OPERATING MANUAL OF THE APPLICATION

FOR ANDROID DEVICES

SONEL ANALYSIS - MOBILE

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1 Basic Information

Sonel Analysis - Mobile is designed for Android devices (version 4.1.2 and later). This application is exclusively for use with Sonel PQM-710 and PQM- 711 power quality analyzers. It is used to read current data, trigger and stop recording, and to configure the analyzer with predefined settings.

2 Using the application

2.1 Starting and connecting to the analyzer

Before starting the application, make sure that your mobile device has activated and correctly configured access point to work with PQM-710/711 (depending on the device, the point name may differ, e.g.: Tethering, Wi-Fi hotspot, Access Point).

If the access point is not active, the error message shown in Fig. 1 will be displayed after starting the application. To activate the access point automatically, press "Turn on" button.
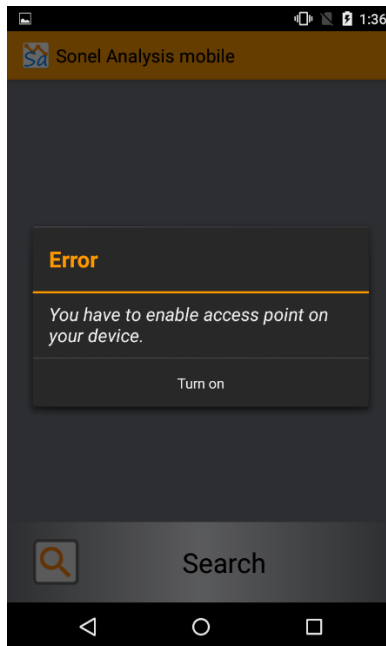

Fig. 1. Message on unavailable active access point.

> **CAUTION!**
> *If the access point does not start automatically, activate it manually as described in the operating instructions of your mobile device.*

> **CAUTION!**
> *The access point in the device with the application must have the same name and password (WPA2 standard) as the network name and password entered in the analyzer. You can change the password and name of the network in the analyzer using Sonel Analysis for PC.*

If the access point is activated, find PQM-710 or PQM-711 analyzer, to which the application will connect. To do this, press "Search" button shown in Figure 2.
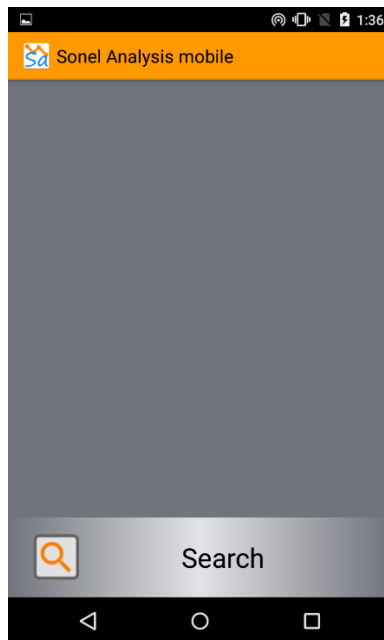

Fig. 2. Analyzer search screen.

If a properly configured PQM-710 or PQM-711 analyzer is available within range of your device, it will appear in the selection list.
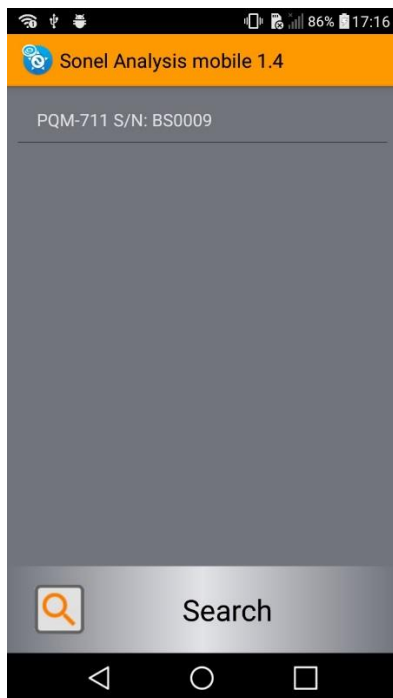

Fig. 3. Screen of selecting the analyzer for connection.

