



User manual

24–40/43 GHz Spectrum Compact v.2

VER 1.4 (FW V5.3.4)

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.

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To get up to date information about accessories and their availability, please contact sales representative.

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Contents

1 OVERVIEW	4
1.1 Appearance & features	4
1.2 Technical specification	5
1.3 Accessories	5
2 OPERATION	6
2.1 Basic operation	6
2.2 SWEEP CONT.	8
2.3 FREQ.....	8
2.4 SPAN.....	9
2.5 MARKER.....	11
2.6 RBW & VBW	12
2.7 LEVEL.....	14
2.8 TRACE	15
2.9 POWER IN BAND	19
2.10 SAVE	21
2.11 PRESET	22
2.12 FULL SCREEN.....	23
2.13 TOOLS.....	24
2.13.1 FILES	24
2.13.2 PROFILES	26
2.13.3 MASK MODE	27
2.13.4 PATH CALC	28
2.13.5 HIGH CONTRAST	30
2.13.6 RECORD	31
2.13.7 AUTO ROTATE.....	33
2.13.8 ABOUT.....	34
2.13.9 SERVICE MENU	34
2.14 SETTINGS.....	36
2.14.1 BRIGHT	37
2.14.2 TIME	38
2.14.3 COLOR.....	39
2.14.4 SIGNAL ID.....	40
2.15 Firmware upgrade.....	41
2.16 Realtime mode with Spectrum Manager	41
CONTACTS	42

1 OVERVIEW

1.1 Appearance & features



24–40/43 GHz Spectrum Compact analyzer is an ultra-light and easy to use measurement solution. This battery powered device does not require external down-converters, and is a must-have tool for any field engineer performing 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 PC software that is included in price of Spectrum Compact.

- Ultra-compact form factor
- Leading sensitivity
- Resistive LCD touchscreen
- Weatherproof - IP marking 54
- Stand-alone functionality
- PC software included in the price
- Audio output for hands-free antenna adjustment
- USB type-C for charging and data access

1.2 Technical specification

P/N	JOSSAP74	JOSSAP54
Frequency range	24.000 – 40.000 GHz	24.000 – 43.000 GHz
Displayed Average Noise Level	-100 dBm @ RBW=100kHz	
Max input power	0 dBm	
RBW (Resolution bandwidth)	100 kHz/ 300 kHz/ 1 MHz	
VBW (Video bandwidth)	1 kHz/ 3 kHz/ 10 kHz/ 30 kHz/ 100 kHz	
Min span	10 MHz @ 100 kHz RBW	
Max span	Full bandwidth	
Sweep speed	0.2 s @ 100 MHz , RBW&VBW on Auto	
Accuracy	+/- 1 dB*	
Input	50 ohm 2.92 mm (f)	
Interface	USB Type-C	
Battery	2 x 3500 mAh Polymer Lithium-ion	
Battery life	up to 3h	
Operating temperature	-15°C to +55°C/ 5°F to 131°F	
International Protection Marking	IP54	
Dimensions	135 x 83 x 34 mm/ 5.31 x 3.27 x 1.34 in	
Weight	0.57 kg/ 20.11 oz	

*Guaranteed at 21°C/ 70°F, CW signal

1.3 Accessories

24-40/43 GHz Spectrum Compact has these accessories available:

- 1 RF cable (P/N: JOACRF02)
- 2 AC/DC USB-C charger (P/N: JOAB452Ci3 / JOAB451Ci2)
- 3 Leather bag (P/N: JOAPAC11)
- 4 USB-C – USB-C Cable (P/N: JOACUB05)
- 5 USB-C – USB-A adapter (P/N: JOACUA31)
- 6 Lanyard (P/N: JOAPAC21)
- 7 Waveguide adapter UBR to SMA:
 - UBR260 to 2.92, 22–33 GHz, WR34 (P/N: JOS26WA001)
 - UBR320 to 2.92, 26–40 GHz, WR28 (P/N: JOS38WA001)
- 8 Horn antenna, 2.92mm connector 26.5–43.5 GHz, Gain: 20.5–22.0dBi (P/N: JOAA2640HG03)
- 9 Handle and Spectrum Compact Pocket for 26.5-43.5 GHz horn antenna (P/N:JOAA2640RK04)
- 10 Rifle scope for horn antennas (P/N JOAASA01)
- 11 Tripod for horn antennas (P/N: JOAASA03)

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 spectrum sweep (SWEEP CONT.), when it is not monitored, and decreasing the screen background brightness (Main screen → TOOLS & SETTINGS → SETTINGS → BRIGHT) prolongs the operation time.

24-40/43 GHz Spectrum Compact charges through the USB type-C port. The device can sweep the spectrum continuously if attached to a power source that can supply 3 A.



SAF Tehnika cannot guarantee that any charger, besides the one supplied with the unit, will ensure continuous sweep.

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**. If the device is attached to a power source, but the battery is not charging (e.g. the power source does not provide enough current for charging), the LED will **flash red**. When fully charged, the LED will **glow green**.



It is recommended to fully charge and discharge a new device few times to ensure that the battery indication is as accurate as possible.

The screen of the spectrum analyzer is divided into two parts: the graph and the buttons, which represent the available menus and options. The horizontal axis of the graph represents linear frequency range in megahertz (MHz). Frequency value increases from left to right. 1 pane represents 1/10th of the currently selected [SPAN](#). 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 adjusted at the [LEVEL](#) menu. Above the graph the input power level at the CENTER frequency is displayed in **yellow** (except for CUMULATIVE trace mode, see [TRACE](#)).

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

To save a spectrum curve for later review, use the [SAVE](#) button. The files are saved in Spectrum Compact Curve file format (.scc). They can be reviewed in [FILES](#) menu and are accessible when the device is connected to a computer.

Tapping the upper left corner takes a screenshot. The screenshots are saved as bitmap (.bmp) images. The screenshots are available only when Spectrum Compact is connected to a computer.

The essential functions of the spectrum analyzer are accessible from the main screen. All of the menus and options are described in detail in the following chapters.



If the overall detected signal power is higher than -40 dBm, a **red** warning "OVERLOAD" will be displayed above the graph.

Initially perform a scan at full (default) span to detect overload presence since a signal outside of the displayed frequency range also contributes to overload!



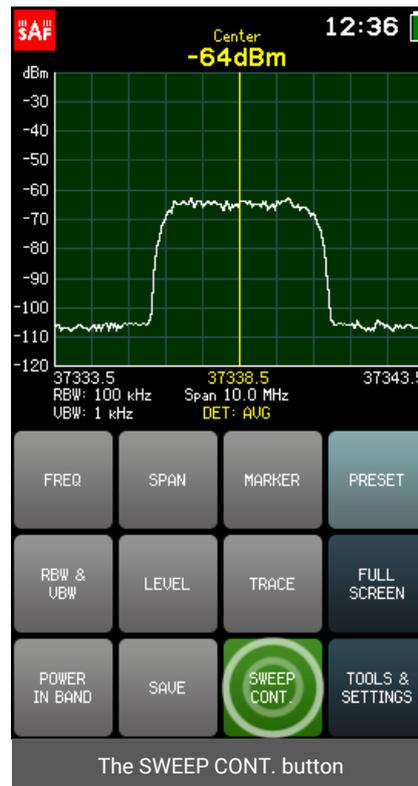
Exceeding the critical input power level of 0 dBm may cause irreversible damage to the equipment!

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 (frequency, level or trace setting) is modified, the sweep is restarted from the beginning.

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 selected span has been swept. SWEEP CONT. is enabled by default.



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).



While at the FREQ menu, tapping the right part of the graph decreases SPAN (zooms in) and tapping the left part of the graph increases SPAN (zooms out). Sliding the graph to the right or to the left modifies START and STOP frequencies by equal amounts.

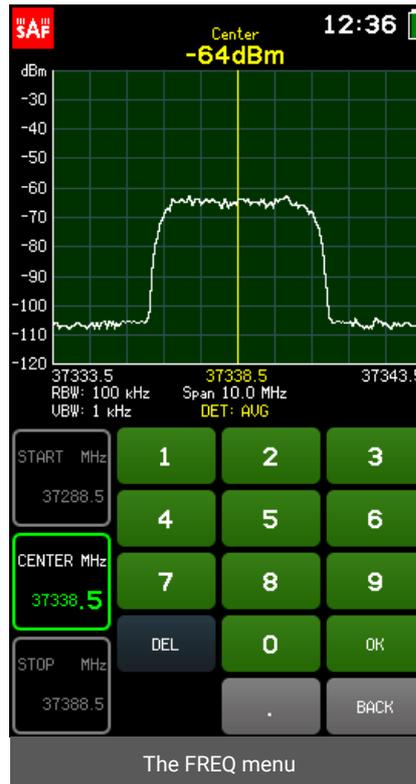
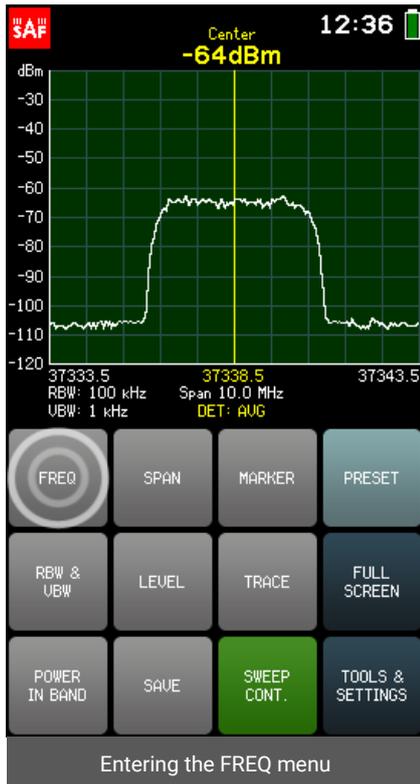
Modifying either START or STOP frequency will alter CENTER frequency and SPAN. Modifying CENTER frequency will alter both START and STOP frequencies, but will preserve SPAN, if possible (it may not be possible due to limits of the supported frequency range).

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

The frequency value can be entered with precision 0.1 MHz (100 kHz) by using the “.” on keypad. To input a value with a decimal digit, first enter the full MHz’s, then tap the “.” button. Until the value is confirmed, the digit after the point is displayed larger. If there are no digit displayed after the point, it means that it is zero.

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



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).



While at the SPAN menu, tapping the right part of the graph decreases SPAN (zooms in) and tapping the left part of the graph increases SPAN (zooms out). Sliding the graph to the right or to the left modifies START and STOP frequencies by equal amounts.

Modifying SPAN preserves CENTER frequency, if possible, but alters START and STOP frequencies. Tapping the MIN SPAN or FULL SPAN button instantly sets SPAN to respectively minimum or maximum allowed value. If the current SPAN value is the minimum or maximum, the corresponding button will be **green**. FULL SPAN is enabled by default.



The AUTO function at the [RBW & VBW](#) menu automatically adjusts resolution and video bandwidths depending on the selected SPAN. AUTO ensures optimum use of the filters. AUTO is enabled by default.



