

ST-03 1M PIRANHA

MULTI-PURPOSE SEARCH DEVICE



USER MANUAL

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1. Introduction

ST-031M is a new generation multifunction counter surveillance device for detection and localization Special Technical Means of Obtaining Secret Information (STMOSI) and for solving other information protection tasks related to information protection technical measures effectiveness evaluation. ST031M is logic continuation of the well-known multipurpose devices series „Piranha”.

All features of previous models are incorporated into ST-031M:

- ST-031M construction, delivery set, technical features and characteristics allow detection of wide range of mostly dangerous STMOSI devices.
- Technical possibilities of the device as whole and additional devices allow finding almost all of the most dangerous physical fields used by STMOSI.
- Independence from external power supplies allow autonomous operation and removes limitation of device use.
- Connection to PC allows controlling and information logging directly from computer screen.

ST-031M main differences from previous models ST-031 and ST-031P:

- Selective wide band detector of electromagnetic field detector with adjustable bandwidth from 1 to 40 MHz is used for detection of STMOSI.
- Selective HF detector bandwidth is wider than in previous models and is from 140 to 4420 MHz.
- Wider band of wire lines scanning receiver 0,05-140 MHz.
- ST-031M uses colour graphics display which increases informativeness of displayed information.
- ST-031M user interface is intuitively understandable.
- ST-031M comes in waterproof case, made of impact resistant plastic. Compact and comfortable styling ensures safety of the device and its components during storage and transportation.

2. General characteristics of the device

2.1. Purpose and main features

Multifunctional searching device ST-031M is designed for the detection and localization of technical surveillance measures and to identify the natural channels of information leakage, as well as for quality control of data protection.

ST-031M maintains performance standards and compliance with the parameters of the technical conditions when the supply voltage is not lower than 4.8V, the atmospheric pressure from 630 to 820 mm Hg, ambient temperature of -5 to +350 ° C and humidity not exceeding 95%.

ST-031M allows us to perform following search tasks:

Discovery of the facts and determining the location of the radio-emitting devices, which creates a potentially dangerous information leakage radiation. These means primarily include the following:

- Radio microphones;
- Telephone transmitters;
- Radio-stethoscopes;
- Concealed video cameras equipped with a radio channel for transmission of information;
- Technical means or systems for spatial radio frequency radiation;
- Beacons of the systems used for moving objects monitoring (e.g. people, transportation means, goods etc.);
- Unauthorized radio stations, radio handsets, and also telephones with radio-extension;
- Radio modems and digital wireless access systems.

Identification of digital protocols used in the detected radio signals. Device is able to distinguish between signals from the base station and signals from cellular phones.

Detection and localization of STM means which use conductive lines of various intended application, for transmission of information, as well as the technical means of information processing, creating informative crosstalk signals on the cable wires. Such means may include:

- Devices transmitting intercepted information by AC 220V mains lines and capable of operating at frequencies up to 30 MHz;
- Technical means of imposing a linear high-frequency signals operating at frequencies above 150 kHz;
- Devices transmitting intercepted information by subscriber telephone lines, the lines of fire and burglar alarm systems with a carrier frequency above 20 kHz
- Computers and other technical means of production, reproduction and transmission of information.

2.2. Packing and delivery set

Device ST-031M set is subject-oriented solution to the above search tasks, to ensure versatility and autonomy of the work, as well as to provide convenience and reliability of transportation and storage.

2.2.1. Packing

The device is made in a portable version. High-impact, waterproof plastic carrying case NANUK-915 (Fig. 1) is used for transportation and storage of the device. External dimensions of the case are presented in Figure 2.

Safety during transportation and storage, as well as the convenience of working with the device is provided by the original laying, which consists of two parts: the upper (extracted from the case) and lower (non-removable).

Layout of ST-031M accessories is presented in Figure 3.

Each component, supplied with ST-031M, has its own individual place. To avoid mechanical damage, the device and its components must be placed in accordance with the standard laying scheme.



Figure 1

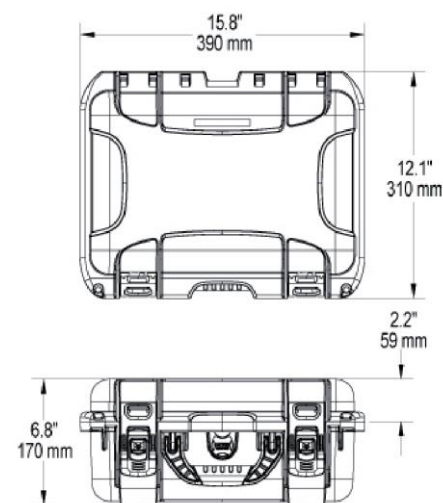


Figure 2

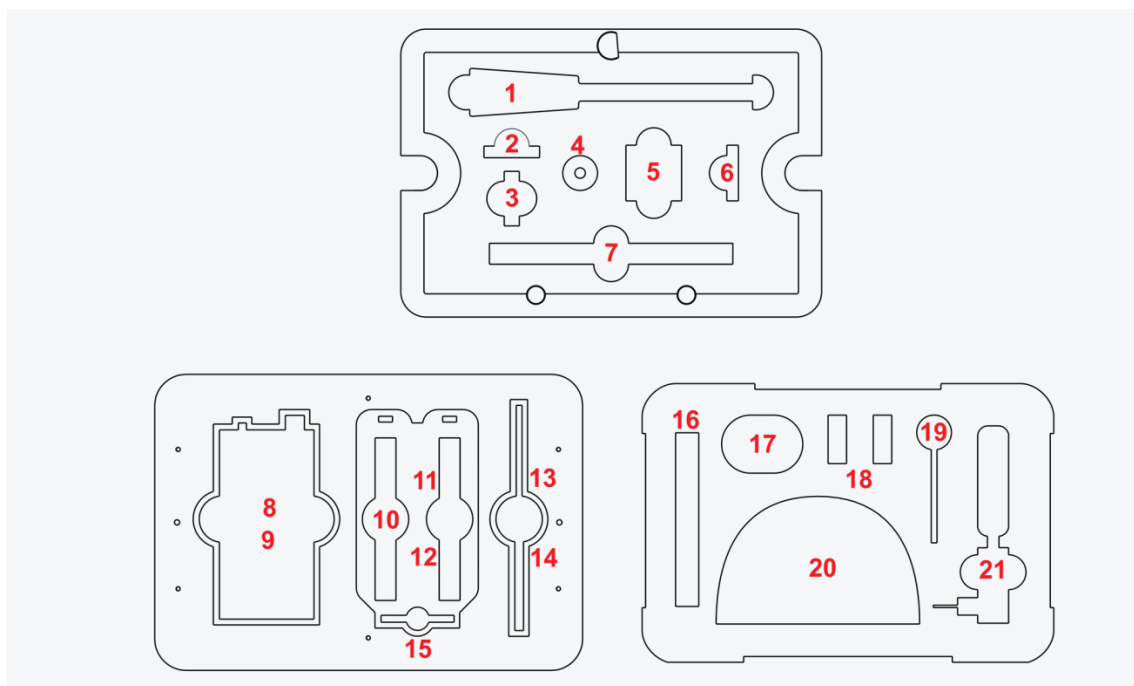


Figure 3

2.2.2. Delivery set

ST-031M delivery set includes:

1. Ultrahigh frequency sensor (UWBD031M).
2. Conductive wire lines differential generator
3. Battery (for conductive wire lines differential generator) .
4. Attenuator.
5. Test sound emitting device.
6. Connecting cable of sound emitting device.
7. Induction converter (Magnetic field sensor).
8. Main controlling, processing and displaying unit.
9. "Crocodile" type clamps (2 pcs).
10. Multipurpose adapter for checking wire lines - BWLC031M.
11. Cable to connect BWLC031M adapter to telephone lines.
12. Multipurpose cable to connect BWLC031M adapter to wire lines.
13. High-frequency telescopic antenna.
14. Cable to connect BWLC031M adapter to electricity sockets for scanning receiver CH2.
15. Flash drive with software.
16. Cable to connect to a PC.
17. Adapter to connect BWLC031M adapter to the multi-wire cables.
18. Telephone adapters (2 pieces).
19. Cable connectors type RG45: 8x4; 8x6; 8x8.
20. Headphones.
21. Charger.
22. Carrying case.
23. User manual and warranty certificate.

Figure 4 shows the main components of ST-031M (numbering corresponds to the numbering of the figure 3).



Figure 4

2.3. Design of the main control, processing and display unit

The main unit is the main part of ST-031M. Figure 5 shows the appearance of the front, top and bottom panels of the main unit.

At the top of the main unit are:

- RF connector for antenna «CH 1»
- jack for connecting scanning receiver adapter «CH 2»
- jack for connecting sensors and adapters «CH 3»
- handle power on / off and volume control «ON / OFF VOL»
- The front of the main unit includes:
 - a. color graphic LCD display (320x240 pixels)
 - b. power indicator «PWR»
 - c. two windows of infrared transmitters for wireless headphones;
 - d. 12 keys membrane keyboard.

Keys assignment:

F1 F2 F3 F4	Group function buttons. Their function varies depending on the mode ST-031M and indicated on the display directly above the button.
	Buttons to change settings.
ENTER	Confirm the selected option button / mode.
ESC	Button to return to the previous mode, or cancel the command.
FUNC	Additional functional button. Provides access to additional features.
HELP	Contexts tips.

More detail button assignments will be presented in the description of controls and indicators in Section 2.

Bottom panel has:

- Headphone jack «PHONE»
- Digital port for connection of external digital devices «EXT»
- Socket for connecting to a PC «USB»
- Socket to connect power supply / charger «DC5V»

In a bottom panel you can find a shield with serial number and manufacturer name indicated.

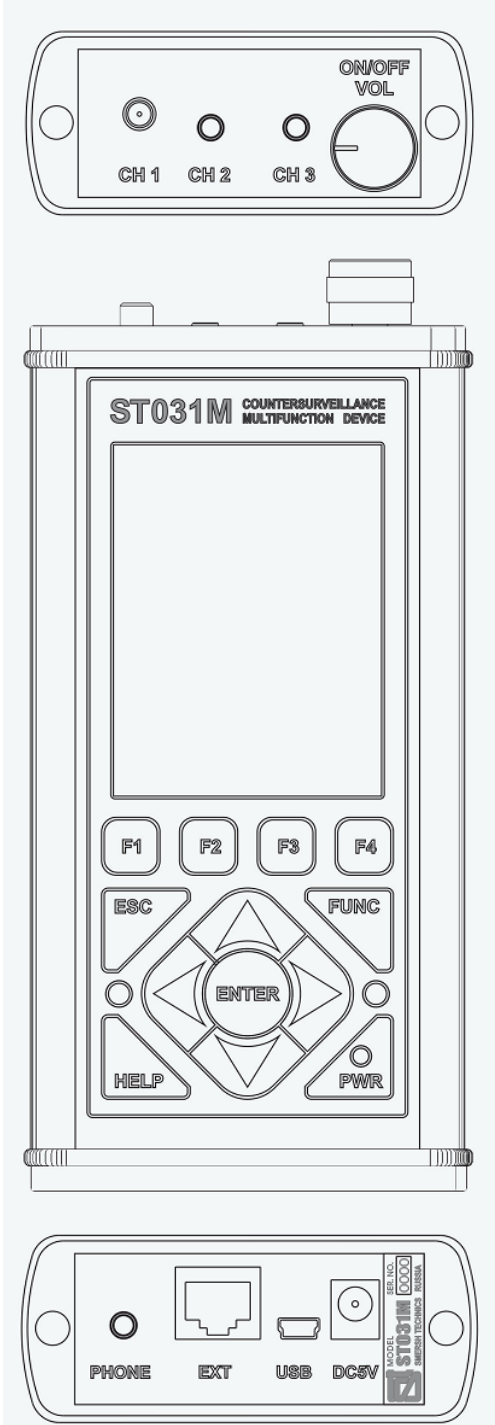


Figure 5

3. ST-031M operation modes

Systemotechnical and software foundation, incorporated in the design and operation of the device algorithms make it possible to apply it in the following modes:

- selective high-frequency electromagnetic field detector (in the frequency range 140-4420 Mhz);
- Scanning Analyser for wire lines (in the frequency range of 0.05-140 MHz);
- Low-frequency signal amplifier (in the frequency range 0.02-100 kHz).

When connecting one or another external device, you must manually choose appropriate mode of operation.

3.1. Switching on ST-031M

Switching the device On/Off is made by rotating volume knob «ON / OFF VOL», located on the top panel (Fig. 5).

To access the "Select Channel" mode, press any button on a ST-031M keyboard.

3.2. Mode "Channel selection"

"Channel selection" is primary menu where user can chose operating mode or set the system configuration.

The screen in the "Channel selection" is shown in Figure 7.

The numbers indicated in the figure:

1. system information text
2. the name of the current mode
3. Battery charge indicator
4. time display (hh: mm)
5. menu "Chose mode"
6. the menu item "Channel 1"
7. the menu item "Channel 2"
8. the menu item "Channel 3"
9. the menu item "Settings"
10. currently selected menu item
11. function keys assignment
12. function name assigned to button **F1**
13. function name assigned to button **F2**
14. function name assigned to button **F3**
15. function name assigned to button **F4**



Figure 6

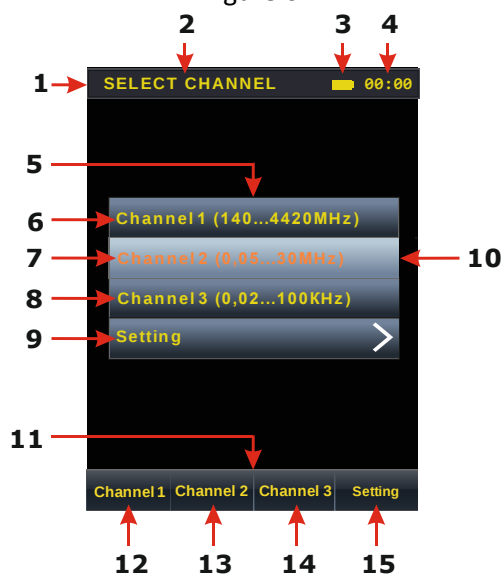


Figure 7

Available functions	Key
Menu item selection	
Activating selected mode	ENTER
Available modes	
"Channel 1" high frequency selective detector (140- 4200 MHz)	F1 or menu button pos.6 Fig.7
"Channel 2" scanning receiver (0.05 ... 30 MHz)	F2 or menu button pos. 7 Fig.7
"Channel 3" low frequency amplifier	F3 or menu button pos. 8 Fig.7
"Settings" (time, date, language, infrared headset)	F4 or menu button pos. 9 Fig.7

3.2.1. "Settings" mode

In the "Settings" menu user can set following system parameters:

- Time
- Date
- Language menu
- Enable / disable the IR headset.

Setting system time

Press button **F4** or chose appropriate menu item in the "Channel Selection" mode.

To adjust the time select menu item in the box that says „Time“ and presses **ENTER**.

In the window that appears, chose between hours or minutes (Fig. 9) using the buttons **LEFT** or **RIGHT**. Use buttons **UP** or **DOWN** to set the desired value. Confirm set time by pressing button **ENTER**.

If you press the **ESC** button, the unit exit without saving your changes. New settings will be stored in memory even when power is turned off.

Setting system date

To adjust the time select menu item in the box which says "Date" and press **ENTER**.

In the window that appears, set the required parameters (similar to how setting time)

Confirm set values by pressing **ENTER**. Tto return to the Mode menu "Settings" press button **ESC**.

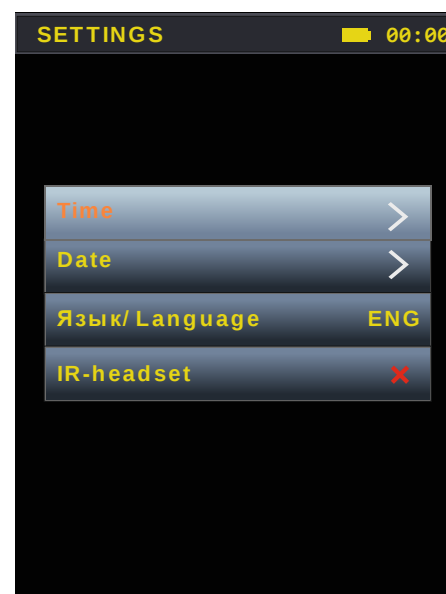


Figure 8



Figure 9



Figure 10

Selecting the Interface Language

The device has English and Russian language interface (the default is Russian).

To change language select menu item "Язык / Language" (Fig. 8) and press **ENTER**. In this menu, chose "RUS" or "EN".

Activating IR headphones

In addition to wired headphones, the instrument provides possibility to use wireless IR headphones. By default, the IR transmitter is off. In order to turn them on in the mode menu "Settings" chose "IR Headset" and press **ENTER**. Choose between IR mode by pressing **ENTER** button: **✗** - IR transmitter is disconnected or **✓** - IR transmitter is active. Press **ESC** to return to previous mode.

3.3. "CHANNEL 1" mode

Selective HF Detector

In this mode user can detect and identify radio signals in the frequency range from 140 to 4420 MHz, as well as to localize the sources of such signals, located in the inspected areas.

3.3.1. "Panorama" mode

This mode is the base for selective RF detector. Mode is activated in "Channel selection" menu by pressing the **F1** key or by selecting the menu item "Channel 1".