After selecting the desired analyzer, a screen is shown, where a three-digit PIN must be entered to connect to the analyzer (Fig. 4). After entering the correct PIN, press "Connect" button.

> *CAUTION!*
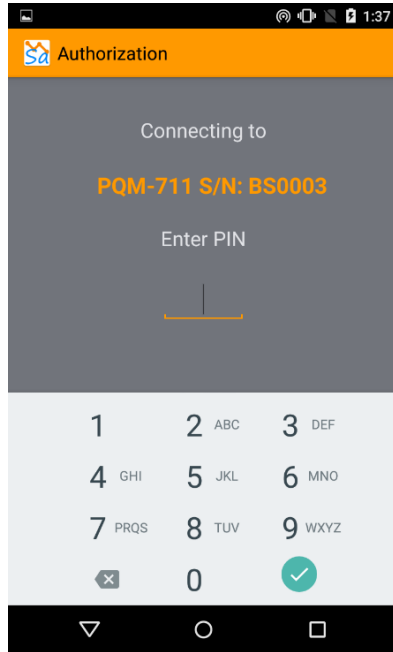> *The analyzer PIN can be set or changed in Sonel Analysis for PC.*

Fig. 4. Screen for entering PIN.

After properly connected to the analyzer, the application will display the main menu (Fig. 5). From the menu we can select the function allowed preview parameters of the measured power grid, go to the analyzer control menu or settings menu.
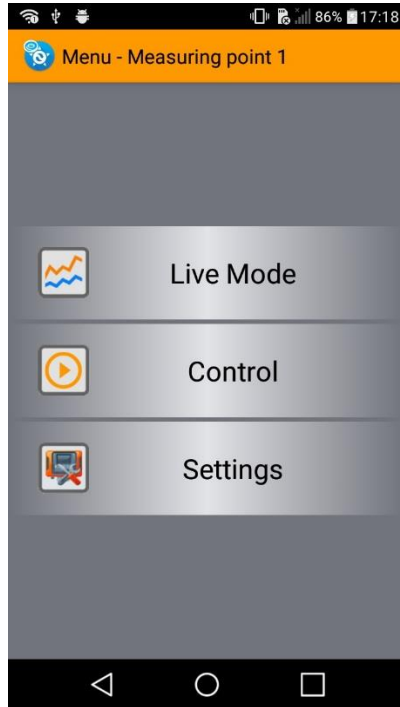
Fig. 5. Main menu of the application.

2.2   On-line measurements

After selecting "Live mode" option the program will display a window with the following functionality:

- Waveforms – preview of waveforms of currents and voltages,
- Timeplots – preview of timeplots for currents and voltages,
- Measurements – preview of measured values in tabular form,
- Phasors – preview of voltage and current vectors and connection status of the analyzer to the network,
- Harmonics – preview of current and voltage harmonics and interharmonics in the form of a bar chart.
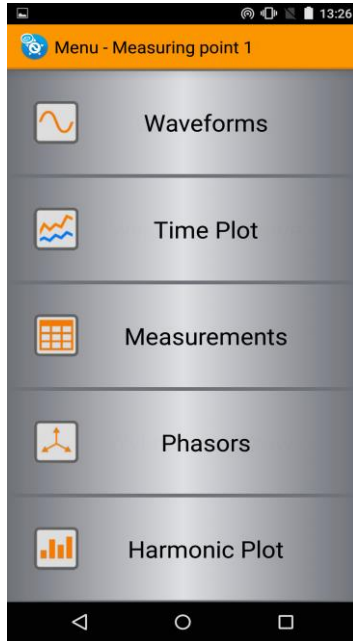
Fig. 6. "Live mode" menu.

2.2.1 'Waveforms' screen

This screen allows you to preview the waveforms of voltages and currents. The number of waveforms corresponds to the network layout. On the right and left side of the screen you may use a drop-down lists to select the scale for the desired phase or to unify all scales (option "All").

Fig. 7. 'Waveforms' screen.

