User manual

E-band & V-band Spectrum Compact

FCC Compliance statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Spectrum Compact does not contain serviceable parts. Warranty will not be applicable in the event Spectrum Compact has been opened.

Contents

1 OVERVIEW

1.1 Appearance & features

E-band and V-band Spectrum Compact analyzers are an ultra-light and easy to use measurement solution for, respectively, the 70 - 87 GHz and the 56 – 67 GHz microwave frequency band. This battery powered device does not require external down-converters, and is a must-have tool for any field engineer performing E-band or V-band equipment installation, link troubleshooting, site planning and maintenance. The instrument utilizes a resistive touch screen for ease of use in the field, allowing the engineer to wear gloves when using the device. Furthermore, its high sensitivity and low noise floor make it possible to detect even exceptionally weak signals. The Spectrum Compact can also be used for high precision detection of existing interference on installed paths or available radio channels. Data logging of all spectrum scans is available on the Spectrum Compact device, and enhanced data processing and analysis is provided by SAF Tehnika designed free PC software.

- Ultra-compact form factor
- Leading sensitivity
- Resistive LCD touchscreen
- Weatherproof - IP marking 54
- Stand-alone functionality
- Free PC software
- Audio output for hands-free antenna adjusting

1.2 Technical specification

P/N	J0SSAP80	J0SSAP60
Frequency range	70.000 – 87.000 GHz	56.000 – 67.000 GHz
Input power range	-90 dBm to -30 dBm	-90 dBm to -40 dBm
Max input power	0 dBm	0 dBm
RBW (Resolution bandwidth)	10 MHz	10 MHz
Min span	1 GHz	1 GHz
Max span	Full bandwidth	Full bandwidth
Sweep speed	0.5 s @ 1 GHz span	0.5 s @ 1 GHz span
Accuracy	+/- 1 dB*	+/- 1 dB*
Input	WR 12	WR 15
Interface	micro USB 2.0 (1.1)	micro USB 2.0 (1.1)
Battery	2 x 2380 mAh Polymer Lithium-ion	2 x 2380 mAh Polymer Lithium-ion
Battery life	up to 3 h	up to 3 h
Operating temperature	-15°C to +55°C/ 5°F to 131°F	-15°C to +55°C/ 5°F to 131°F
International Protection Marking	IP54	IP54
Dimensions	147 x 83 x 34 mm/ 5.79 x 3.27 x 1.34 in	147 x 83 x 34 mm/ 5.79 x 3.27 x 1.34 in
Weight	0.57 kg/ 20.11 oz	0.57 kg/ 20.11 oz

*Guaranteed at 21°C/ 70°F

Antennas

P/N	J0S80ASA01	J0K60ASA01
Gain	20 dBi	20 dBi
Input	WR 12	WR 15
3dB beamwidth	15 degrees	15 degrees
Size	37 x 24 x 24 mm/ 1.46 x 0.94 x 0.94 in	46 x 29 x 29 mm/ 1.81 x 1.14 x 1.14 in

1.3 Package contents

Before opening the package, please inspect it for any visible damage.

E-band Spectrum Compact comes with following accessories:
  1 - SAF E-Band antenna (P/N J0S80ASA01);
  2 - Universal 5.9V DC charger (P/N J0AB4618i1);
  3 - Micro USB to 3.5 mm adapter (P/N J0ACUA35);
  4 - Water and shockproof case (P/N J0SPAC07);
  5 - Lanyard (P/N J0APAC21).

V-band Spectrum Compact comes with following accessories:
  1 - SAF V-Band antenna (P/N J0K60ASA01);
  2 - Universal 5.9V DC charger (P/N J0AB4618i1);
  3 - Micro USB to 3.5 mm adapter (P/N J0ACUA35);
  4 - Water and shockproof case (P/N J0SPAC07);
  5 - Lanyard (P/N J0APAC21).

1.4 Connecting the antenna

To connect the SAF E-Band or V-band antenna:
1) Push both of the mounting screws so that the screw ends come out of the back of the Spectrum Compact unit.
2) Place the antenna on the screw ends.
3) Hold the antenna and the Spectrum Compact unit firmly and rotate the mounting screws clockwise while pushing the antenna towards the Spectrum Compact. Alternate rotating the right and the left screw after each full turn.
4) The antenna is attached when there is a small gap (about 1 mm or 1/32 in) between the back of the Spectrum Compact and the antenna's outer edge.

⚠ If the detected signal power is higher than -40 dBm (for J0SSAP60) or -30 dBm (for J0SSAP80), a red warning "OVERLOAD" will be displayed on the screen.

⚠ Initially perform scan at maximum (default) span to detect overload presence.

⚠ Exceeding the critical input power level of 0 dBm may cause irreversible damage to the equipment!

2 OPERATION

2.1 Basic operation

To turn on the Spectrum Compact, press and hold the power button on the left side for about 1.5 seconds. To turn the device off, press and hold the button again for about 1.5 seconds. The guaranteed operation time with a fully charged battery is 3 h. The small battery in the upper right corner indicates the current battery level. When there is about 15 minutes of active sweeping time left, a red warning "BATTERY LOW" will be displayed on the screen, above the graph.

> Turning off the continuous sweeping of the spectrum (SWEEP CONT.), when it is not monitored, and decreasing the screen background brightness (TOOLS & SETTINGS → SETTINGS → BRIGHT) prolongs the operation time.

The Spectrum Compact is charged through the DC port using the included weatherproof DC charger (or any other 4.5V − 6.5V, 2.5A DC charger). A turned off device slowly charges also while connected to PC through USB port. The Spectrum Compact can operate continuously when it is being charged through the DC port.

When Spectrum Compact is connected to a power source, a quick press of the button allows checking the battery status without turning on the device. While charging, the LED located under the transparent button will glow red. When fully charged, the LED will glow green.

> The LED indication may be inaccurate for power supplies with output current 1.5 A and less (e.g. most of the USB ports on computers). For the actual battery status please check the on-screen indication.

The screen of the spectrum analyzer is divided into two parts: the graph and the option buttons.

The horizontal axis of the graph represents linear frequency range in megahertz (MHz). Frequency value increases from left to right. The displayed frequency range can be selected at the FREQ menu. The vertical axis of the graph represents logarithmic input power range in decibels referenced to one milliwatt (dBm). The input power level increases from bottom to top. The displayed input power range can be selected at the LEVEL menu.

> Tapping the right side of the graph decreases displayed frequency range while preserving the CENTER frequency (zooms in). Tapping the left side of the graph increases displayed frequency range while preserving the CENTER frequency, if possible (zooms out). Sliding the graph to the left or right, modifies the START and STOP frequencies by equal amounts.

Above the graph the input power level at the CENTER frequency is displayed in yellow. The Spectrum Compact supported frequency range is given under the graph. The currently displayed frequency range is represented with a white bar. The already registered spectrum curve's position is represented with a yellow bar.

Under the bar, on the left side, the currently selected detector is indicated (see DETECTOR). On the right side, the polarization, which depends on rotation of the device, is indicated ("POL VER" for vertical polarization and "POL HOR" for horizontal polarization).

Tapping the clock in the upper right corner swaps the displayed time/date format.

Tapping the SAF logo in the upper left corner takes a screenshot. The screenshots are saved as bitmap (.bmp) images on the 4 GB microSD memory card. Screenshots are accessible when Spectrum Compact is connected to a computer using a micro USB cable. To save a spectrum curve in the Spectrum Compact file format (.scc) for later review, use the SAVE or SAVE AS button.

The spectrum analyzer functions, which are accessible by tapping the square buttons on the screen, are described in detail in the following chapters. The basic functions are accessible from the main screen.

2.2 SWEEP CONT.

Tapping the SWEEP CONT. button starts and stops continuous sweep of the selected spectrum range and registering of a spectrum curve.

If a sweeping related parameter (displayed frequency or input power level range, trace mode, detector) is modified while sweeping, current sweep is restarted from the beginning. When disabling continuous sweeping, ongoing sweep is finished before full stop.

When SWEEP CONT. is enabled, the SWEEP CONT. button is green and a small white bar is moving under the graph, indicating how far the spectrum has been swept. SWEEP CONT. is enabled by default.
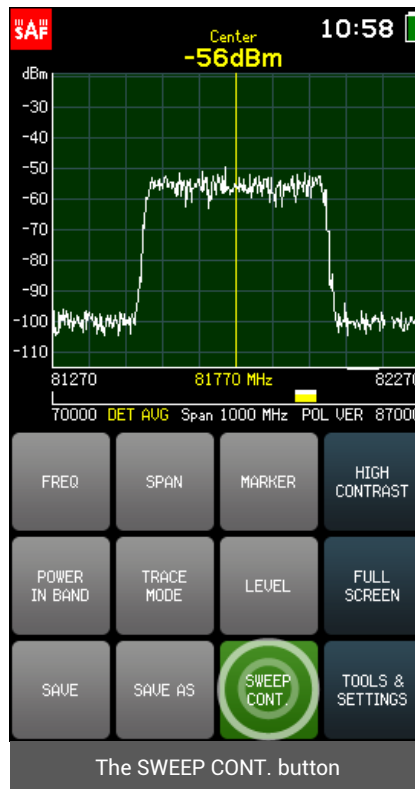
The SWEEP CONT. button

2.3 FREQ

The FREQ menu allows selecting START (left limit of the horizontal axis), CENTER (center value of the horizontal axis) and STOP (right limit of the horizontal axis) frequencies of the spectrum range in megahertz (MHz).

Modifying either START or STOP frequencies will alter the CENTER frequency and the SPAN. Modifying the CENTER frequency will alter both the START and STOP frequencies but will preserve the SPAN, if possible (it may not be possible to preserve the SPAN due to the limits of the supported frequency range).

The currently selected parameter (START/ STOP/ CENTER) is displayed in white. To select a different parameter, tap on it once. The color of the keypad buttons shows which numbers can be entered at the current digit position to obtain a valid parameter value − the numbers on the green buttons can be entered, the numbers on the red buttons cannot be entered. If the currently entered value is valid, it is displayed in

green (also OK button is green). If the value is not valid, it is displayed in red (also OK button is red). To confirm a valid value, tap the OK button or tap the selected parameter.

To exit the FREQ menu and return to the main screen, tap BACK.

Entering the FREQ menu

The FREQ menu

Entering an invalid CENTER value
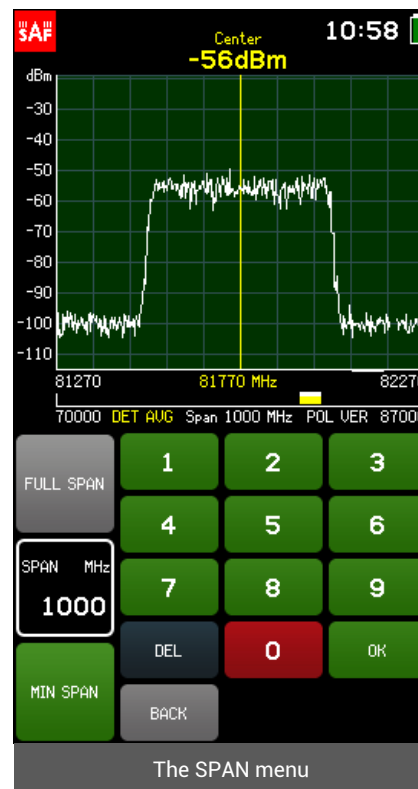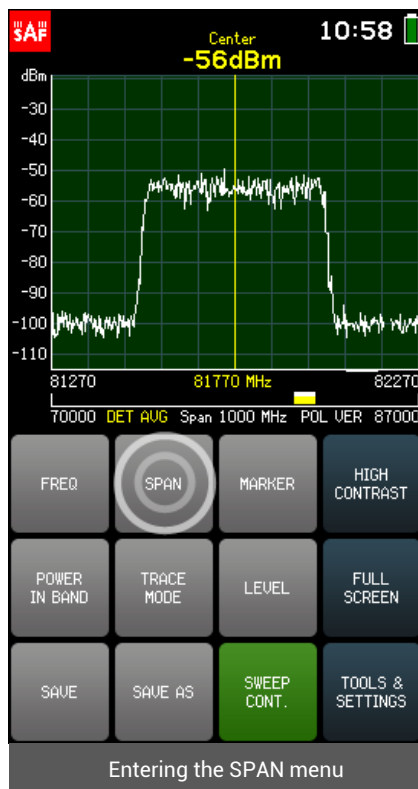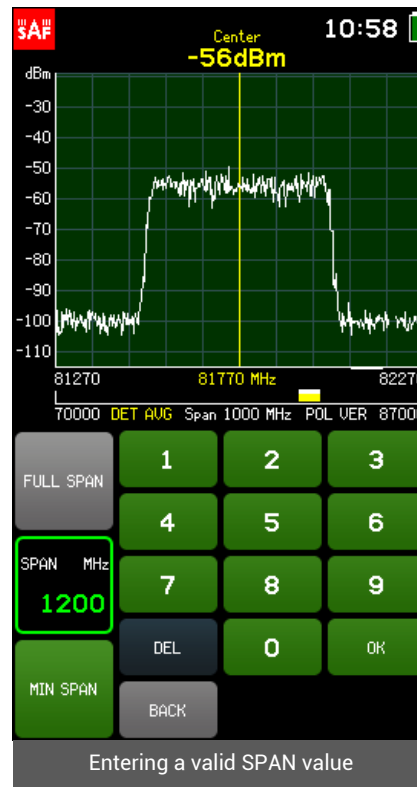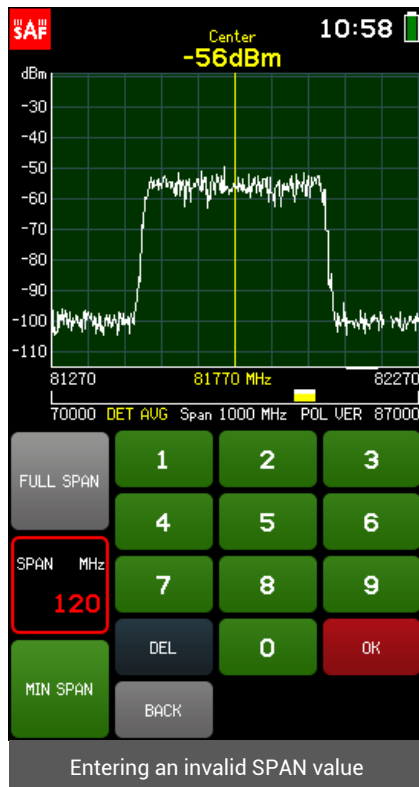