The minimum allowed SPAN differs for each of the resolution bandwidths - 10 MHz for 100 kHz RBW, 30 MHz for 300 kHz RBW and 100 MHz for 1 MHz RBW

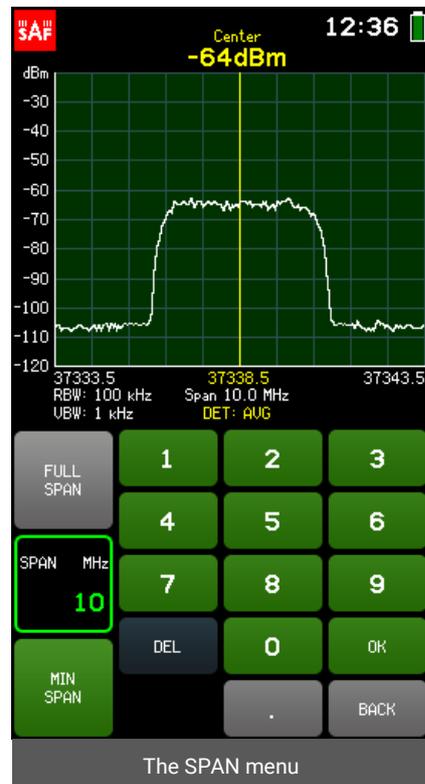
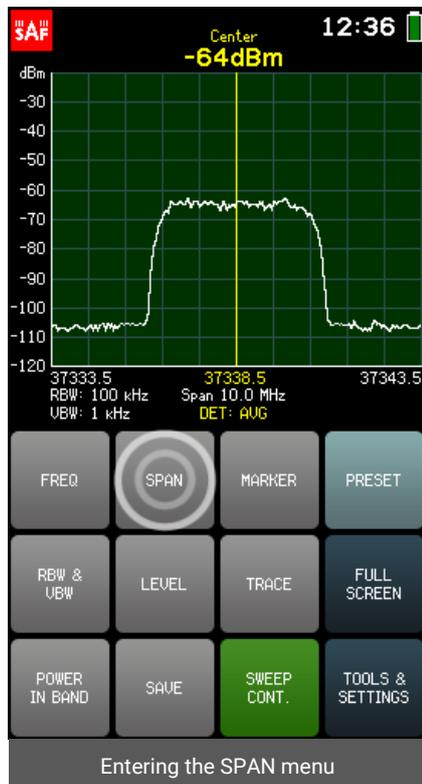


For the MIN/MAXHOLD trace mode there is a maximum SPAN limitation of 3000 MHz for 100 kHz RBW and 9000 MHz for 300 kHz RBW (see [TRACE](#)).

The current SPAN is displayed in white. The color of keypad buttons 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** (and OK button is **green**). If the value is not valid, it is displayed in **red** (and OK button is **red**). To confirm a valid value, tap the OK button or tap the parameter.

The frequency value can be entered with precision 0.1 MHz (100 kHz) by using the “.” on keypad. To input a value with a decimal digit, first enter the full MHz’s, then tap the “.” button. Until the value is confirmed, the digit after the point is displayed larger. If there are no digit displayed after the point, it means that it is zero.

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



2.5 MARKER

The MARKER menu allows placing a marker, which shows the input power level at the 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 (and OK button is green). If the value is not valid, it is displayed in red (and OK button is red). To confirm a valid value, tap the OK button or tap the parameter.

The frequency value can be entered with precision 0.1 MHz (100 kHz) by using the "." on keypad. To input a value with a decimal digit, first enter the full MHz's, then tap the "." button. Until the value is confirmed, the digit after the point is displayed larger. If there are no digit displayed after the point, it means that it is zero.



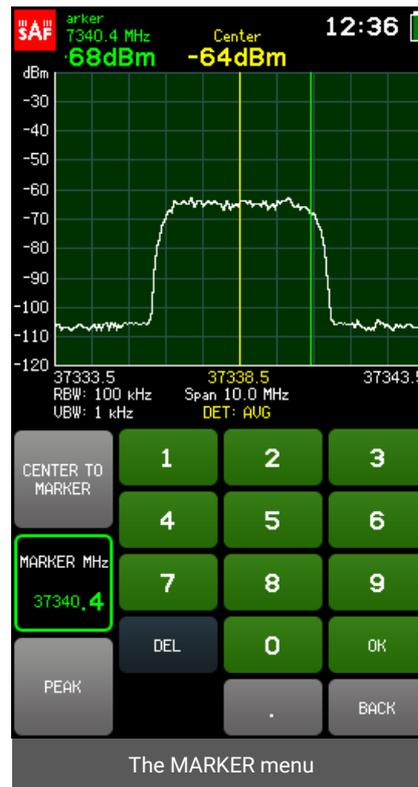
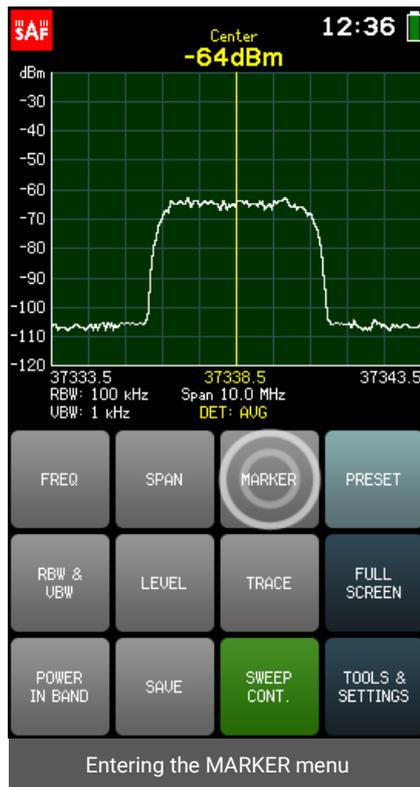
While in the MARKER menu, the marker can be moved by tapping on the left or right side of the graph. Tapping and holding will move the MARKER faster. MARKER can also be moved by dragging the MARKER line itself.

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.



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.



2.6 RBW & VBW

The RBW & VBW menu allows selecting the resolution bandwidth (RBW) and video bandwidth (VBW) of the spectrum analyzer.

The available RBW values are:

- 100 kHz
- 300 kHz
- 1 MHz



Narrower RBW allows to distinguish closer signals, but the span is swept considerably slower.



The minimum allowed SPAN differs for each of the resolution bandwidths - 10 MHz for 100 kHz RBW, 30 MHz for 300 kHz RBW and 100 MHz for 1 MHz RBW.

The available VBW values are:

- 1 kHz
- 3 kHz
- 10 kHz
- 30 kHz
- 100 kHz



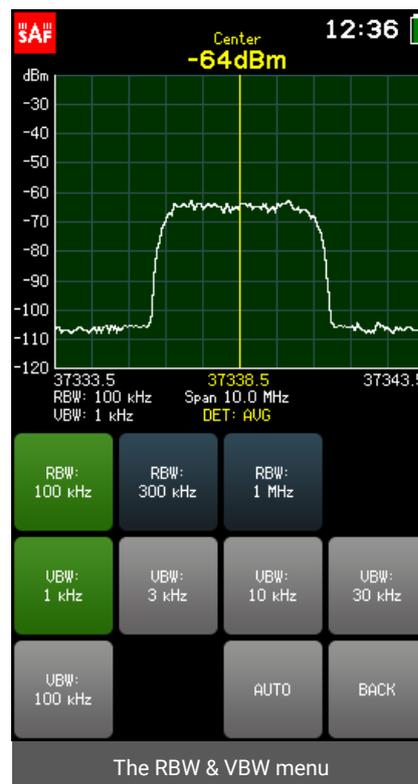
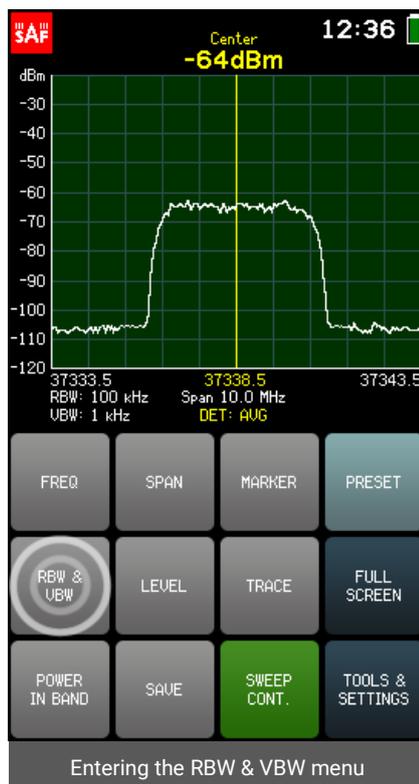
Narrower VBW stabilizes the displayed trace (i.e. smooths the noise) and allows to see weaker signals better, but for pulsating signals a wider VBW should be used.

Tapping the AUTO button enables and disables automatic adjustment of RBW and VBW depending on the selected SPAN. AUTO ensures optimum use of the filters. When AUTO is enabled, the AUTO button is **green**. AUTO is enabled by default.



If another RBW or VBW is selected manually, AUTO is immediately disabled.

To exit the RBW & VBW menu and return to the main screen, tap BACK.



2.7 LEVEL

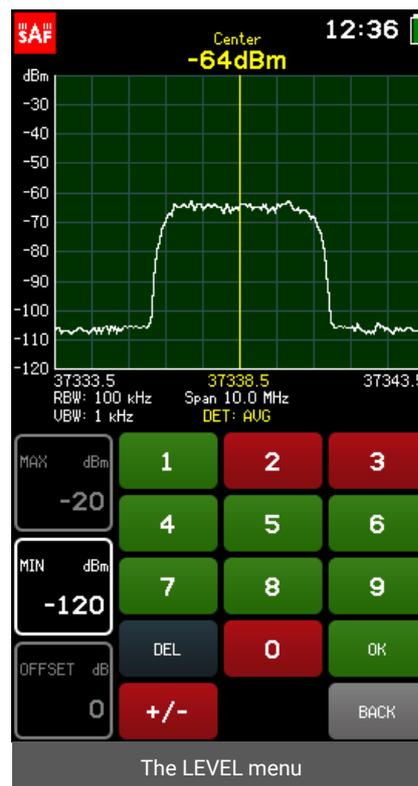
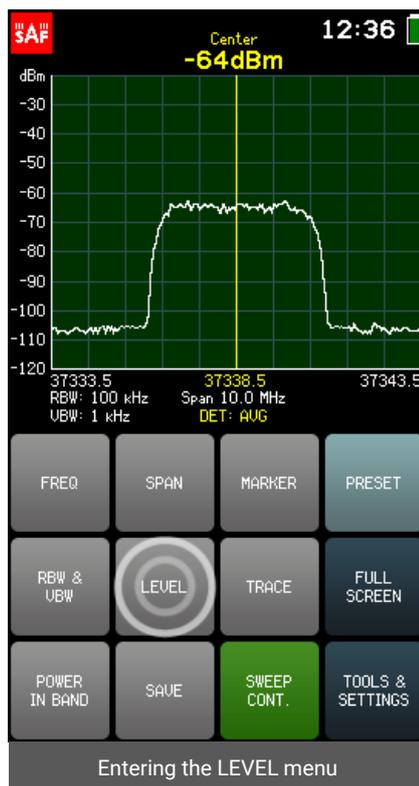
The LEVEL menu allows selecting the MAX (highest limit of the vertical axis) and MIN (lowest limit of the vertical axis) values of the displayed input power range in dBm, and an input power level OFFSET value (e.g. if an external attenuator is being used) in decibels (dB).