2.2.2 'Timeplots' screen

This screen allows you to preview the timeplots of voltages and currents. The number of timeplots corresponds to the network layout. On the right and left side of the screen you may use a drop-down lists to select the scale for the desired phase or to unify all scales (option "All").
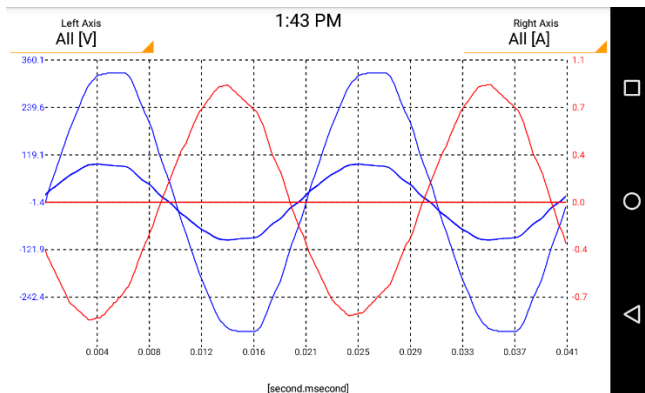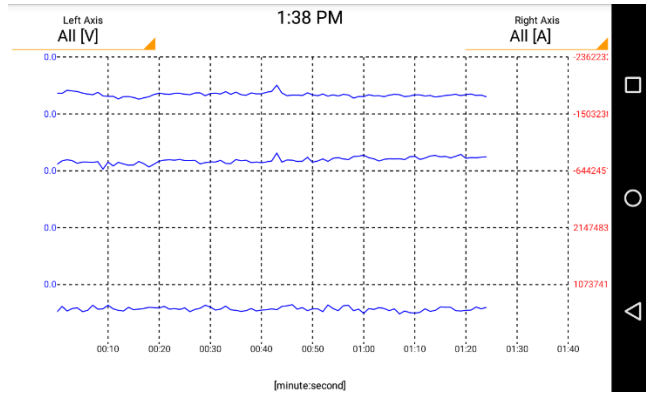

Fig. 8. 'Timeplots' screen.

2.2.3 'Measurements' screen

The 'Measurements' screen allows you to preview measured parameters in tabular form. The number of parameters displayed in the table corresponds to the network layout. If a parameter is marked with "---" in the table, this means that the parameter is not recorded for the current network layout.

Zero parameters marked with an asterisk (e.g. I L1 = 0 *) indicate that the current measured by the analyzer in a given phase is lower than the current reset threshold set in the analyzer. This function prevents measuring noise generated by current measuring transducers.

CAUTION!
The current reset threshold may be set in Sonel Analysis for PC.

		L1	L2	L3	L1-2
U	[mV]	7.868	29.32	37.50	25.49
U_{dc}	[V]	-7.053	-18.70	-0.117	---
f	[Hz]	50.00	50.00	50.00	
I	[A]	0*	0*	0*	---
I_{dc}	[A]	0*	0*	0*	---
P	[mW]	-0.465	0*	0*	---
Q_b	[mvar]	-0.723	0*	0*	---
S	[mVA]	0*	0*	0*	---
D	[mvar]	0*	0*	0*	---
E_{p+}	[mWh]	0.006	0.043	0.020	---
E_{p-}	[mWh]	-0.015	-0.024	-0.032	---
E_{QB+}	[mvarh]	0.008	0.000	0.127	---
E_{QB-}	[mvarh]	-0.005	-0.231	-0.009	---
E_s	[mVAh]	0.414	0.476	0.334	---
PF	---	0*	0*	0*	---
$\cos\varphi$	---	0*	0*	0*	---
$\tan\varphi$	---	0*	0*	0*	---
THD U	[%]	17.77	24.21	20.15	---
THD I	[%]	0*	0*	0*	---
TID U	[%]	25.52	21.97	16.81	---
TID I	[%]	0*	0*	0*	---

Fig. 9. 'Measurements' screen.

2.2.4 'Phasors' screen

This screen allows you to preview voltages and currents. In addition, the application displays a table with the harmonic data for the measured currents and voltages.