Entering a valid CENTER value
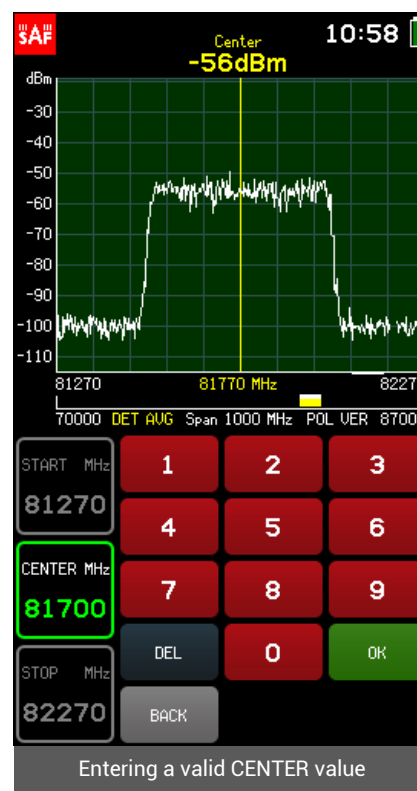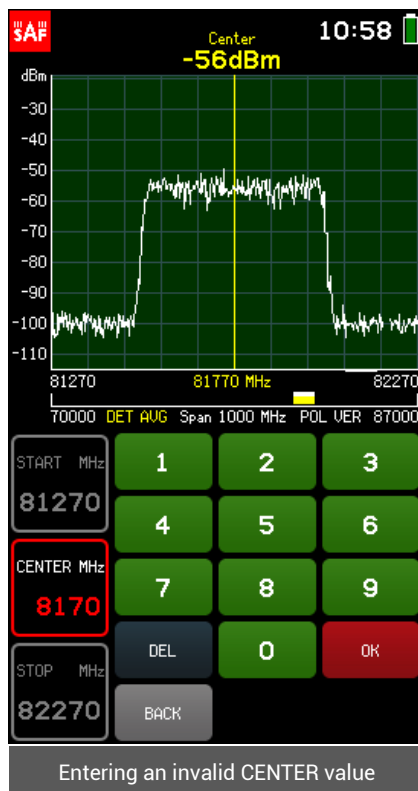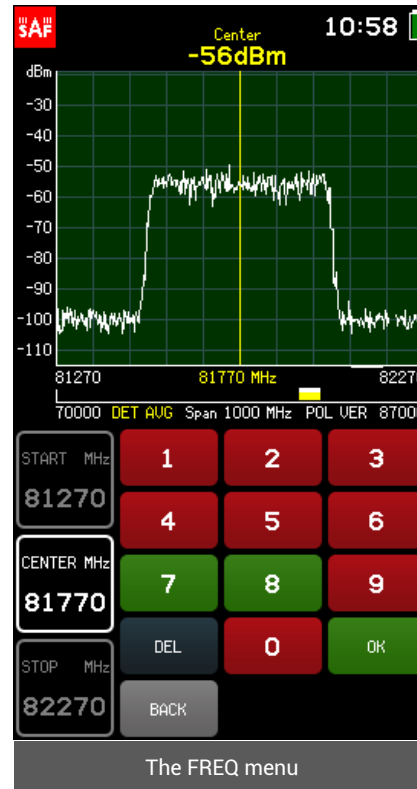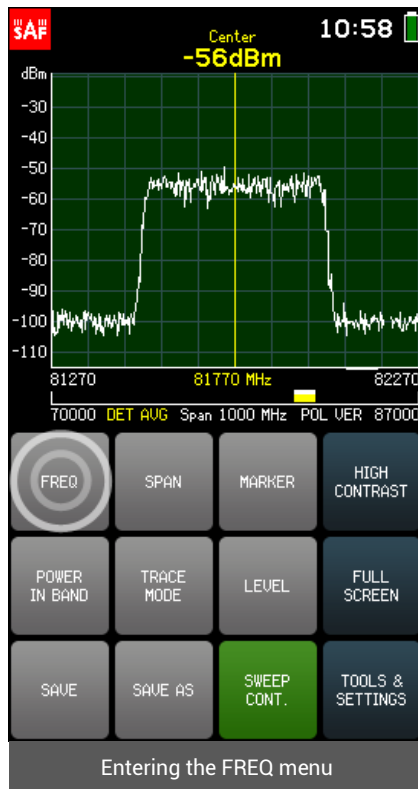
2.4 SPAN

The SPAN menu allows selecting the range of the horizontal axis (difference between START and STOP frequencies) i.e. span, in megahertz (MHz).

Modifying the SPAN preserves the CENTER frequency, if possible, but alters the START and STOP frequencies. Tapping the MIN SPAN or FULL SPAN button instantly sets the SPAN to the minimum (1000 MHz) or maximum (17000 MHz) value. If the minimum or maximum SPAN is already selected, the corresponding button will be green. FULL SPAN is enabled by default.

The current SPAN is displayed in white. The color of keypad buttons shows which numbers can be entered at the current digit position to obtain a valid parameter value – the numbers on the green buttons can be entered, the numbers on the red buttons cannot be entered. If the currently entered value is valid, it is displayed in green (also OK button is green). If the value is not valid, it is displayed in red (also OK button is red). To confirm a valid value, tap the OK button or tap the parameter.

To exit the SPAN menu and return to the main screen, tap BACK.

Entering the SPAN menu   The SPAN menu

11

Entering an invalid SPAN value   Entering a valid SPAN value

2.5 MARKER

The MARKER menu allows placing a marker which shows the input power level at a specified frequency.

Tapping the PEAK button turns on and off the automatic search for the highest input power level in the displayed frequency range, and places the MARKER there. Tapping the CENTER TO MARKER button changes the CENTER frequency to the current MARKER frequency (while preserving SPAN, if possible), i.e. centers the graph on the MARKER.

The current MARKER frequency is displayed in white. The color of the keypad buttons shows which numbers can be entered at the current digit position to obtain a valid parameter value – the numbers on the green buttons can be entered, the numbers on the red buttons cannot be entered. If the currently entered value is valid, it is displayed in green (also OK button is green). If the value is not valid, it is displayed in red (also OK button is red). To confirm a valid value, tap the OK button or tap the parameter.

> While in the MARKER menu, the marker can be moved by tapping on the left or right side of the graph. Tapping and holding will move the MARKER faster. MARKER can also be moved by dragging the MARKER line itself.

If the MARKER frequency is outside of the currently displayed frequency range, arrows on the graph will indicate beyond which side of the graph the MARKER is positioned. While in the MARKER menu, tap the graph anywhere once to automatically place the MARKER in the displayed frequency range.

When MARKER and SWEEP CONT. are enabled and Micro USB to 3.5 mm adapter with headphones is connected, an audio signal can be heard. The audio signal indicates the input power level at the MARKER frequency with beeps – more frequent beeping corresponds to higher detected input power level (and vice versa). The audio function can be tested TOOLS & SETTINGS → SERVICE MENU → SOUND CHECK.

⚠️ MARKER and POWER IN BAND cannot be activated both at the same time.

To exit the MARKER menu and return to the main screen, tap BACK. When MARKER is enabled, the MARKER button is green on the main screen. Tapping the MARKER button when it is active, disables the MARKER. MARKER is disabled by default.

Entering the MARKER menu

The MARKER menu

Entering an invalid MARKER value

Entering a valid MARKER value
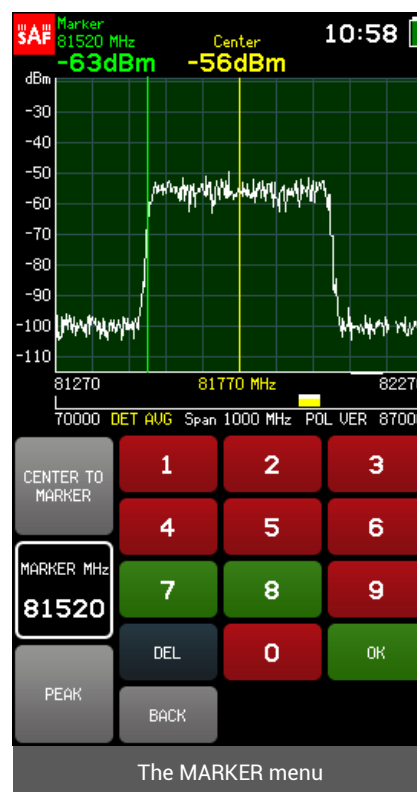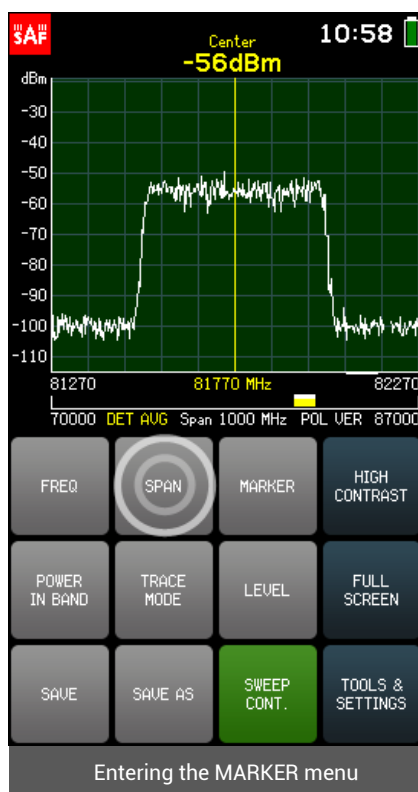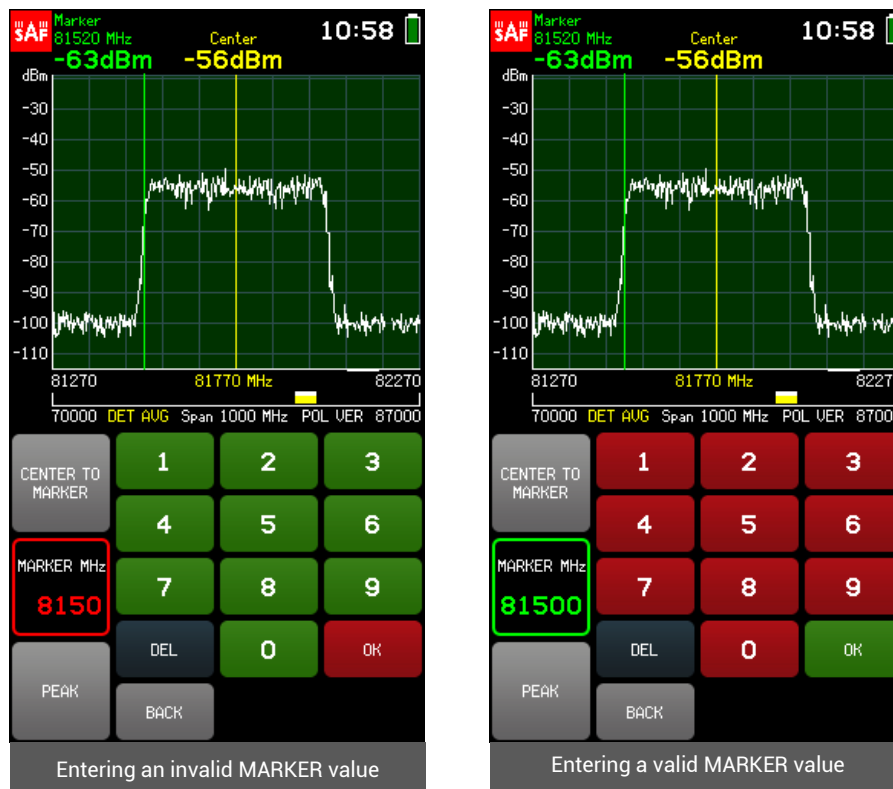
2.6 POWER IN BAND

The POWER IN BAND menu allows measuring the input power in a specified band width BW i.e. over a range of frequencies, with the center frequency CENTER.

Tapping the SET TO CENTER button, centers POWER IN BAND on the current CENTER frequency.

The currently selected parameter (BW/ CENTER) is displayed in white. The color of the keypad buttons shows which numbers can be entered at the current digit position to obtain a valid parameter value – the numbers on the green buttons can be entered, the numbers on the red buttons cannot be entered. If the currently entered value is valid, it is displayed in green (also OK button is green). If the value is not valid, it is displayed in red (also OK button is red). To confirm a valid value, tap the OK button or tap the selected parameter.

While in the POWER IN BAND menu, the POWER IN BAND area can be moved by tapping on the left or right side of the graph. Tapping and holding will move the POWER IN BAND area faster. POWER IN BAND area can also be moved by dragging the POWER IN BAND area itself.

   If the POWER IN BAND area is outside the currently displayed frequency range, arrows on the graph will indicate beyond which side of the graph POWER IN BAND is positioned. While in the POWER IN BAND menu, tap the graph anywhere once to instantly place the POWER IN BAND area in the displayed frequency range.

   When POWER IN BAND and SWEEP CONT. are enabled and Micro USB to 3.5 mm adapter with headphones is connected, an audio signal can be heard. The audio signal indicates the input power level at the POWER IN BAND area with beeps – more frequent beeping corresponds to higher detected input power (and vice versa). The audio function can be tested in TOOLS & SETTINGS → SERVICE MENU → SOUND CHECK.

MARKER and POWER IN BAND cannot be activated both at the same time.

   To exit the POWER IN BAND menu and return to the main screen, tap BACK. When POWER IN BAND is enabled, the POWER IN BAND button is green on the main screen. Tapping the POWER IN BAND button when it is active, disables the POWER IN BAND. POWER IN BAND is disabled by default.