The screen is shown in Fig. 11.

The numbers indicated in the figure:

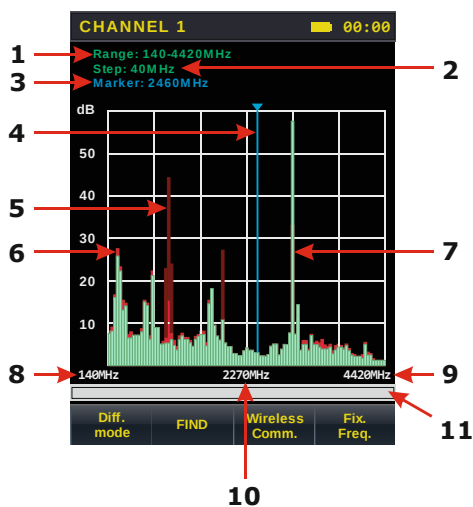


Figure 11

1. value of lower and upper bounds of the range panorama
2. value of scan step
3. frequency corresponding to the position of the marker on display
4. screen marker
5. max. signal level at a given frequency for the time of the session (maroon colour)
6. pulse component of the signal (red colour)
7. constant component of the signal (green colour)
8. value of the lower boundary frequency of the panorama
9. value of the upper boundary frequency of the panorama
10. value of the center frequency of the panorama
11. indicator showing current viewing band in comparison to maximum possible.

Available functions	Key
Changing the scanning step and limits the range of frequencies: 1, 2, 5, 10, 20, 40 MHz	UP or DOWN
Move display marker	LEFT or RIGHT
Show context tips	HELP
Available modes	
"Differential mode"	F1
"SEARCH"	F2
"Wireless networks"	F3
"Fixed frequency"	F4
Exit from current mode	
To "Chose channel" mode	ESC

3.3.2. "Differential" mode

In this mode, the signal levels, obtained in the "Panorama," taken as "zero" and displays only the exceeding set signal level. Enabling - the F1 key from the "Panorama" mode.

Indication of switch-on - change the colour labels "Diff. mode" from yellow to orange and lightening the background colour of the label (item 4 in Fig. 12)

The screen of the differential mode is shown in Figure 12.

Numbers indicated in the figure:

1. maximum signal level for the entire session observation for a given frequency (maroon colour)
2. indication of pulse signals (yellow colour)
3. indication of the average signal level (purple colour)
4. Indicates if differential mode is active.

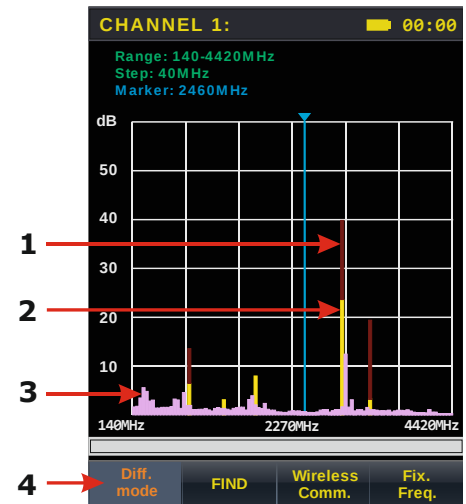


Figure 12

Available functions	Key
Changing the scanning step and limits the range of frequencies: 1, 2, 5, 10, 20, 40 MHz	UP or DOWN
Move display marker	LEFT or RIGHT
Show context tips	HELP
Available modes	
"Panorama mode"	F1
"SEARCH"	F2
"Wireless networks"	F3
"Fixed frequency"	F4
Exit from current mode	
To "Chose channel" mode	ESC
To "Panorama" mode	F1

3.3.3. "Fixed Frequency" mode

This mode is designed for fine-tuning to the frequency of the detected signal frequency, as well as to locate the source.

Mode activation is done from the "Panorama" mode by pressing button F4

Mode screen shown in Figure 13.

The numbers indicated in the figure:

1. the value of center frequency of the signal (corresponding to the frequency which was set in "Panorama" or "Diff. Mode" modes);
2. the value of bandwidth (corresponding to the value set in "Panorama" or "Diff. Mode" modes);
3. max. signal level for the entire observation session
4. an indicator of relative changes in signal level (shown in red pulse component)
5. an indicator of relative changes in signal level (shown in green DC component).

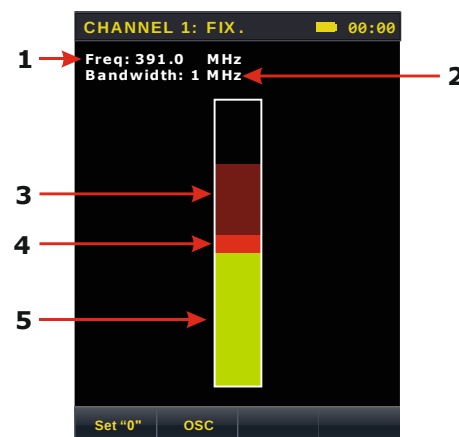


Figure 13

Available functions	Key
Monitoring changes in the relative signal level of the indicator (item 4, 5, Figure 13)	
Listening to the demodulated signal on speaker or headphones	
Adjust the center frequency of the signal with a step equal to the bandwidth (Figure 13 item 1)	LEFT or RIGHT
Changing the bandwidth: 1, 2, 5, 10, 20, 40 MHz (Fig. 13 key 2)	UP or DOWN
"Zeroing" the relative signal level, "Const. zero "	F1
Show context tips	HELP
Available modes	
"Oscilloscope"	F2
Return to "Panorama" or "Diff. Mode" mode	ESC

"Oscilloscope" Sub-mode

Screen sub modes "Oscilloscope" is presented in Figure 14.

The numbers indicated in the figure:

1. value of dividing the time axis (ms or msec)
2. value of the amplitude axis (dB)
3. measured value of signal amplitude (dB)

Available functions	Key
Acoustic control of demodulated signal	
Visual inspection of demodulated signal waveform	
Changing the scale interval of the time axis: 100, 200, 400, 800 μ s / div, 1, 3, 6 ms / div	LEFT or RIGHT
Scale change of fission axis amplitude: 2.5 or 12,5 dB / div	UP or DOWN
Call of contexts tips	HELP
Exit to previous mode	ESC

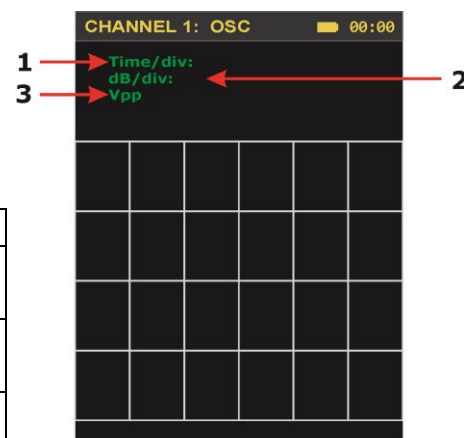


Figure 14

3.3.4. "SEARCH" Mode

Automatic detection of signal levels that exceed an adaptive threshold. The search is performed in frequency range defined in the "Panorama" or "Diff. regime." modes.

When you activate this mode (press F2 in "Panorama" mode) message is briefly displayed on screen accompanying the process of signal detection (Fig. 15).

Upon completion of the search process, forming a table presented in Figure 16, where the numbers denote:

1. total number of detected signals
2. number of detected signal in table
3. central frequency of detected signal
4. relative level of detected signal
5. additional information about the signal
6. position indicator line
7. indicator of changes in the relative level of the selected signal (shown in green DC component)
8. indicator of changes in the relative level of the selected signal (red shows the DC component).

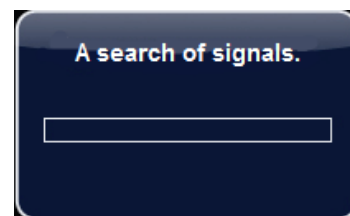


Figure 15

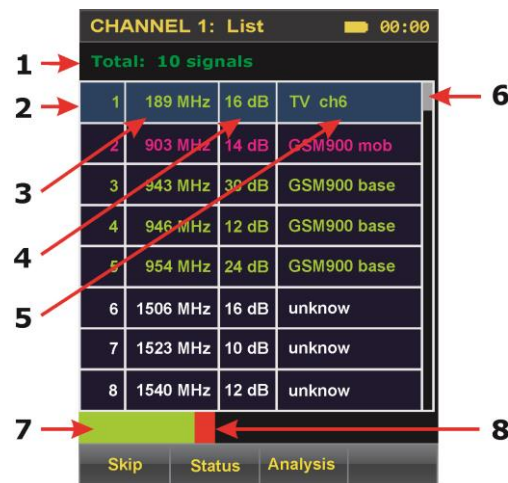


Figure 16

If you find air television signals, digital communication base stations and some other standard signals, the additional information (item 5 Figure 16) specifies the type of data signals, the color of the labels in a row - the green, which corresponds to the status of "known" (not dangerous) signal.

Upon detection of signals of digital mobile communications in the additional information (item 5 Figure 16) specifies the type of data signals, the colour of text boxes in a row - red, which corresponds to the status of "dangerous" (potentially dangerous) signal.

Upon detection of signals of a type that cannot be identified automatically, the additional information (item 5 Figure 16) indicates «unknown», while the colour labels in a row - white, which corresponds to the status of "unknown" signal.

At its discretion, the user can change the status of the signals detected by manually.

Available functions	Key
The choice of the signal in the list. Selected signal is displayed as a highlighted line	UP or DOWN
Listening to the selected demodulated signal on the speaker or headphones.	
Monitoring changes in the relative signal level of the indicator (item 7, 8, Fig. 16)	
Removing the signal from the list	F1
Assignment of signal status. The options are:	Press F2
"Dangerous" - red label	
"Known" - green label	
"Unknown" - white label	
Call of contexts tips	HELP
Available modes	
"Analysis"	F3
Output mode "Panorama" without saving results	ESC

3.3.5. "Analysis" mode

In general, the work unit in the "Analysis" mode is similar to working in the "Fixed-frequency" mode (p.3.3.3), except that in this case there is a possibility to save changes.

Mode screen "Analysis" presented at Fig.17.

The numbers indicated in the figure:

1. value of the center frequency of the selected signal;
2. the value of fixed bandwidth;
3. max. value of the signal level at a given frequency for the entire session of observation;
4. an indicator of changes in the relative level of the selected signal (shown in red pulse component);
5. an indicator of changes in the relative level of the selected signal (shown in green DC component).

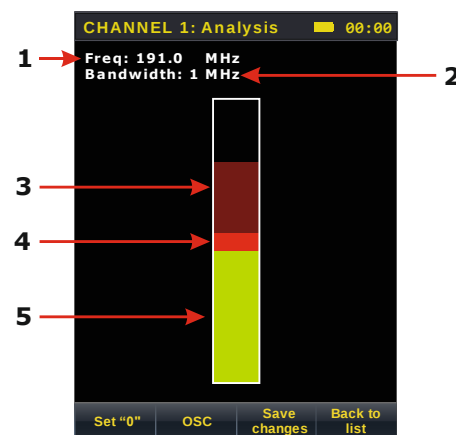


Figure 17

Available functions	Key
Control of the relative signal level according to the indicator (item 3, 4, Figure 17)	
Listening to the demodulated signal on speaker or headphones	
Adjust the center frequency with a step equal to the bandwidth	LEFT or RIGHT
Changing the bandwidth: 1, 2, 5, 10, 20, 40 MHz	UP or DOWN
"Zeroing" the relative level of the selected signal, "Setting zero"	F1
Save the changed value of the frequency of returning to the table of detected signals	F3
Call of contexts tips	HELP
Available modes	
"Oscilloscope"	F2
Exit from current mode:	
to the table of detected signals without saving the changed value of the center frequency of the signal	F4 or ESC
to the table of detected signals while preserving the values of the modified center frequency of the signal	F3

"Oscilloscope" Submode

Screen "Oscilloscope" submode is presented in Figure 18.

The numbers indicated in the figure:

1. value of dividing the time axis (ms or msec)
2. value of amplitude axis scale (dB)
3. measured value of the signal amplitude (dB)

Available functions	Key
Acoustic control of demodulated signal	
Visual inspection of demodulated signal waveform	
Changing the scale interval of the time axis: 100, 200, 400, 800 μ s / div, 1, 3, 6 ms / div	LEFT or RIGHT
Scale change of fission axis amplitude: 2.5 or 12,5 dB / div	UP or DOWN
Call of contexts tips	HELP
Exit to previous mode	ESC

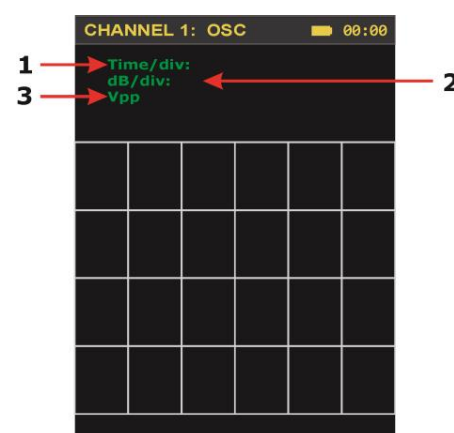


Figure 18

3.3.6. "Wireless communications" mode

This mode is designed for search of digital transmitters using the most common standard data transfer protocols, as well as a qualitative assessment levels of base stations of digital communication.

In this mode, there are three main sub-mode search digital devices:

- "Mobile devices"
- "Base stations"
- "User list"

To enter the "Wireless communications" from the "Panorama" mode press button F3, which automatically connects sub-mode "Mobile devices".

Sub-mode "Mobile devices"

The view of the screen is presented on figure 19.

The numbers indicated in the figure:

1. Name of a standard digital signal
2. Indicator of the relative signal level.
3. Table cursor.

Available functions	Key
Selecting the standard	UP or DOWN
Evaluation of the relative levels of signals selected in wireless standards	
Switching selected standard off / on	F2
Simultaneously switching on all previously Switched off standards	F3
Call of contexts tips	HELP
Available modes	
"Base stations"	F1
"Analysis"	F4
Exit to previous mode	ESC

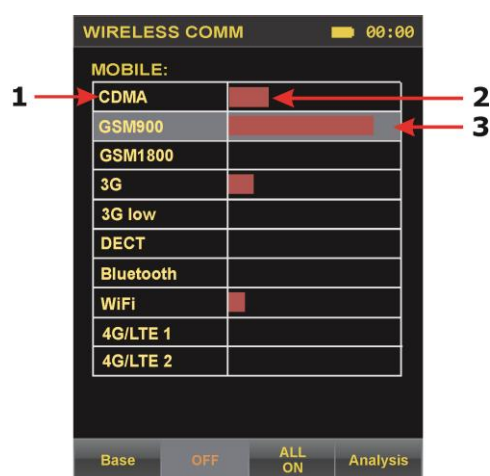


Figure 19

Sub-mode "Base stations"

The view of the screen is presented on figure 20.

Available functions	Key
Selecting the standard	UP or DOWN
Evaluation of the relative levels of signals selected in wireless standards	
Switching selected standard off / on	F2
Simultaneously switching on all previously Switched off standards	F3
Call of contexts tips	HELP
Available modes	
"User list"	F1
"Analysis"	F4
Exit to "Panorama" mode	ESC

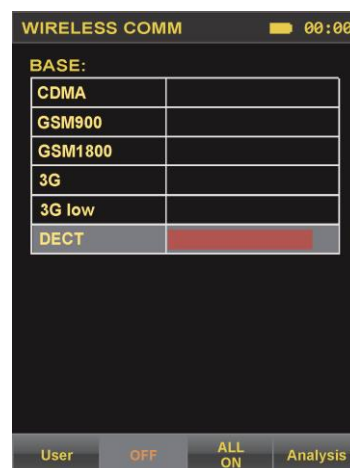


Figure 20

Sub-mode "User list"

This sub-mode allows operator to create his own list of bands with particular frequency range of standard digital protocols. For example, an alternative Wi-Fi, with 3.6 GHz working range. Furthermore, this mode allows to create a set of "dangerous" frequency bands, which are commonly used in wireless microphones, video cameras with a radio channel and other radio transmitting STMOSI. Creation of User list is performed by using the PC software.

The view of the screen is presented on Figure 20a.

Available functions	Key
Selecting the standard	UP or DOWN
Evaluation of the relative levels of signals selected in wireless standards	
Switching selected standard off / on	F2
Simultaneously switching on all previously Switched off standards	F3
Call of contexts tips	HELP
Available modes	
"Base stations"	F1
"Analysis"	F4
Exit to "Panorama" mode	ESC

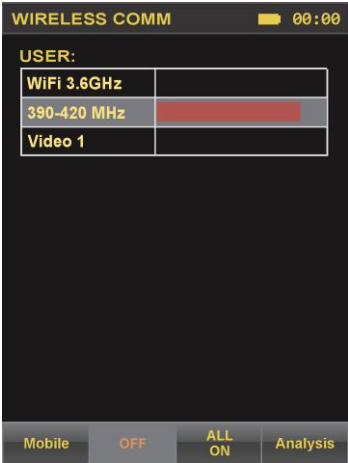


Figure 20a

Sub-mode "Analysis"

This sub-mode is designed for selecting the frequency of the detected signal, and also to find the location of the signal source. To enter from the sub-modes "Mobile devices", "Base stations" and "User list " press button F4. The view of the screen is presented on Figure 20b.

