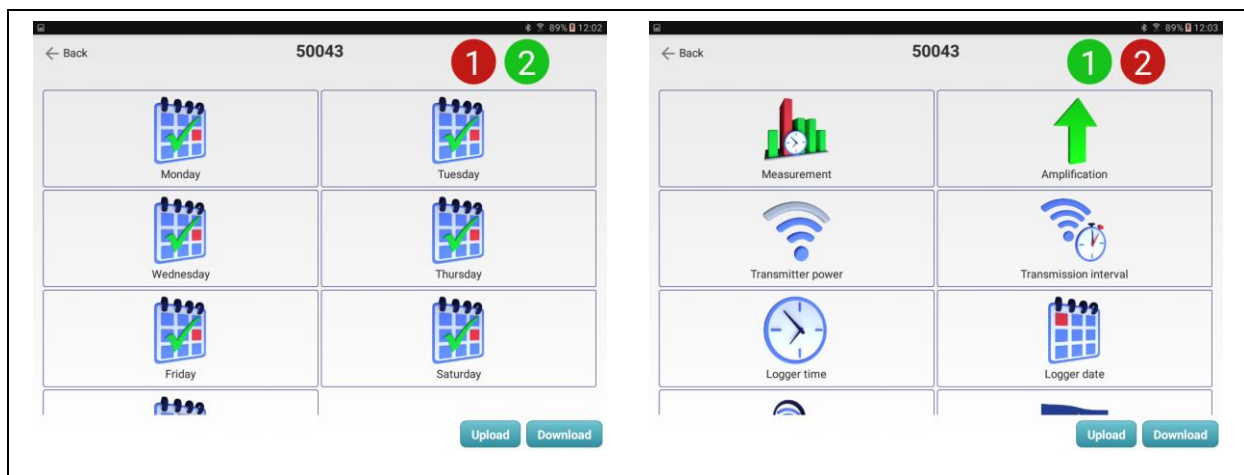


Illustration 2-17: “Logger settings” mask

The upper part of the mask hosts the “Back”, “1”, and “2” menu items. If you wish to leave or close the mask, tap on “Back”. If you wish to switch from one setting view to the other, tap on “1” and “2” respectively, with a red menu item indicating the mask which is currently activated. Menu item “1” also hosts the setting options for the data transmission times of the radio logger, menu item “2” offers all the other functions.

The lower part of the mask hosts the “Download” and “Upload” functions to read out or set the radio logger settings. Please note that the radio logger needs to be read out before any setting can be changed in the mask. This read-out process can be started by tapping on “Download”. The system then offers a dialog where the particular radio logger can be selected. Then tap on “Apply” in the selection dialog to read out the chosen radio logger. If the selected logger is not set to communication mode but to data transmission mode, the AZA-OAD program first tries to wake the logger. As soon as the logger has been woken, the read-out process of the radio logger settings is started. If the radio logger is set to a mode which does not allow waking, an error message is created by the program and the radio logger needs to be woken through the magnet and then set to communication mode. For detailed information on how to activate the mode where the logger can be woken, please refer to the



Online Chapter.

The radio loggers are delivered with a de-activated radio module to avoid any unnecessary reduction of the logger battery lifetime. This means that as soon as a radio logger has been put into operation for the first time, it must be set to communication mode with the magnet before it can be read out.

When the radio logger settings have been read out successfully, the serial number of the particular logger which has just been read out is displayed in the upper part of the mask. Please note that the settings changed now are not automatically saved by the logger. When the settings have been adapted in the program, these new settings can be transferred to the radio logger by tapping on "Upload". This step also saves the new settings on the radio logger.

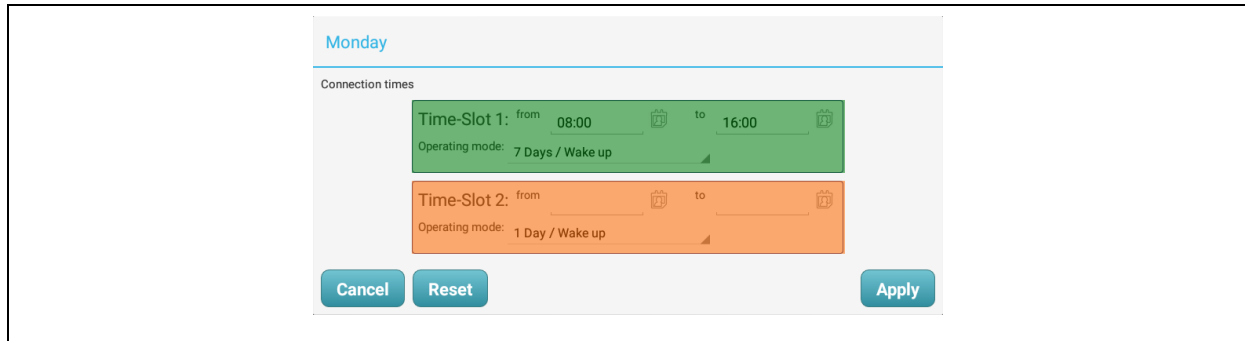
Tapping on the "Transfer" menu item opens a dialog, and the program asks the operator whether only the "Time" of the radio logger or the "Time+Date" are to be saved. If only the time of day is to be saved, all level values saved so far remain in the logger memory. If a new time and a new date are set, the logger identifies this process as a reset process and automatically deletes all level values saved on its memory card.