Entering the POWER IN BAND menu	The POWER IN BAND menu

Entering an invalid CENTER value

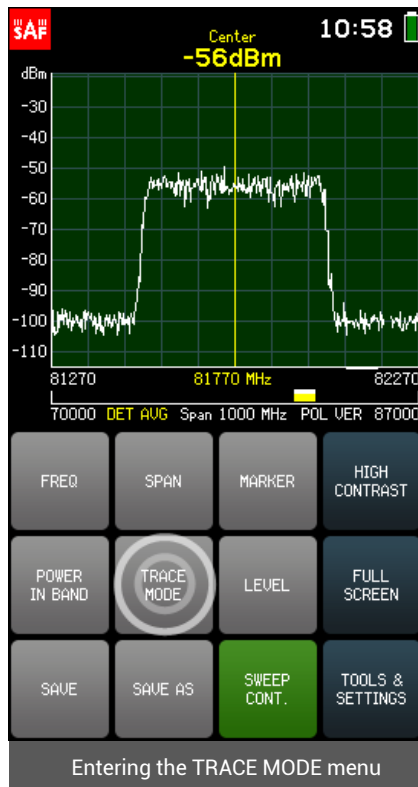
Entering a valid CENTER value
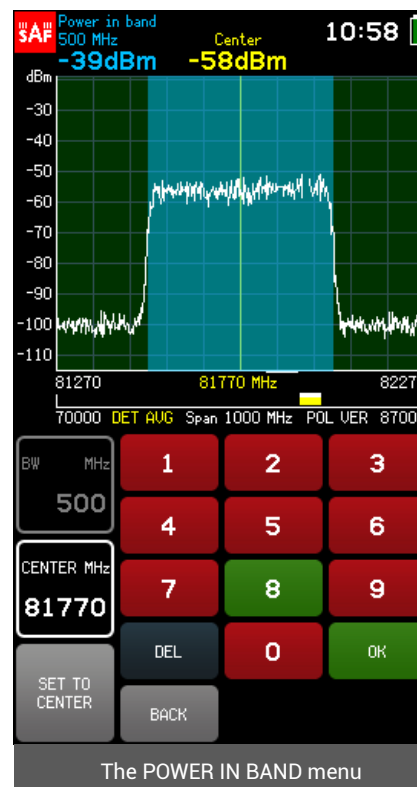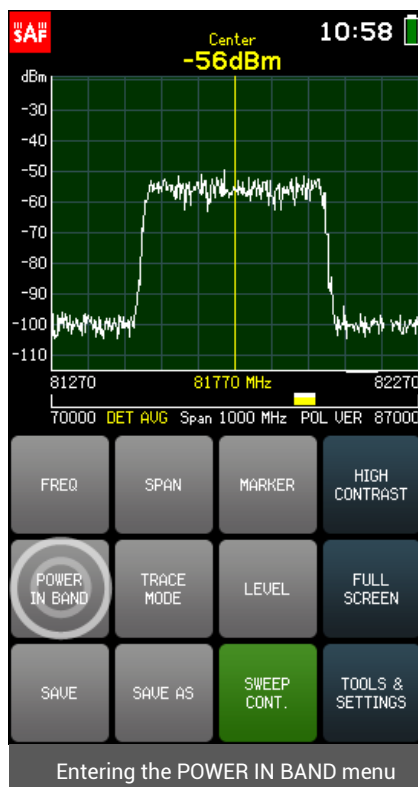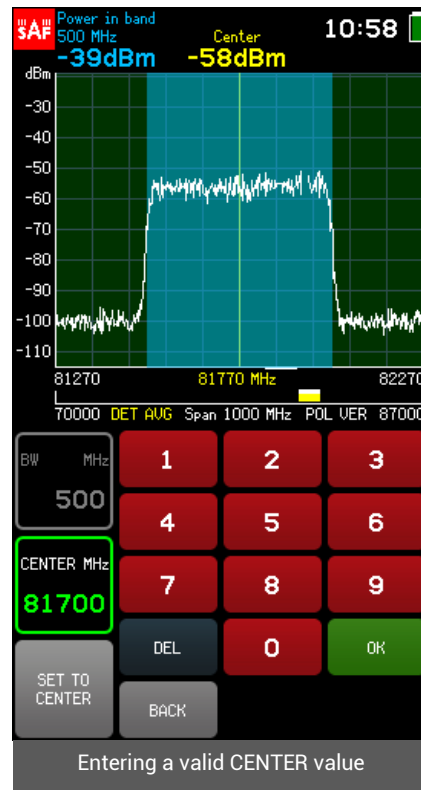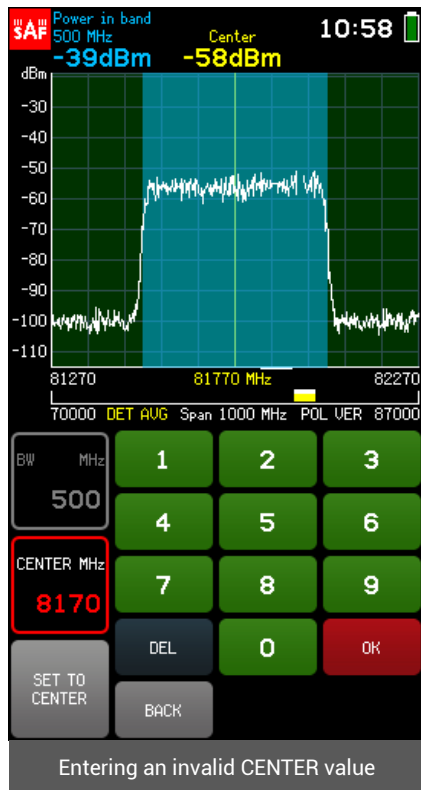
2.7 TRACE MODE

The TRACE MODE menu allows selecting the type of the displayed spectrum curve. The available trace modes are:

- *NORMAL*

   Normal trace mode (the default trace mode).

| Entering the TRACE MODE menu | The NORMAL (default) trace mode |
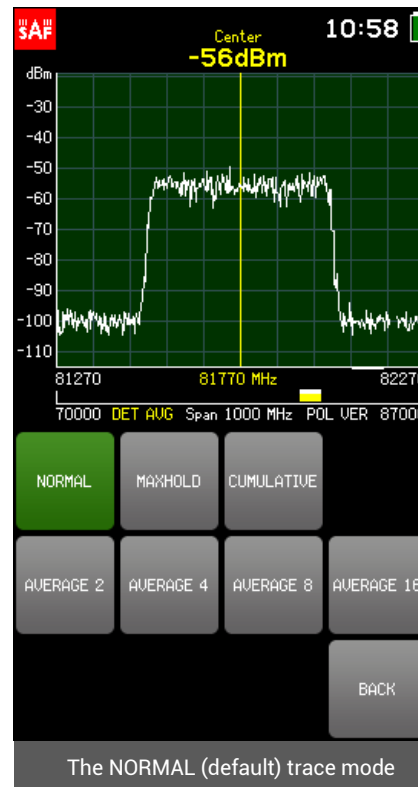
- *MAXHOLD*

    Shows in blue the highest power levels registered since the sweeping with this trace mode commenced, additional to a NORMAL (actual real-time) trace. The number in blue under the graph shows from how many sweeps the MAXHOLD trace has been plotted. When a spectrum curve is saved, only the blue MAXHOLD trace remains. If the POWER IN BAND is activated with MAXHOLD trace mode, the input power value will be shown for both of the traces – in white for NORMAL trace and in blue for MAXHOLD trace. Center and MARKER input power values are shown for the blue MAXHOLD trace.

    MAXHOLD trace mode can be used to detect intermittent signals or to measure the maximum power of fluctuating signals.

The MAXHOLD trace mode

The MAXHOLD trace mode with PiB
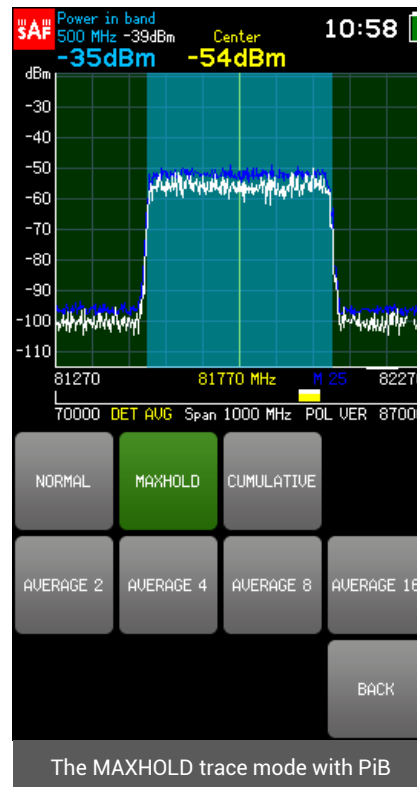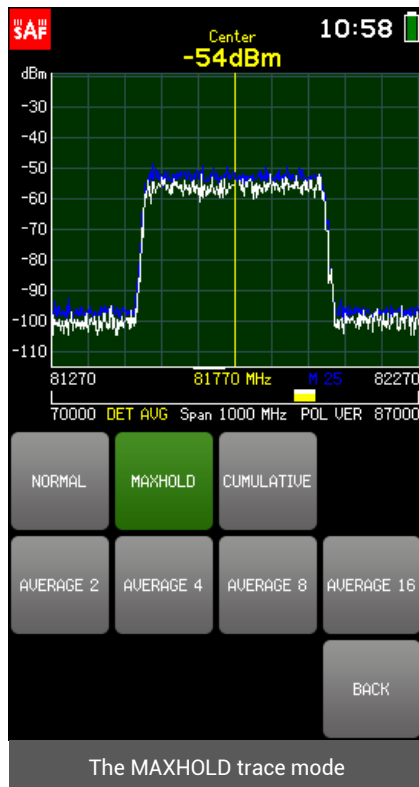
- *CUMULATIVE*

    Shows in green all detected input power levels in range since the sweeping with this trace mode commenced. The number in green under the graph shows from how many sweeps the CUMULATIVE trace has been plotted.

    ⚠ MARKER, POWER IN BAND and FULL SCREEN are not available for CUMULATIVE trace mode.

    📝 CUMULATIVE trace shows how the signal energy is divided within the spectrum.

- *AVERAGE 2/4/8/16*

    The displayed trace is an average over the last two, four, eight or sixteen sweeps. The number in cyan below the graph indicates over how many sweeps the trace is averaged.

    📝 AVERAGE trace mode is used to smooth out the noise effects.

The CUMULATIVE trace mode

The AVERAGE trace mode
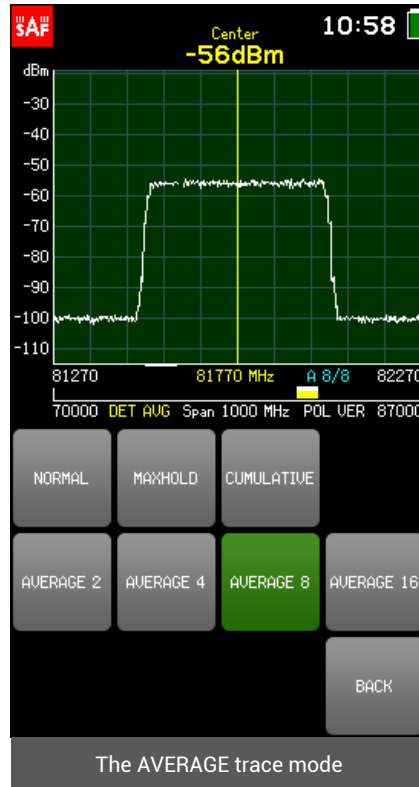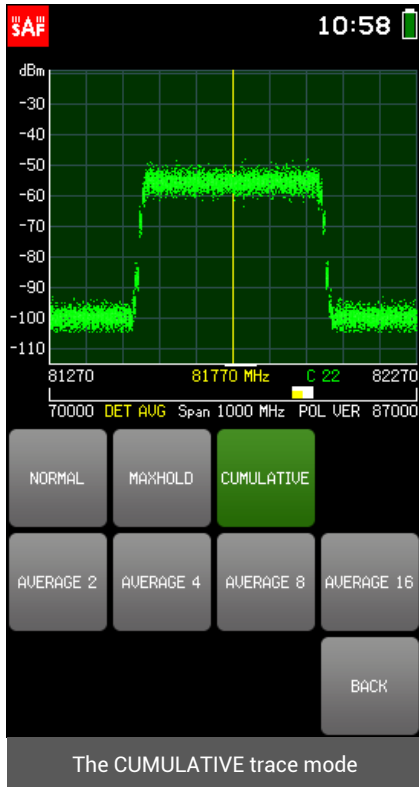
To exit the TRACE MODE menu and return to the main screen, tap BACK.

2.8 LEVEL

The LEVEL menu allows selecting the MAX (highest limit of the vertical axis) and MIN (lowest limit of the vertical axis) values of the displayed input power range in dBm, and an input power level OFFSET value (e.g. if an attenuator is being used) in decibels (dB).

The currently selected parameter (MAX/ MIN/ OFFSET) is displayed in white. To select a different parameter, tap on it once. The color of the keypad buttons shows which numbers can be entered at the current digit position to obtain a valid parameter value – the numbers on the green buttons can be entered, the numbers on the red buttons cannot be entered. If the currently entered value is valid, it is displayed in green (also OK button is green). If the value is not valid, it is displayed in red (also OK button is red). To confirm a valid value, tap the OK button or tap the selected parameter.

> While in the LEVEL menu, tapping the upper part of the graph decreases the displayed input power range (zooms in) and tapping the lower part of the graph increases the displayed input power range (zooms out). Sliding the graph up or down modifies the MAX and MIN values by equal amounts.

To exit the LEVEL menu and return to the main screen, tap BACK.

Entering the LEVEL menu

The LEVEL menu

Entering an invalid MAX value


Entering a valid MAX value
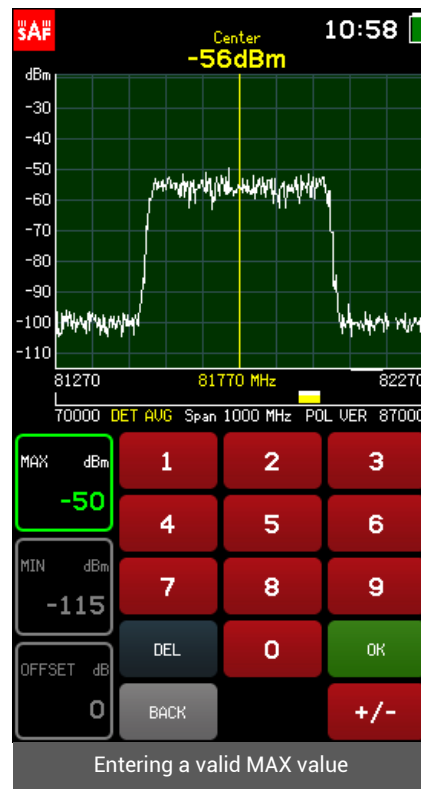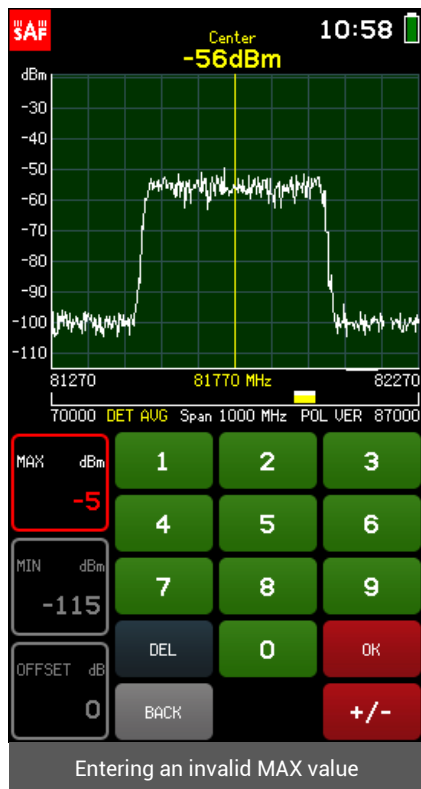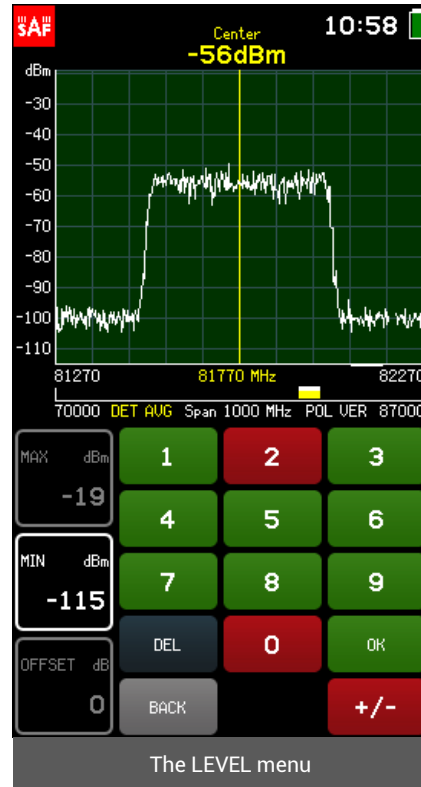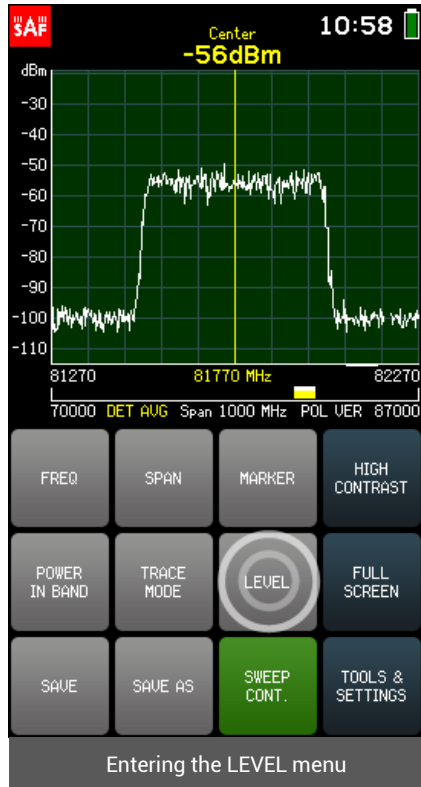
2.9 SAVE

Tapping the SAVE button instantly saves the spectrum curve with an automatically generated file name. The file name is formed as follows: the first letter indicates the trace mode used ("C" corresponds to NORMAL trace, "M" – to MAXHOLD trace, "W" – to CUMULATIVE trace and "A" to AVERAGE 2/4/8/16 traces), the remaining digits are the file order number.