A very useful functionality is the option of checking the status of the analyzer connection to the network. A given parameter is shown in one of the four states and means:

- V – meets the criteria of correctness,
- X – the parameter does not meet the criteria of the verification algorithm (possible connection error),
- ? – the algorithm is unable to determine the correctness of the parameter,
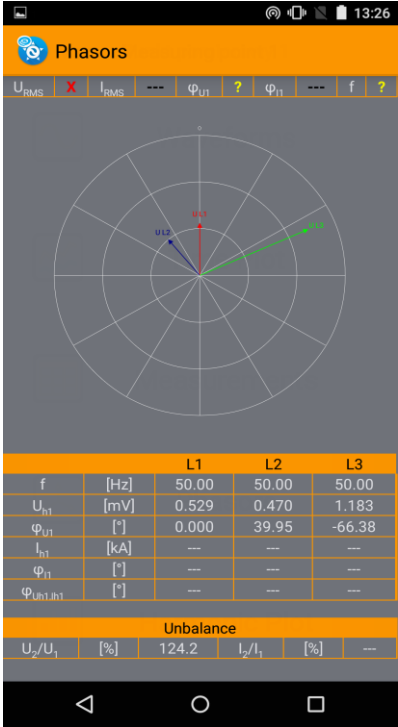- "---" - the parameter is not monitored.

Fig. 10. 'Phasors' screen.

2.2.5 'Harmonic plot' screen

The screen allows you to view harmonics or interharmonics in the form of a bar chart. The application allows you to display the voltage and current plots for one selected phase.

Figure 11 shows the screen used for selecting a phase plot - you may choose the plot with harmonics or interharmonics. After selecting the desired phase, the application will show a plot of harmonics or interharmonics.
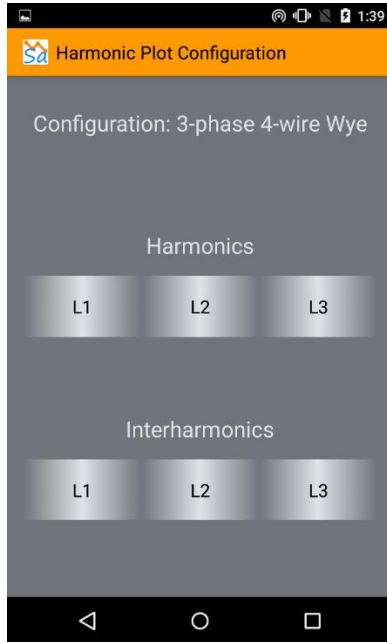
Fig. 11. Screen with harmonic plot selection.

The bar chart (for harmonics and interharmonics) provides the following options (Fig. 12):

- Show fundamental - enabling this option will show you the fundamental (inter)harmonics. By default, this option is disabled.
- Show percentage - enabling this option will show you (inter)harmonics as percentage values relative to the fundamental harmonic. By disabling this option you will be shown values in volts and amperes. By default, this option is enabled.
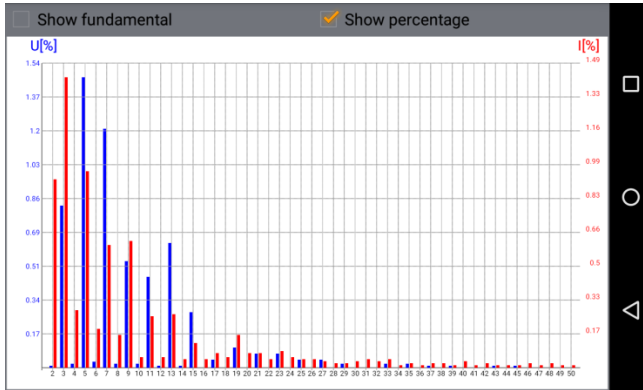
Fig. 12. 'Harmonics' screen.

2.3   *Analyzer control menu*

After selecting "Control" option from the screen shown in figure 5, we will see a window which allows us to select one of four measurement points (configurations).