- The number meaning in the illustration:
- 1 - The value of the center frequency band;
 - 2 - Set bandwidth value;
 - 3 - The maximum signal level for the entire session of observation.
 - 4 - An indicator of the relative change in the signal level (Pulsing component shown in red);
 - 5 - An indicator of the relative change in the signal level (Continuous component shown in green);
 - 6 - The value of the lower boundary of the set bandwidth;
 - 7 - The value of the upper boundary of the set bandwidth;
 - 8 - An indicator showing the viewing width and span relatively to the established boundaries of the bandwidth.

Available functions
Control of changes in the relative signal level on the indicator.
Listen to the demodulated signal to a speaker or headphones

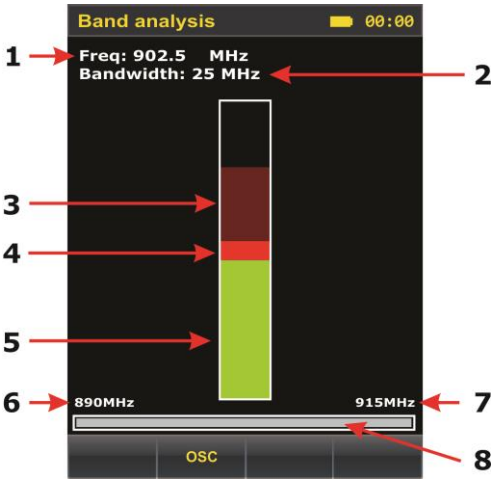


Figure 20b

3.3.7. Recommendations for the use ST-031M in selective RF detector mode ("Channel 1")

Using ST-031M in different modes of selective HF detector is focused on the detection, identification and localization of special technical means of obtaining secret information (STMOSI), transmitting the signal off-site search in the frequency range 140-4200 MHz. It should be understood that the device can detect only "active" STMOSI, e.g. working at the time of transfer.

Unique features implemented in ST-031M selective detector are:

- The ability to detect signals exceeding the threshold in an adaptive automatic mode with the formation of a list of these signals. The list indicates the most important information about the signal (center frequency, level, information on the possible type of signal). In addition, if the frequency of the detected signal coincides with the frequencies of known signals (broadcast stations, base stations, communications systems, etc.), it is automatically assigned the status of "known", ie certainly not "dangerous". When a match is the central frequency of the detected signal with frequencies typical for mobile digital communications, such signals automatically is assigned the status of "dangerous" because it can be signals of wireless microphones that use the channel same as a standard digital protocols.
- The presence of differential treatment makes it possible-selected signals, the sources are located in the near zone, e.g. on-site search.
- Ability to control signal at a fixed frequency (modes' Fix. Frequency "and" Analysis "). This greatly simplifies the process of localizing the source of the signal, even against the more powerful signals.
- Ability to listen to the acoustic information on the built-in speaker or headphones allows operator to identify the signals. If you set the center frequency of coincidence with the frequency of wireless microphone located in the premises (with not encoded transmission), the headphones will hear the noise of the room. To identify the source of the detected signal is recommended that you create in a room called "Control the sound." The source of this sound can serve as a tape recorder, CD / DVD player or a specific source of the reference tone. Should not be used for this purpose the television or radio.

Should be considered as dangerous signals:

- demodulated signals are correlated with the signal source reference tone (this is typical for analog microphone with "unencrypted transmission channel and a relatively simple types of encoding);
- frequencies do not coincide with the frequencies of TV channels, radio and other "known" sources;
- levels of which vary considerably when entering and navigating through the object being tested (with high probability the sources of these signals are close to the device).

In accordance with the characteristics of the selective RF detector, in general, there are three main options for transmitting STMOSI search:

- Search using the automatic mode;
- Search in manual mode;
- Search for digital mobile communications and STMOSI, based on them.

The proposed further uses of ST-031M are typical and may be adjusted depending on the characteristics of the object and the challenges faced by search operators.

3.3.7.1. Search using automated signal detection mode.

This search option is essential. Its main advantages - simplicity and minimal detection time. Recommended for use on most sites, provided the low and medium levels of radio spectrum load.

No.	Action	Control element	Indication
Preparation			
1.	Inside of the scanned area connect the RF antenna to the "CH1" and headphones to the «PHONE» at the bottom of the unit		
2.	Switch-on the device	Turn the volume control clockwise.	Splash screen. Figure 6.
3.	Enter into the "Channel Selection" mode	Press any key on the keyboard	Screen "Channel selection" mode. Figure 7.
4.	Enter into the "Settings" mode (if required to change settings)	Two ways: - With the buttons UP or DOWN set the cursor to the "Settings" and press ENTER ; - Press the F4 button	Screen "Settings" mode. Figure 8.
5.	Perform the necessary settings change and exit the into the "Channel selection" mode	In accordance with Clause 3.2.1.	
6.	Enter into the "Channel 1" mode	Two ways: - With the buttons UP or DOWN set the cursor to the "Channel 1" and press ENTER ; - Press F1 button	Basic mode selective RF Detector "Panorama" Figure 11.
Signal detection			
7.	Enable automatic search mode	F2 button	The message as in Fig.15 will be shown on screen. Upon completion of the automatic search, results will be generated and presented on-screen table (list) of detected signals, arranged in ascending order of their center frequency. By default, cursor is located on the first row of the table. Fig.16.
8.	Select signal	Use UP or DOWN set table pointer to a string containing information about the signal of interest.	In headphones listen to demodulated signal. The indicator (position 7, 8, Fig.16) shows the relative level of constant and pulsed signal components
9.	Select mode "Analysis"	Button F3	Screen "Analysis." mode Figure 17. In headphones listen for demodulated signal. The display shows the relative level of constant and pulsed signal components
10.	Adjust the center frequency and bandwidth signal.	adjustment: frequency - LEFT or RIGHT bandwidth - UP or DOWN	By observing changes in the relative level of the signal and listening to the demodulated signal, set the frequency and the bandwidth corresponding to

			the maximum signal level and the best signal quality in the headphones
11.	Exit from the "Analysis" to the table of detected signals	Save changes - F3 button Without saving changes - Button F4 or ESC	When you press F3, detected signal parameters in the table will change in accordance with the adjustments.
12.	Changing status of the signal	Successive pressing F2	Font color changes
13.	Remove signal from list	Use UP or DOWN to set the table cursor on the signal you want to delete. Press the F1 button	The line will be removed from the list of detected signals.
Signal source localization			
14.	Chose signal	Same as in step 8	
15.	Switch-on "Analysis" mode	Same as in step 9	
16.	Setting current signal level as "Zero"	Button F1	The relative level of the signal is taken as "zero", while the level of the indicator will be significantly reduced.
17.	Locate place of signal source		By observing changes in the relative level of the indicator, find place where indicator shows maximum level.
Repeat steps 14-17 for all "dangerous" and "unknown" signals in the table.			

Notes:

If the list of detected signals contains signals whose frequency is within the 140-280 MHz range, it might be that these signals are the upper harmonics of high-power signals, with central frequencies below 140 MHz. This circumstance is due to the fact that the lower limit of the working range of the selective RF detector is 140 MHz and the device cannot record the signal at frequencies below this limit. However, their harmonics are detected reliably within the operating range.

3.3.7.2. Search in manual mode

This option is recommended to apply in a complex electromagnetic environment. The advantages of this method include the possibility of using selective RF detector in a differential mode, which allows distinguishing between external and internal signals (sources which are located in the near zone). However, the search takes longer than in the automatic mode.

No.	Action	Control element	Indication
Preparation			
1.	Outside of the scanned area connect the RF antenna to the "CH1" and headphones to the «PHONE» at the bottom of the unit		
2.	Switch-on the device	Turn the volume control clockwise.	Splash screen. Figure 6.
3.	Enter into the "Channel Selection" mode	Press any key on the keyboard	Screen "Channel selection" mode. Figure 7.
4.	Enter into the "Settings" mode (if required to change settings)	Two ways: - With the buttons UP or DOWN set the cursor to the "Settings"	Screen "Settings" mode. Figure 8.

		and press ENTER ; - Press the F4 button	
5.	Perform the necessary settings change and exit the into the "Channel selection" mode	In accordance with Clause 3.2.1.	
6.	Enter into the "Channel 1" mode	Two ways: - With the buttons UP or DOWN set the cursor to the "Channel 1" and press ENTER ; - Press F1 button	Basic mode selective RF Detector "Panorama" Figure 11.
Getting difference spectrum			
7.	Enable "Differential Search" mode	F1 button	Differential search screen as in Fig.12 The signal levels obtained in the "Panorama" mode are taken as "zero." The screen displays deferential spectrum range (average - lilac color, pulse components - yellow). Purple color on the screen shows the maximum signal levels obtained in the "Panorama"
Signal detection			
8.	Enter to inspected room		
9.	Monitor change in signal levels on device screen. If increase in the levels are observed, set screen marker on to the peak of signal.	Buttons LEFT or RIGHT	
10.	Switch-on "Fixed frequency" mode	Press F4	"Fixed frequency" control mode screen. Figure 13.
11.	Fine-tuning	Adjustment: Frequency – buttons LEFT or RIGHT Bandwidth – UP or DOWN	Watching the change in the relative level of signal and listening to demodulated signal in headphones, set the frequency and bandwidth, corresponding to the maximum level and the best sound quality.
Signal source localization			
12.	Zeroing relative signal level	Button F1	The relative level of the signal is taken as "zero." Levels decrease significantly on the display.
13.	Find location of the signal source		By observing change of the indicator, find area in the room where the relative signal level shows maximum level.
Repeat operations described in steps 9-13 for all signal levels which rose at the entrance to the inspected premises.			

Notes:

For a detailed assessment of the busiest parts of the spectrum range and fine-tune the display marker in the modes of the "Panorama" and "Differential mode" it is useful to reduce on-screen viewing band (button **UP**).

In assessing the demodulated signals in the "Fixed frequency" mode it is recommended to use "Oscilloscope" sub-mode.

During localization of signal sources in the "Fix. frequency" mode, operator should pay attention to changes in levels of continuous and pulse current signal components (red and green), with respect to the maximum recorded level (maroon colour). In the case of moving away from the source of signal, it is clearly visible decrease in the levels of the current signal on the background of the maximal recorded level and, vice versa.

If the searching area has a high level of background signals, use the attenuator (Figure 4, No. 4). The attenuator is connected to the jack CH1 on top of the main unit (Figure 5). The antenna, in this case, is connected on top of the attenuator. The attenuator provides suppression of the signal by 20 db. Detection range of the radio transmitters, when attenuator installed, decreases.

3.3.7.3. Search in "Wireless Communications" mode

"Wireless Communications" mode is designed to detect signals of the most common digital communications and data transmission systems. Mobile devices of these systems can be used as STMOSI. Selective RF detector ST-031M allows not only to identify the signals of these devices, but also to localize the sources of such signals in the inspected area.

The user also has the ability to qualitatively assess the level of base station signals common used in digital communication and data transmission.

Furthermore, due to the presence of sub-mode "User list", it is possible to create and use different frequency bands, which are different then the integrated by the manufacturer. This feature extends the capabilities of the device to search for "nonstandard" channels, as well as increases the effectiveness of the search for radio microphones, which are using the most typical frequency ranges.

Creating and editing User lists is done by PC software.

No.	Action	Control element	Indication
Preparation			
1.	Inside of the searching area connect the RF antenna to the "CH1" and headphones to the «PHONE» at the bottom of the unit		
2.	Switch-on the device	Turn the volume control clockwise.	Splash screen. Figure 6.
3.	Enter into the "Channel Selection" mode	Press any key on the keyboard	Screen "Channel selection" mode. Figure 7.
4.	Enter into the "Settings" mode (if required to change settings)	Two ways: - With the buttons UP or DOWN set the cursor to the "Settings" and press ENTER ; - Press the F4 button	Screen "Settings" mode. Figure 8.
5.	Perform the necessary settings change and exit the into the "Channel selection" mode	In accordance with Clause 3.2.1.	
6.	Enter into the "Channel	Two ways:	Basic mode selective RF Detector

	1" mode	- With the buttons UP or DOWN set the cursor to the "Channel 1" and press ENTER ; - Press F1 button	"Panorama" Figure 11.
Wireless communication signal detection			
7.	Enable "Wireless Communications" search mode	F3 button	"Wireless Comm" screen will appear Fig. 19
Once you have enter the "wireless network" will automatically connect sub-mode "Mobile device". Connecting the sub-modes "Base station" and "User list" is made by pushing F1			
"Mobile devices" signal detection			
8.	Turning off standard "Mobile devices" of digital communication	With the buttons UP or DOWN set table cursor to the desired signal type. Press F2 .	When turning off, the color indicating the type of signal changes from yellow to grey.
9.	Enabling previously disconnected "Mobile devices" of digital communications	With the buttons UP or DOWN set the table cursor to the desired disabled type of signal. Press F2 . For simultaneous connection of all types of previously disconnected signals press F3 .	When turning off, the color indicating the type of signal changes from grey to yellow.
The presence of active mobile devices is determined by the signal strength indicator (to the right of the table refer to a specific type of device).			
Analysis of the detected signal			
10.	Analysis of the detected signal	With the buttons UP or DOWN use the table cursor to the line corresponding to the detected signal. Press F4 .	The device turns into sub-mode "Analysis". The screen is conforming to Figure 20b.
11.	Setting the center frequency and bandwidth	With the buttons UP or DOWN set the necessary bandwidth value. With the buttons LEFT or RIGHT set the value of the center frequency.	Using configuration it is necessary to reach the maximum level of indication level.
12.	Analysis of oscilogramme	Press button F2 . Vertical scaling – UP or DOWN Horizontal scaling – LEFT or RIGHT	The device turns into sub-mode "Oscilloscope". The screen is conforming to Figure 14.
Signal source localization			
In the mode "Analysis" (Figure 20b) put the device in the center of the inspected place. While moving the device within a room, watch the corresponding information by indicator of the signal strength. The area where the indicator corresponds to the maximum signal level will be the approximate location of the detected signal. Note: In some cases, it is not possible to clearly determine the location of installed source. For the exact location it is recommended to disconnect the antenna from the connector CH1 and continue the search.			
Control of base station signal levels of digital communication			
13.	Enter sub-mode "Base stations"	In the sub-mode "Mobile devices" press F1 .	The screen of sub-mode "Base stations" .Figure 20
14.	Turning off standard "Base stations" of digital communication	With the buttons UP or DOWN set table cursor to the desired signal type. Press F2 .	When turning off, the color indicating the type of signal changes from yellow to grey.
15.	Enabling previously disconnected "Mobile devices" of digital communications	With the buttons UP or DOWN set the table cursor to the desired disabled type of signal. Press F2 . For simultaneous connection of all types of previously disconnected signals press F3 .	When turning off, the color indicating the type of signal changes from grey to yellow.
Availability of operating base stations is determined by the level of indicated signal.			

16.	Analysis of the detected signal	Actions analog to paragraph no. 10, 11 of this table.
17.	Analysis of oscilogramme	Actions analog to paragraph no. 12 of this table.
“User list” signal detection		
18.	Create (edit) and save user list.	
All further actions to detect, analyze and locate are similar to those specified in paragraphs 8-12 of this table.		

3.4.2. "Differential" mode

In this mode, the signal levels obtained in the „Panorama“ taken as „zero“ and display only the levels of excess.

Enabling – press **F1** key from the "Panorama" mode.

Indications include - change the color labels "Diff. regime" from yellow to orange and lightening the background color of the label (position 3 in Fig. 22)

The screen of the differential mode is shown in Figure 22.

The numbers indicated in the figure:

1. Display of pulse signals (yellow)
2. Display of the average signal level (purple color)
3. Display the activation of the differential mode.

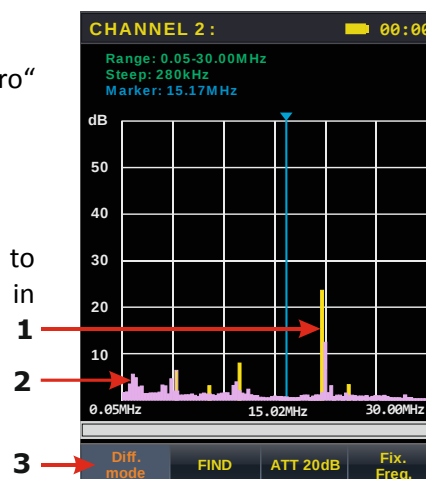


Figure 22

Available functions	Key
Changing the scanning step and frequencies band limits: 28, 140, 280 kHz	UP or DOWN
Move screen cursor	LEFT or RIGHT
Show context tips	HELP
Available modes	
"Differential"	F1
"Search"	F2
"Attenuator 20 dB"	F3
"Fixed frequency"	F4
Exit from current mode	
To the "Select channel" mode	ESC

"Attenuator" function

The function allows you to reduce the input signals at 20dB. This is necessary in cases, if the levels of interference signals in tested line are too high.

Enable - **F3** button in the "Panorama" mode.

Activating attenuation in "Differential mode" leads to the exit from this mode to the "Panorama" mode. However, when the attenuator is active, "Differential mode" is available.

Also, when the attenuator is active, following modes are available:

- automatic search ("Search")
- control signal at a fixed frequency ("Fix. frequency")

Function activation indicator - change color of the text "ATT 20 dB" in the function assignments keys line from yellow to orange, and lightening the background color of the lettering.