As soon as any of the "Time" or "Time+Date" buttons has been tapped on, a dialog is displayed where the operator can decide whether only the read out radio logger or also additional other radio loggers are to be programmed with the changed settings. Tapping on "Yes" will start the setting programming process for the particular logger which has just been read out. Tapping on "No" makes a selection dialog appear where the operator can choose additional radio loggers to be programmed with the new settings. As soon as the "Apply" menu item has been tapped on, the programming process for the selected radio loggers is started.



### **Online times**

Availability of a radio logger in terms of time of day can be set with the "Online times" menu item. Each day of the week can be set individually. Please note that a radio logger in general transmits the noise level recorded only at the set data transmission times (online times), and there will be no data transmission at any other time of day. Also, the radio logger cannot be contacted or woken by the AZA-OAD program at a time of day other than set previously. However, the radio logger can be manually set to communication mode with the magnet as described in Chapter 1.5.1.



**Illustration 2-18: “Online times” dialog**

As shown in Illustration 2-18 above, two data transmission times (online time slots) can be set for each day, but the system also operates smoothly if only one online time slot per day has been set. This single online time can be set either with “Time-Slot 1” (green field in Illustration 2-18) or with “Time-Slot 2” (orange field in Illustration 2-18).

If you intend to set a time of day, please tap on the symbol right to the particular input field to open a dialog where the exact time (hour + minute) can be set. As soon as this dialog has been confirmed by tapping on “OK”, the set online time is displayed in the corresponding field (green and orange respectively). If the set online time is no longer required, it can be deleted by tapping on “Reset”. Tapping briefly on the “Time-Slot 1” expression allows copying the online time from the green field into the orange field. Tapping on the “Time-Slot 2” expression copies the set online time from the orange field into the green field.

As already stated previously, the online times for data transmission can be selected individually for each day by tapping on the corresponding tile for the selected day.

The “Operating mode” menu item determines the format of the measurement data to be transmitted to the AZA-OAD program by the radio logger. Currently the following data transmission modes are available:


- serial number / wake up
- 1 day and 1 day / wake up
- 7 days and 7 days / wake up
- 7 days+ and 7 days+ / wake up
- 14 days and 14 days / wake up

The number of days in the particular mode reflects the number of measurement results transmitted to the program by the radio logger. So "7 Days" indicates that seven measurement values are transmitted (provided the radio logger has conducted seven measurements), and with "14 Days", fourteen measurement values are transmitted. There is a "+" version available for the "7 Days" mode. In this "+" version, not only the measurement values are transmitted but also the "ActualLow" and "ActualHigh" values are sent to the program.

The amendment "Wake up" means that the radio logger is automatically set to data reception mode as soon as the measurement data transmission process has been completed. This data reception mode allows the AZA-OAD program to wake the radio logger automatically. If the selected operation mode does not imply the "wake up" function, the radio logger needs to be set to communication mode manually with the magnet.



### Measurement

Unlike the unidirectional radio logger, the bidirectional radio logger accepts an individual start time for a measurement (level value acquisition). Of course, it is recommended to stick to night-time measurements (F.A.S.T recommends measurements to take place at around 2am) as disturbing noises are reduced to a minimum at this time and thus the leakage status can be evaluated in an optimal way. Nevertheless, tapping on the clock symbol results in displaying a dialog where the clock time can be changed. At first, the operator is requested to set the noise level acquisition function to "ON" and to "OFF" respectively. If noise level acquisition is set to "OFF", the process is terminated and the mask displays the symbol . If noise level acquisition is set to "ON", a dialog is displayed where the time can be adapted. The settings made can now be confirmed and accepted with "OK".



### Amplification

The previous radio logger system featured a setting option for sensor sensitivity. This function has proved to be very helpful for daily work and thus has also been integrated into the current bidirectional radio logger system. The sensor sensitivity can be adapted by changing the amplification factor. A low amplification factor is recommended for pipes which make sound

travel easily. For pipes which rather absorb sound and hinder sound propagation, a high amplification factor is recommended.



### **Transmitter power**

The “Transmitter power” function affects the radio performance of the system. So if the radio logger is applied in a built-up area or is placed in a deep manhole, high transmission power is more likely to provide reasonable results. And if the logger is placed in the fields or on a pillar hydrant, the low transmission power option is recommended. Of course, there is a direct relation between transmission power and battery capacity. So if transmission power is set to high, the energy of the battery will be used up more quickly than with a low transmission power setting.