After saving the spectrum curve, the assigned file name is displayed in the upper left corner of the graph. The saved spectrum curves can be reviewed in the TOOLS & SETTINGS → FILES.

⚠ SAVE button is not available if at least one full sweep has not been done.

Saving a spectrum curve stops an ongoing continuous sweeping. To resume the continuous sweeping, tap the SWEEP CONT. button.

| The SAVE button | An automatically assigned filename |
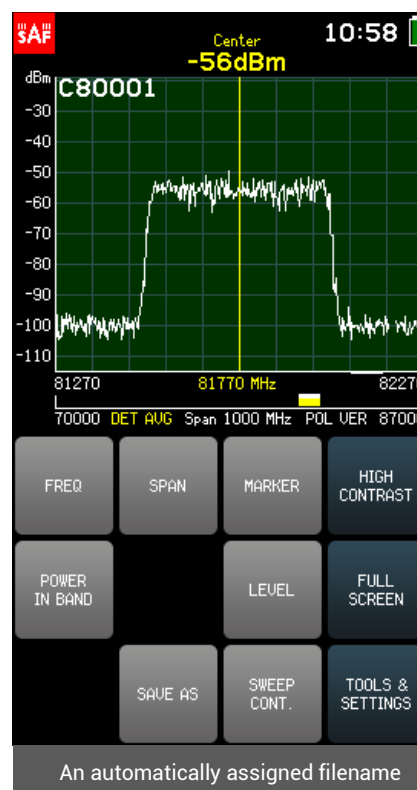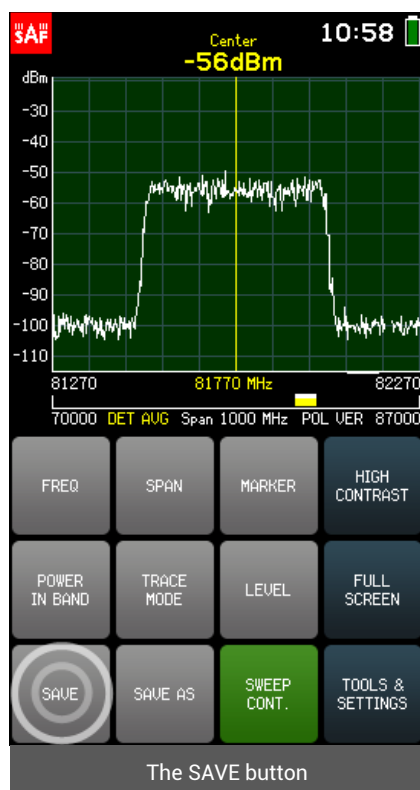
2.10 SAVE AS

The SAVE AS menu allows saving the spectrum curve (by tapping SPECTRUM CURVE) and the current Spectrum Compact configuration (by tapping NEW PROFILE) with a custom name.

The file name can be up to 8 characters long. The saved spectrum curves can be reviewed in the TOOLS & SETTINGS → FILES. The saved profiles can be reviewed and set in the TOOLS & SETTINGS → PROFILES.

SAVE AS button is not available if at least one full sweep has not been done.
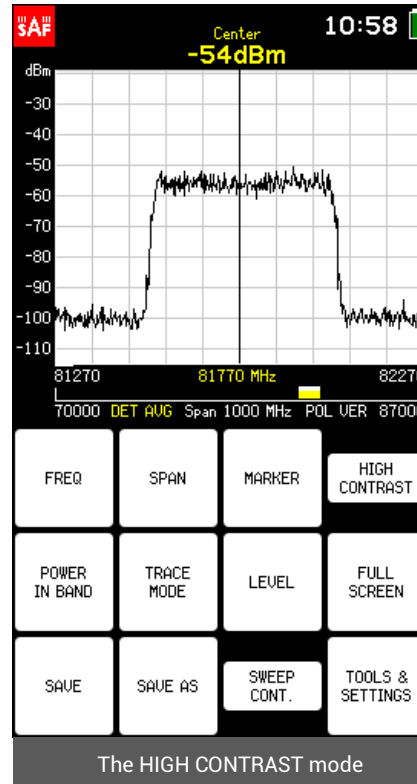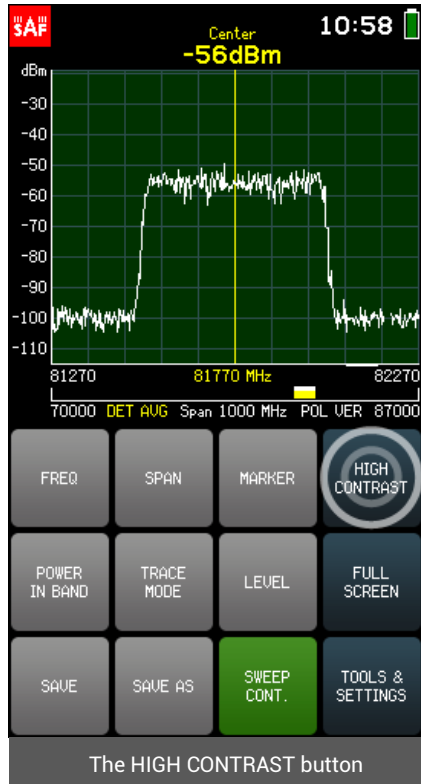
To exit the SAVE AS menu and return to the main screen, tap BACK.

Entering the SAVE AS menu

The SAVE AS menu

Entering a custom filename

A file with a custom filename
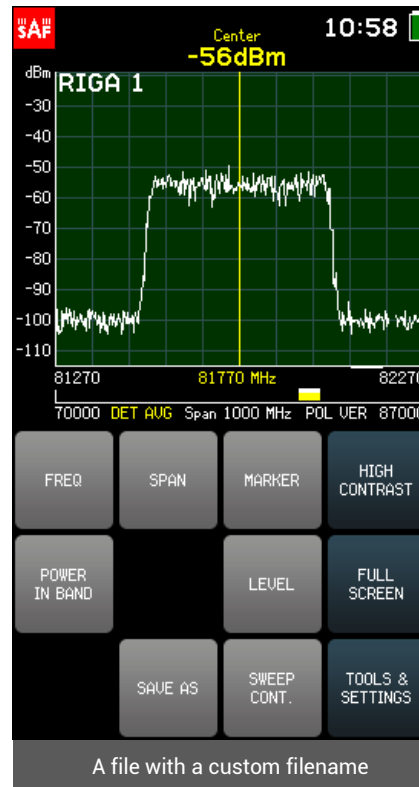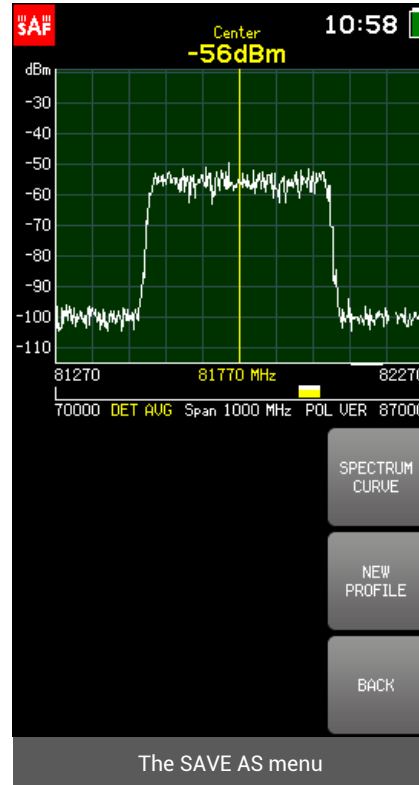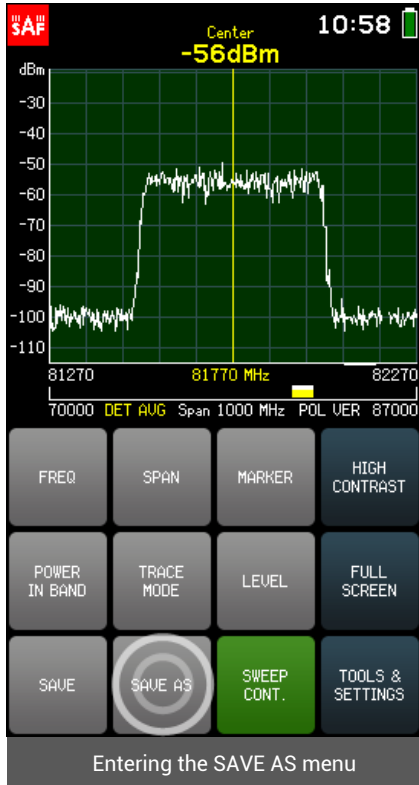
2.11 HIGH CONTRAST

Tapping the HIGH CONTRAST button swaps the interface color scheme and sets BRIGHTNESS to maximum. HIGH CONTRAST mode is designed to improve the visibility in direct sunlight. In HIGH CONTRAST mode the active buttons are indicated by a narrower shape.

To exit the HIGH CONTRAST mode, tap the HIGH CONTRAST button again.

The HIGH CONTRAST button

The HIGH CONTRAST mode

2.12 FULL SCREEN

Tapping the FULL SCREEN button expands the graph. In FULL SCREEN mode, there are only buttons SAVE, SAVE AS and SWEEP CONT. accessible. To exit the FULL SCREEN mode and return to the main screen, tap BACK.

The FULL SCREEN button

The FULL SCREEN mode

The FULL SCREEN mode (see AUTO ROTATE)
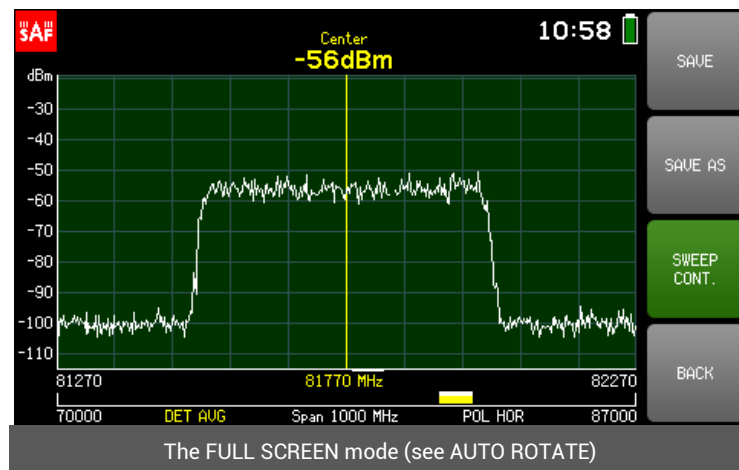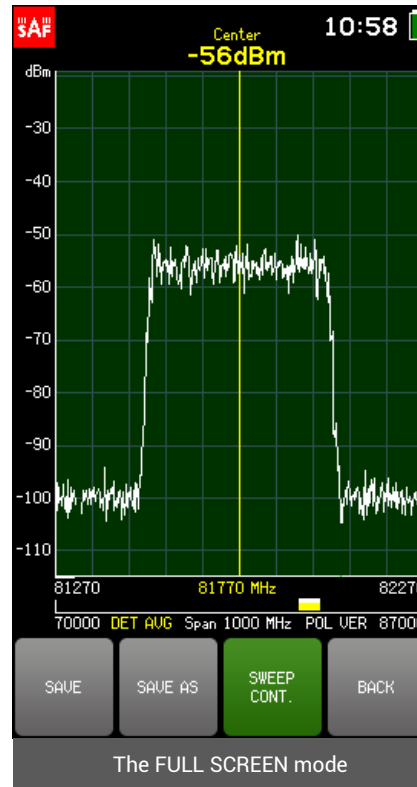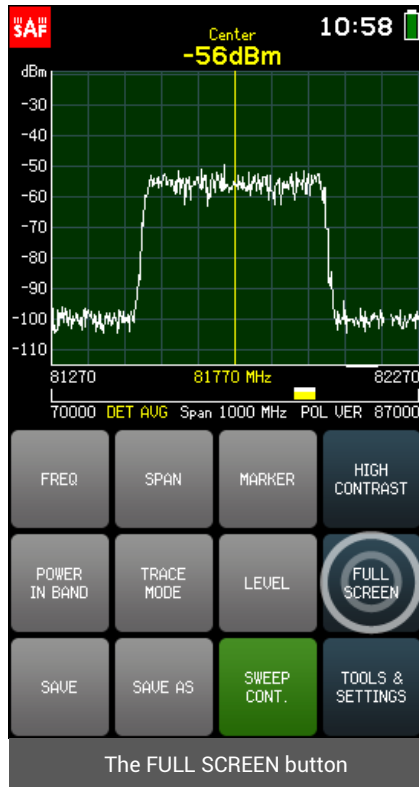
2.13 TOOLS

More advanced functions of the spectrum analyzer are accessible from the TOOLS menu. To access the TOOLS menu, tap the TOOLS & SETTINGS button. To exit the TOOLS menu and return to the main screen, tap BACK.

Entering the TOOLS menu   The TOOLS menu
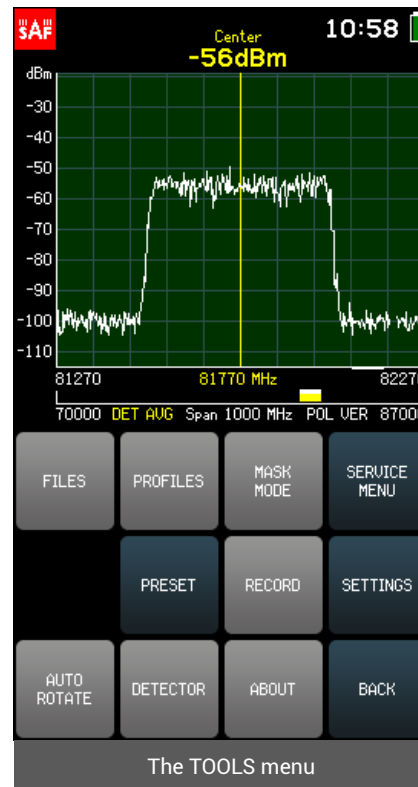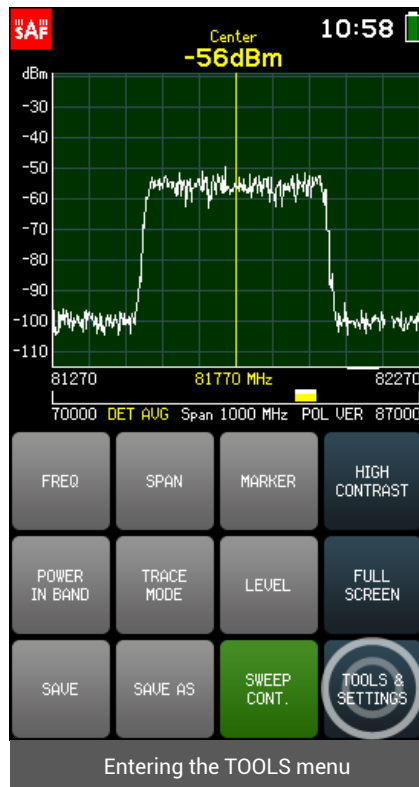
2.13.1 FILES

The FILES menu allows operation with previously saved spectrum curves.