While at the SCALE 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 (if there is input power range available).

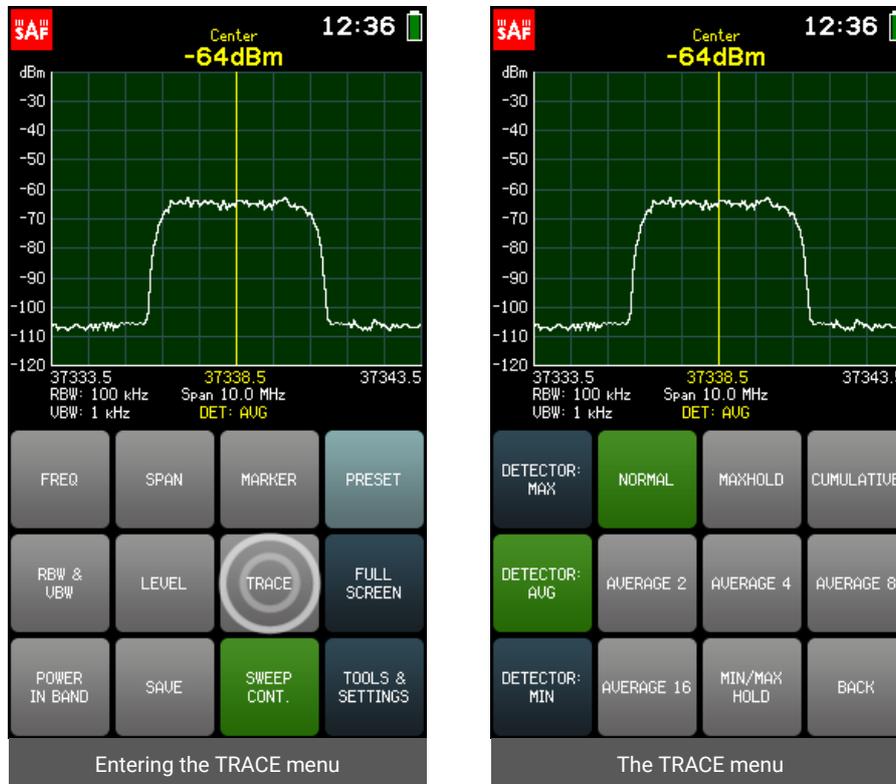
The currently selected parameter (MAX/ MIN/ OFFSET) is displayed in white. To select a different parameter, tap on it once. The color of the keypad buttons shows which numbers can be entered at the current digit position to obtain a valid parameter value – the numbers on the green buttons can be entered,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

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



2.8 TRACE

The TRACE menu allows adjusting the spectrum curve by selecting the most suitable DETECTOR and trace mode.



The DETECTOR determines 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.

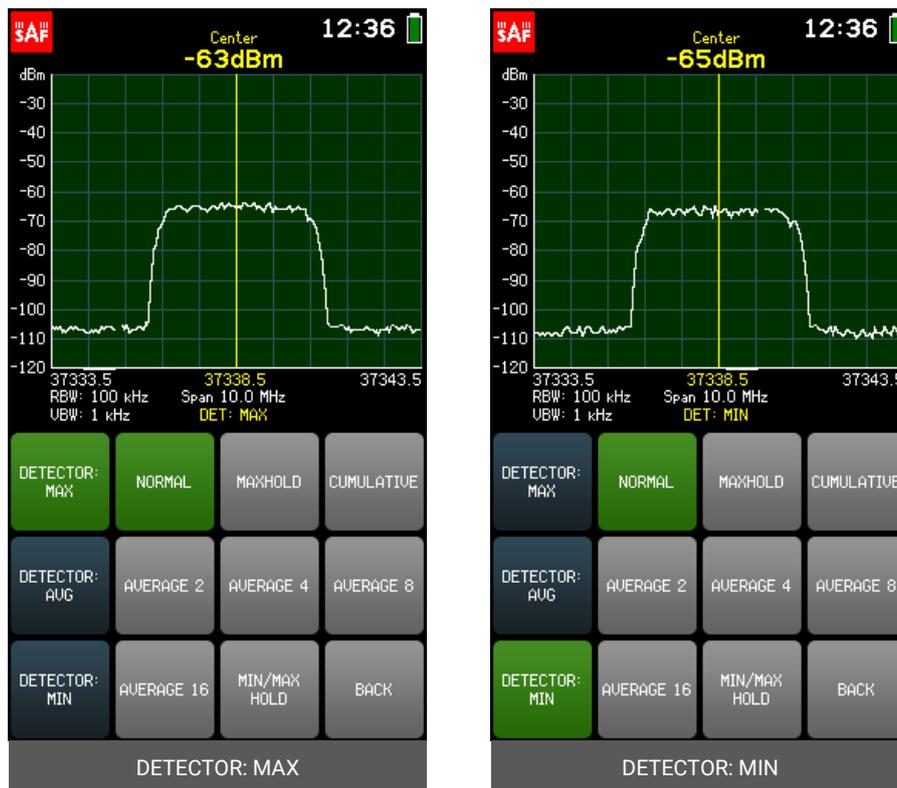
The available detectors are:

- **DETECTOR: AVG**
Displays the averaged value over the values detected (the default detector).
- **DETECTOR: MAX**
Displays the highest detected input power level values.
- **DETECTOR: MIN**
Displays the lowest detected input power level values.



For input power measurements (with POWER IN BAND) the AVG detector is recommended.

The currently used detector is indicated in **yellow** under the graph.



The available trace modes are:

- *NORMAL*

Normal trace mode (the default). The power level values detected in real-time are displayed on screen without additional processing.

- *MAXHOLD*

Shows in **blue** the highest power levels registered since the sweeping with this trace mode commenced, additional to the *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 *MAXHOLD* trace is preserved. Center and *MARKER* input power values are shown for the **blue** *MAXHOLD* trace. If *POWER IN BAND* is activated with *MAXHOLD* trace mode, the input power value is shown with larger digits for the **blue** *MAXHOLD* trace and with smaller digits for the *NORMAL* trace.



Use *MAXHOLD* trace mode for antenna adjustments. It can also be used to detect intermittent signals or to measure the maximum power of fluctuating signals.

- *MIN/MAXHOLD*

Shows in **blue** the highest and in **green** the lowest power levels registered since the sweeping with this trace mode commenced, additional to the

NORMAL (actual real-time) trace. The number in **blue** under the graph shows from how many sweeps the MIN/MAXHOLD trace has been plotted. When a spectrum curve is saved, all three traces are preserved. Center and MARKER input power values are shown for the **blue** MAXHOLD trace. If POWER IN BAND is activated with MIN/MAXHOLD trace mode, the input power value is shown with larger digits for the **green** MINHOLD trace and with smaller digits for the NORMAL trace.



MIN/MAXHOLD trace mode shows which signals are intermittent and what their maximum and minimum power levels are.



For the MIN/MAXHOLD trace mode there is a maximum SPAN limitation of 3000 MHz for 100 kHz RBW and 9000 MHz for 300 kHz RBW.



MASK MODE is not available for MIN/MAXHOLD trace mode (if a MIN/MAXHOLD trace is set as a mask, its MAXHOLD trace is used).



NEW RECORD is not available for MAXHOLD and MIN/MAXHOLD trace modes. New record should be made with either NORMAL or AVERAGE trace mode and then MIN/MAX LEVELS option should be used (see [RECORD](#)).

- *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.



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



MARKER, POWER IN BAND, FULL SCREEN, NEW RECORD and MASK MODE are not available for CUMULATIVE trace mode. CUMULATIVE traces cannot be set as masks.

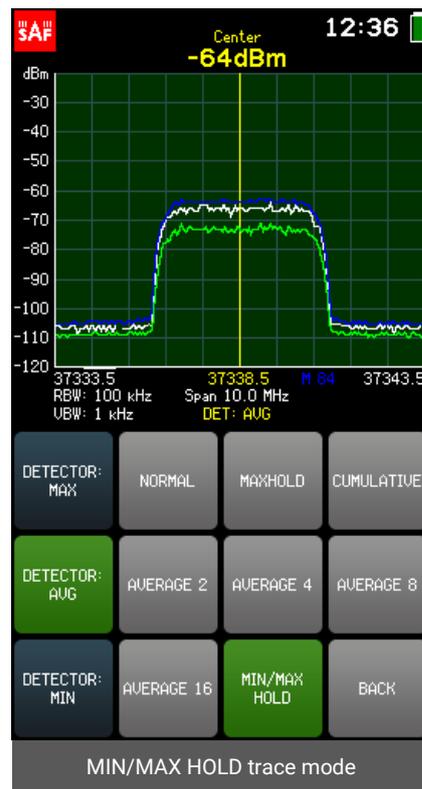
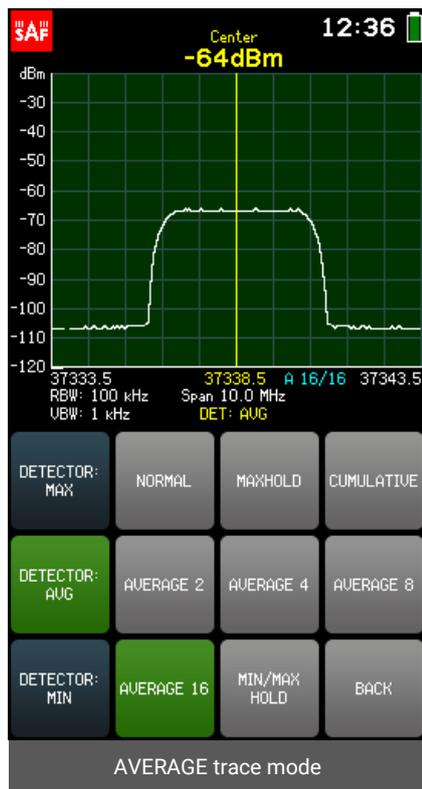
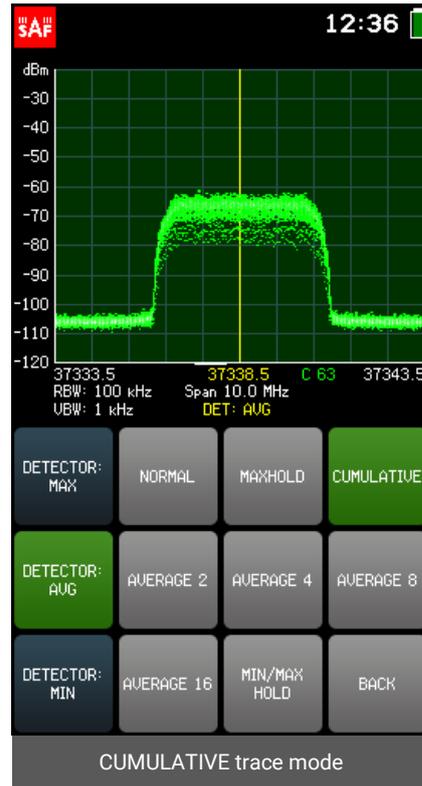
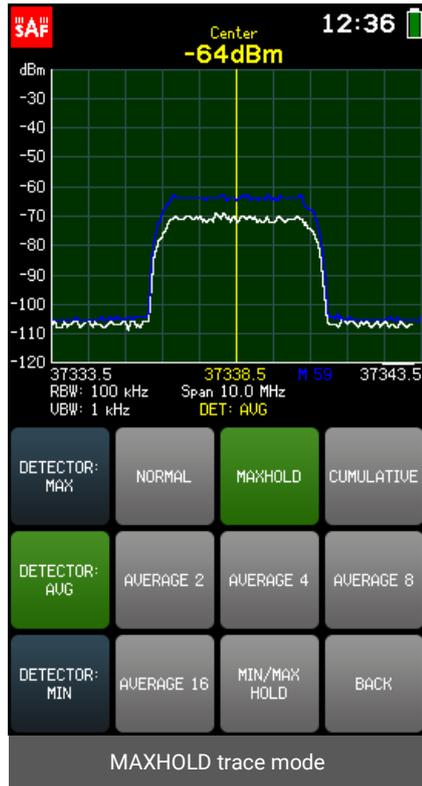
- *AVERAGE 2/4/8/16*

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 which helps to stabilize the input power level reading.