3.4.3. "Fixed Frequency" mode

This mode is designed for fine-tuning the central frequency of the detected signal.

Sign of the modes of the "Panorama" or "Differential mode" - the **F4** button

Mode screen shown in Figure 23.

The numbers indicated in the figure:

1. the value of signal center frequency (corresponding to the frequency at which the marker was set in "Panorama" or "Diff. Mode" modes)
2. demodulator (AM or FM)
3. an indicator of relative changes in signal level (shown in red pulse component)
4. an indicator of relative changes in signal level (shown in green DC component).

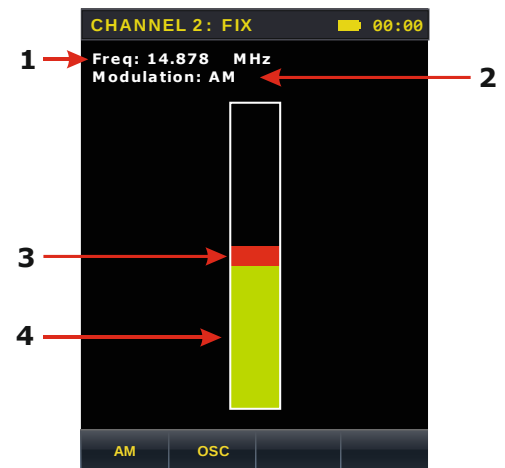


Figure 23

Available functions	Key
Monitoring changes in the relative signal level of the indicator (item 3, 4, Fig. 23)	
Listening to the demodulated signal on speaker or headphones	
Adjust the center frequency of the signal with a step equal to the bandwidth (position 1 Figure 23)	LEFT or RIGHT
Change demodulation type (AM/FM)	F1
Show context tips	HELP
Available modes	
"Oscilloscope"	F2
Exit to the previous mode ("Panorama" or "Diff. Mode")	ESC

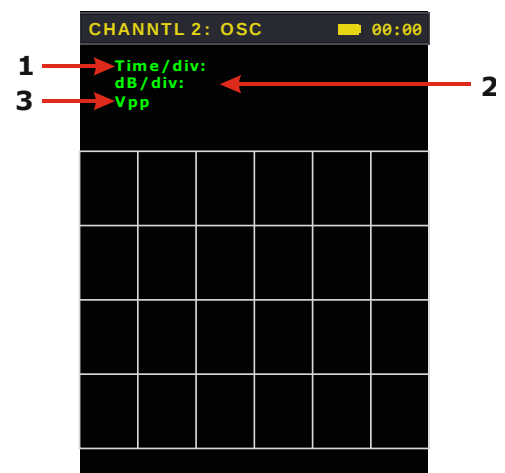


Figure 24

Sub-mode "Oscilloscope"

"Oscilloscope" sub-mode screen presented at Figure 24.

The numbers indicated in the figure:

1. set the value of scale of time axis (ms or msec)
2. set the value of scale of amplitude axis (dB)
3. measured value of the signal amplitude (dB).

Available functions	Key
Acoustic control of demodulated signal	
Visual control of demodulated signal waveform	
Changing the scale interval of the time axis: 100, 200, 400, 800 μ s / div, 1, 3, 6 ms / div	UP or DOWN
Changing division scale of the amplitude axis 3 or 15 dB / div	LEFT or RIGHT
Show context tips	HELP
Exit to "Fixed frequency" mode	ESC

3.4.4. "SEARCH" mode

Automatic detection of signal levels that exceed an adaptive threshold. The search is performed in the frequency range defined in the "Panorama" or "Diff. mode" modes.

When you activate SEARCH mode (button F2 from "Panorama" mode) message is displayed on screen that accompanies the process of signal detection (Figure 25).

Upon completion of the search process, forming a table presented in Figure 26, where the numbers denote:

1. total number of detected signals
2. number of detected signal in table
3. the central frequency of the detected signal
4. the relative level of the detected signal
5. Additional information about the signal
6. Current position indicator line in the list
7. an indicator of changes in the relative level of the selected signal (shown in green DC component)
8. an indicator of changes in the relative level of the selected signal (shown in red pulse component)
9. Display currently active demodulator (AM / FM).



Figure 25

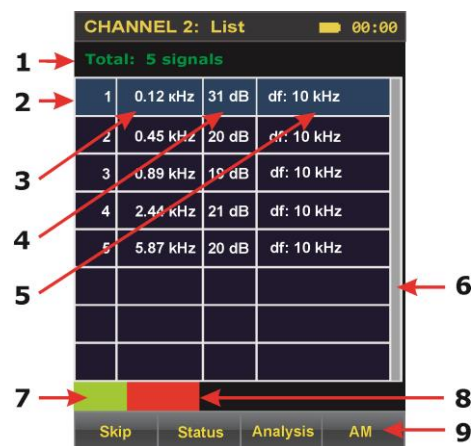


Figure 26

Available functions	Key
The choice of the signal in the list. Selected signal is displayed as a highlighted line	UP or DOWN
Listening to the selected demodulated signal on the speaker or headphones.	
Monitoring changes in the relative signal level of the indicator (item 7, 8)	
Remove signal from the list	F1
Assignment of signal status. The options are:	Press F2 several times to choose appropriate status
"Dangerous" - red label	
"Known" - green label	
"Unknown" - white label	
Switch demodulator mode AM/FM	F4
Call of contexts tips	HELP
Available modes	
"Analysis"	F3
Output mode "Panorama" without saving results	ESC

3.4.5. "Analysis" mode

The regime is intended to clarify the parameters of the signals detected in the automatic mode. In general, the work unit in the "Analysis" is similar to working in the "fixed rate" (p.2.4.3), except that in this case, it is possible to save your changes.

To enter "Analysis" sub-mode (from "SEARCH" mode) - press **F4**.

Mode screen is shown in Fig.27.

The numbers indicated in the figure:

1. value of the center frequency of the selected signal;
2. select demodulator (AM or FM);
3. an indicator of changes in the relative level of the selected signal (shown in red pulse component);
4. an indicator of changes in the relative level of the selected signal (shown in green DC component).

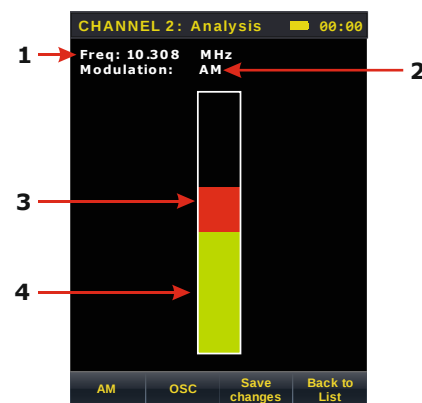


Figure 27

Available functions	Key
Control of the relative signal level according to the indicator (item 3, 4, Figure 27)	
Listening to the demodulated signal on speaker or headphones	
Adjust the center frequency of the signal (item 1 in Figure 27)	LEFT or RIGHT
Changing type of demodulator (AM/FM)	F1
Call of contexts tips	HELP
Available modes	
"Oscilloscope"	F2
Exit from current mode:	
to the table of detected signals without saving the changed value of the center frequency of the signal	F4 or ESC
to the table of detected signals while preserving the values of the modified center frequency of the signal	F3

"Oscilloscope" sub-mode

Sub-mode is activated from "Analysis" mode by pressing **F2** button.

Screen "Oscilloscope" submode is presented in Figure 28.

The numbers indicated in the figure:

1. value of dividing the time axis (ms or msec)
2. value of amplitude axis scale (dB)
3. measured value of the signal amplitude (dB)

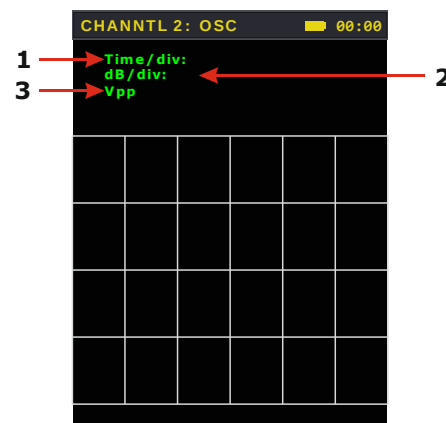


Figure 28

Available functions	Key
Acoustic control of demodulated signal	
Visual inspection of demodulated signal waveform	
Changing the scale interval of the time axis: 100, 200, 400, 800 μ s / div, 1, 3, 6 ms / div	LEFT or RIGHT
Scale change of fission axis amplitude: 3 or 15 dB / div	UP or DOWN
Call of contexts tips	HELP
Exit to "Analysis" mode	ESC

3.4.6. Recommendations for the use of ST-031M in scanning receiver (Channel 2) mode

Using ST-031M in scanning receiver mode is focused on the discovery of channels used by special technical means of obtaining secret information (STMOSI), transmitting the signal off-site by power and low-current lines in the frequency range 0.05-140 MHz.

As can be seen from the description of modes of scanning receiver, in many respects they are similar to the modes implemented in a selective high-frequency detector. However, the use of these modes is different in some way. This is due to the specifics of performing search of wired STMOSI.

For example, using a scanning receiver cannot locate the source of the signal detected by the methods described in the "Channel 1". The main objective of using a scanning receiver ST-031M - the discovery of the fact of illegal transmission of signals from the scanned area of a wire lines (within the range of operating frequencies, "Channel 2"). These lines can be:

- mains
- telephone lines
- line of security and fire alarm
- lines of computer networks
- cable TV lines
- radio transmitting lines, etc.

When analyzing received information, signals to be considered as dangerous:

- demodulated signals are correlated with the signal source reference tone set in the scanned area (this is typical for analog STMOSI, the un encoded transmission channel and a relatively simple types of encoding);
- which levels are much higher than the background noise and interference;
- broadband signals.

It is required from operator not only the ability to work with the search appliance, but also the possession of information about the inspected object:

- what types of wire lines are installed in inspected premises;
- lines installation scheme;
- possibility of unauthorized access to the lines from the outside of inspected premises, etc.

Strict adherence to the rules of electrical safety is very important, when checking lines. Life-threatening voltage is applied to the device adapter.

In general, the verification of wire lines is as follows:

- Scanning frequency range characteristic of the wired STMOSI and detection of the most powerful signals.
- Investigation of detected signals (estimated informativeness of demodulated signals, determining the form of modulation of analog signals and their correlation with the acoustic environment of inspected premises, analysis of waveforms of digital signals, etc.).
- Identification of dangerous signals.

Since the device has two types of search (manual - mode "Panorama" and the automatic - mode "Search"), the difference in the proposed search options is only in the method of signal detection. Further action on the analysis and identification of signals in both methods are identical.

The proposed further uses ST-031M are typical and may be adjusted depending on the characteristics of the object and the tasks faced by search operators.

Using the universal adapter BWLC031M

The adapter is designed to connect ST-031M "Piranha" to high and low voltage wire lines in the scanning receiver mode (Channel 2) and to low-voltage lines in the mode of low-frequency amplifier (Channel 3).

The appearance of the adapter is shown in Figure 28a.

The numbers in the illustration:

- 1 - jack for connecting the adapter to the tested wire line
- 2 – indicators showing the presence of voltage in the tested wire line
- 3 - wire with a jack for connecting adapter into "CH3" socket (low-frequency amplifier) ST-031M
- 4 - wire with a jack for connecting adapter into "CH2" socket (scanning receiver) ST-031M (wire marked with a red marker)
- 5 - Shield.

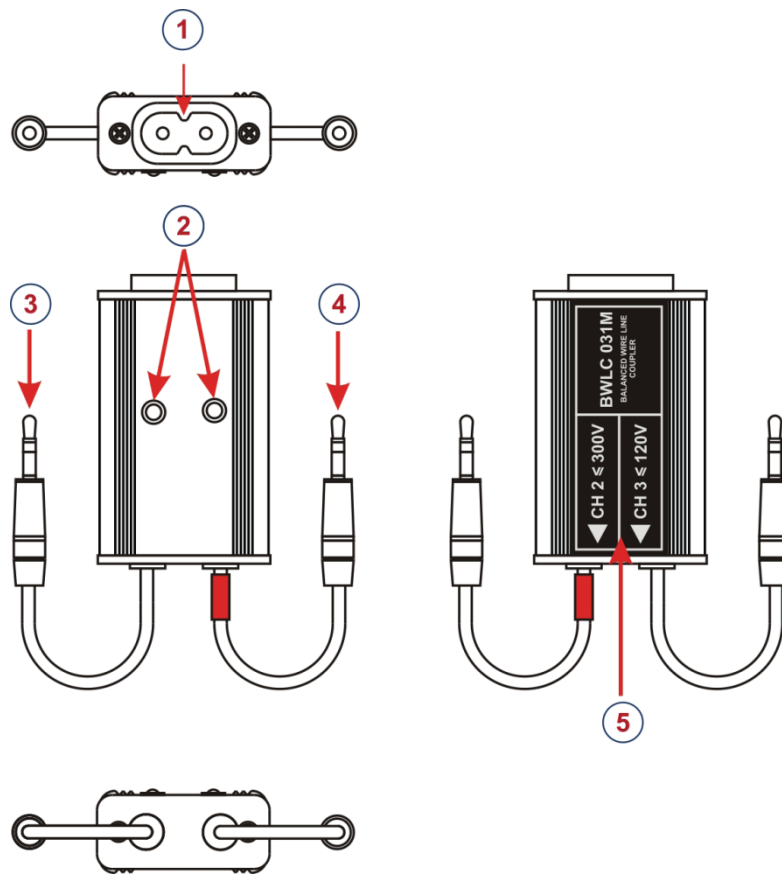


Figure 28a

Connection in scanning receiver mode (Channel 2)

There are two options to connect the adapter to wire lines (Fig.28b).

- If the power supply line, equipped with a standard electricity sockets, is inspected, it is convenient to use a connecting cable pos.14 figure 4 (wiring diagram A Fig.28b).
- If you plan to work on the crosses, vending machines, etc., you must use multipurpose cable (position 12) and clamps (position 9) Figure 4. (wiring diagram B in Fig.28b).

The output cable of the adapter is marked in red (Figure 28a, position 4) and has to be connected to the socket "CH2", located on the top panel of ST-031M.

Warning! Do not connect the cable to the other output jacks ST031M!

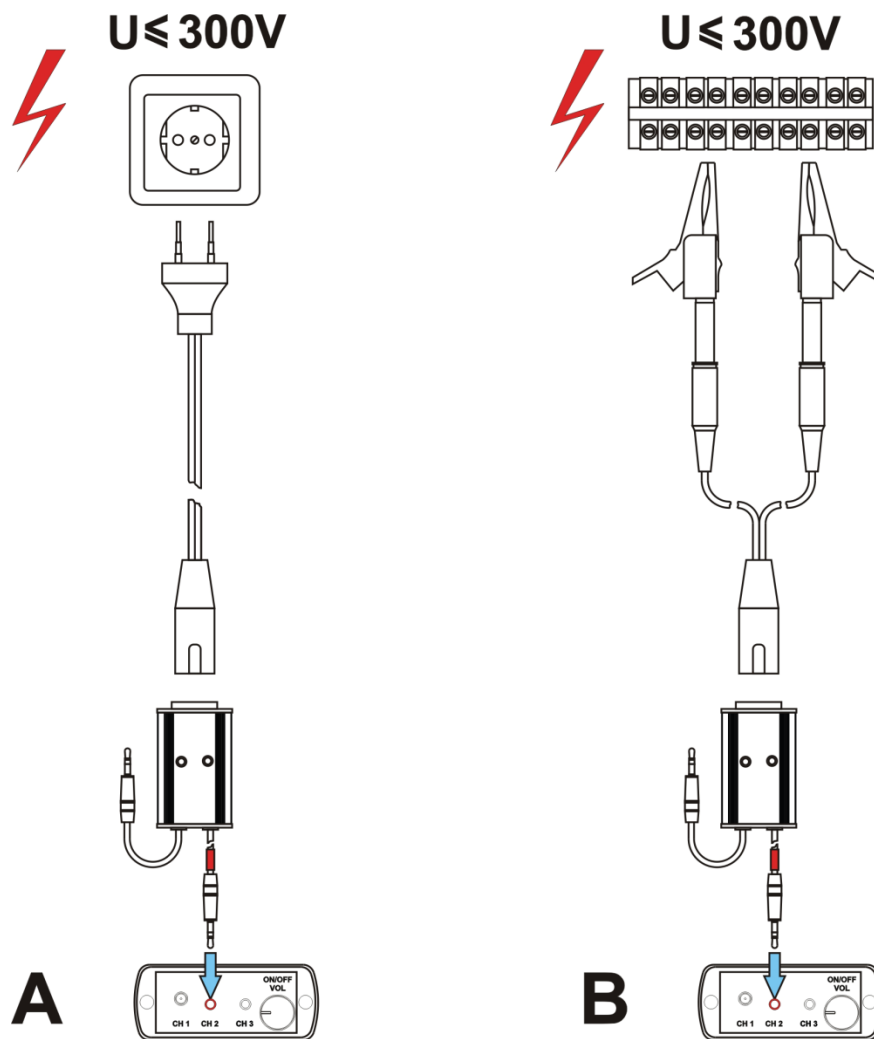


Figure 28b

3.4.6.1. Search using automated signal detection mode

This search option is essential. Its main advantages are simplicity and minimal signals detection time.