### **Transmission interval**

The “Transmission interval” option allows changing the data transmission interval for the data to be sent from the radio logger to the Servicemaster. The interval options range from 5 seconds to 20 seconds. Please note that an extended interval extends battery capacity.



### **Logger time**

The logger time can be changed by tapping on the tile. A corresponding dialog will appear, and once the time has been changed, tapping on “OK” in the time dialog makes the program accept the changed setting. Please note that you need to tap on “Upload” to transfer any changed setting to the particular radio logger.



### **Logger date**

Unlike the unidirectional radio logger, the new bidirectional radio logger is capable of managing the date independently. Tapping on this tile opens a calendar dialog where the new date for the radio logger can be selected. The AZA-OAD program accepts the new date as soon as the date has been confirmed with “OK”. Please note that if the date has been changed all measurement values saved so far are lost, i.e. the values can no longer be read out. It is therefore recommended to check – and to correct, if required – the date of the radio logger when the device comes back from repair or is delivered as a new device.



### Signal check

The “Signal check” option forces the radio logger to select a secure transmission mode for data transmission to the Servicemaster. This procedure is recommended if several transmission procedures have failed or if the radio logger is not received at all by the Servicemaster system.



### Summertime zones

This “Summertime” feature allows setting various summertime zones making the radio logger adapt its clock automatically to the particular time zone. Currently there are three time zones available for the system and also the option to set none of the three time zones. If the “no time zone” option is chosen, the time is not automatically adapted by the radio logger.



### Info

Information on battery condition and on the software version and hardware version can be called with this tile.



### Factory settings

If the operator is insecure about the settings made or if inappropriate settings have been made on the logger, the device can be reset by tapping on the “Factory settings” tile. This function resets any change made in the “Logger settings” mask. Please note that transferring any new setting to the radio logger requires tapping on “Upload”.

## 2.4.4 Logger utilities

This tile hosts additional functions provided by the radio logger but not affecting the settings directly. Please note that these functions can be applied only if the radio logger has been set to communication mode beforehand. The mask does not make the program wake the radio logger automatically. So the logger needs to be set to communication mode either with the magnet as described in Chapter 1.5.1 or through the “Wake up” tile to use the below-stated functions.

 **Info**

Information on battery condition and on the software version and hardware version can be called with this tile.

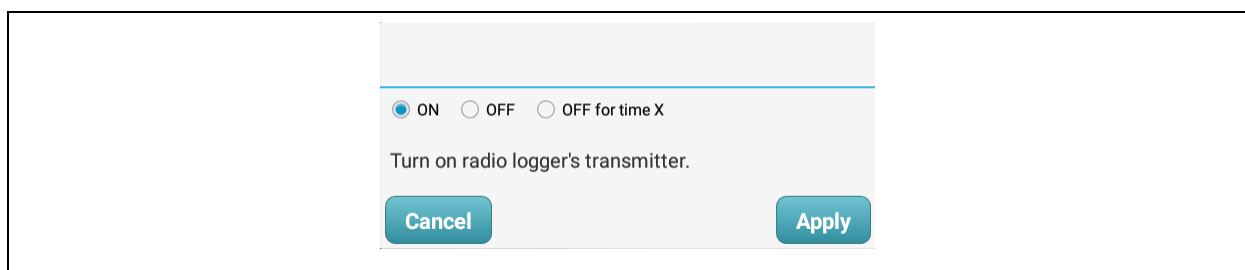
 **Wake up**

If the radio logger has been set in a way so that the device can be woken, the logger can be set to communication mode by tapping on "Wake up" and can now be applied in combination with the other functions. If the radio logger has not been set to a mode where it can be woken, the device needs to be woken with the magnet beforehand.

 **Transmitter state**

As already stated before, the radio logger comes with certain factory settings (e.g. radio module switched off) on delivery. Therefore, it is recommended also to check the state of the radio system if a logger fails to be woken through the program although data transmission times and operation mode have been set correctly.

After tapping on the tile, a selection dialog appears in which one or several loggers can be chosen by tapping on the particular line(s). As soon as a particular logger has been chosen, a tick is set at the beginning of the particular logger line. If only one logger has been chosen, the program starts on reading out the radio state of the selected radio logger. If this radio logger could be read out properly, a dialog as shown in Illustration 2-19 is displayed indicating the radio state of the logger. If several loggers have been selected in the above mentioned selection dialog, the dialog as shown in Illustration 2-19 is displayed immediately. However, the radio state of the individual radio logger is not indicated.