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



2.9 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 a specified center frequency CENTER.



POWER IN BAND feature also can be used to measure the channel width or channel separation by adjusting the BW to fit.

Tapping the SET TO CENTER button, centers POWER IN BAND on the CENTER frequency of the currently selected SPAN.



To increase the accuracy of input power level measurements, select DETECTOR: AVG and one of the AVERAGE traces at the [TRACE](#) menu.

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



The BW of POWER IN BAND cannot be narrower than the currently selected RBW (see [RBW & VBW](#)).

The frequency value can be entered with precision 0.1 MHz (100 kHz) by using the “.” on keypad. To input a value with a decimal digit, first enter the full MHz’s, then tap the “.” button. Until the value is confirmed, the digit after the point is displayed larger. If there are no digit displayed after the point, it means that it is zero.



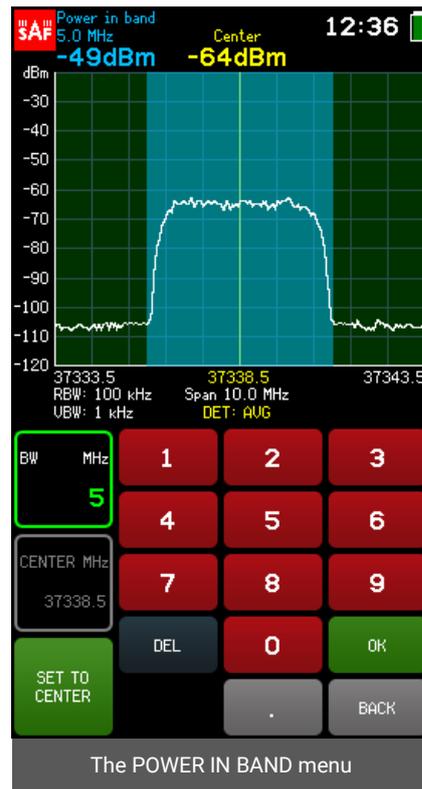
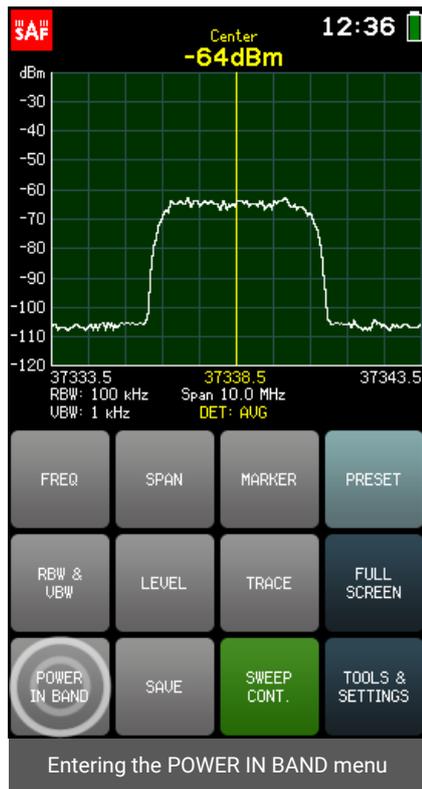
While in the POWER IN BAND menu, the POWER IN BAND area can be moved by tapping on the left or right side of the graph. Tapping and holding will move the POWER IN BAND area faster. POWER IN BAND area can also be moved by dragging the POWER IN BAND area itself.

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.



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.



2.10 SAVE

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

Holding the SAVE button allows saving the current spectrum curve with a custom file name. The name can be up to 8 characters long.



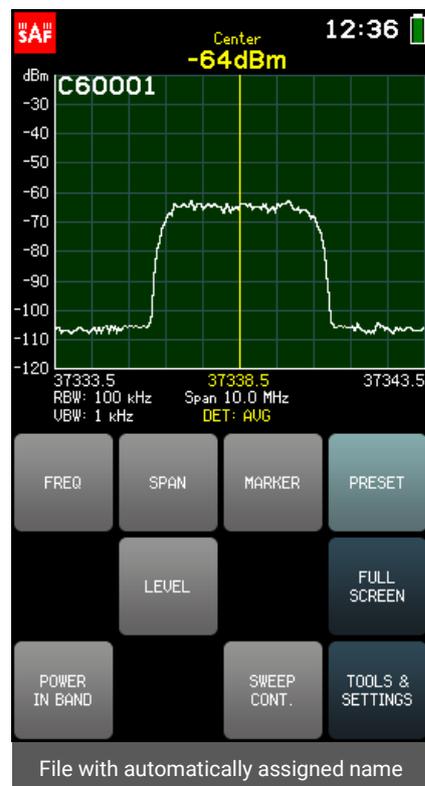
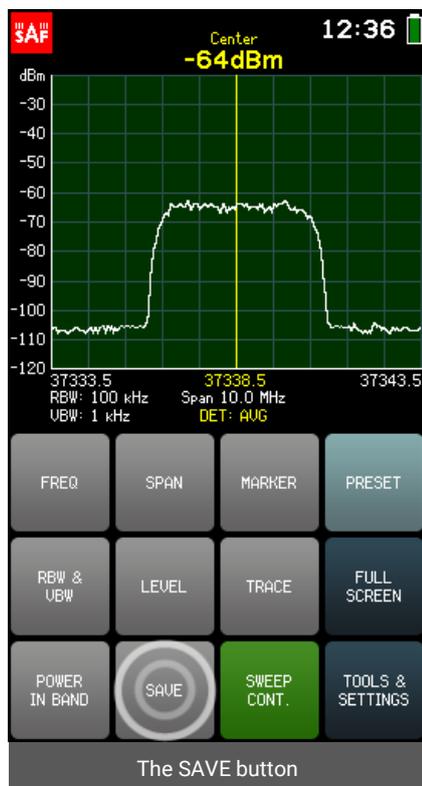
When assigning a custom file name, it is checked whether the name does not match with an already existing one. In that case it is not possible to confirm.



SAVE button is not available if at least one full sweep has not been done with the current sweep settings.

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

Saving a spectrum curve stops continuous sweep and puts the saved file on screen. To resume continuous sweep (thus closing the file), tap SWEEP CONT. button.



2.11 PRESET

The PRESET menu allows resetting the Spectrum Compact to the factory defaults. To confirm the action tap the PRESET button once more. To complete the action, reboot the Spectrum Compact.



Use PRESET to quickly default settings and clear the enabled features. Use PROFILES to save a configuration before using PRESET and to restore it afterwards.

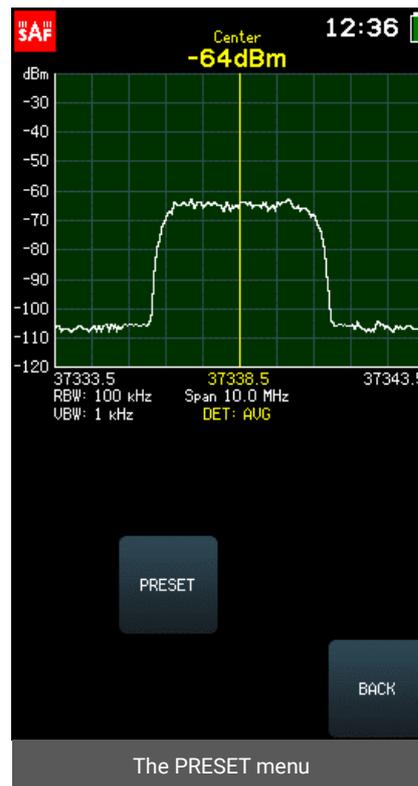
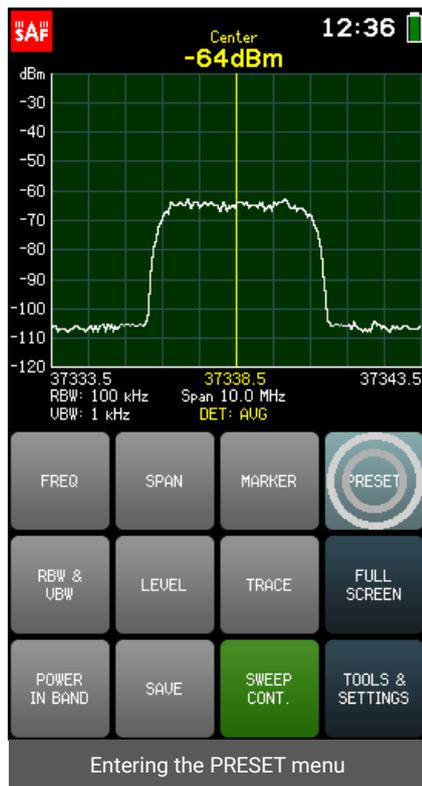


PRESET will not format the internal storage disk of the Spectrum Compact.