Navigate the files using the arrows or the slider. Tap on the file to select it – the selected spectrum curve will be previewed. To get more options, tap OPEN. Main screen with the selected file is then displayed. From the main screen the input power range and frequency range can be modified (zooming in on the frequency axis could be done, if the file was saved with SPAN greater than 1000 MHz), and the MARKER or POWER IN BAND can be enabled or adjusted.

⚠️ SPAN, LEVEL, MARKER and POWER IN BAND menus are not available for spectrum curves saved with CUMULATIVE trace mode.

Files are sorted by time they were created – the latest file is displayed first.

To close the file and resume real-time sweeping, tap SWEEP CONT. To view a different file go to TOOLS & SETTINGS → FILES.

To exit the FILES menu and return to the TOOLS menu, tap BACK.

Entering the FILES menu

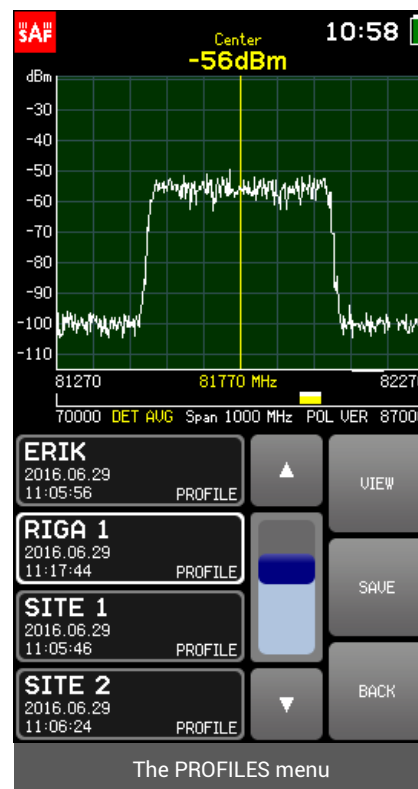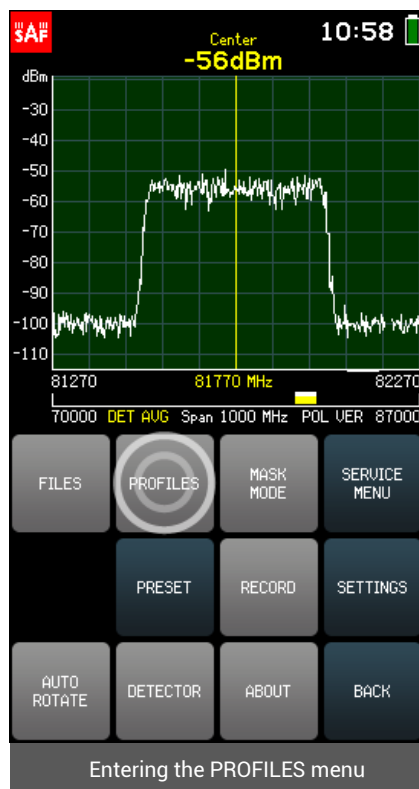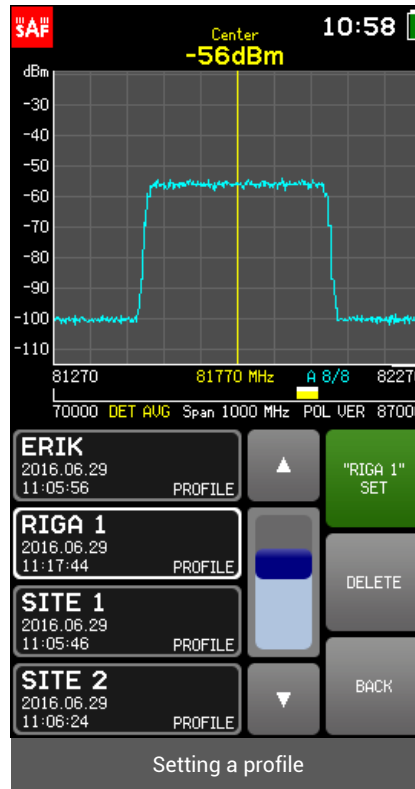The FILES menu

After opening a file
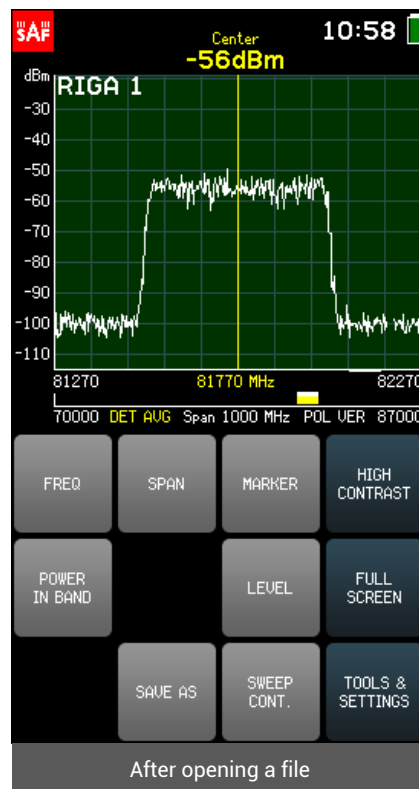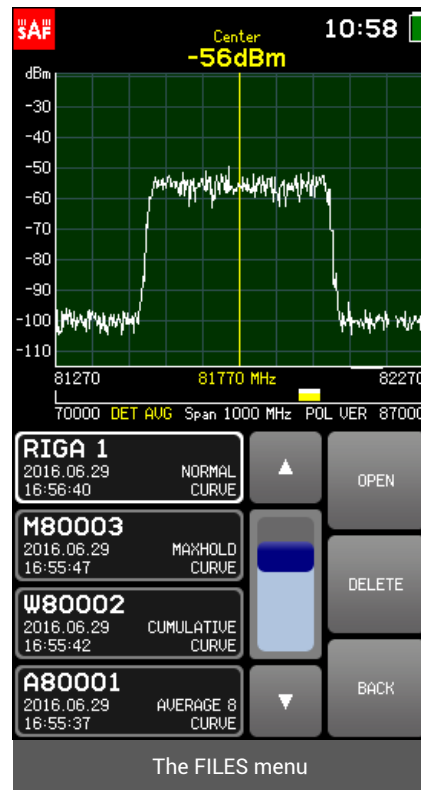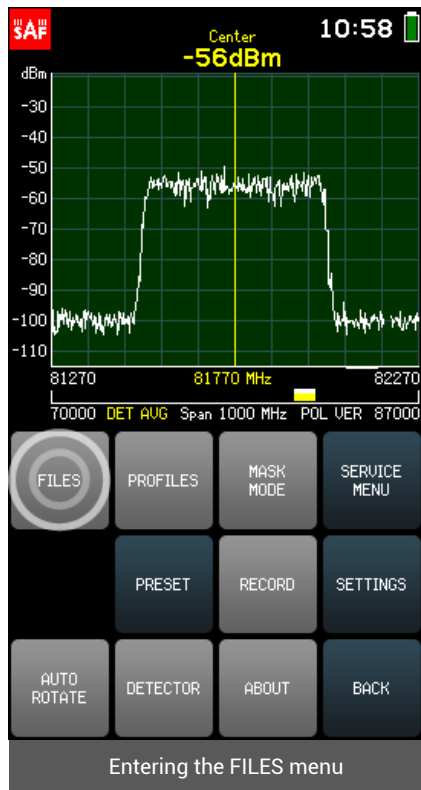
2.13.2 PROFILES

The PROFILES menu allows saving and restoring the Spectrum Compact configuration – the displayed frequency and input power range, MARKER or POWER IN BAND position, trace mode, detector, mask and settings (e.g. brightness).

To save the current configuration as a profile, tap SAVE. The profile name can be up to 8 characters long. To preview the saved profiles and restore a profile, tap the VIEW button. Navigate the profiles using the arrows or the slider. Tap on the profile to select it and then tap the SET button to restore it.

Profiles are sorted alphabetically.

To exit the VIEW submenu, tap BACK. To exit the PROFILES menu and return to the TOOLS menu, tap BACK.

Entering the PROFILES menu

The PROFILES menu

Saving a profile   Setting a profile

2.13.3 MASK MODE

The MASK MODE menu allows setting a file as a spectrum mask and thus visually comparing the current spectrum curve with a saved one.

To enter the file system, tap SELECT FILE. Navigate through the files using arrows or the slider, tap on the file to select it and then tap the SET AS MASK button. The mask curve is displayed in red. Tapping the RELATIVE MASK button turns on and off centering of the mask. If the RELATIVE MASK button is active (green), the mask is always centered on the CENTER frequency. If the RELATIVE MASK button is inactive, the spectrum curve used as mask is positioned in its actual frequency range (represented with a red bar in the supported frequency range under the graph). To adjust the mask vertically i.e. set a MASK OFFSET, tap the +10, -10, +1 or -1 buttons that moves the mask curve by 10 or 1 decibels upwards or downwards. To clear the MASK OFFSET, tap C. To exit the MASK MODE menu and return to the TOOLS menu tap BACK.

> MASK MODE can be used to check the cross-polar discrimination of an antenna.

To exit the SELECT FILE submenu, tap BACK. To exit the MASK MODE menu and return to the TOOLS menu tap BACK. When MASK MODE is activated, the MASK MODE button is green in the TOOLS menu. Tapping the MASK MODE button when it is active disables the MASK MODE. MASK MODE is disabled by default.

Entering the MASK MODE menu

The MASK MODE menu

The SELECT FILE submenu
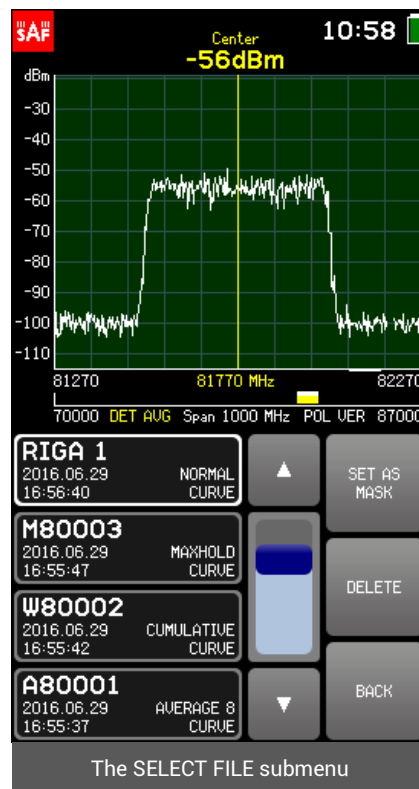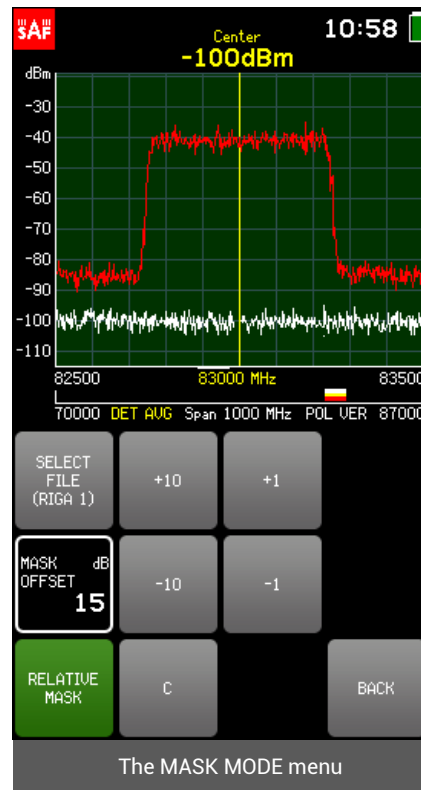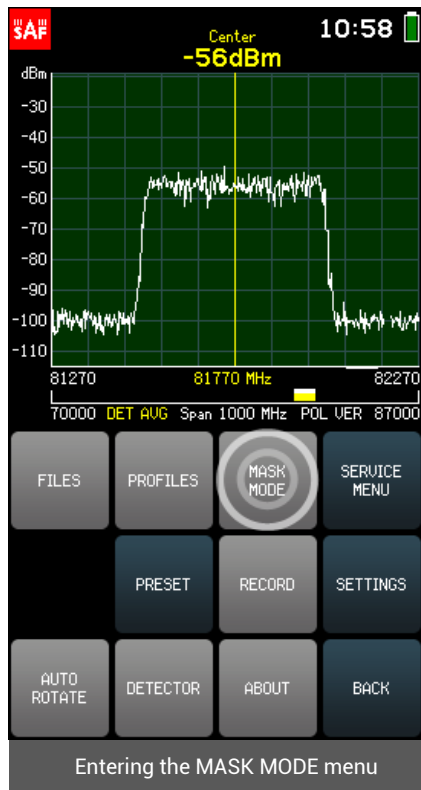
⚠ MASK MODE is not available for CUMULATIVE trace mode.

2.13.4 PRESET

The PRESET menu allows resetting the Spectrum Compact to the factory defaults. To confirm the action tap the PRESET button once more. Afterwards turn off and on the Spectrum Compact.

To exit the PRESET menu and return to the TOOLS menu tap BACK.

⚠ PRESET will not format the internal storage disk of the Spectrum Compact.

Entering the PRESET menu

The PRESET menu
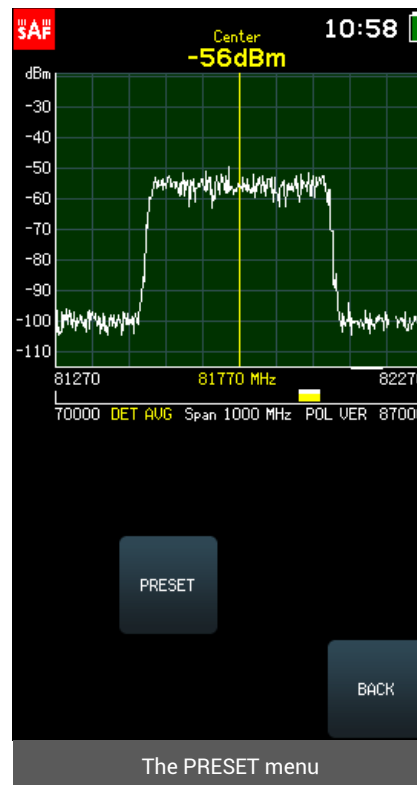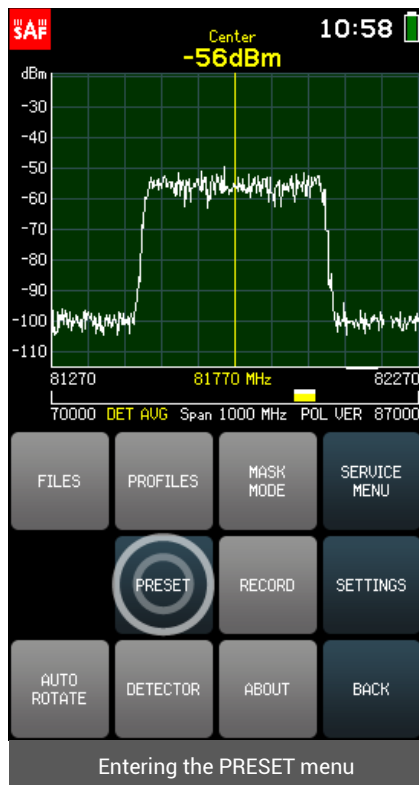
2.13.5 RECORD

The RECORD menu allows creating a record. To start a new record, tap NEW RECORD. The name for all records is given automatically but it can be changed afterwards (RECORD→OPEN→ RENAME RECORD). The maximum length of a record is 30 minutes. If the recording is not manually stopped, either by tapping the NEW RECORD button again or by tapping the OPEN or BACK buttons, a new record will automatically be started after 30 minutes.