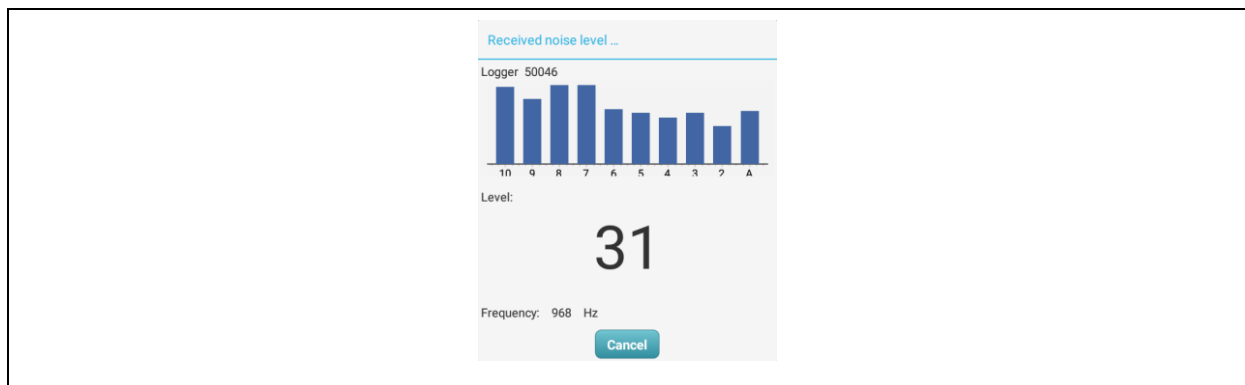


**Illustration 2-19: "Transmitter status" dialog**

Selecting “ON” and “OFF” respectively and then tapping on “Apply” activates/de-activates the radio module of the logger. The radio state is automatically programmed for each logger marked in the selection dialog. Tapping on “Cancel” closes the dialog without changing the logger settings.

### Test measurement

Tapping on “Test measurement” makes the radio logger carry out a test measurement. This means, the logger transmits the current noise level value and the corresponding frequency to the program once a second. The upper part of the dialog appearing as soon as the function has been started displays the last 10 measurement values in a bar chart, with the most recent measurement value being displayed at the right end of the diagram.



**Illustration 2-20: “Test measurement” dialog**

The latest level value is not only displayed visually, it is also displayed in numbers in the middle of the dialog. The displayed numbers range from 1 (lowest possible level value) to 99 (highest possible level value). The currently acquired frequency of the noise level value is displayed beneath the current level value. This frequency reveals the highest frequency line acquired at the point of time of data acquisition. Tapping on “Cancel” terminates the test measurement and closes the dialog.

### Connection test

Tapping on “Connection test” activates a features which checks whether the radio logger can be contacted through the program. If the connection is stable, the communication LED on the logger cap starts flashing thus indicating that the program, the Servicemaster device, and the radio logger are interconnected. If the connection is flawed, the program issues an error

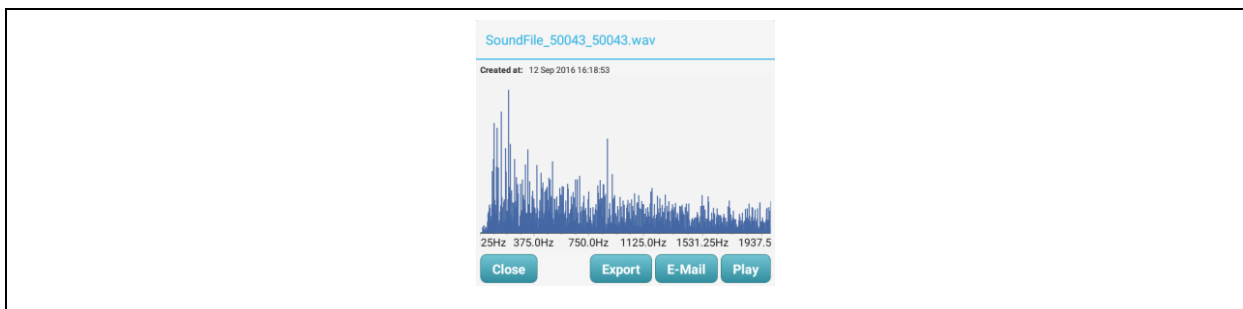


message after a few moments. This error message may have two different causes: one possible cause is that the radio logger is not set to communication mode, another possible cause may be an interrupted radio reception on the Servicemaster’s side. In the latter case, press again the “Connection test” button to restart the connection test. If the error message keeps occurring (even after several trials), the radio logger has probably not been set to communication mode and the operator needs to activate the communication mode on the radio logger as described in Chapter 1.5.1 before a stable connection can be confirmed by the system.



### Reading out a noise sample

A file containing the leakage-borne noise level is created by the radio logger after every night-time measurement procedure. This file can be read out through this program function. The program starts on the read-out process as soon as the “Read out noise sample” tile has been tapped on. If downloading the file was successful, the dialog as shown in Illustration 2-21 below will be displayed.