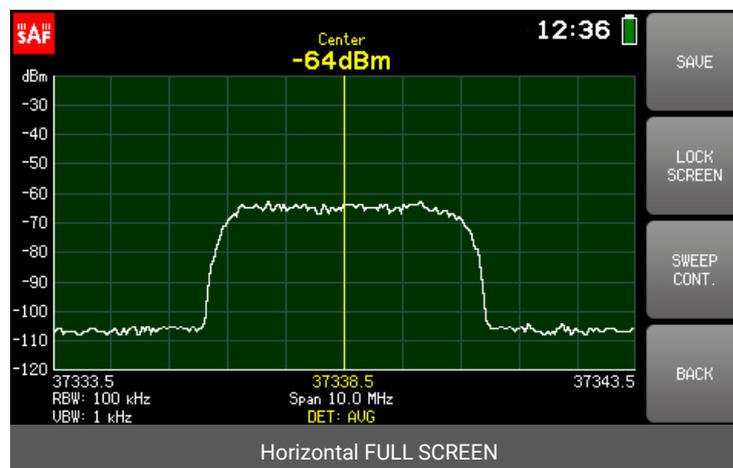
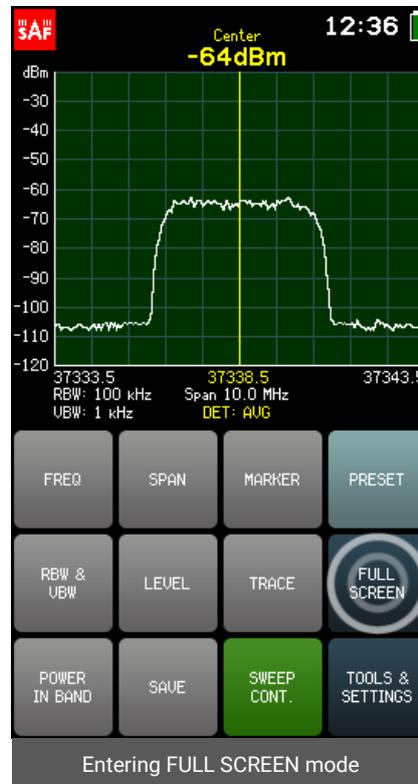
PRESET and reboot is mandatory after the firmware upgrade.

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



2.12 FULL SCREEN

Tapping the FULL SCREEN button expands the graph. In FULL SCREEN mode, there are only buttons LOCK SCREEN, SAVE, HIGH CONTRAST and SWEEP CONT. accessible.



- **LOCK SCREEN**

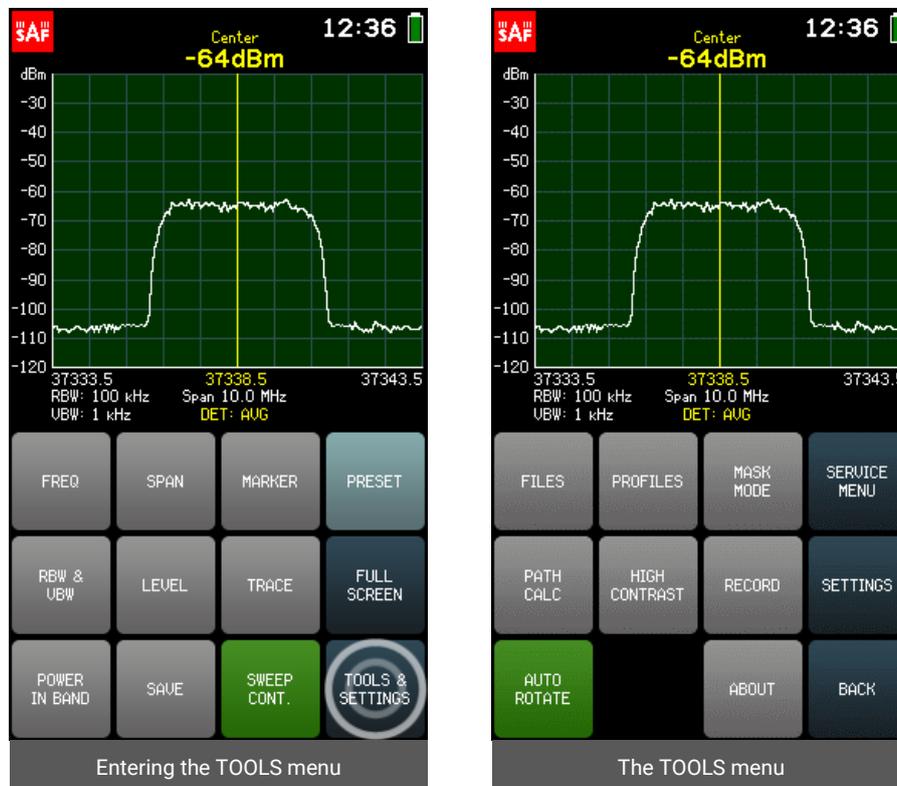
The LOCK SCREEN button allows locking the screen of Spectrum Compact so that nothing can be accidentally tapped. When LOCK SCREEN is enabled, the LOCK SCREEN button is **green**. The LOCK SCREEN button is disabled by shortly pressing the power button.

To exit the FULL SCREEN mode and return to the main screen, tap BACK.

2.13 TOOLS

Additional functions of the spectrum analyzer are accessible at the TOOLS menu. To access the TOOLS menu, tap the TOOLS & SETTINGS button from the main screen.

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



2.13.1 FILES

The FILES menu allows operating with previously saved spectrum curves.

Navigate the files using the arrows or the slider. Files are sorted by the time they were created and the latest file is on top of the list. 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 adjusted (zooming in on the frequency axis could be done, if the file was saved with SPAN greater than MIN SPAN for file's RBW), and the MARKER or POWER IN BAND can be enabled or adjusted.

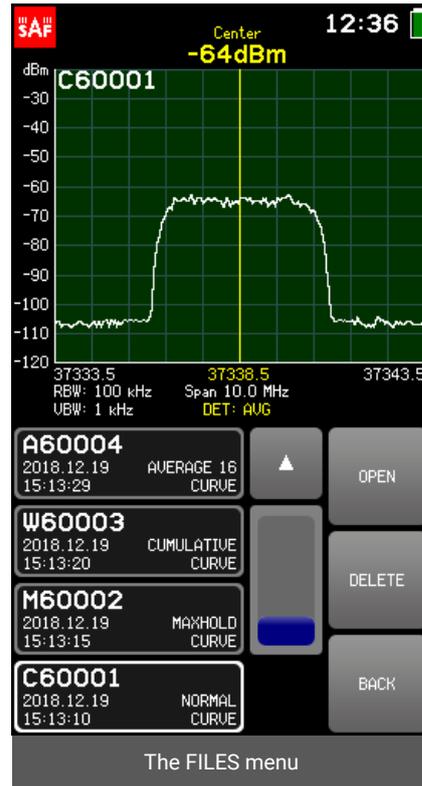
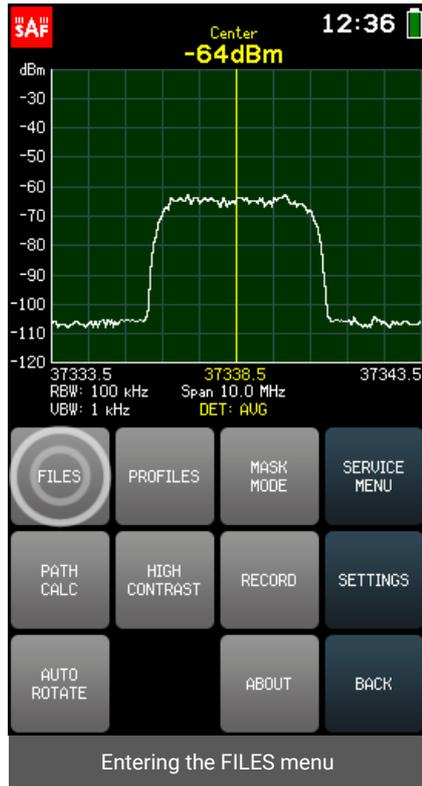


FREQ, SPAN, LEVEL, MARKER and POWER IN BAND are not available for spectrum curves saved with CUMULATIVE trace mode.

To close the file and resume the real-time sweep, tap SWEEP CONT. To view a different file go to FILES menu again.

A saved spectrum curve can be deleted with DELETE from the FILES menu or from the folder "CURVES" when Spectrum Compact is connected to a computer.

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



2.13.2 PROFILES

The PROFILES menu allows saving and restoring the Spectrum Compact configuration – frequency, level, trace and screen settings, a mask etc.

To save the current configuration as a profile, tap SAVE. The profile name can be up to 8 characters long.



When assigning a custom file name, it is checked whether the name does not match with an already existing one. In that case it is not possible to confirm it.

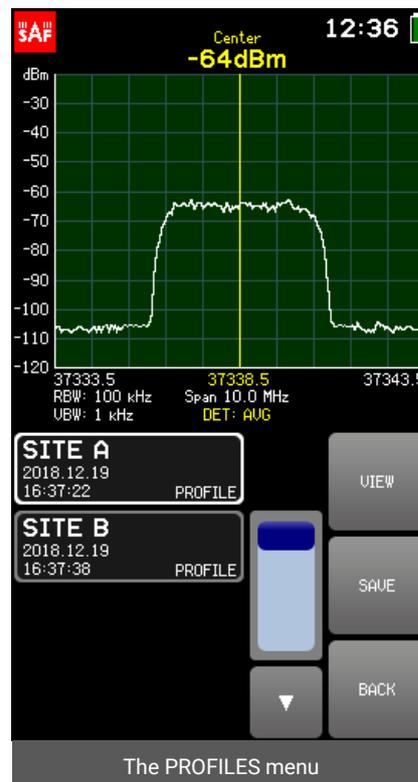
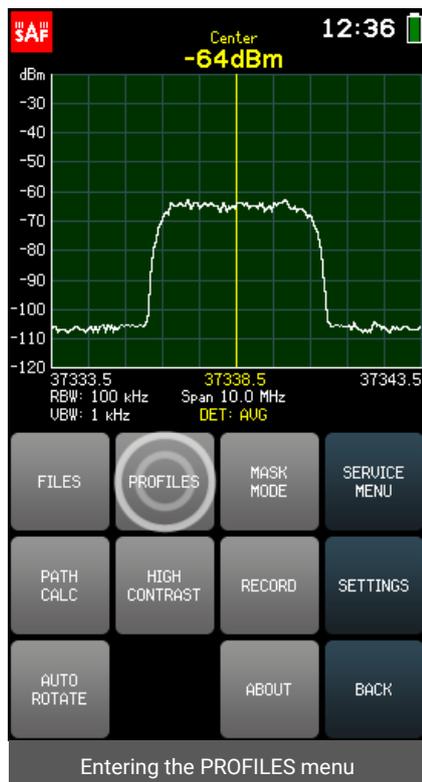
To preview the saved profiles and restore a profile, tap the VIEW button. Navigate the profiles using the arrows or the slider. Profiles are sorted alphabetically. Tap on the profile to select it and then tap the SET button to set it.



To see how the current spectrum looks with a selected profile, make sure the SWEEP CONT. button is active at the main screen.

A profile can be deleted with DELETE from the VIEW menu or from the folder “PROFILES” when Spectrum Compact is connected to a computer.