> Spectrum Compact can be left at a site with NEW RECORD button active and the created records examined later. Provided with a DC charging, Spectrum Compact can record files continuously.

> NEW RECORD is not available for CUMULATIVE trace mode.

Entering the RECORD menu
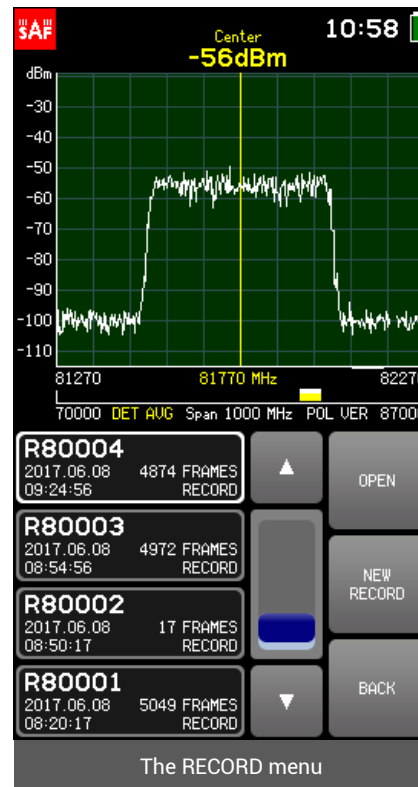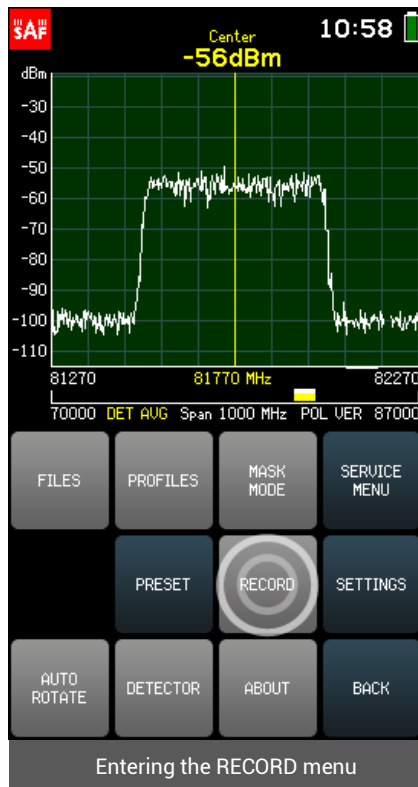
The RECORD menu

Navigate the records list using the slider and the arrows. The time the record was started and the number of frames is given. To view a record, tap on it to select it, then tap OPEN. The playback is started from the selected frame by tapping PLAY. A specific frame can be selected with the slider and the arrows.

The PLAY submenu

The SHOW MAX LEVELS feature
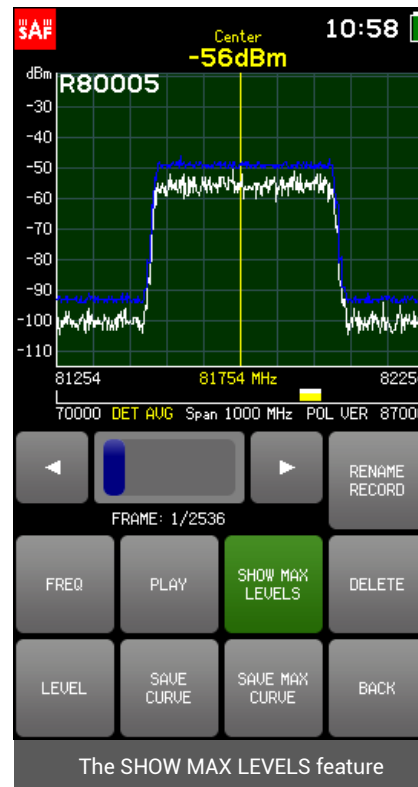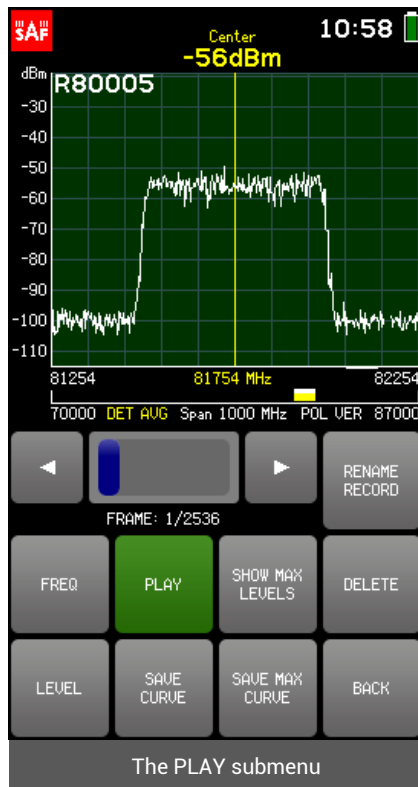
The displayed frequency and level range of the record can be selected with buttons FREQ and LEVEL. The spectrum curve in the currently displayed frame can be saved as a separate file with button SAVE CURVE. Feature SHOW MAX LEVELS allows to see the highest detected input power levels during the entire record. If consecutive records were created automatically, the maximum levels are shown for all the previous records in the session. This trace can be saved as a spectrum curve with button SAVE MAX CURVE.

To exit the OPEN submenu, tap BACK. To exit the RECORD menu and return to the TOOLS menu tap BACK.

2.13.6 AUTO ROTATE

Tapping the AUTO ROTATE button turns on and off the automatic rotation of the screen, if the device is turned by 90 or 180 degrees. Disabling the AUTO ROTATE locks the screen position. When the AUTO ROTATE is enabled, the button is green. AUTO ROTATE is enabled by default.

> AUTO ROTATE is useful when turning the Spectrum Compact sideways to check different polarization.

The AUTO ROTATE button

Horizontal version of the main screen
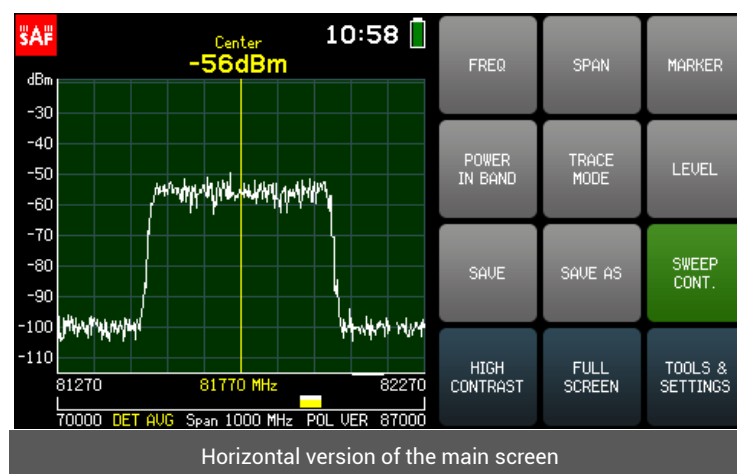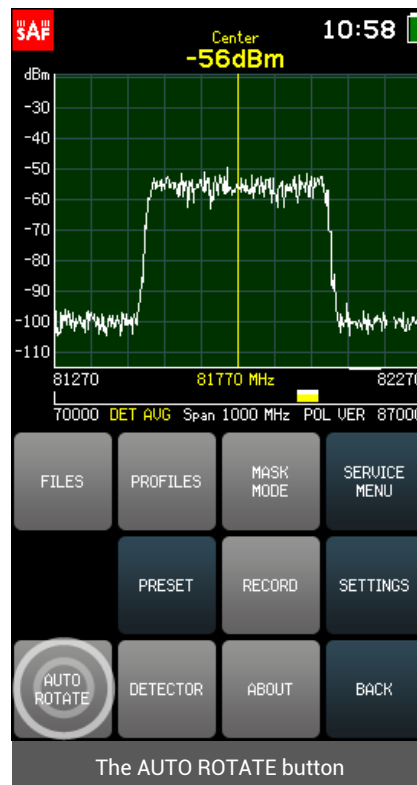
2.13.7 DETECTOR

The DETECTOR menu allows determining which of the detected input power levels are displayed on the screen, since the Spectrum Compact does several measurements of the same frequency range during each sweep.

The available detectors are:

- *AVG*

    Displays the averaged value over the values detected (the default detector).

- *MAX*

    Displays the highest detected input power level values.

- *MIN*

    Displays the lowest detected input power level values.

⚠ The noise floor differs for each of the detectors.

The currently used detector is indicated in yellow under the graph on the left side. To exit the DETECTOR menu and return to the TOOLS menu tap BACK.

| Entering the DETECTOR menu | The AVG detector |

The MAX detector

The MIN detector
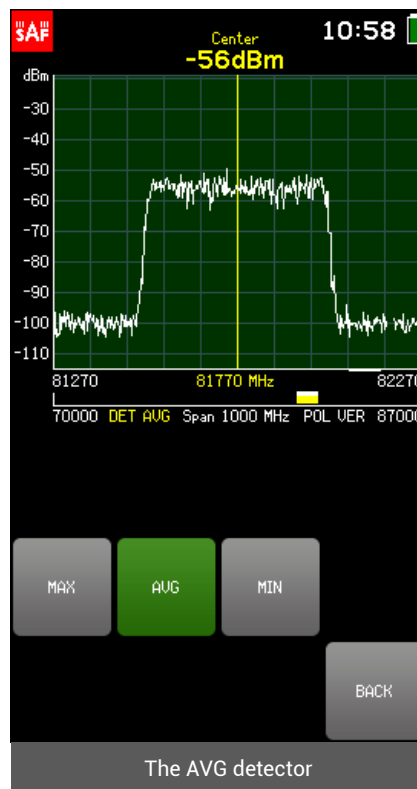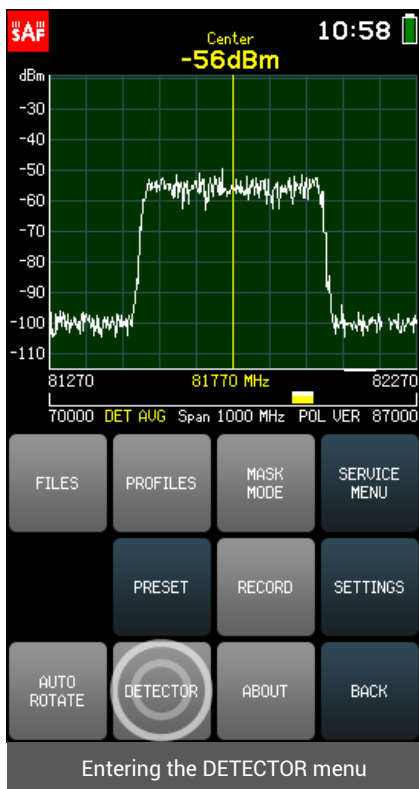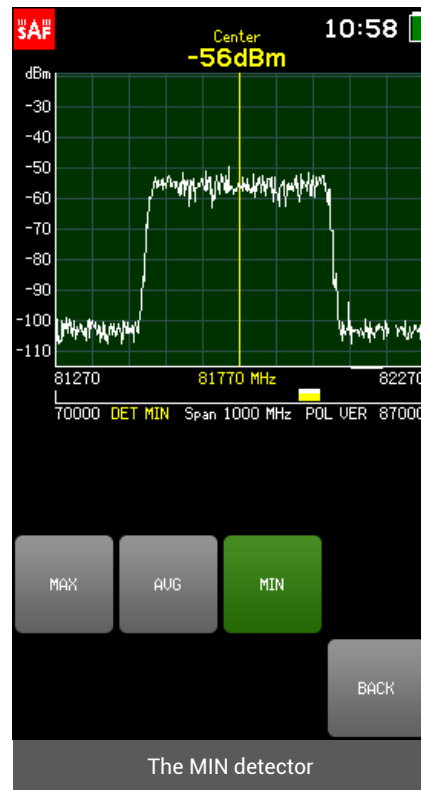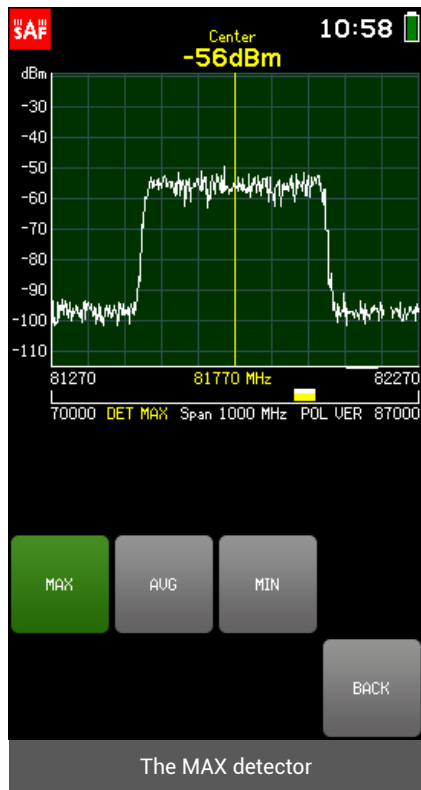
2.13.8 ABOUT

The ABOUT menu contains information about the Spectrum Compact device: supported frequency range, product number, serial number, hardware version, firmware version and the time when the firmware was created. To exit the ABOUT menu and return to the TOOLS menu, tap BACK.