**Illustration 2-21: “Leakage noise“ dialog**

The “Leakage noise” dialog is to provide the operator with some information on the noise level file. The upper part of the dialog shows the naming of the noise level file and also when the file was created and transmitted to the tablet (right beneath). In the middle of the dialog, the spectrum of the leakage-borne noise is displayed. As this spectrum may be complex due to the scope of frequency distribution, it may take a little while to be displayed.

If you wish to terminate and to leave the dialog, tap on “Close”. Tapping on “Play” starts the retrieval of the noise level file. If the noise is not audible, the volume has to be increased with the android volume control. Sometimes, however, the leakage-borne noise is still hardly audible. In such case, the noise level file can be transmitted to a computer by tapping on the “E-mail” button as described in Chapter 2.5.1. If the tablet has been interconnected with the

Watercloud system (see Chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**), the noise level file can be directly transferred to the server through the "Export" menu item. Tapping on this menu item opens the dialog as described in Chapter 2.5.3.

Please note that sending a noise level file or an e-mail is not possible unless your tablet is connected to the Internet. Also, a valid e-mail account has to be activated on the tablet, and the tablet needs to be connected to the Watercloud server.



### Creating a noise sample

If a noise level file has to be created covering the current situation on the leakage spot or on a certain pipe section, such a file can be created and subsequently be read out through this program function. Please note that if a leakage-borne noise level file is created to cover the current situation and is read out subsequently, the previous night-time measurement file will be deleted. The process corresponds to the "Read out noise sample" process to a great extent. The only difference is that a noise level file is created beforehand.



### Playing a saved noise sample

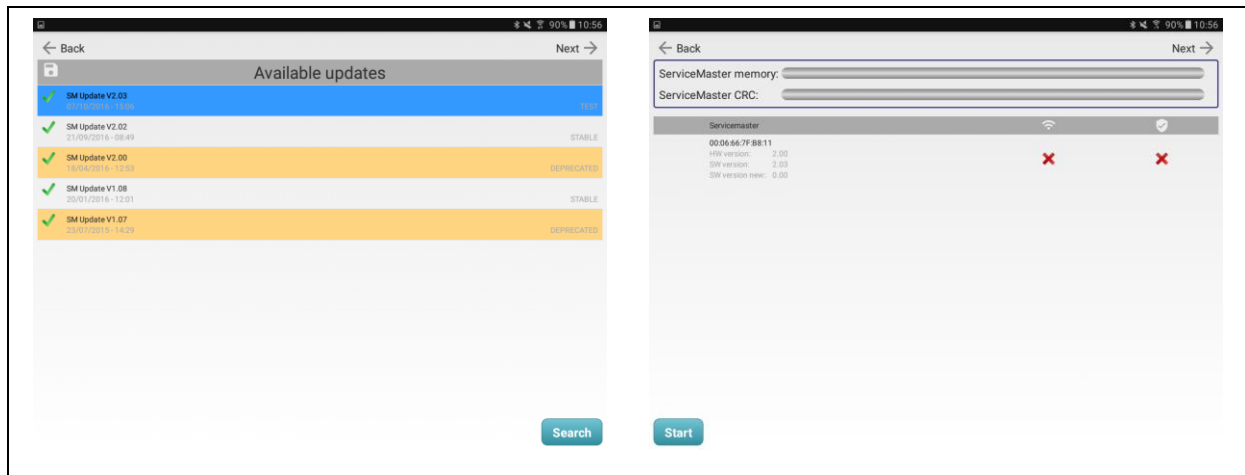
If a noise level file was read out on the radio logger beforehand, tapping on "Play saved noise sample" makes a dialog appear as shown in Illustration 2-21. If no noise level file was read out beforehand, the dialog will not be displayed and the system generates a message informing the operator that there is not yet any noise level file available on the tablet.

## 2.4.5 Firmware-Update

**NOTE:** IF A FIRMWARE UPDATE IS TO BE CONDUCTED, THE SERVICEMASTER DEVICE MUST BE SUPPLIED WITH POWER THROUGH THE USB CHARGING CABLE DURING THE ENTIRE UPDATE PROCESS.

Another innovative feature of the new AZA system is the option to update the firmware on the radio loggers. On doing so, please tap on the "Firmware update" tile to open the mask for the firmware updates. Please note that there is a difference between updating the firmware on the Servicemaster and updating the firmware on a radio logger. If the Servicemaster is to be updated, the "Servicemaster" tile needs to be tapped on, and if the radio logger has to

be updated, please tap on the “Logger” tile. As soon as the particular tile has been tapped on, the dialog as shown in the left part of Illustration 2-22 is displayed.



**Illustration 2-22: “Firmware update“ masks 1 / 2**

All firmware updates are filed to our corporate FAST server. Therefore, the tablet needs to be connected to the internet before the update is started and the connection with the Internet must not be interrupted until downloading the updates has been completed. Tapping on “Search” makes the AZA-OAD program issue a request to our corporate server enquiring whether or not a new firmware update for the particular radio logger(s) is available. If there are any updates available, these updates are listed in a table as shown in the left part of Illustration 2-22. If no update is available, the system responds to the request by issuing an empty update list.