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



2.13.3 MASK MODE

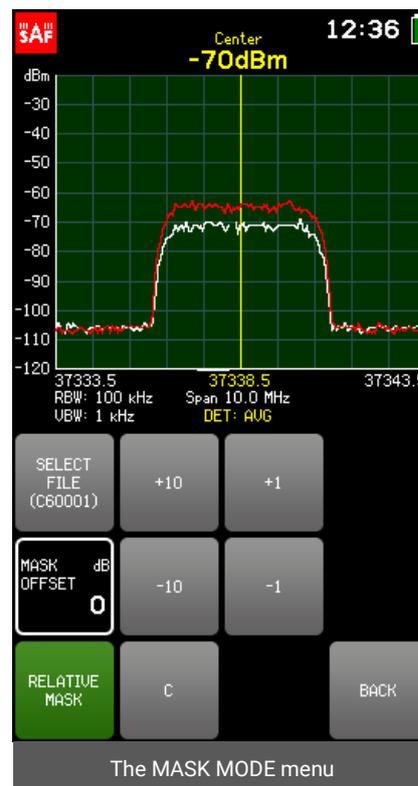
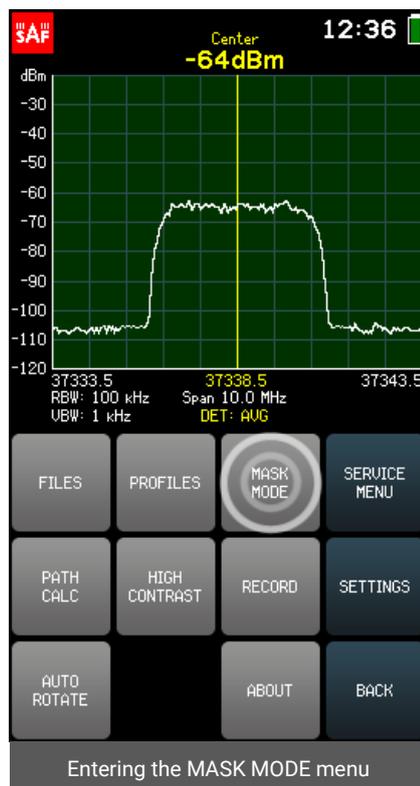
The MASK MODE menu allows setting a file as a spectrum mask and thus visually comparing the current spectrum curve with a saved one.



MASK MODE is not available for CUMULATIVE and MIN/MAXHOLD trace mode. CUMULATIVE traces cannot be used as masks. The MAXHOLD trace is set as a mask from a MIN/MAXHOLD file.

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 centered on the current CENTER frequency. If the RELATIVE MASK button is inactive, the spectrum curve used as mask is positioned in its actual frequency range with which it was saved. To adjust the mask vertically i.e. set a MASK OFFSET, tap the +10, -10, +1 or -1 button that moves the mask curve by 10 or 1 decibels upwards or downwards. To clear the MASK OFFSET, tap C.

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 at the TOOLS menu. Tapping the MASK MODE button when it is active disables the MASK MODE. MASK MODE is disabled by default.



2.13.4 PATH CALC

The PATH CALC menu allows evaluating received signal level (RSL). The calculator is adapted for the 24-40/43 GHz frequency range.



The calculated value is an estimation for distances starting from 0.1 km/ 0.1 mile. For more credible result, use a professional link planning tool!

The parameters required for the calculation are:

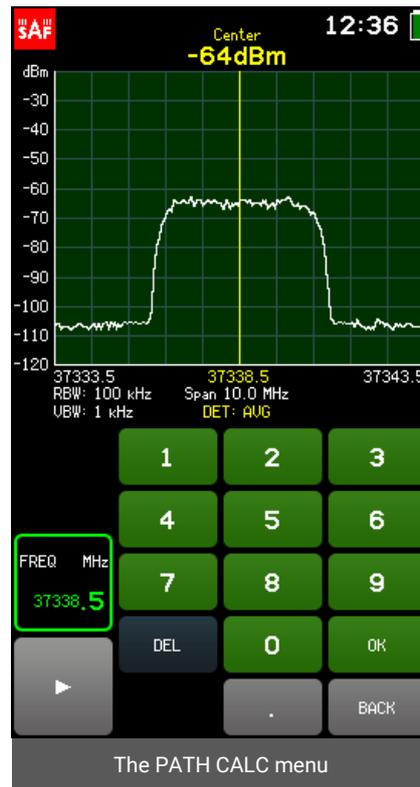
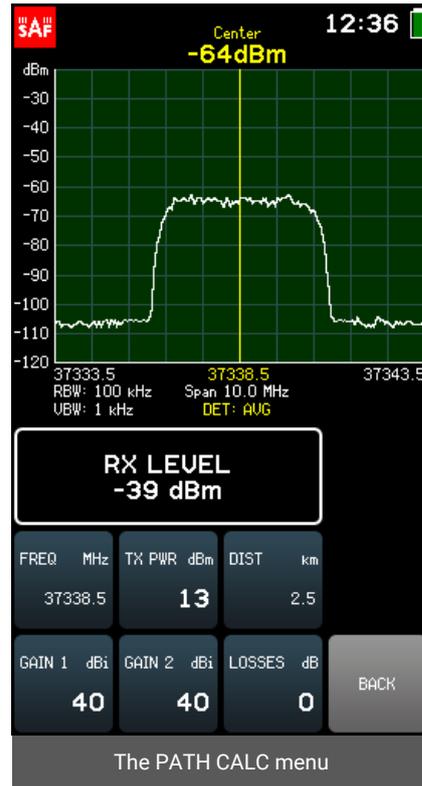
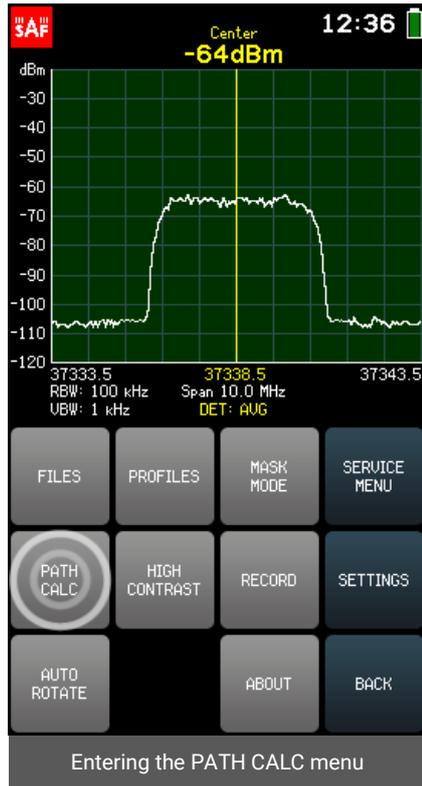
- transmitter frequency **FREQ**, in MHz;
- transmitter power **TX PWR**, in dBm;
- distance between the transmitter and receiver **DIST**, either in kilometers or in miles;
- gain of the transmitter antenna **GAIN 1**, in dBi;
- gain of the receiver antenna **GAIN 2**, in dBi;
- (optional) losses value to account for any known additional losses, e.g. cables, weather, obstacles, in dB.

The **RX LEVEL** is calculated continuously so it is possible to see how the value changes depending on the parameters.

To select a 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** (and OK button is **green**). If the value is not valid, it is displayed in **red** (and OK button is **red**). To confirm a valid value, tap the OK button or tap the selected parameter. If the currently selected parameter is already correct, next/ previous parameter can be selected by using the arrow buttons.

The frequency and distance values can be entered with precision 0.1 by using the “.” on keypad. To input a value with a decimal digit, use the “.” button. Until the value is confirmed, the digit after the point is displayed larger. If there are no digit displayed after the point, it means that it is zero.

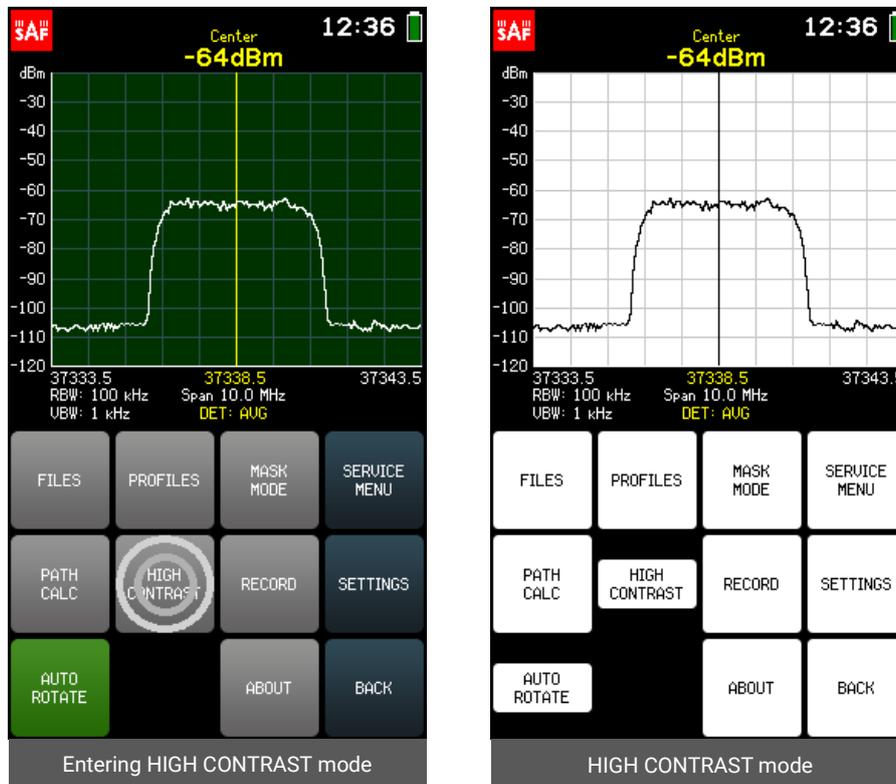
To exit the parameter submenus, tap **BACK**. To exit the PATH CALC menu and return to the **TOOLS** menu, tap **BACK**.



2.13.5 HIGH CONTRAST

Tapping the HIGH CONTRAST button swaps the interface color scheme and sets screen background 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 instead of green color.

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



2.13.6 RECORD

The RECORD menu allows creating a record. To start a new record, tap NEW RECORD. Name for record is assigned 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, next record will be automatically started after 30 minutes.



Spectrum Compact can be left at a site with NEW RECORD button active and the created records can be examined later. When charging with the supplied power source, Spectrum Compact can record files continuously.



NEW RECORD is not available for MAXHOLD and MIN/MAXHOLD trace modes. Use button SHOW MIN/MAX LEVELS to see the maximum and minimum input power values with NORMAL or AVERAGE 2/4/8/16 trace modes instead.



NEW RECORD is not available for CUMULATIVE trace mode.