When checking power lines, it is recommended to search with attenuator switched-on!

No.	Action	Control element	Indication
Preparation			
1.	Connect universal adapter BWLC031M to the main unit and tested line as shown in Fig.28b (option A or B). The presence in the line of DC current is indicated by one of the two indicators (No.2, Figure 28a). If inspected line has alternating voltage - both LEDs should light. No light indicates that the tested line has no current.		
2.	Switch-on the device	Turn the volume control clockwise.	Splash screen. Figure 6.
3.	Enter into the "Channel Selection" mode	Press any key on the keyboard	Screen "Select channel" mode. Figure 7.
4.	Enter into the "Settings" mode (if required to change settings)	Two ways: - With the buttons UP or DOWN set the cursor to the "Settings" and press ENTER ; - Press the F4 button	Screen "Settings" mode. Figure 8.
5.	Perform the necessary settings change and exit the into the "Channel	In accordance with Clause 3.2.1.	

	selection" mode		
6.	Enter into the "Channel 2" mode	Two ways: - With the buttons UP or DOWN set the cursor to the "Channel 2" and press ENTER ; - Press F2 button	
7.	Setting the scanning range and enter in base mode "Panorama"	Two ways: - With the buttons UP or DOWN choose the needed FR range and to confirm press ENTER ; - Set the FR range with the help of buttons F1 , F2 , F3 .	Menu of selecting the scanning range. Base mode of scanning receiver - "Panorama". Figure 21
8.	Switch-on attenuator (necessary in case of checking power lines, in case of checking low current lines – depends on band spectrum load)	Button F3	Attenuator indicator becomes active
Signals detection			
9.	Enable automatic search mode	Button F2	The message as in Fig.25 will be shown on screen. Upon completion of the automatic search, results will be generated and presented on-screen table (list) of detected signals, arranged in ascending order of their center frequency. By default, cursor is located on the first row of the table. Fig.26
Detected signals analysis			
10.	Select signal	Use UP or DOWN to set the table cursor to a string containing information about the interested signal.	In headphones listen to demodulated signal. The indicator (position 7, 8, Fig.26) shows the relative level of constant and pulsed signal components
11.	Evaluation by modulation type	Button F4	The default mode is AM. Pressing F4 toggles the demodulator to the FM (which is displayed on the screen). Pressing F4 again, returns the AM. You must connect different demodulators to determine which of them gives better acoustic quality of the signal.
If the demodulated signal correlates with the acoustic environment in inspected room or control sound, then it means that STMOSI device is installed in room and transmits information by wire under test. Signal must be treated as "Dangerous" (button F2). The localization of such a device can be made by reducing the volume of the sound emitter, and moving it around the room. In this demodulated signal is monitored in the headphones. Approximate STMOSI installation location will coincide with the place where the emitters sound had best quality. In case of detection of broadcast station signals on the known frequencies, such signals can be assigned with status "Known", or deleted from the list by pressing F1 If the detected signal cannot be demodulated, and its frequency does not comply with the frequencies of the broadcast stations (operating in the scanned frequency range), the signal must be analyzed more detailed.			
12.	Switch-on "Analyze" mode	Button F3	"Analyze" mode screen. Listen to demodulated signal. Indicator shows

			constant and impulse components of the signal.
13.	Adjustment of signal central frequency	Buttons LEFT or RIGHT	By observing changes in relative level of the signal and listening to the demodulated signal, set the frequency corresponding to the maximum signal level and the best signal quality in the headphones.
14.	Exit from the "Analysis" submode to the table of detected signals	With saving changes - F3 button Without saving changes - Button F4 or ESC	When you press F3 , detected signal parameters in the table will change in accordance with the corrections made.
15.	Changing status of the signal	Button F2	Font color changes

3.4.6.2. Search using manual signal detection mode

This search option is a subsidiary. Recommended to use on wire lines with high levels of background noise.

No.	Action	Control element	Indication
Preparation			
1.	Connect universal adapter BWLC031M to the main unit and tested line as shown in Fig.28b (option A or B). The presence in the line of DC current is indicated by one of the two indicators (No.2, Figure 28a). If inspected line has alternating voltage - both LEDs should light. No light indicates that the tested line has no current.		
2.	Switch-on the device	Turn the volume control clockwise.	Splash screen. Figure 6.
3.	Enter into the "Select channel" mode	Press any key on the keyboard	Screen "Channel selection" mode. Figure 7.
4.	Enter into the "Settings" mode (if required to change settings)	Two ways: - With the buttons UP or DOWN set the cursor to the "Settings" and press ENTER ; - Press the F4 button	Screen "Settings" mode. Figure 8.
5.	Perform the necessary settings change and exit the into the "Channel selection" mode	In accordance with Clause 3.2.1.	
6.	Enter into the "Channel 2" mode	Two ways: - With the buttons UP or DOWN set the cursor to the "Channel 2" and press ENTER ; - Press F2 button	Scanning receiver base mode "Panorama" Figure 21.
7.	Setting the scanning range and enter in base mode "Panorama"	Two ways: - With the buttons UP or DOWN choose the needed FR range and to confirm press ENTER ; - Set the FR range with the help of buttons F1 , F2 , F3 .	Menu of selecting the scanning range. Base mode of scanning receiver - "Panorama". Figure 21
8.	Switch-on attenuator (necessary in case of checking power lines, in case of checking low current lines – depends on band spectrum load)	Button F3	Attenuator indicator becomes active

Setting the scanning FR range			
If the band load range is not uniform, it is recommended to set the range in accordance with the boundaries of areas of interest. This is convenient in terms of following fine-tuning the marker on the frequency of the signal of interest.			
9.	Setting central frequency of the band	Buttons LEFT or RIGHT	First it is necessary to define the start and end frequency range of bandwidth area in which search will be performed. Then determine center frequency of the resulting range. Set the marker to central frequency.
10.	Band scaling	Buttons UP or DOWN	Set the desired width of the band (with respect to frequency, corresponding to position of screen marker).
Compensation of interference signals			
Connect one of adapter's probes to one of the wire of two-wired-line which is under testing.			
11.	Switch-on differential mode	Button F1	The level of the previously detected signals is taken as zero. Display shows the differential spectrum.
Signals detection			
Connect adapter's second probe of the second wire of the test line. The spectral image on the screen will change. A spectrum picture on the screen will change. It shows the difference signal levels. In the ideal case, the spectrum shows signals characteristic in the testing line.			
12.	"Rough" signal adjustment	Buttons LEFT or RIGHT	Set screen market to signal of interest
13.	Signal control on fixed frequency	Button F3	"Fixed frequency" screen mode
14.	Fine tuning	Buttons LEFT or RIGHT	By monitoring indicator value, set the frequency where signal level is maximal.
15.	Evaluation of modulation type	Button F1	By changing modulation type, achieve best quality of demodulated signal.
If the demodulated signal correlates with the acoustic environment in inspected room or control sound, then it means that STMOSI device is installed in room and transmits information by wire under test. The localization of such a device can be made by reducing the volume of the sound emitter, as it was described in recommendations for the automated searching mode. Repeat steps 12-15 for all powerful signals which appears in differential spectrum.			

3.5. "CHANNEL 3" Mode. Low-frequency amplifier.

This mode is intended for assessment of low-frequency signals received by various sensors and adapters:

- LF adapter (BWLC031M);
- Magnetic field sensor;
- UHF sensor.

The format of information in the "Channel 3":

- oscillogramme;
- linear spectrum;
- octave spectrum.

3.5.1. Mode enabling / disabling

Mode enabling is done from the menu "Select channel" when you select "Channel 3" or by pressing **F3**. Once you have entered into this mode the information by default is presented in the format of oscilloscope (Figure 29). Exiting from the "Channel 3" into "Select channel" - the button **ESC**.

3.5.2. Selecting the type of the adapter

To work correctly with ST-031M in the "Channel 3" it is necessary to choose the appropriate type of the connected adapter. To do this, regardless if any sub-mode is on screen (oscilloscope, linear or octave spectrum), press **F4**.

In the appeared menu (Figure 30), using the buttons **UP** or **DOWN** tick the symbol **✓** on the conforming position and press **ENTER**.

By default in the menu (Figure 30) LF adapter (BWLC031M) is chosen.

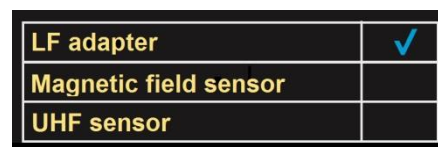


Figure 29

3.5.3. Sub-mode "Oscilloscope"

The screen of the mode "Oscilloscope" is presented on Figure 30.

The numbers indicated in the figure:

1. Indication of the enabled sub-mode.
2. Vertical oscillogramme scaling
3. Setting the value of time axis dividing (ms or msec)
4. RMS value of signal amplitude.
5. The measured value of the signal amplitude (dB)
6. Indication of the set gain value.

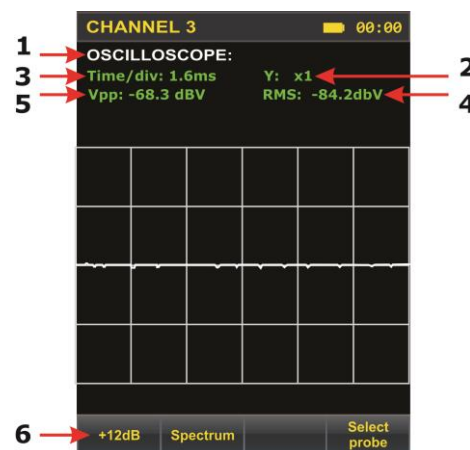


Figure 30

Available functions	Key
Acoustic control of the signal	
Visual inspection of the signal waveform	
Changing the scale interval of the time axis: 100, 200, 400, 800 μ s/div, 1, 3, 6 ms/div	LEFT or RIGHT
Vertical scaling of oscillogramme: x1, x2, x4	UP or DOWN
Setting gain value: +12, +24, +36, +48	F1
Switching to the sub-mode "Linear spectrum"	F2
Call for the menu to select the adapter	F4
Call of contexts tips	HELP
Exit to "Select channel" mode	ESC

3.5.4. Sub-mode “Linear spectrum”

The screen of this mode is presented on Figure 31.

The numbers indicated in the figure:

- 1 - Indication of set sub-mode.
- 2 - The frequency corresponding to the marker position.
- 3 - Digital indications of the signal amplitude at the frequency of marker.
- 4 - Marker.
- 5 - A graphical signal strength indicator at the frequency of marker.
- 6 - Display the set value of the gain.

Available functions	Key
Acoustic control of the signal	
Signal parameter control	
Setting the marker on the signal	LEFT or RIGHT
Setting gain value: +12, +24, +36, +48	F1
Switching to the sub-mode "Oscilloscope"	F2
Switching to the sub-mode "Octave spectrum"	F3
Call for the menu to select the adapter	F4
Call of contexts tips	HELP
Exit to “Select channel” mode	ESC

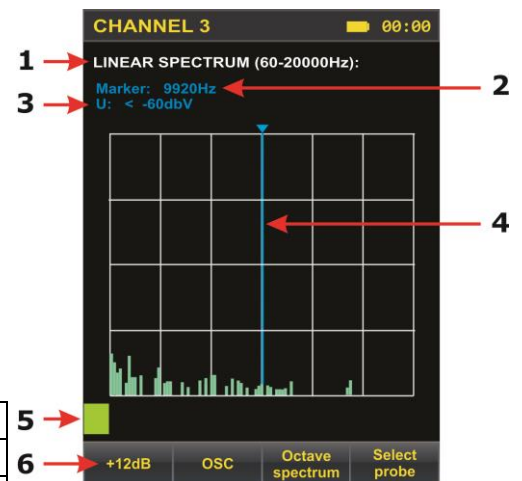


Figure 31

3.5.5. Sub-mode “Octave spectrum”

The screen of this mode is presented on Figure 32.

The numbers indicated in the figure:

- 1 - Indication of set sub-mode.
- 2 - The frequency corresponding to the marker position.
- 3 - Digital indications of the signal amplitude at the frequency of marker.
- 4 - Marker.
- 5 - A graphical signal strength indicator at the frequency of marker.
- 6 - Display the set value of the gain.

Available functions	Key
Acoustic control of the signal	
Signal parameter control	
Setting the marker on the signal	LEFT or RIGHT
Setting gain value: +12, +24, +36, +48	F1
Switching to the sub-mode "Oscilloscope"	F2
Switching to the sub-mode "Linear spectrum"	F3
Call for the menu to select the adapter	F4
Call of contexts tips	HELP
Exit to “Select channel” mode	ESC

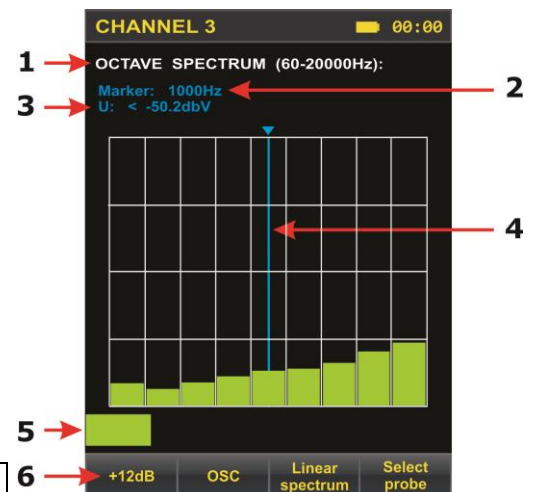


Figure 32

3.5.6. Recommendations for the use of ST-031M in “Channel 3” - Low-frequency amplifier

The use of low-frequency amplifier ST-031M allows multiple search functions. Implementations of these functions are achieved by using special sensors or adapters. The set of ST-031M Piranha includes the following adapters:

- Multipurpose adapter for checking wire lines (BWLC031M).
- Induction converter (Magnetic field sensor).
- Ultrahigh frequency detector (UWBD031M).

To identify the detected signals it is required to use controlling sound emitter. The following table lists includes the major search function of LF amplifier of ST-031M and sensors by which these functions are implemented.

Search function	Sensor/adapter used
Check low-current lines. (subjected to all low-current lines, placed in checked room).	Multipurpose adapter for checking wire lines (BWLC031M).
Detection of low-frequency magnetic fields, modulated by controlling sound, and also the detection of different operating electronic devices (including those, which are in the stand-by/passive mode).	Induction converter (Magnetic field sensor).
Detection and localization of transmission channels in the room transmitting STMOSI, which are operating in the frequency range from 4400 up to 12000 MHz.	Ultrahigh frequency detector (UWBD031M).

3.5.7. Multipurpose adapter for checking wire lines (BWLC031M) in the mode Low-frequency amplifier (Channel 3)

Multipurpose adapter BWLC031M, connected to the input of the Low-frequency amplifier (CH3) is designed to check low-voltage wire lines for the presence of cable microphones, as well as detection of "microphone effect" of electronic equipment.

The order of operation

Connect the BWLC031M adapter to the main unit (CH3) and tested line, as shown in Figure 33. When testing telephone lines, computer networks or other conductive lines, with RJ45 connectors, it is recommended to use a special adapter for connecting multi wires pos.17 (Figure 4) (connection option A Figure 33). When connected to a line in the distribution boxes it is comfortable to use convenient connecting cable item pos.12 and clamps pos.9 (Figure 4) (connecting option B Fig.33).

The presence in the line of DC current is informed by one of the two indicators lighting (item 2 Figure 28a). If inspected line has alternating voltage - both LEDs should light up. No light indicates that the tested line has no voltage.

Caution ! Connecting any sensors and adapters to jack «CH3» is done only when the main unit is switched off !

Connect your headphones to the «PHONE» on the bottom of the unit.

Turn on the device. In the channel selection mode select “Channel 3” - Low-frequency amplifier. When entering Channel 3 Low-frequency amplifier the sensor "LF adapter" will be set by default.

Use **F2** and **F3** to set the desired mode of display (oscilloscope, linear spectrum or octave spectrum).

With the button **F1** set the desired gain value (+ 12dB / + 24dB / + 36dB / + 48dB).

Use the volume knob to set the volume.

Listening through headphones referential tone helps to indicate the presence of microphone in the tested line or indicates “microphone effect” of the equipment connected to this line.