Additionally we can start recording data to the analyzer memory by pressing the "START" button. To stop the registration process press the "STOP" button.

> ***CAUTION!***
> ***The measurement points configuration can be changed in Sonel***
> ***Analysis on PC or in Sonel Analysis Mobile settings menu.***

> ***CAUTION!***
> ***The Start time and stop time of the reistration can be changed in***
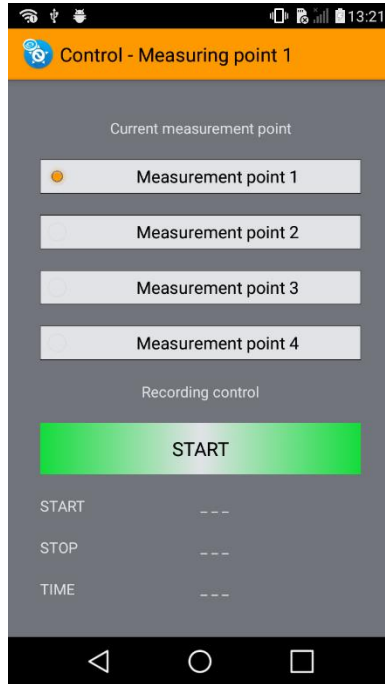> ***Sonel Analysis on PC.***

Fig. 13. Control screen.

2.4 Analyzer settings menu

The configuration module allows you to program the analyzer according to the predefined measurement scenarios. In the configuration process, apart from selecting the scenario and the number of the measuring point which will receive the new configuration, you must specify the basic parameters such as:

- network layout,
- rated voltage,
- the type of used current clamps,
- voltage and current transducers,
- averaging period.

Move between the individual configuration screens by dragging your finger across the screen from right to left or vice-versa.

2.4.1 Screen of the measurement scenario

Screen No. 1 allows you to select the measuring point, which will receive the new configuration. The next step is to choose a measurement scenario with predefined settings. There are two possible variants of scenarios:

- User - predefined measurement scenarios with names that match the measured parameters.
- Normative - predefined settings for measurements according to power quality standards.
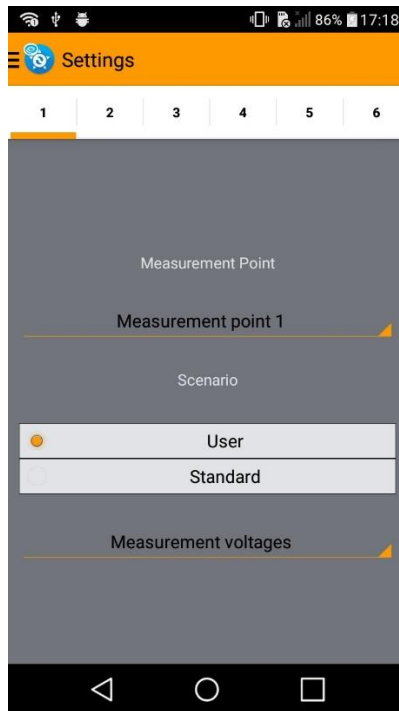

Fig. 14. Measurement scenario selection screen

> ***CAUTION!***
> ***Sending a new configuration will delete all data saved in the selected measuring point.***

2.4.2 Screen of network selection

Screen No. 2 is used to define the type of network in which the measurements will be performed. In addition, you need to determine the nominal frequency of the network.
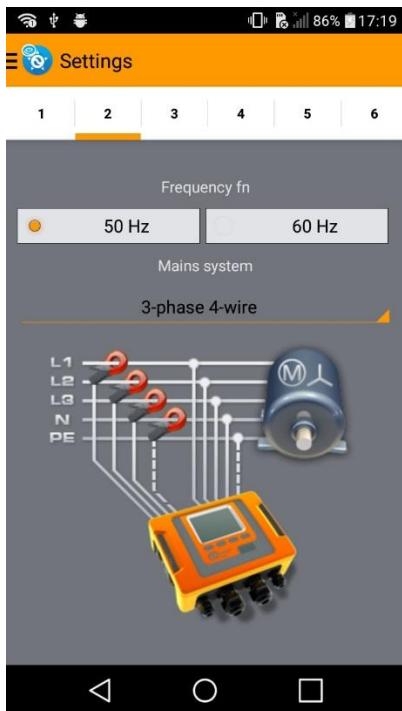

Fig. 15. Screen of selecting the measurement scenario

CAUTION!
For the DC measurement scenario, you can't select frequencies.