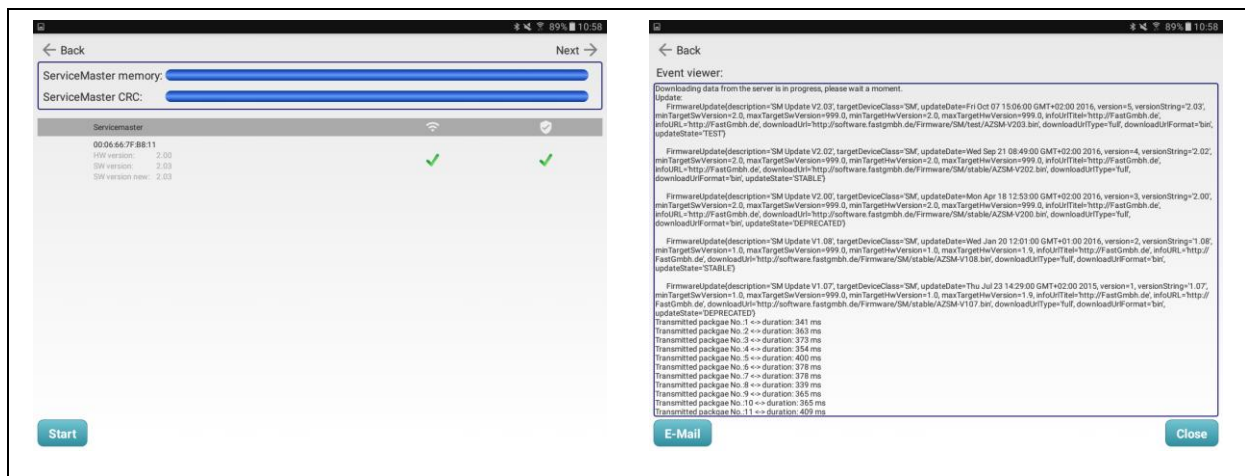
The found updates are marked on the list: A green tick means that the update is ready to be downloaded, whereas a rotating gear indicates that the particular update is already being downloaded by the program. This download process may take a little while if the internet connection is limited. If an update is marked with a red “X”, the update cannot be used as a complete download failed. In this case, please tap on “Search” and download the flawed update again.

As soon as downloading the firmware update(s) has been completed, a certain firmware update can be selected by tapping on the particular row on the list. Selecting a certain update turns the row blue, as shown in the left part of Illustration 2-22. Now please tap on “Next” in the upper part of the mask (see also left part of Illustration 2-22) to open the next mask (see right part of Illustration 2-22). In this mask, the actual update process can be initiated by tapping on “Start”. If an update for a radio logger has been selected, the upper part of the

mask hosts four progress bars to indicate the current status of the updating process. The mask for the Servicemaster update displays only two progress bars.

First, the program data is sent to the Servicemaster, which is indicated at "ServiceMaster memory:". As soon as the bar is completed in blue, this step has been finalized. Then the program data is checked in the Servicemaster memory device. The completion of this step is also indicated through a blue bar to the right of "ServiceMaster CRC:". If the update is intended for the Servicemaster, the updating process can now be started by tapping on "Yes".

If the update is intended for a radio logger, there is a third step required by the program once the second bar has turned blue as described above. In this third step, the Servicemaster transfers the program data to the selected radio logger. The status can be monitored at "Logger memory:". Finally, the program data is checked on the radio logger, and this checking process is also indicated with a progress bar at "Logger CRC:". As soon as all four bars are displayed in blue, the radio logger automatically starts the firmware update process. This finalizing step is completed within a few seconds.



**Illustration 2-23: "Firmware update" masks 2 / 3**

As soon as updating the firmware is completed, the mask is displayed as shown in the left part of Illustration 2-23. Now there should be two green ticks each with every device (Servicemaster or radio logger). The first green tick indicates that communicating with the particular device was successful, and the second tick indicates that the firmware update could be installed. Please note that any device listed without the two green ticks indicates a failed firmware update. Tapping on "Start" repeats the updating process for such a device on the list.

The updating progress is not only indicated graphically with the progress bars but also in written form with a log file. This file can be read through the "Event viewer" and can also be sent to another computer by tapping on "E-mail". If the firmware update process fails, the failure can be traced through the log file. Tapping on "Next" (see left part of Illustration 2-23) opens the "Event viewer" mask as shown in the right part of Illustration 2-23.

## 2.5 Import / Export

The "Import/Export" tile allows exporting AZA-OAD program data to or importing data from the Watercloud. Tapping on the tile opens a menu for data import and data export respectively, with the "Import logger" (Chapter 2.5.2), "Export logger" (Chapter 2.5.3), and "Export correlation" (Chapter 2.5.4) menu item not being activated unless the tablet has been interconnected with the Watercloud (see Chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**).