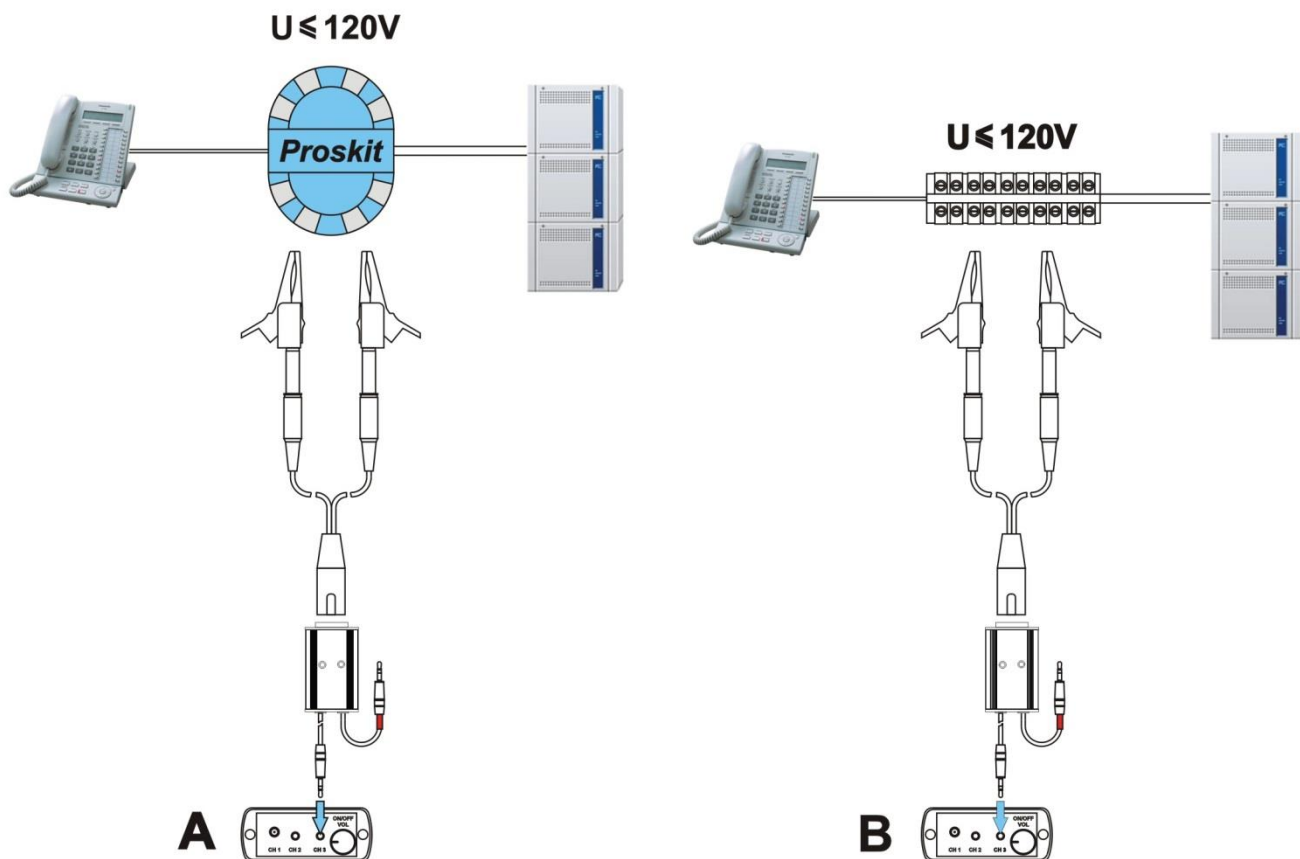


Figure 33

3.5.8.1. Conductive wire lines differential generator

The conductive wire lines differential generator is used for detection of cable microphones not powered during the eavesdropping equipment detection process. This unit is used in combination with the multipurpose adapter BWLC031M (Channel 3 mode).

Outer appearance of the unit is shown in a Figure 34. The numbers represent:

- 1 – Power source (battery. “Krona” type)
- 2 – Contact unit
- 3 – Wire clamps.

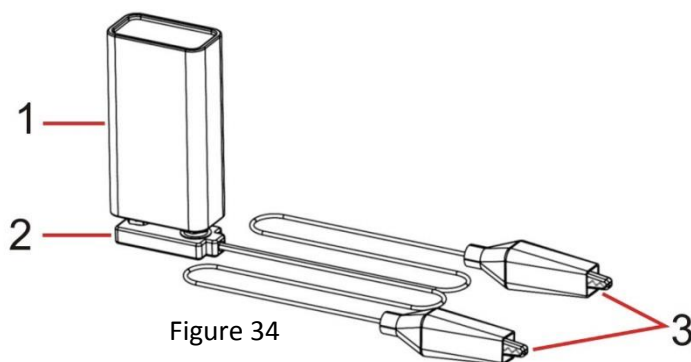
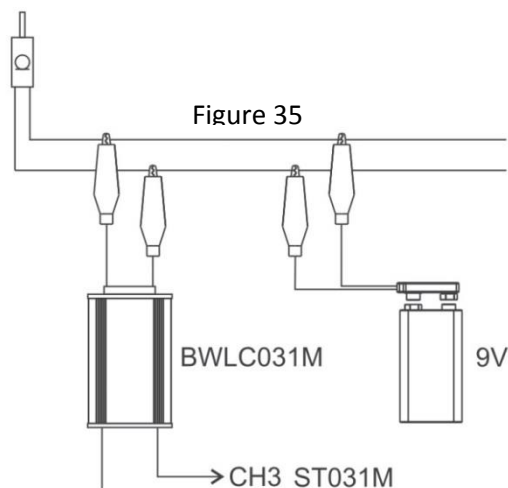


Figure 34

Operational instructions

- Find a wire section to connect the BWLC031M and the generator to;
- Connect the BWLC adapter to a wire line for inspection (both indicators are down – the power on the line is cut off) and to CH3 on ST031M;
- Turn on the ST031M in a low frequency amplifier mode (Channel 3);



- Turn on the sound generator in the room to be inspected;
- Check for information signal on a wire line using a pair of headphones connected to main ST031M unit;
- In case there is no information signal, connect the generator as shown in drawing no.9.
- In case there is a signal – the wire line is “bugged”.
- If after connecting the equipment as shown in Figure 36 there is no informative signal, the polarity has to be changed (switch the clamps positions).
- If there is no signal in the wire line after changing the polarity of clamps, the wire line is considered to be secure.

Caution! If you are testing a stranded/multi-core wire line, the procedure has to be repeated with every strand combination possible.

3.5.8.2. Induction converter (Magnetic field sensor)

The induction converter is used to evaluate the electromagnetic fields disturbances in the negotiations room, and signals possibly created by eavesdropping equipment.

The converter could also be used for wall communication lines detecting.

Construction of the induction converter

The induction converter consists of a magnetic antenna and an amplifier, with a radio-waves transparent casing. Outer appearance of the unit is shown in the Figure 36. The two-step switch is located on the forward side of the converter case (1 on Figure 36). The indicator led (2 on Figure 36) and connection cable (3 on Figure 36) are located on the back side of the unit.

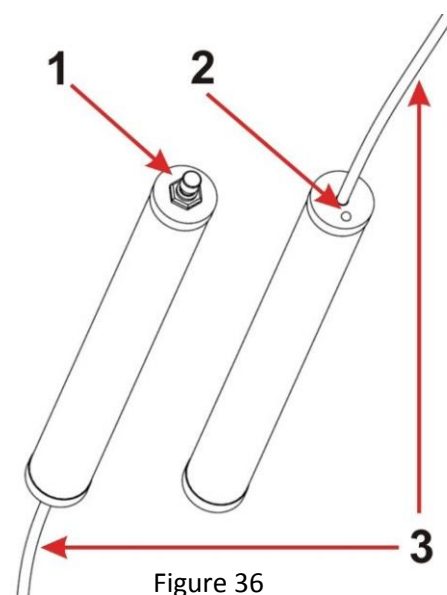


Figure 36

Operating the induction converter

Plug in the 3,5mm stereo-jack into CH3 on the upper panel of ST-031M device.

Turn on the ST-031M.

Select the “Channel 3” option (low frequency amplifier).

Press **F4** to select the sensors installation menu. Using the **UP** or **DOWN** keys, select the **✓** symbol in the “Magnetic field sensor” line and press the **ENT** key. Using the two-step switch (1 on Figure 36) turn on the preferable working mode. Ensure that that the unit is working properly using the indicator led (2 on figure 36). If the indicator glows, the unit is working in the magnetometer mode; if not, it is working in the second mode which can be used to compensate the disturbances in the electric net (50Hz).

Use buttons **F2** and **F3** to set the desired mode display (oscilloscope, linear or octave spectrum).

With the **F1** key to set the desired gain value (+ 12dB / + 24dB / + 36dB / + 48dB).

Use the volume knob to set the volume.

Recommendations and intended use of the induction converter

As stated above, the induction converter is used to evaluate the possibility of information leakage through channel of side electromagnetic emissions. The electromagnetic field is created by authorized electronic equipment (such as PC's, phones and selected communications, amplifiers, recorders etc.) Such electromagnetic fields could also transmit additional unauthorized signals.

The main testing and evaluation task in this sector consists of:

- detecting the low frequency electric emissions of the electronic equipment in the room concerned
- detecting the information-carrying signal in such emissions
- detecting the area, which is covered by the signal created.

Additional functions of the induction converter as a side-equipment using other detection methods:

- “Physical search” procedures (detection of audio recording equipment, mobile phones and several other types of electronic devices)
- Checking of the cable systems (communications checking).

Testing and evaluation of the low frequency electro-magnetic emissions of the electronic equipment

To lower the electromagnetic disturbances level during the testing procedures, switch of all the office equipment known to emit non-informative electromagnetic signals, such as day light lamps, air conditioners, coolers etc. If a high level of harmonic disturbances is present (usually, if the 220V/50Hz net), it is recommended to use the second mode of the induction converter (differential mode of antenna switching). To enter this mode, use the two-step switch (1 on drawing No. 5). The indicator led should be off if the correct mode in this case was selected. Every source of possible electromagnetic information transmission leakage danger should be turned on and inspected separately. The antenna of the sensor is placed in the near vicinity of the inspected device than gradually withdrawn (and orientated in different angles) to locate the place where information-carrying signal is "blocked" (or audio signal level is too weak to be considered readable).

Detection of unauthorized electric equipment

There are two main factors, which help/prevent the detection of such devices: the ambient electromagnetic field level in the vicinity of an unauthorized equipment/device and the electromagnetic emission level of such a device itself.

The detection capabilities of non-shielded voice recorders, mobile phones and some types of micro-cameras by an induction converter unit usually do not exceed 10-15 cm.

Detection of unauthorized electric wiring

In this case the induction converter is used as a simple electrical communication detection device. The antenna is positioned parallel to the inspected wall near its surface. Moving the sensor "by sectors" it is possible to find the sources of electromagnetic emissions. After finding the initial source, the orientation of the wiring is determined by moving antenna in horizontal and vertical motions. This operation is most resultative when using the unit's second function (gradientometer).

3.5.8.3. Ultrahigh frequency sensor (UWBD031M)

UHF sensor is used in the closest guard zone detection and localization of radio-emitting devices working in the diapasons from 3 to 12 GHz.

Construction of the UHF sensor

The microwave sensor consists of an antenna module in a radio-wave transparent case and a cable with a standard 3.5 mm jack. The outer appearance of the module is shown in the drawing no.2. The antenna is directional. The direction of the search is opposite to the cable. The module is powered through the main ST-031M module.

Operating procedures for the UHF sensor

Plug the microwave 3,5m jack to the CH3 of the main ST-031M unit. Turn on the ST-031M device and select the low-frequency amplifier mode ("Channel 3").

Direct the microwave sensors antenna towards the possible location of the radio-transmitting device and watch the reading on the main ST031M module (signal level indicator, oscillogramme). If the radio-transmitter working in diapason from 3 to 12 GHz is presented in the vicinity of the detector, signal level indicator will show it. It is possible to detect the approximate location of the radio-transmitting device through finding maximal value of the signal.

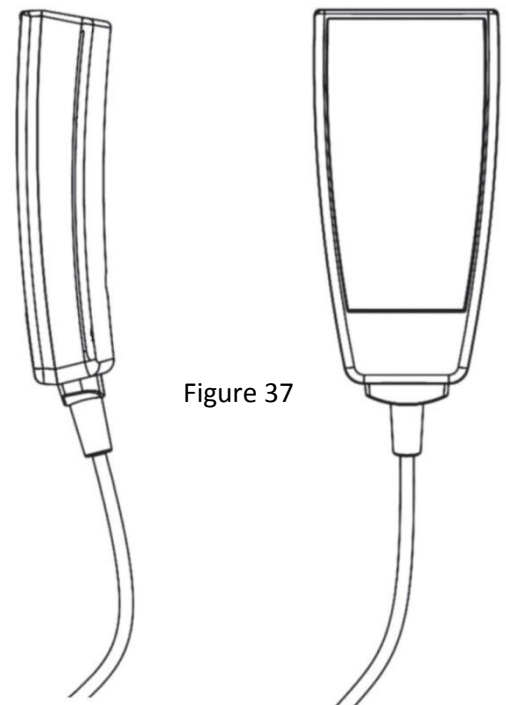


Figure 37

4. Operating ST-031M with a personal computer

Operate **ST-031M** with a personal computer (PC) by using the program **ST031M-Piranha**.

Main features:

- Duplication of the controlling functions.
- Display ST-031M graphical information on PC monitor.
- Creating and editing User list.
- Archiving of information received from ST-031M on PC hard drive
- A software upgrade (firmware inside ST-031M).

4.1. The program ST031M-Piranha

Program installation

Installation file "ST031m_piranha_1_1.exe" is located on a USB flash card that is included with the device. To install the software run the file "ST031m_piranha_1_1.exe" and follow the instructions.

If the base module ST-031M is not connected to the computer, status bar indicates status as "Disconnected" (Figure 38).

The user can only access "Settings" menu item.

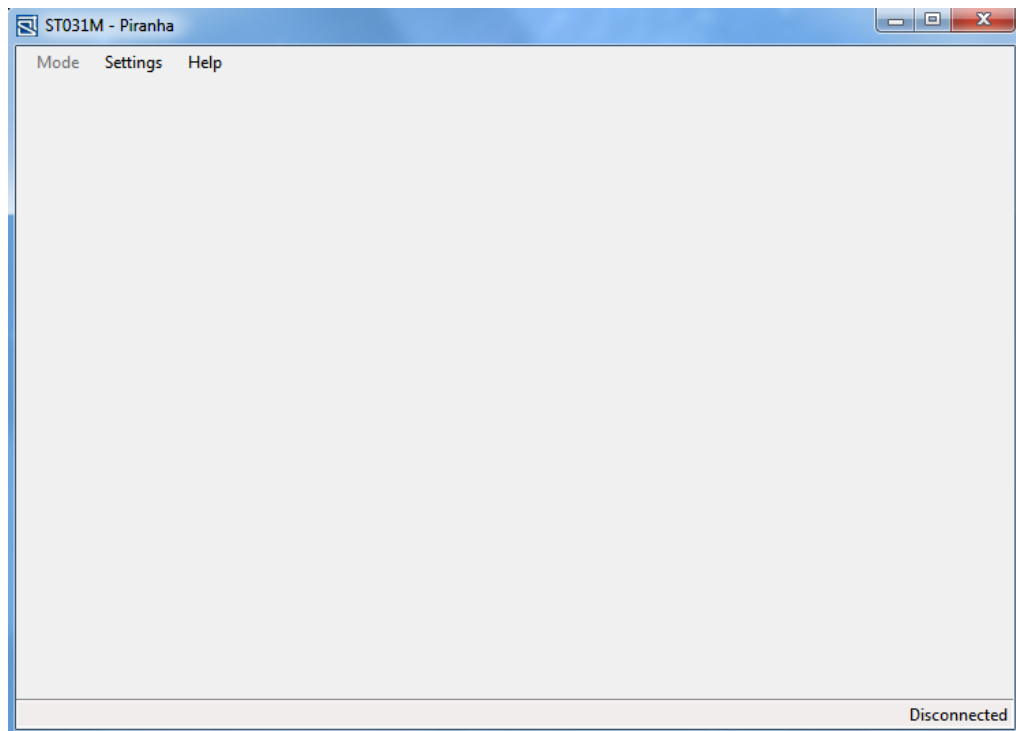


Figure 38

Connect ST-031M base module to USB port. Switch-on ST031M. Program status bar change status to "Connected"
User can access following menu items:

1. "Mode" – select one of 3 channels
2. "Settings" – chose interface language and automatic updates.
3. "Help" -> "Updates" – update device firmware.

4.2. "Channel 1" mode

"Channel 1" mode can be accessed on menu bar: "Mode" -> "Channel 1" (Figure 39).

In the graphics area of the window displays information corresponding to the "Panorama" mode.

Choose "Search", "Wireless Networks" or "Fixed frequency" mode by pressing the corresponding button on the left of the graphics area.

When you click on the button with the camera's icon, current image is saved in the folder "Smersh Technics" (created automatically) on the C: drive on your computers HDD.

Created image is named as "dd.mm.yyyy hh.mm.ss.jpg" that includes the date and time of the image (example: 01.01.2012 12.30.00.jpg - picture taken January 1st, 2012 at 12 h 30 minutes. 00 sec.).