2.4.3 Screen for voltage settings

Screen No. 3 allows you to set the rated voltage, which will be a reference point for thresholds of events. The list varies depending on the selected frequency and the network layout.

Button "   N-PE voltage   " activates recording of voltage in PE channel of the analyzer. Button "   Voltage Transducers   " is used to set the voltage transducer ratio. After activating the transducers, the voltage selection list is disabled.
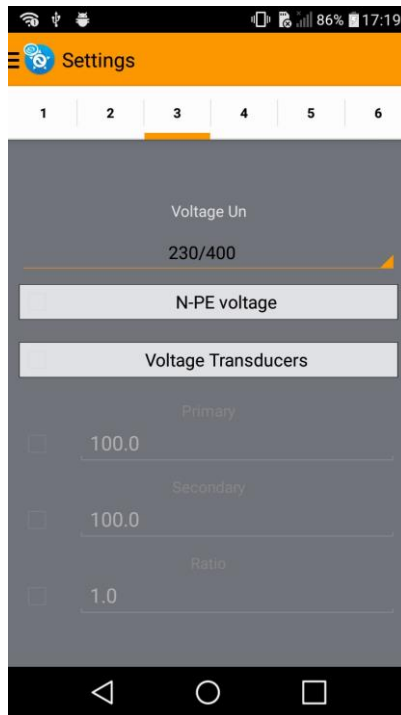

Fig. 16. Screen of voltage parameters.

2.4.4 Screen current clamp selection

Screen No. 4 allows you to select current clamps. The list changes depending on the scenario and frequency.

Button "N-conductor Current" activates recording of current in N channel of the analyzer. Button "Current Transducers" is used to set the current transducer ratio.
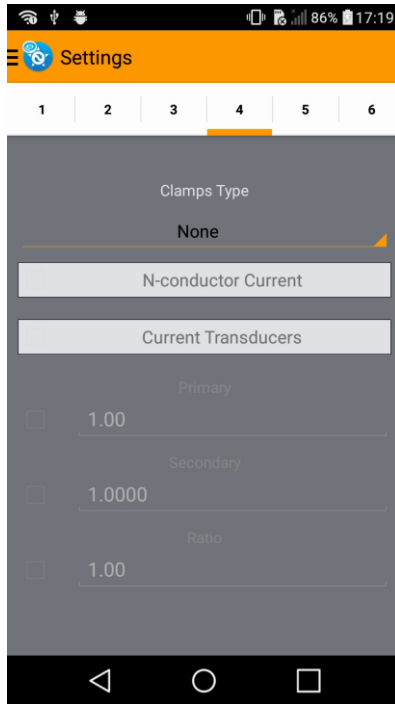

Fig. 17. Screen of current parameters.

2.4.5 Screen for selecting the averaging period

Screen No. 5 is used to select the period, after which the averaged values will be saved in the analyzer memory.
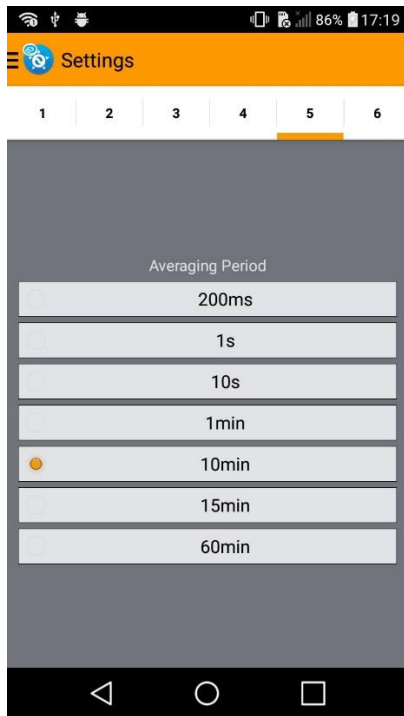

Fig. 18. Screen for selecting the averaging period.