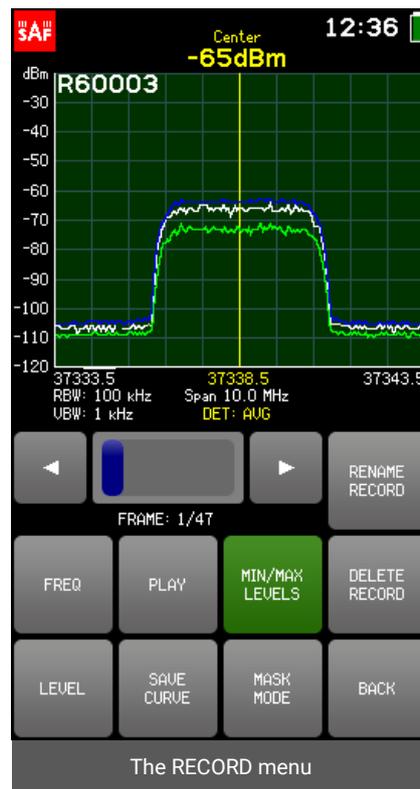
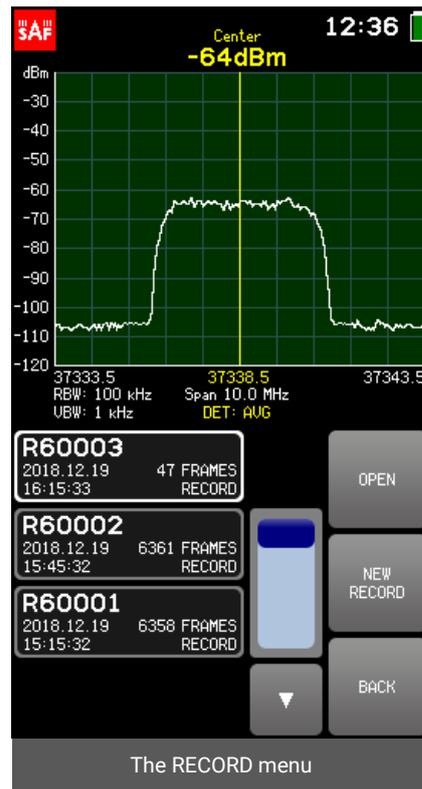
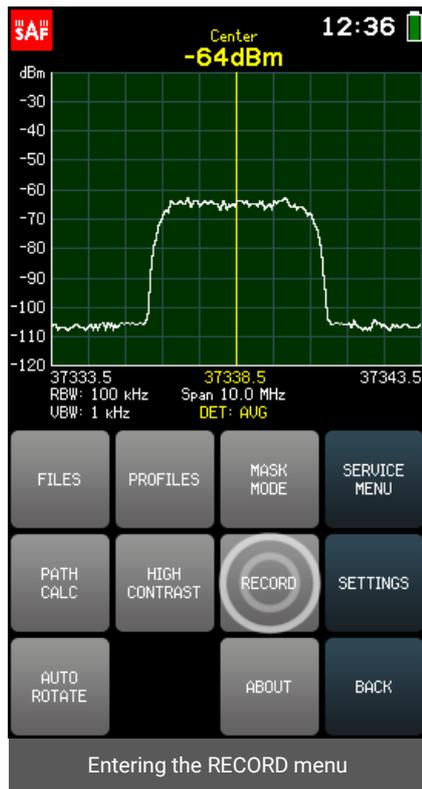
Navigate the records list using the slider and the arrows. The time the record was started and the number of frames is given. To view a record, tap on it to select it, then tap OPEN. The playback is started from the selected frame by tapping PLAY. A specific frame can be selected with the slider and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

The displayed frequency and level range of the record can be adjusted with buttons FREQ and SCALE. The trace in the currently displayed frame can be saved as a separate spectrum curve with button SAVE CURVE. Feature SHOW MIN/MAX LEVELS allows to see the highest and the lowest detected input power levels during the duration of record.



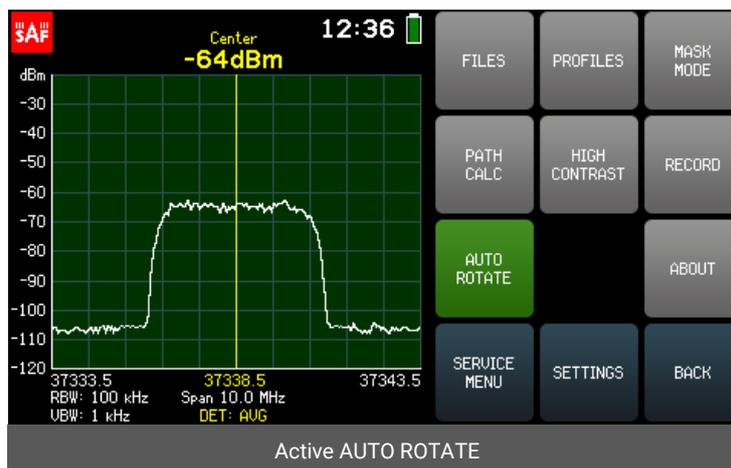
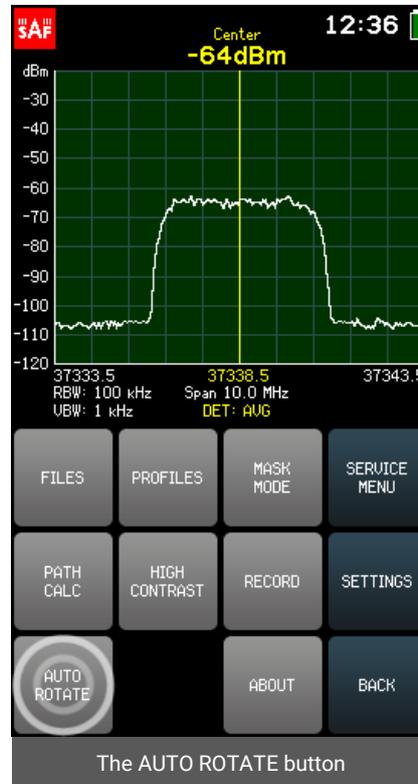
If the SHOW MIN/MAX LEVELS button is active, the curve saved from the record will be a MIN/MAXHOLD curve (with sweep count of 1).

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



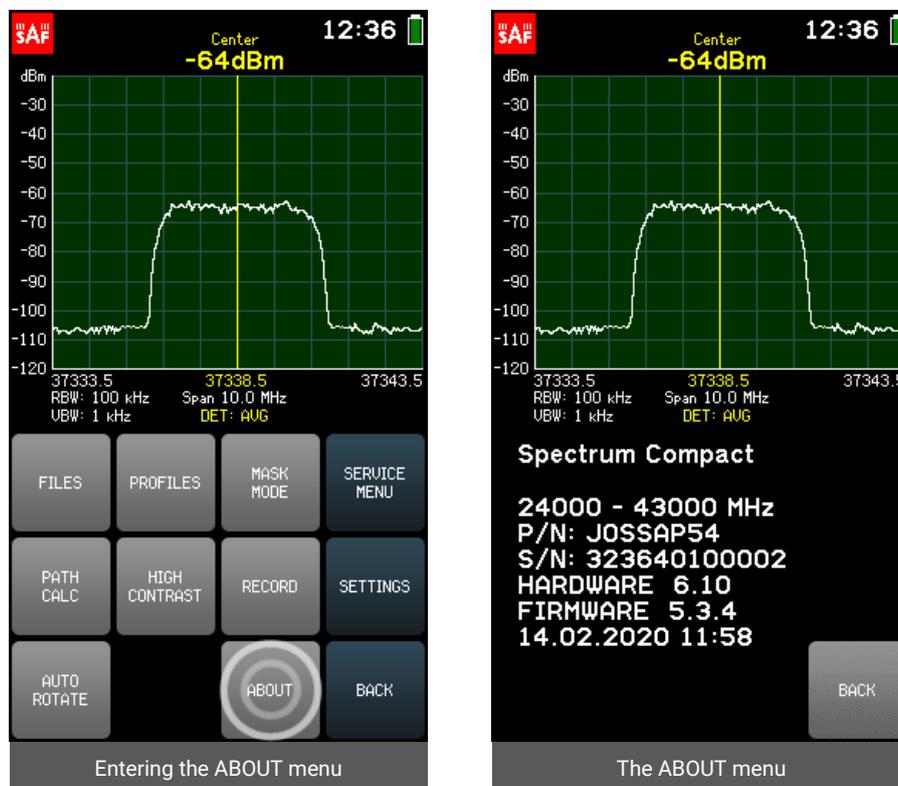
2.13.7 AUTO ROTATE

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.



2.13.8 ABOUT

The ABOUT menu contains information about the Spectrum Compact device: supported frequency range, product number, serial number, hardware and firmware versions, and issue date. To exit the ABOUT menu and return to the TOOLS menu, tap BACK.



2.13.9 SERVICE MENU

SERVICE MENU allows determining how the Spectrum Compact behaves when connected to a computer.

- *USB MODE*

The submenu USB MODE allows setting the Spectrum Compact to either Mass Storage Device (MSD) mode or to Virtual COM Port (VCP) mode. The MSD mode allows obtaining files saved on the Spectrum Compact.



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.

The VCP mode allows opening a serial connection.



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

The serial connection is required to monitor spectrum with Spectrum Compact on a PC (see [Realtime mode with Spectrum Manager](#) and user manual for Spectrum Manager).

By default Spectrum Compact is in MSD mode and it is recommended to keep it so for file access and firmware upgrade.

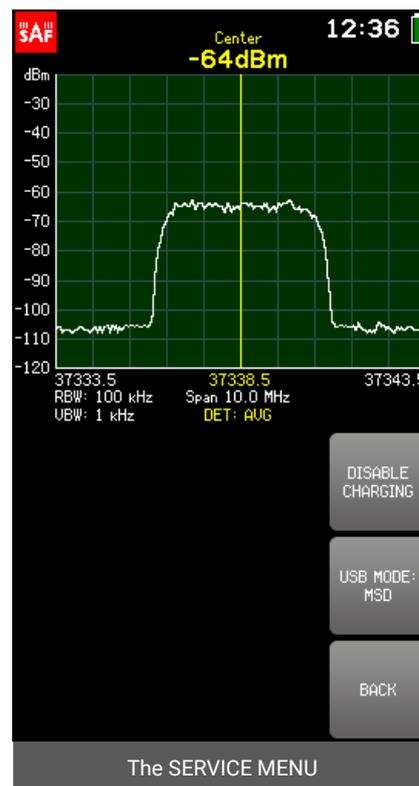
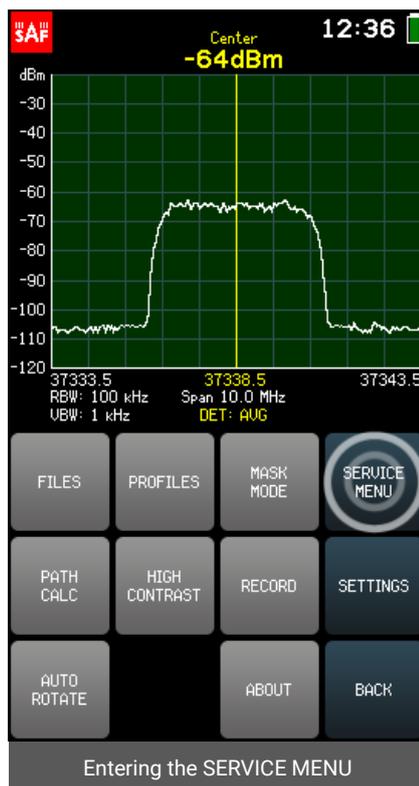
To exit the USB MODE submenu, tap BACK. To exit the SERVICE MENU and return to the TOOLS menu tap BACK.

- *DISABLE CHARGING*

Tapping the DISABLE CHARGING button disables the current draw from a power source, e.g., a laptop computer. It is still possible to sweep the spectrum or work with files but only the Spectrum Compact's battery power is used.