### 2.5.1 E-mailing a logger

Tapping on the "E-mail logger" menu item opens a dialog as shown in Illustration 2-24. Please note that sending an e-mail requires an operational internet connection for the tablet. Also, a valid e-mail account has to be activated on the tablet.

Tapping on "Cancel" interrupts the e-mail sending process and makes the system return to the start screen. The "Search" menu item opens the contact list to select the receiver of the e-mail. As soon as receiver has been chosen, the particular e-mail address is inserted into the first field of the dialog. The e-mail address can also be complemented manually by tapping on the first line, which makes a keyboard appear in the lower part of the screen to enter an address. The subject line can be used to enter additional information, although the AZA-OAD program completes such information in general. If the information needs to be changed, just tap on the line and complement, change, or add the information with the keyboard displayed on the screen.



Illustration 2-24: "E-mail" dialog

When all the information relevant for the particular e-mail has been added, tap on “Sending” to send off the e-mail. A window is now displayed in the lower part of the screen as soon as the “Sending” button has been tapped on. This window offers a variety of programs which can be used to send the e-mail off. The AZA-OAD program shuts down automatically after the program has been selected and changes to the particular e-mailing program. Android returns to the AZA-OAD program as soon as sending the e-mail has been completed.

The file attached to the e-mail can then be imported to the AZ-Easy program for processing purposes. The radio logger data contained in the export file complies with the information as displayed in the radio logger table (Chapter 2.2.1).

### 2.5.2 Importing a logger

Logger data can be imported from the Watercloud into the AZA-OAD program with this menu item provided some radio loggers have been assigned in the particular districts in the Watercloud system. Tapping on the button makes a dialog as shown in Illustration 2-25 appear on the screen and the request concerning the districts is started on the Watercloud server as soon as “Search” has been tapped on. With this request, all district names are listed in the adjacent selection field. Tapping on the selection field opens a list which allows choosing from the single districts if several districts were defined in the Watercloud.