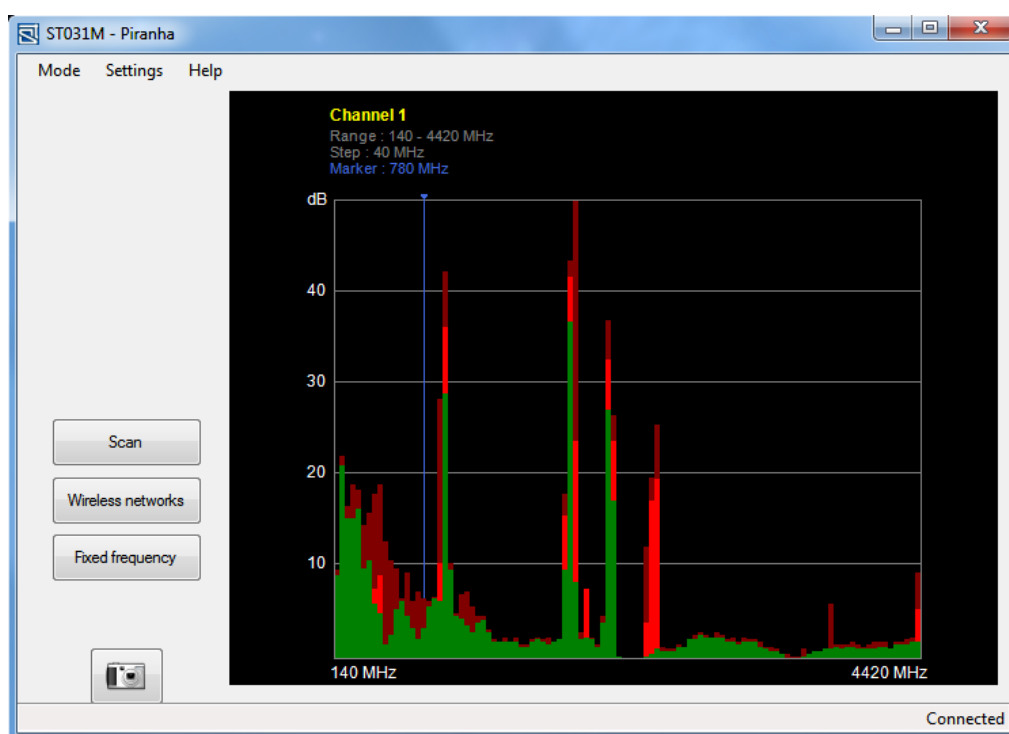


Figure 39

When you move the mouse pointer over the graphics area, a line of light grey colour is displayed. When you press a mouse button, marker is set to this line. Scaling (change step) is carried out with the mouse wheel while the pointer should be in the graphics area.

4.2.1. "Search" mode

Displays table of detected signals (Fig. 40). To skip signal, change status, the transition into the signal analysis mode and exit to "Panorama" mode of the first channel is accomplished by pressing corresponding button on the left of the graphics area. The bottom of the panel has a window for operative editing of notes. When you click on the Excel icon program opens Microsoft Excel (if installed on your computer). The data are transferred from table to Excel and can be edited later.

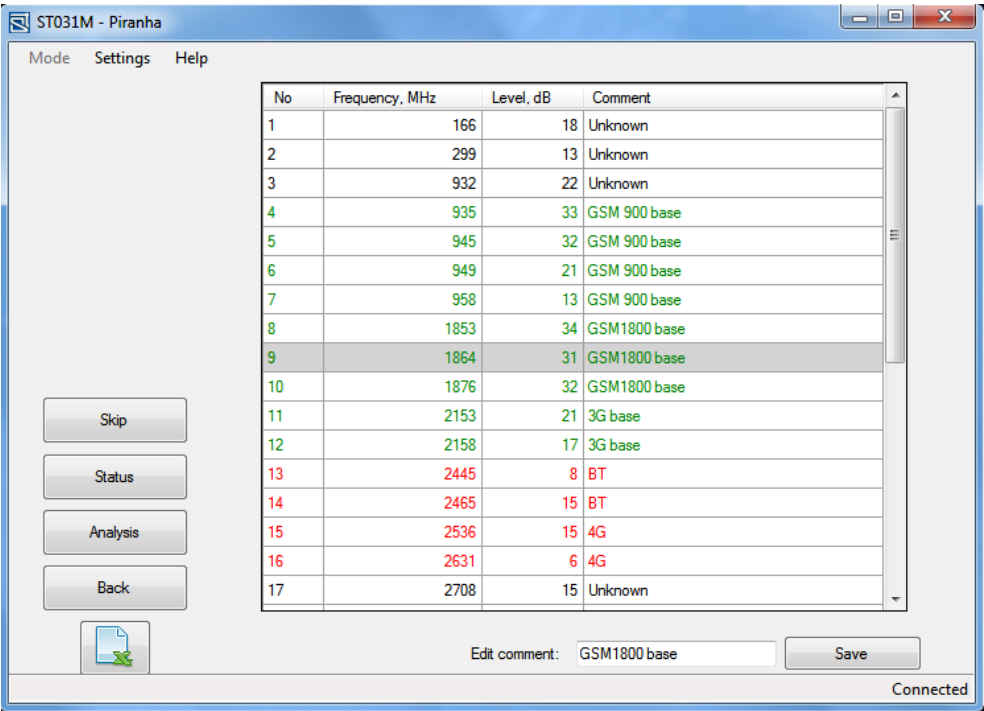


Figure 40

4.2.2. "Wireless Networks" mode

In the left of the screen (Fig.41) there are menu to choose the operational mode (Mobile device, Base station, or a User list. By pressing button "Back" the user comes back to "Panorama" view in Channel 1.

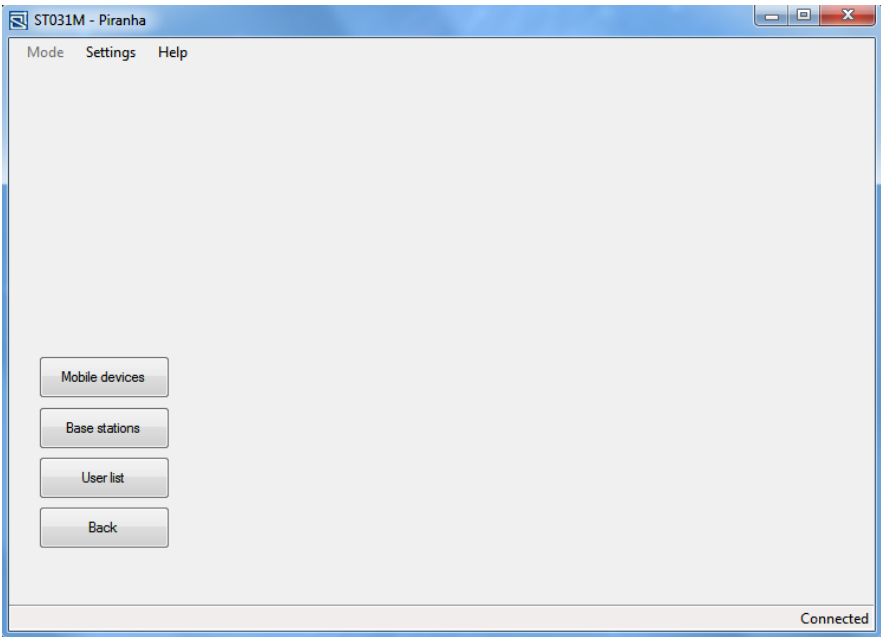


Figure 41

4.2.2.1. Mobile devices

Duplicates the screen of main unit in the mode of signal detection of Mobile devices (Fig.42).

In this option a standard frequency band list of mobile of digital communications is used.

To exclude from the list a certain standard, it is necessary to point the cursor to the in the graphics area of the necessary position (row background changes in to the blue) and press the left mouse button. In the same row in the symbol ✓ will change to ✗.

In order to to connect a certain standard must repeat this operation.

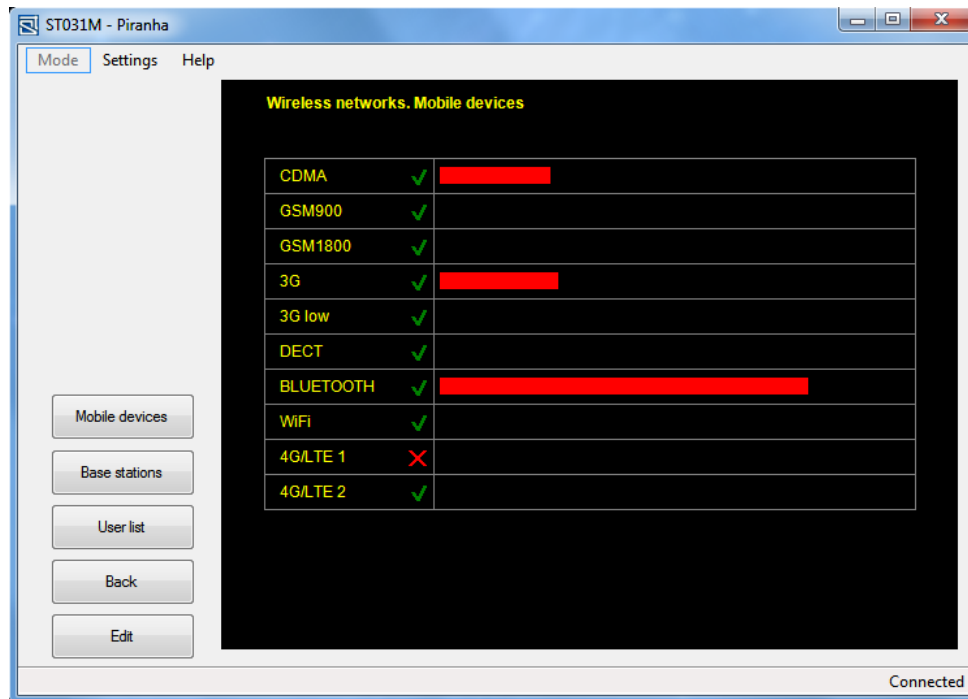


Figure 42

On the left side of the screen are located buttons that allows to:

- switch to mode of control base station signals of digital communication "Base stations";
- switch to the mode "User list";
- exit to the main menu "Back";
- edit the list of standard signals of mobile devices "Edit".

4.2.2.2. Base stations

Duplicates the screen of main unit in the mode of signal detection of base stations. The graphics, information and functions are analog to mode "Mobile Devices". In the process of search, list of standard base station frequency bands of digital communication are used.

4.2.2.3. User list

This mode provides the opportunity to create and update the list of frequency bands that are not included in the default list of "Mobile device" and "Base station". It is convenient to adapt the device to the conditions of a particular region, if the frequency bands of digital communication systems are different from regulated in home country. Furthermore, the user has the ability to create frequency bands, which are commonly used for transmission of STMOSI.

The first time you open the program, it activates the list, established by the manufacturer (430-450 MHz - without the "handler"). To create a new list, it is needed to activate with the button "Edit". The user can edit, add or delete the row from the list. Form of entered data consists of two border limits Fmin - Fmax (width not more than 100 MHz), and the so-called "Handler" (Figure 43). Under the handler is placed a special pattern, characterising a certain type of digital communication. If the "handler" is set, then only the signals, corresponding to that pattern of that frequency range will be detected. If the handler is not set, the device will display all signals in the set range. After the activation with the button "Save", the user list is placed into the memory of main unit of ST-031M and can be used without the PC.

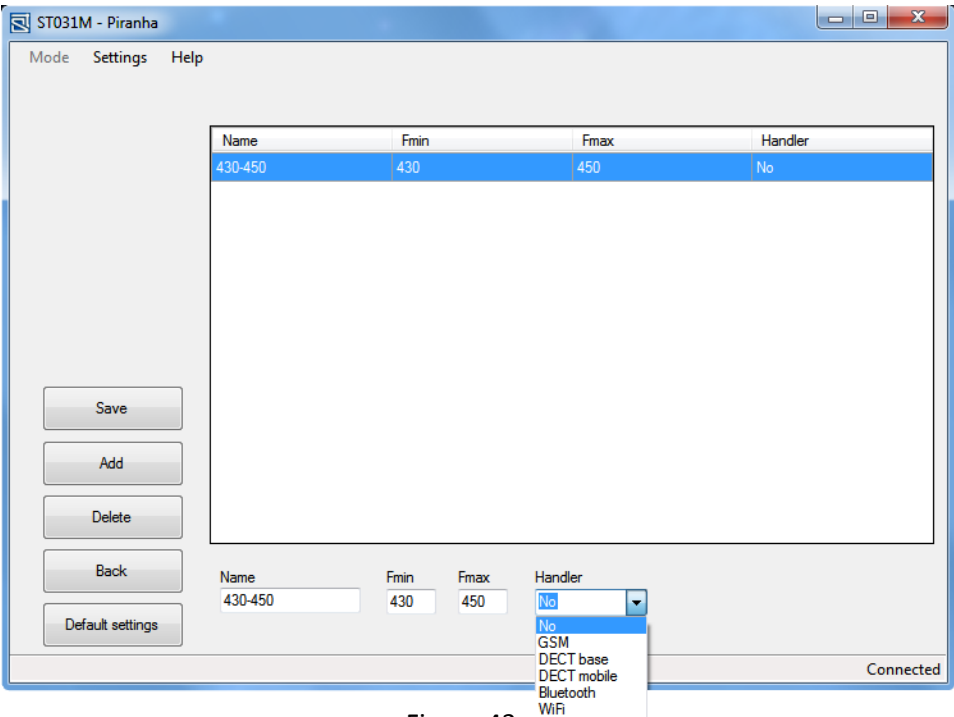


Figure 43

4.2.3. "Fixed frequency" mode

Window (Fig. 44) consists of two parts. The right side displays information from device screen (continuous and pulse level of the selected signal). On the left part spectrum is displayed in the selected range of frequencies. You can change the selected signal by clicking mouse on the appropriate reading. The image can be saved by pressing the button with the camera icon. Go into the "Oscilloscope" mode by pressing corresponding button on the left of the graphics area. "Back" button - exit to "Panorama" mode of the first channel.

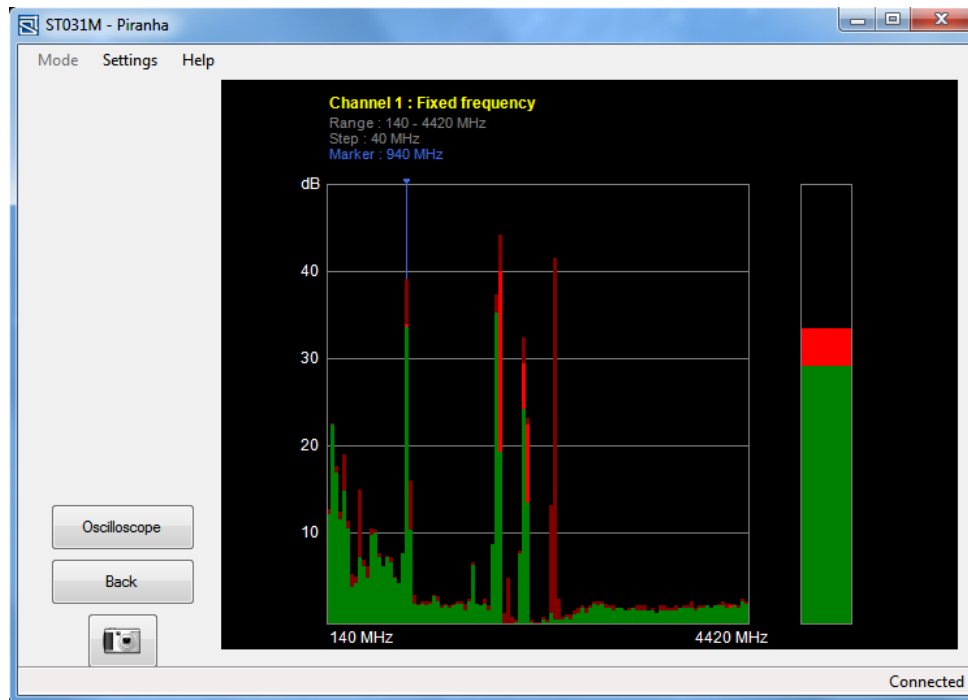


Figure 44

4.2.4. "Oscilloscope" mode

Screen displays selected signal waveform (Figure 45). Scale screen by using mouse wheel while the mouse pointer must be inside the graphics area. The image can be saved by pressing the camera icon. Exit to previous mode (Fixed frequency) by pressing "Back".

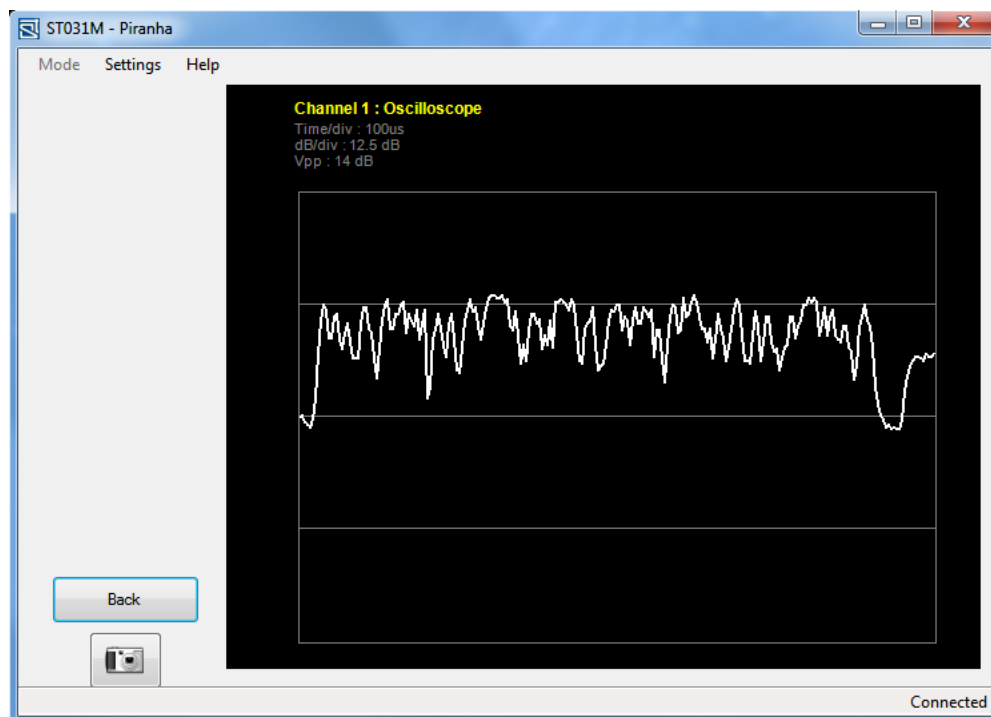


Figure 45

4.3. "Channel 2" mode

Activate mode from main menu by pressing "Mode" -> "2 Channel"

Next, user needs to set the scanning range. Selection menu of the frequency band borders located on the left side of the screen. After choosing the frequency range, the software screen displays the same information like it is on the screen of the main unit (Figure 46).