When DISABLE CHARGING is enabled, the DISABLE CHARGING button is **green**. To allow charging the device, disable the button by tapping it again. The DISABLE CHARGING button is automatically deactivated when the device is turned off.

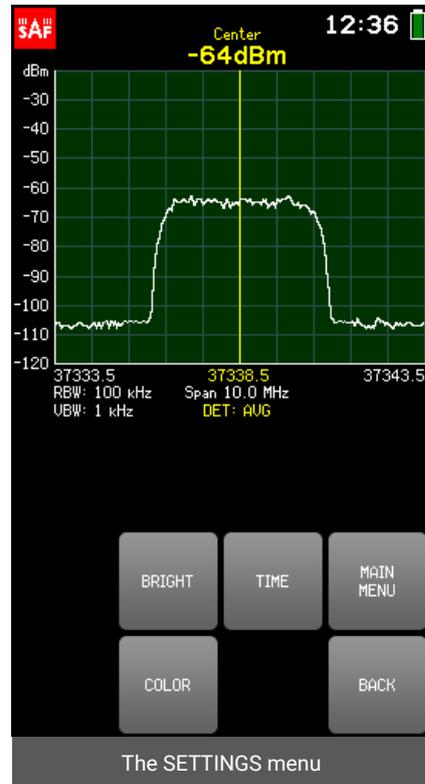
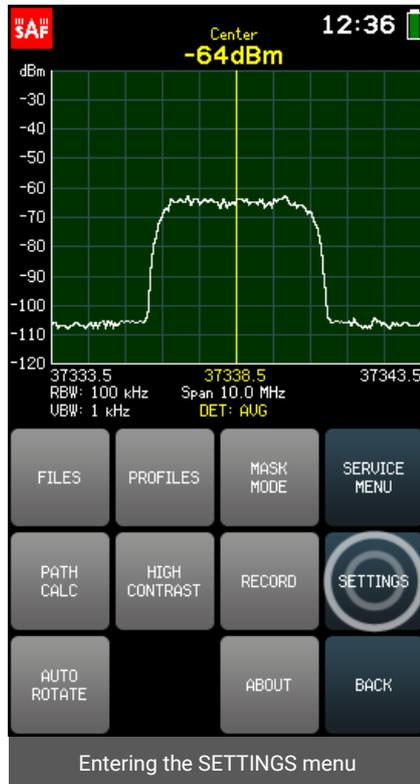
To exit the SERVICE MENU tap BACK.



2.14 SETTINGS

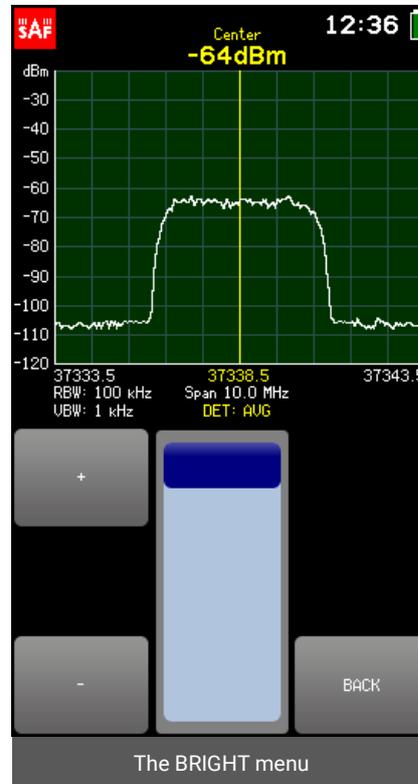
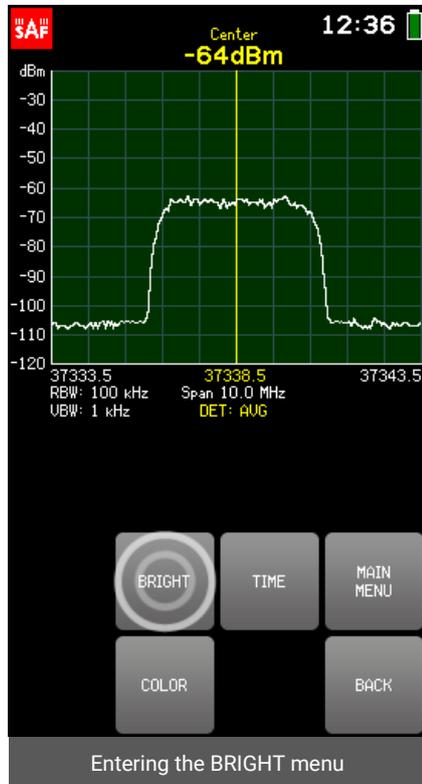
All the other settings of the spectrum analyzer are accessible from the SETTINGS menu. To access the SETTING menu, from the main screen go to TOOLS & SETTINGS → SETTINGS.

To exit the SETTINGS menu and return to the TOOLS menu, tap BACK. To return to the main screen, tap MAIN MENU.



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.



2.14.2 TIME

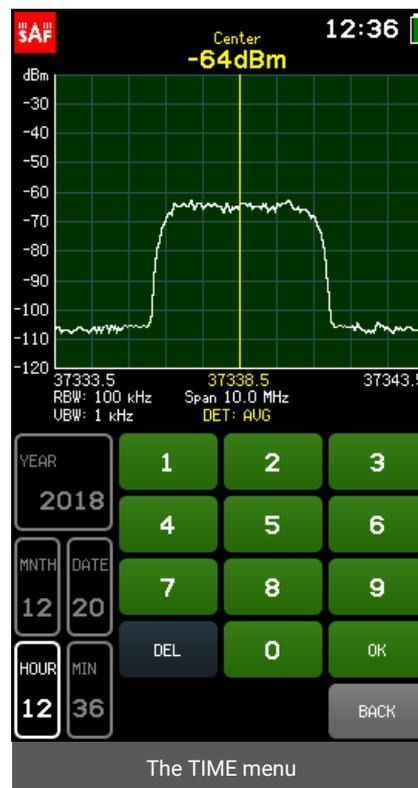
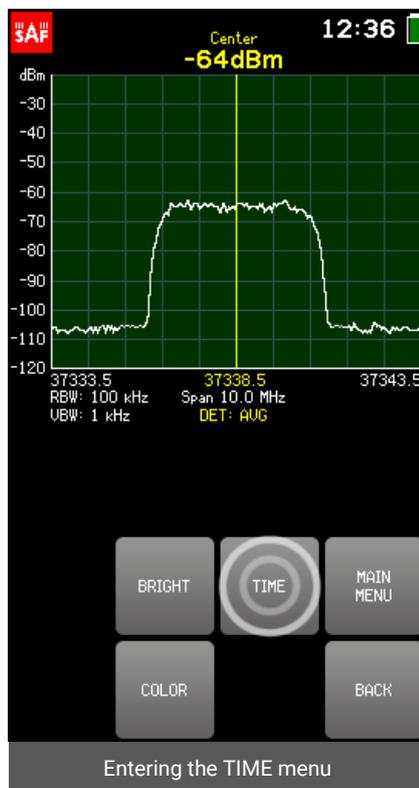
The TIME menu allows setting the time/date format of the Spectrum Compact.

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



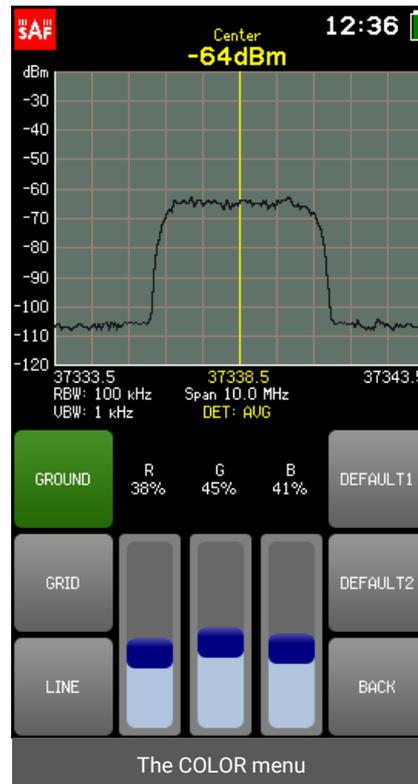
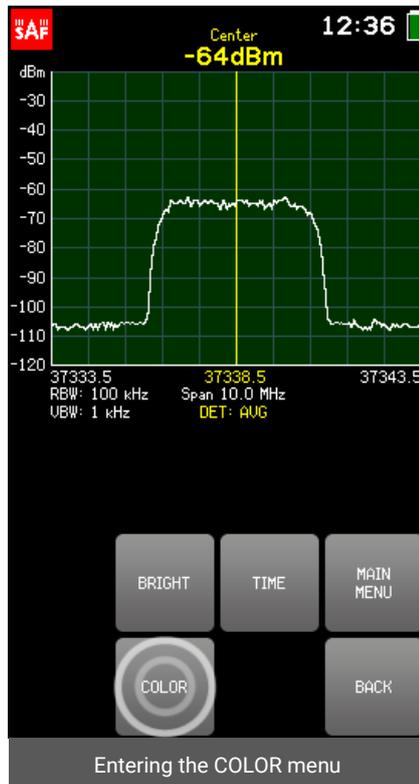
If the battery of Spectrum Compact was fully discharged or removed and the clock was stopped, before using the analyzer there is a prompt to set time to ensure correct timestamp for files.

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



2.14.3 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.



2.14.4 SIGNAL ID

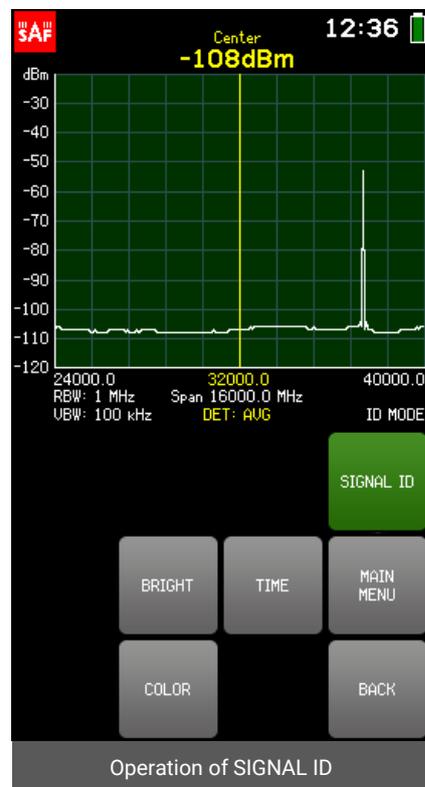


SIGNAL ID is available only for the 1 MHz RBW.

Tapping the SIGNAL ID button turns on and off a filter algorithm that reduces the power levels of the harmonic signals. 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.



2.15 Firmware upgrade

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 MASS STORAGE DEVICE, do nothing. If the USB mode is set to VIRTUAL COM PORT, set it to MASS STORAGE DEVICE by tapping OK.
4. Connect the device to a computer.
5. Copy both – the firmware file (with extension “.fw”) and the initialization file (with extension “.ini”).
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.
10. Check the firmware version by tapping TOOLS & SETTINGS, then tap ABOUT.



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 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.

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