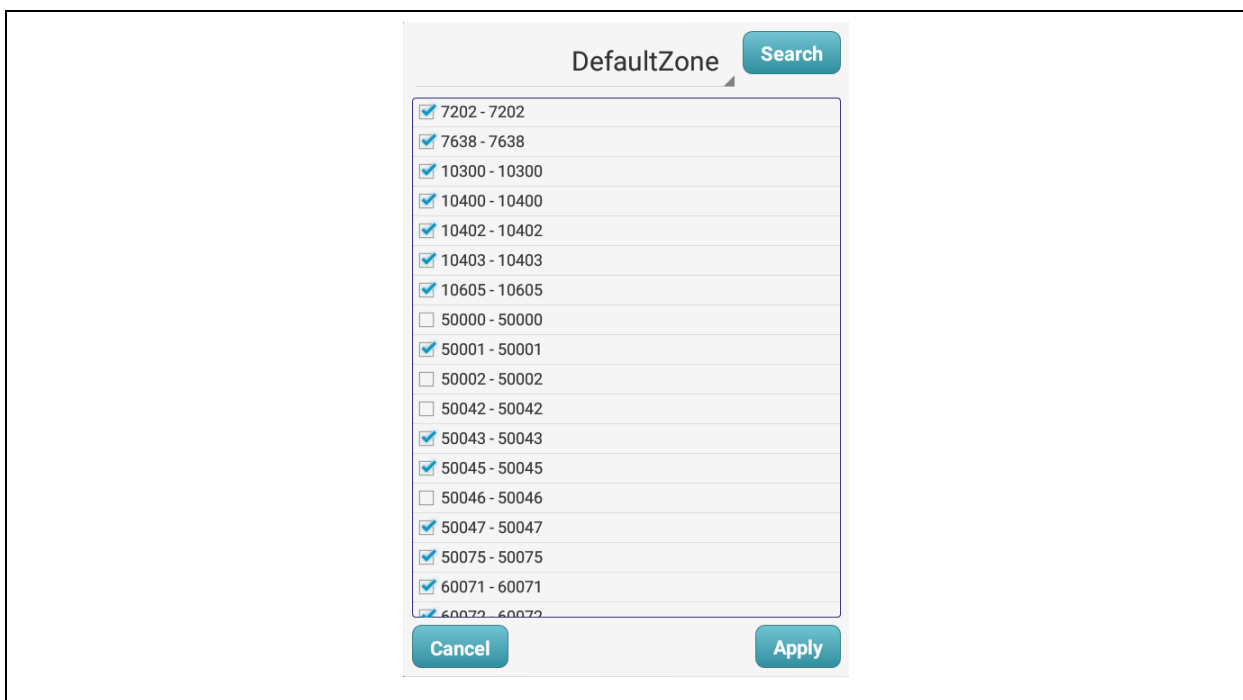
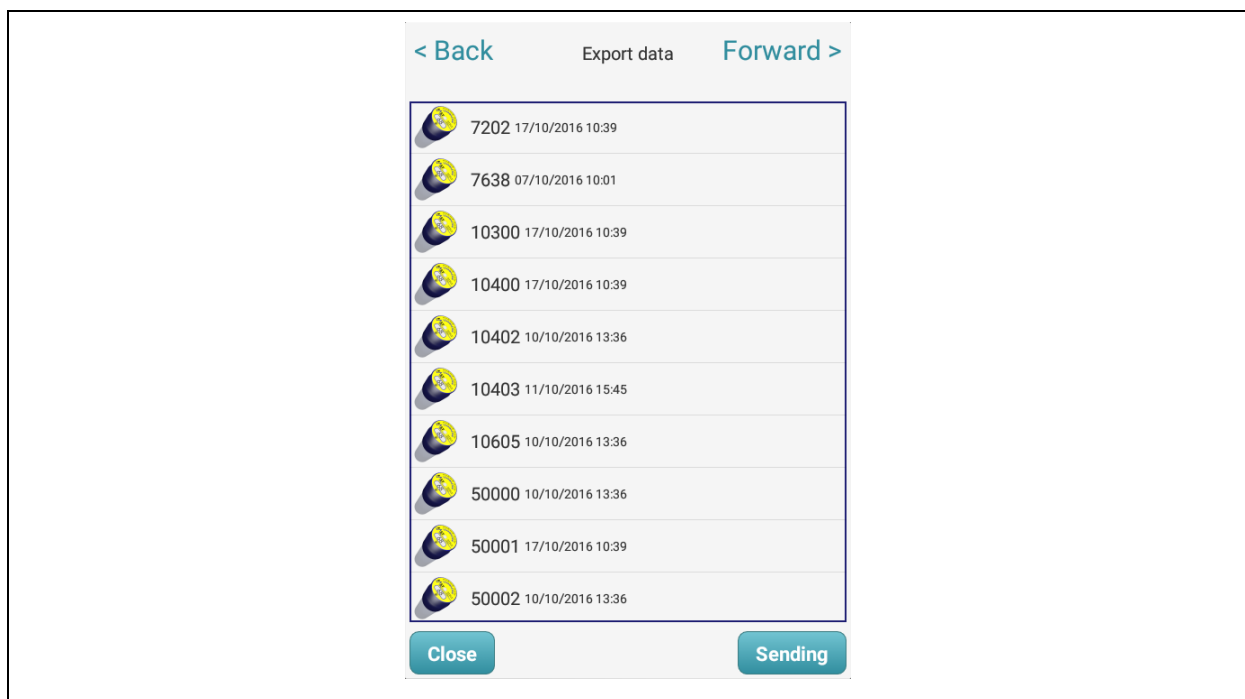


Illustration 2-25: “Importing a logger“ dialog

If the districts contain any radio loggers, these loggers are displayed in the central selection list. If the selected district does not have any logger data, the system generates a message and the selection list remains empty. Those radio loggers which are to be imported into the AZA-OAD program are ticked automatically. If importing a certain logger is not intended, the logger has to be tapped on to make the tick disappear. Please note that those loggers which are not ticked, will not be imported into the program. When selecting the data to be imported has been completed, the importing process can be started by tapping on "Apply". The dialog can be closed without importing any radio logger by tapping on "Cancel".

### 2.5.3 Exporting a logger

When the tablet has been interconnected with a Watercloud user account, the program releases the "Export logger" menu item, which leads the operator to the dialog as shown in Illustration 2-26. The buttons "<Back" and "Forward>" allow leafing back and forth between the list views "Export data", "Send", and "Failed". Tapping on the "Close" button will close the dialog.



**Illustration 2-26: "Exporting a logger" dialog**

Tapping on "Sending" starts the transmission of the received AZ loggers to the Watercloud server. Please make sure that the tablet is connected with the internet for data transmission. The connection between the tablet and the internet must be implemented either through Wifi, UMTS, or LTE as otherwise the program issues a message and terminates data transfer.

If an internet connection has been established, a dialog indicating data transmission progress is displayed after tapping on "Sending". When data transmission has been completed, the dialog is closed automatically and the operator can check through the "Failed" list if the entire data has been transferred properly to the Watercloud server. If the list holds no radio logger, all data from the radio loggers has been successfully transferred to the server. If the list shows any radio logger, the operator can tap on "Sending" to transfer the flawed data to the Watercloud server again.

#### **2.5.4 Exporting a correlation**

The "Exporting a correlation" function works in the same way like exporting a radio logger as described in Chapter 2.5.3. Both the dialog and the single steps are the same. The only difference is that instead of the radio logger data the saved correlations will be transmitted to the Watercloud.