CAUTION!
For normative scenarios, the selection screen of the averaging
period is skipped, as averaging times are defined by the standards.

2.4.6 Screen for sending the configuration

Screen No. 6 allows you to send the selected configuration to the measurement point.

After correct sending the configuration, the application will prompt you to the control screen - Fig. 13 in order to start recording.
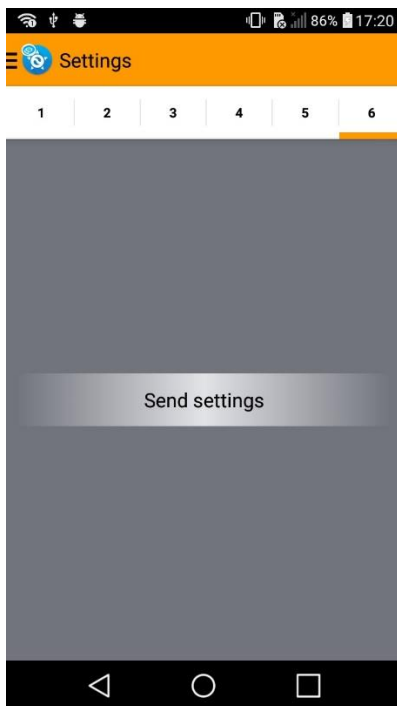

Fig. 19. Screen for sending the configuration.

> **CAUTION!**
> **During active recording of the parameters, you cannot send the configuration.**

2.5   Disconnecting active connection

To disconnect the analyzer from the network, enter the main menu screen (Fig. 5) and press "Back ◁" system button on your device, which uses the application. A warning message will appear. To disconnect, press the **Disconnect** button (Fig. 20).
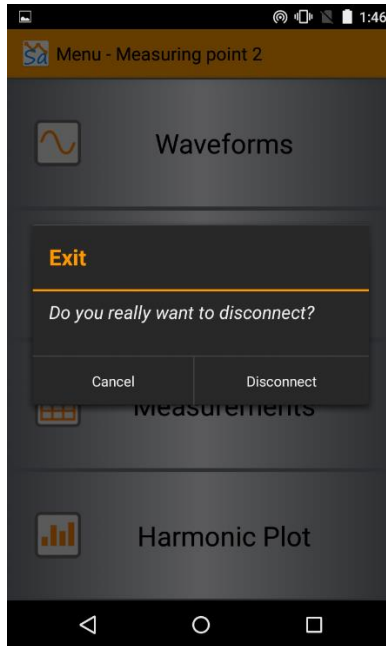

Fig. 20. 'Disconnect' screen.

2.6   Closing the application

To exit the application, enter the screen with the list of the analyzers (Fig. 3) and press "Back ◁" system button. Then the message is displayed as shown in Fig. 21. After pressing **Exit**, the application is closed.
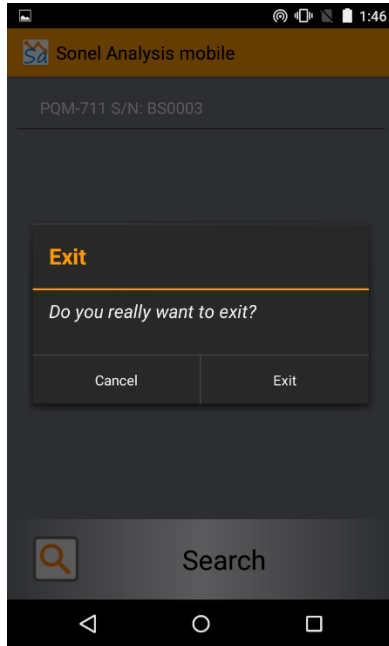
Fig. 21. 'Exit' screen of the application.

2.7   Language selection

At any time, you can change the language of the application. Polish and English language options are available. Language selection is available after pressing "menu ■" system button .