Entering the ABOUT menu

The ABOUT menu
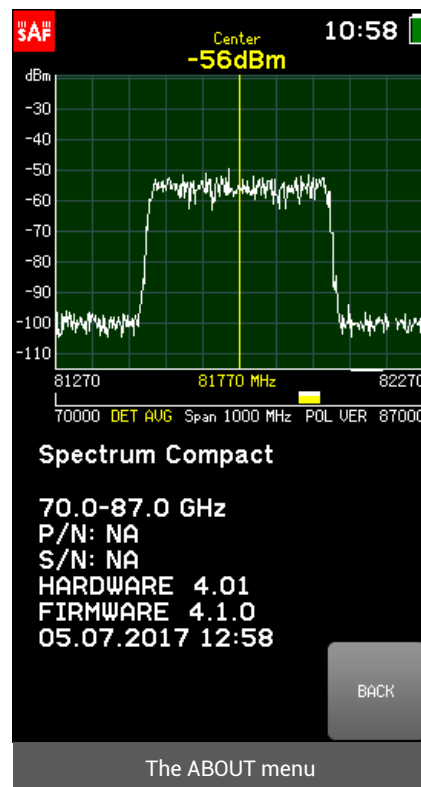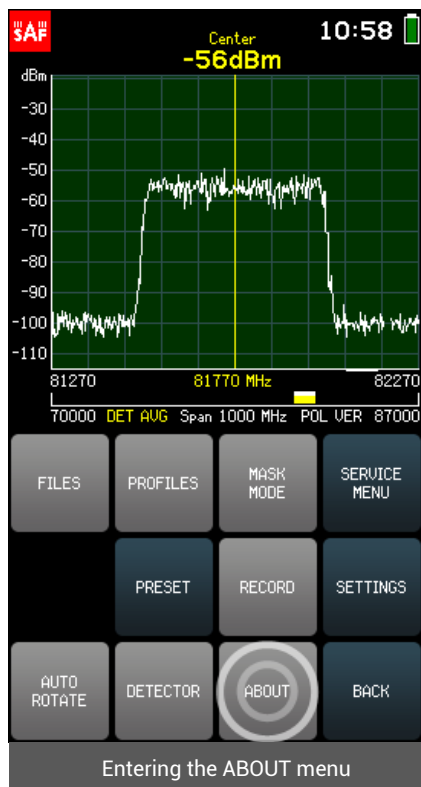
2.13.9 SERVICE MENU

The submenu SOUND CHECK allows testing the audio function (see MARKER and POWER IN BAND). The audio signal indicates the input power level at the MARKER frequency/ POWER IN BAND area with beeps – more frequent beeping corresponds to higher detected input power level (and vice versa).

The micro-USB to 3.5 mm adapter with headphones should be connected. SOUND CHECK submenu then transmits the audio signal that corresponds to different input power levels. Tapping the + button or moving the slider up, increases the simulated input power level, tapping the - button or moving the slider down, decreases the power level. The currently simulated power level is indicated between the + and - buttons. The beeping frequency as a function of input power level is given in the following chart:

Beeping frequency as a function of input power level (default reference)
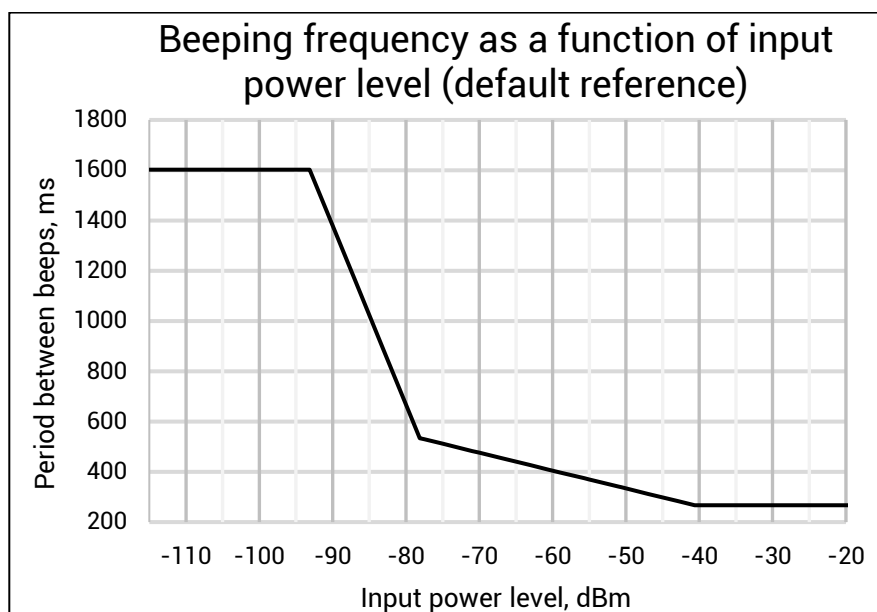
SET REFERENCE button can be used to improve the operation of audio function. The chart above shows the default case. To properly set the reference level, first, select the Spectrum Compact settings - frequency, trace mode, MARKER or POWER IN BAND and the detector (see: DETECTOR) - as they will be during the adjustment. Then go to the SOUND CHECK menu and tap SET REFERENCE.

SET REFERENCE button defines the ground floor for the adjustment i.e. the lowest level that is set to be improved (basically, it is the noise floor).

To exit the SOUND CHECK submenu, tap BACK.

Entering the SERVICE menu

Entering the SOUND CHECK submenu

The SOUND CHECK submenu
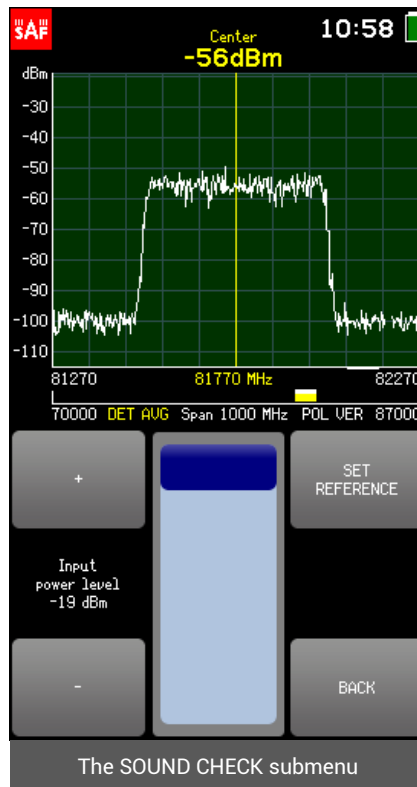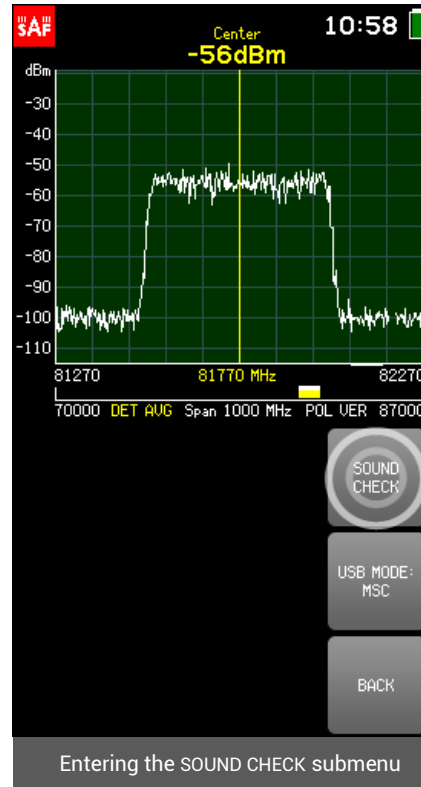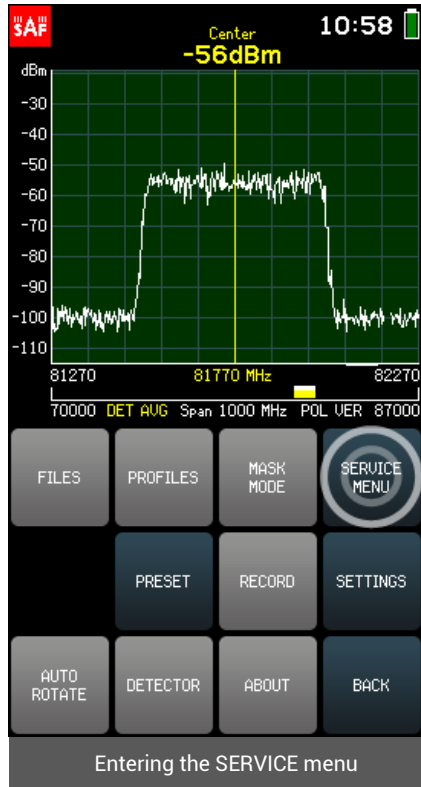
The submenu USB MODE allows setting the Spectrum Compact to either Mass Storage Device (MSD) mode or to Virtual COM Port (VCP) mode. The USB MODE determines how the Spectrum Compact behaves when connected to a computer. The MSD mode allows obtaining files saved on the Spectrum Compact. The VCP mode allows opening a serial connection. The Spectrum Compact is in MSD mode by default and it is recommended to keep it in this mode for file access.

> ⚠ When Spectrum Compact is connected to a computer in MSD mode, it is not possible to save or delete spectrum curves, records and profiles, or to take screenshots.

> ⚠ Before changing the USB mode from MSD to VCP, please stop any ongoing file transfer to or from Spectrum Compact and close files opened directly from Spectrum Compact's drive.

To exit the USB MODE submenu, tap BACK. To exit the SERVICE MENU and return to the TOOLS menu tap BACK.

Entering the USB MODE submenu


The USB MODE submenu
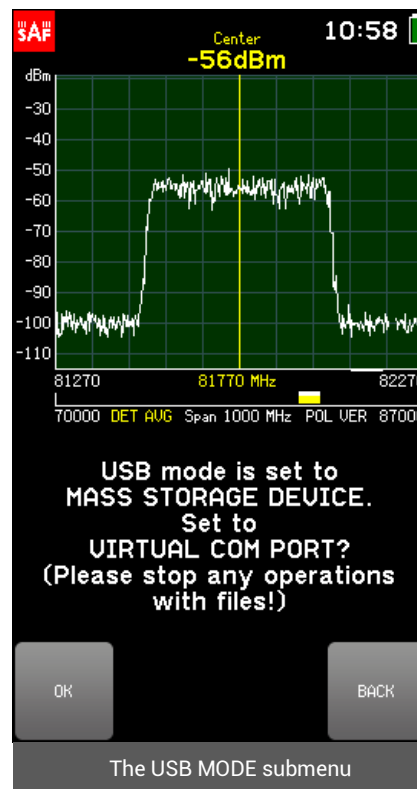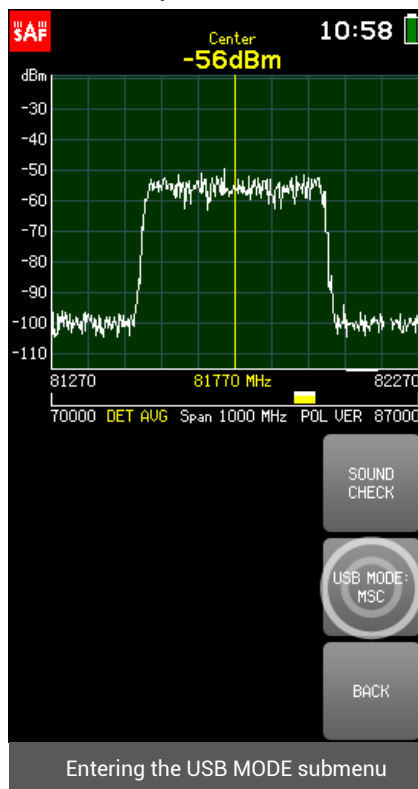
2.14 SETTINGS

The spectrum analyzer settings are accessible from the SETTINGS menu. To access the SETTING menu, from the main screen go to TOOLS & SETTINGS → SETTINGS. To exit the SETTINGS menu and return to the TOOLS menu, tap BACK. To return to the main screen, tap MAIN MENU.

Entering the SETTINGS menu

The SETTINGS menu
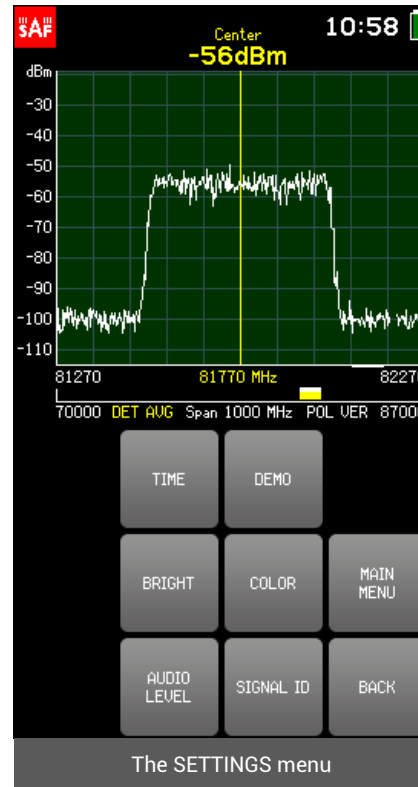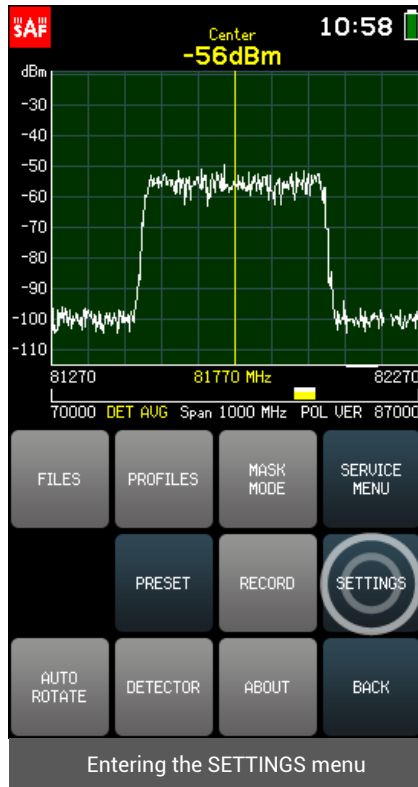
2.14.1 BRIGHT

The BRIGHT menu allows setting the background brightness of the screen. Tapping the + button or moving the slider up, increases the brightness, tapping the - button or moving the slider down, decreases the brightness. To exit the BRIGHT menu and return to the SETTINGS menu, tap BACK.

Entering the BRIGHT menu

The BRIGHT menu
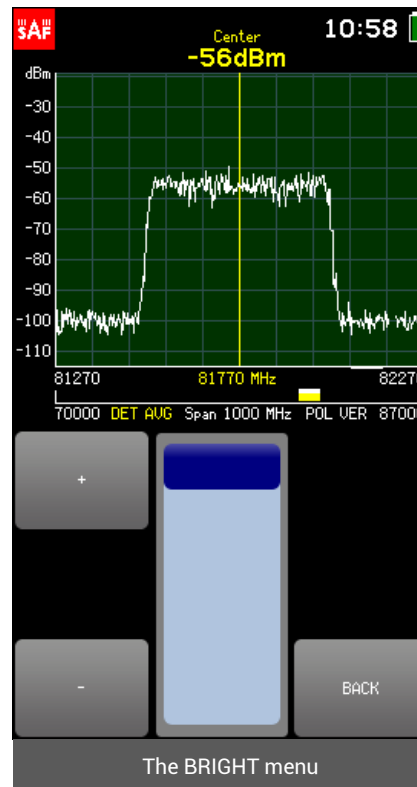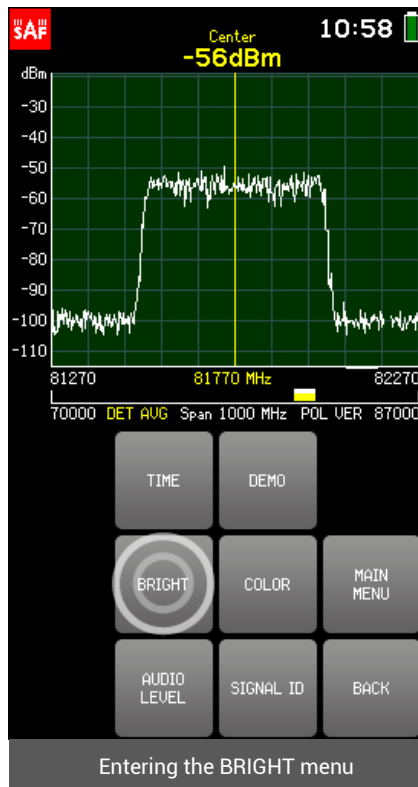
2.14.2 TIME

The TIME menu allows setting the time/date format of the Spectrum Compact.

The currently selected parameter (YEAR/ MONTH/ DATE/ HOUR/ MIN) is displayed in white. To select a different parameter, tap on it once. The color of the keypad buttons shows which numbers can be entered at the current digit position to obtain a valid value – the numbers on the green buttons can be entered, the numbers on the red buttons cannot be entered. If the currently entered value is valid, it is displayed in green (also OK button is green). If the value is not valid, it is displayed in red (also OK button is red). To confirm a valid value, tap the OK button or tap the selected parameter.

To exit the TIME menu and return to the SETTINGS menu, tap BACK.

Entering the TIME menu

The TIME menu
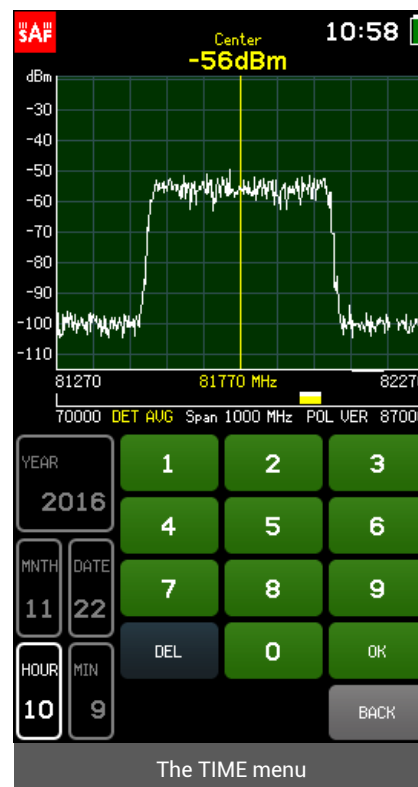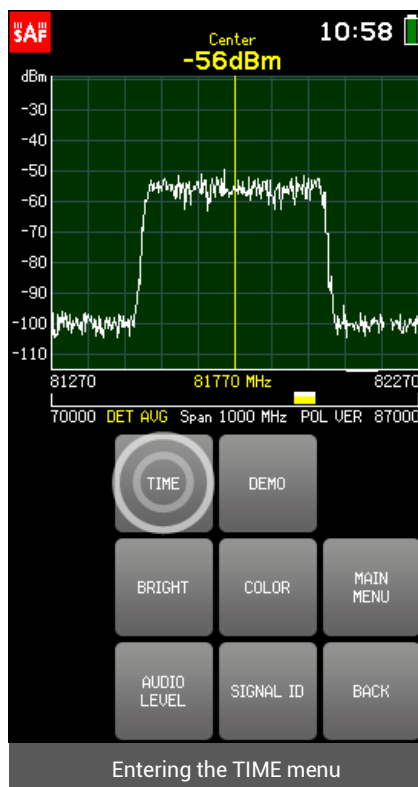
2.14.3 DEMO

The DEMO menu allows turning on a set of simulated signal patterns, DEMO is used to test Spectrum Compact functionality without an actual input signal.

To turn on the DEMO, tap ON. The available demo signals are:

1. Adjacent channel interference
2. 500 MHz channel
3. 60 MHz channel
4. Damaged TX
5. Multipath
6. Co-channel interference
7. Out of band interference
8. In band interference

To exit the DEMO menu and return to the SETTINGS menu, tap BACK. When DEMO is enabled, the DEMO button is green in the SETTINGS menu and an indication "DEMO ON" is shown under the graph on the right side. Tapping the DEMO button when it is active disables the DEMO. DEMO is disabled by default.

Entering the DEMO menu

The DEMO menu
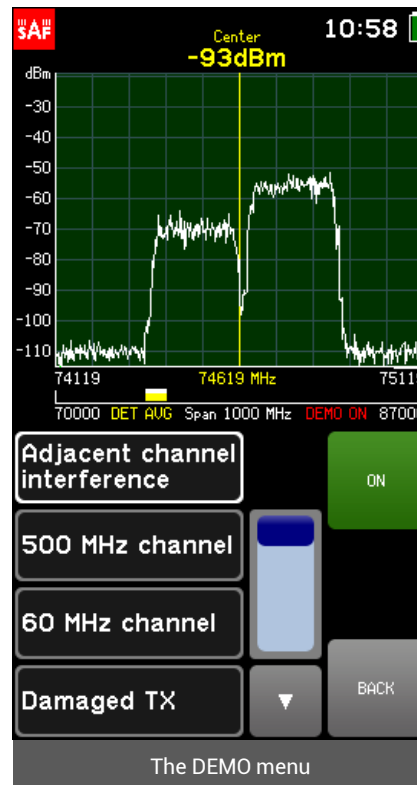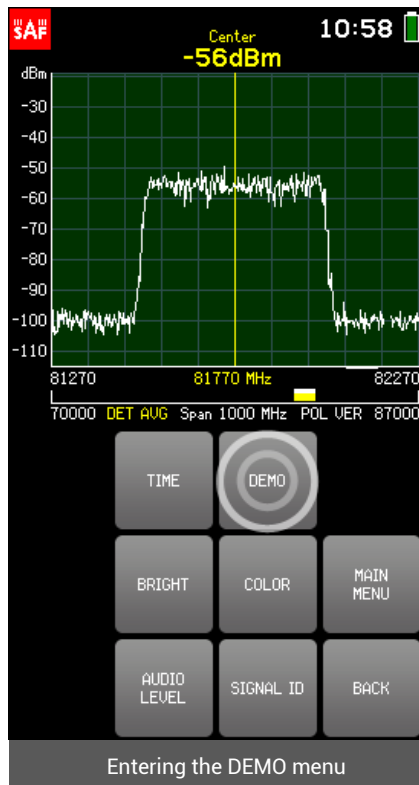
2.14.4 COLOR

The COLOR menu allows setting a custom color scheme for the graph. Tap the button GROUND, GRID or LINE to set the color for the background, the grid or the spectrum curve (NORMAL and AVERAGE traces), respectively. The color is defined by moving the sliders for red (R), green (G) and blue (B) channels. To restore the default color scheme, tap DEFAULT. To exit the COLOR menu and return to the SETTINGS menu, tap BACK.

Entering the COLOR menu

The COLOR menu
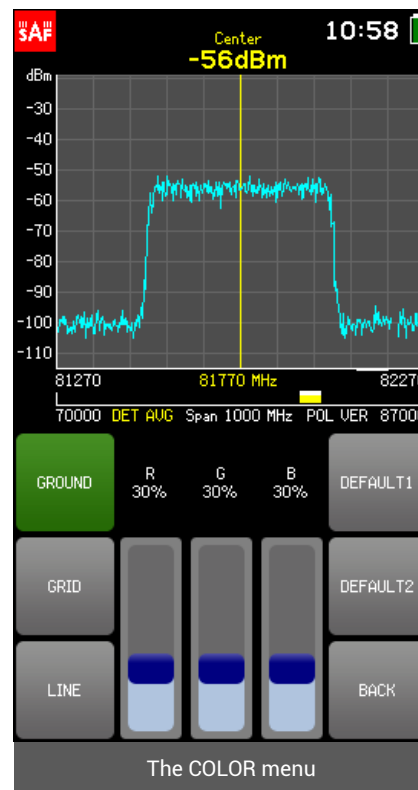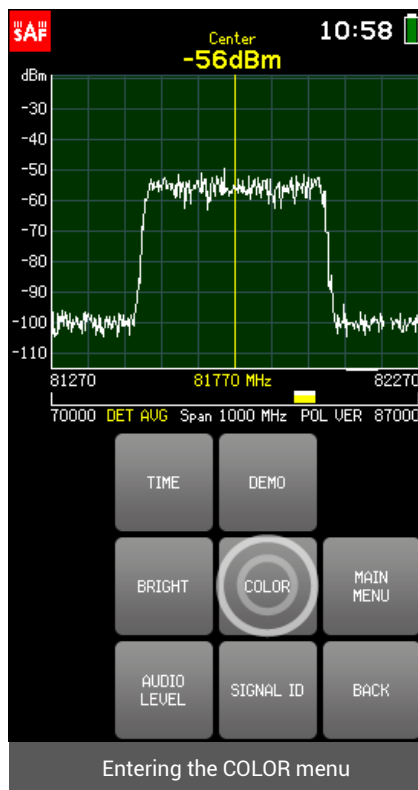
2.14.5 AUDIO LEVEL

The AUDIO LEVEL menu allows setting the volume of the audio output. Audio indication can be heard, if SWEEP CONT. is enabled together with either the MARKER or the POWER IN BAND, and the micro-USB to 3.5 mm adapter with headphones is connected. Tapping the + button or moving the slider up increases the volume, tapping the - button or moving the slider down decreases the volume. To exit the AUDIO LEVEL menu and return to the SETTINGS menu, tap BACK.

Entering the AUDIO LEVEL menu

The AUDIO LEVEL menu
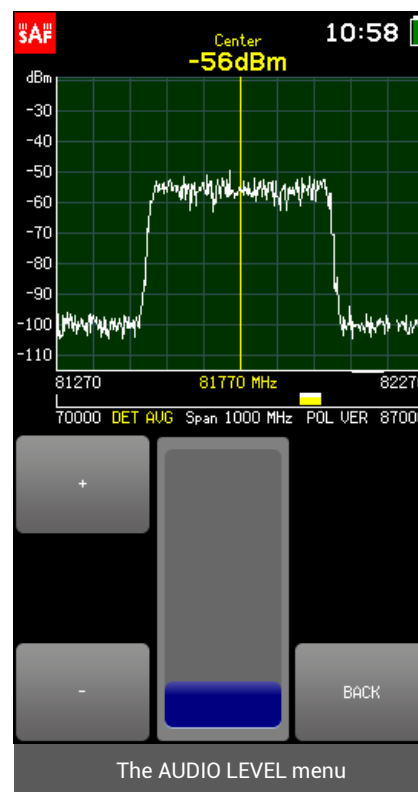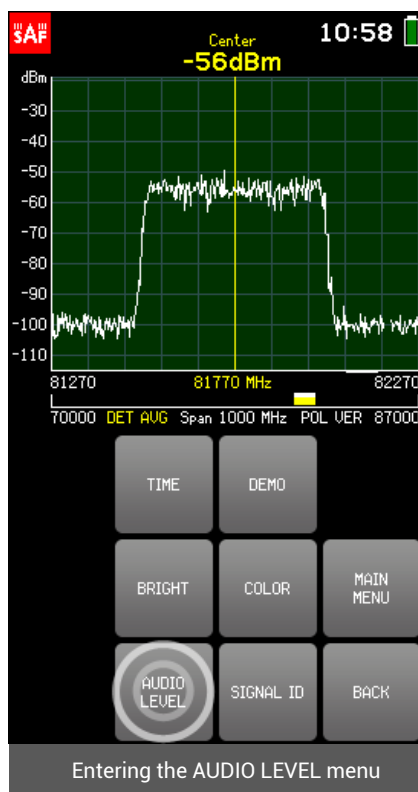
2.14.6 SIGNAL ID

Tapping the SIGNAL ID button turns on and off a filter algorithm that reduces the power levels of the harmonic signals (to up to -90 dBm). These artificial signals may become visible on screen, if the input power is high and the span is comparatively large.

Enabling the SIGNAL ID slows down the sweeping. To observe the operation of SIGNAL ID, enable and disable it repeatedly and compare the displayed power levels.

When SIGNAL ID is enabled, the SIGNAL ID button is green in the SETTINGS menu and an indication "ID MODE" is shown under the graph on the left side. SIGNAL ID is disabled by default.

⚠ The SIGNAL ID option is not available when viewing saved spectrum curves.

The SIGNAL ID submenu
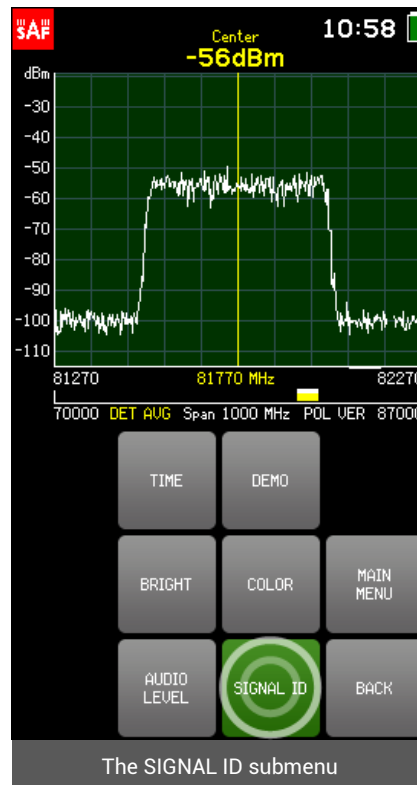
2.15 Firmware upgrade

1. Turn Spectrum Compact on.
2. From the main screen tap TOOLS & SETTINGS, then tap the PRESET button. Confirm by tapping once more.
3. Turn Spectrum Compact off and back on.
4. Connect the Spectrum Compact to a PC using a micro USB cable.
5. Copy both – the firmware (with extension ".fw") and the initialization (with extension ".ini") files.
6. Open the Spectrum Compact drive and paste the two files into the FIRMWARE folder.
7. Turn Spectrum Compact off and back on. The text "FIRMWARE UPGRADE" should be shown.
8. From the main screen tap TOOLS & SETTINGS, then tap the PRESET button. Confirm by tapping once more.
9. Turn Spectrum Compact off and back on.

PRESET restores Spectrum Compact's configuration to factory defaults. To preserve the current configuration, before tapping PRESET, save it as a PROFILE and after the firmware upgrade process restore it.

Please avoid downgrading to older firmware versions!

2.16 Realtime mode with Spectrum Manager

To use E-band or V-band Spectrum Compact with Spectrum Manager in Realtime mode, follow these steps:

1. Turn Spectrum Compact on.
2. From the main screen tap TOOLS & SETTINGS, then tap SERVICE MENU. Tap USB MODE.
3. If the USB mode is already set to VIRTUAL COM PORT, do nothing. If the USB mode is set to MASS STORAGE DEVICE, set it to VIRTUAL COM PORT by tapping OK.
4. Connect the device to a PC with installed Spectrum Manager software.
5. Launch Spectrum Manager.
6. Either select "Start Realtime" (if there is only one Spectrum Compact connected to the PC) or wait for the Spectrum Manager to detect all connected devices and then choose the desired one from a drop-down list.
7. The realtime sweep should be now shown on the graph. See Spectrum Manager user manual for further details.

CONTACTS

Global headquarters

SAF Tehnika JSC
VAT No. LV40003474109
OFFICE, MANUFACTURING AND LEGAL ADRESS:
24a, Ganibu Dambis
Riga, LV-1005, Latvia
E-MAIL:
info@saftehnika.com
TECHNICAL SUPPORT E-MAIL:
techsupport@saftehnika.com
PHONE: +371 670 468 40
FAX: +371 670 468 09

Office hours: Monday – Friday
9:00 AM – 6:00 PM, UTC/GMT +3 hours

North America office

SAF North America LLC

OFFICE ADDRESS:
3250 Quentin Street,
Unit 128, Aurora CO 80011
E-MAIL:
salesna@saftehnika.com
TECHNICAL SUPPORT E-MAIL:
techsupport@saftehnika.com
PHONE: 720 502 0724