Switching to "Search" and "Fixed frequency" modes, as well as the activation of the attenuator and differential mode is done by pressing the corresponding buttons on the left of the screen area.

By clicking on the button with the image of the camera, the current screenshot is saved in the folder «Smersh Technics» (created automatically) on the C: drive of your computer. When you move the mouse pointer on the spectrum area the moving line is displayed by light grey colour. When you press a mouse button to any place - a marker is set on the pressed position.

Scaling (step change) is carried out with the mouse wheel, and the pointer must be in the graphics area. Mode "Fixed frequency" in Channel 2 is analog to the mode "Fixed frequency" of the Channel 1.

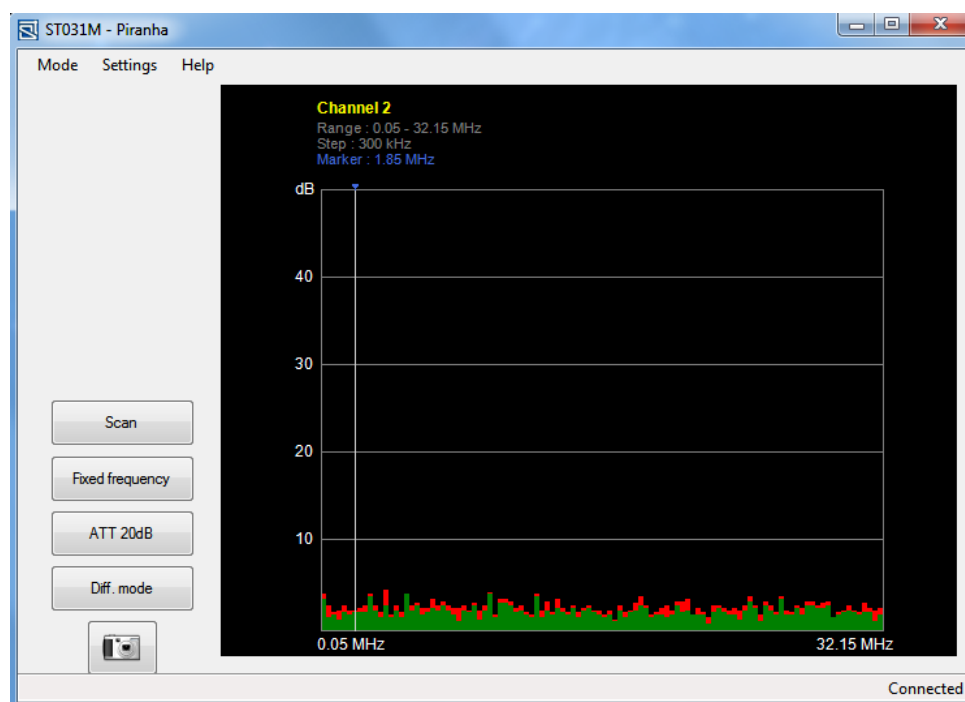


Figure 46

4.3.1. "Search" mode

Displays table of detected signals. Skip signal, change signal status, enter to signal analysis mode and exit to previous mode of the Channel 1 is done by pressing the corresponding buttons on the left of the screen area.

When you click on the Excel icon program opens Microsoft Office Excel (if installed on your computer). The data from the table is transferred from table to Excel and can be edited later. By pressing "Analysis" user can switch to the mode of signal analysis.

4.4. "Channel 3" mode

Activate mode from main menu by pressing "Mode" -> "3 Channel". In the graphical area the information of the main unit screen is presented (Figure 47). Form of presented information - oscillogramme.

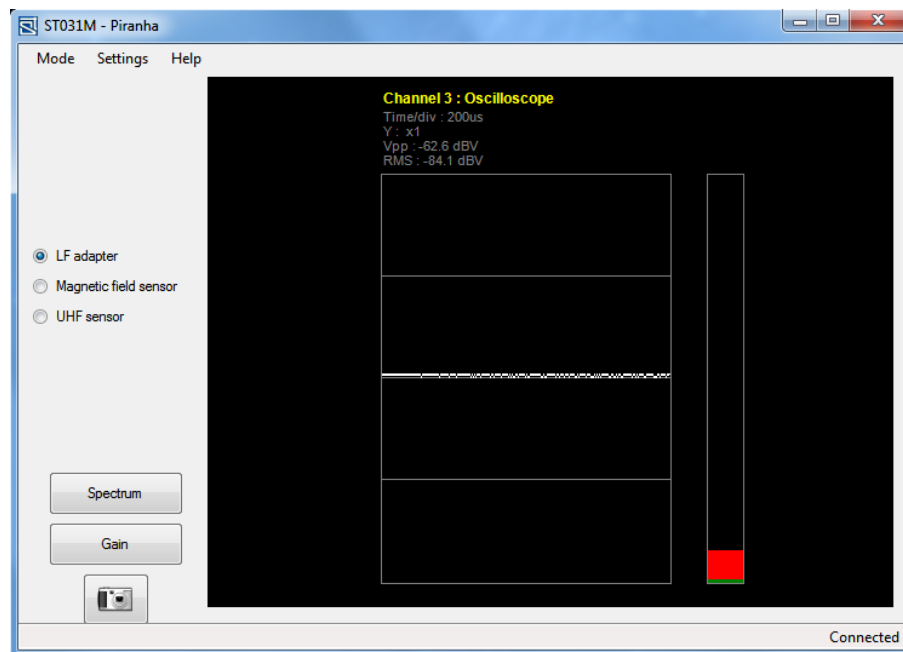


Figure 47

Setting the type of adapter is made with the mouse in the list on the left of the screen area. Switching to the mode of spectrum analyser and the gain value setting is done by pressing the appropriate buttons on the left of the screen area. The screen mode of the spectrum analyser is presented on Figure 48.

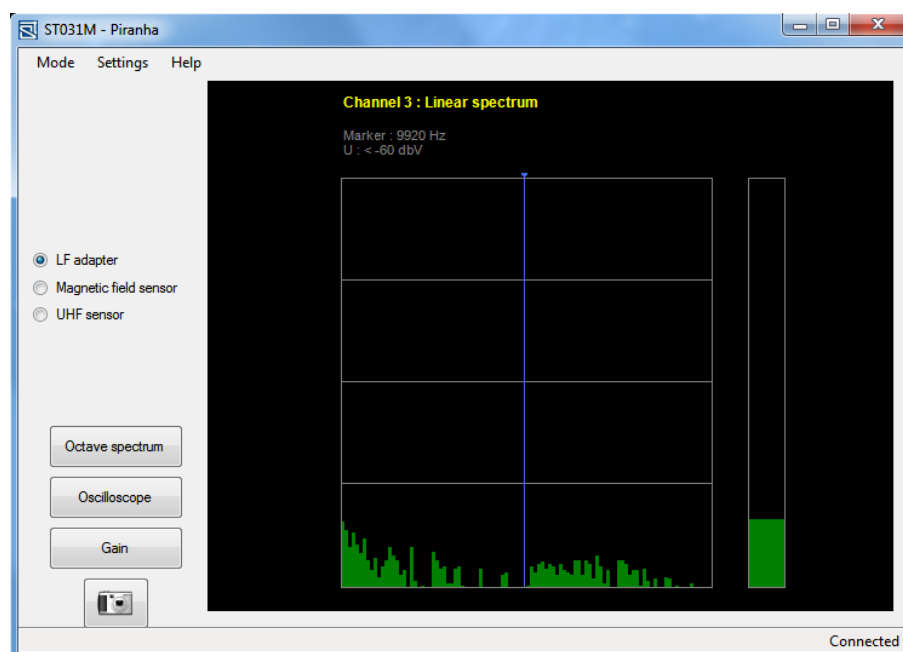


Figure 48

Scaling of time axis is carried by mouse wheel, while the pointer must be in the graphical area.

By clicking on the button with the image of the camera, the current screenshot is saved in the folder «Smersh Technics» (created automatically) on the C: drive of your computer. When you move the mouse pointer on the spectrum area the moving line is displayed by light grey colour. When you press a mouse button to any place - a marker is set on the pressed line.

Pressing the button "Spectrum" the form of information on the screen is linear spectrum (Figure 48).

At this mode it is also possible to connect the sensors/adapters and the setting gain value. In addition, option for setting the marker on the interested signal, to do it, it is necessary to move the mouse pointer to a signal in the graphical area and click the left mouse button. Then, in the informational line will appear the value of the marked frequency.

Switching to oscilloscope and spectrum octave modes is carried out using the corresponding buttons on the left of the graphical area.

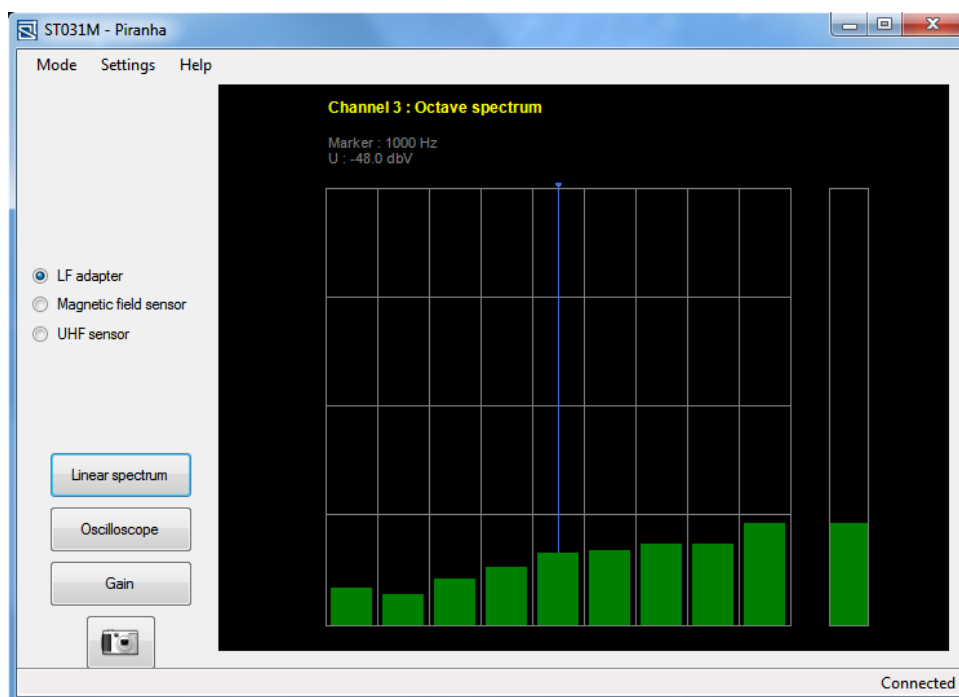


Figure 49

When switching to the mode Octave spectrum, the screen is displaying the signal spectrum conforming to Figure 49. The rest of the settings and control modes are similar to those described above.

It is possible to switch to oscilloscope and linear spectrum modes by corresponding buttons on the left of the graphical area.

4.4.1. "Settings" menu

The menu item "Settings" selects the interface language.

4.4.2. "Help" menu

This menu item is designed to update the software of ST-031M. To update it is needed to press: "Help" -> "Update".

This mode checks for new firmware version and software (if you have an Internet connection). If the new version is not available, the message "The latest version of firmware is installed" appears. If there is a new version, an appropriate message will be displayed, and the button "Next" will be available (Figure 50).

By clicking the button "Next" automatic software updated is processed.

The program can be updated manually. Before proceeding this step, first it is needed to check the manufacturers website for new software availability. If available - download it to PC hard disc drive. Next, run commands: "Help" -> "Update" -> "Update manually", specify the path to the saved file.

Attention: before installing the firmware of ST-031M, the main unit must be in screensaver mode (Figure 51)! To achieve this, if the unit is in operational mode, it must be switched off and on again (not pressing any buttons after that). If the device was turned off, the device just needs to be turned on.

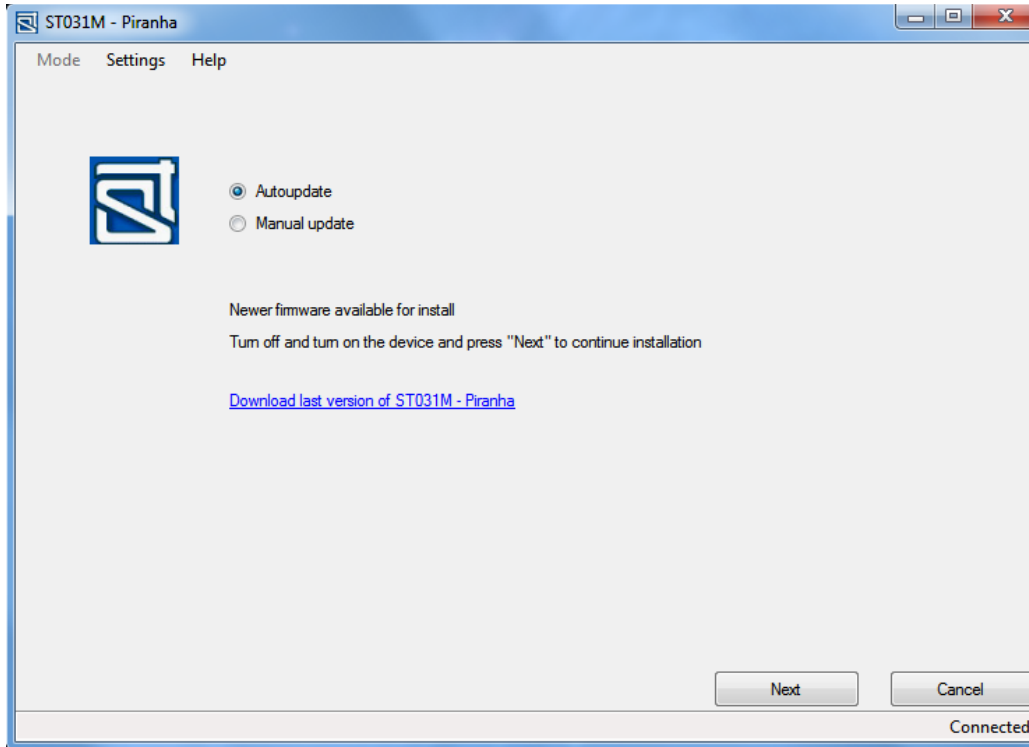


Figure 50



Figure 51

5. Test sound emitting device.

The test sound emitting device is used to:

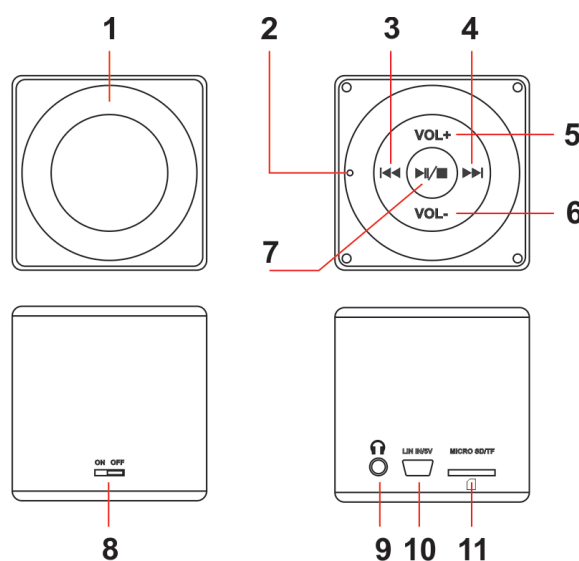
- Create a testing sound emission in a speech-similar diapason, acoustic sensors of eavesdropping devices. Correlation of the sound generator's information is completed on a ST-031M channel, which can confirm or deny the suspicion about the natural or technical information leakage possibilities in the room examined.
- Switch eavesdropping devices, which have VOX activation features, on.
- Locate wired acoustic eavesdropping device sensors.
- Generate "white noise" during the search procedures.
- Reading audio information from eavesdropping device by linear input mode.

The MP3 is used as test sound emitting device. User has the possibility to record a random (best suited for any special types of the detection procedures) track into the integrated memory storage.

Outer appearance of the unit is shown in a Figure 52.

The numbers represent:

- 1 – Speaker
- 2 – Power indicator
- 3 – "Previous track" key
- 4 – "Next track" key
- 5 and 6 – "Volume control" keys
- 7 – "Play/pause/stop" key
- 8 – "Power off" button
- 9 – Headphones jack
- 10 – Line in/battery charging jack
- 11 – MicroSD port



Audio playback mode

Record the required control- or white noise audio tracks on the microSD card.

Plug the microSD card into the sound generator's micro SD port (pos.11).

Power on the device (pos.8) - the power led will light up.

The first track (by track order) on card is played by default instantly.

User can change the sound generator's features through keys pos.3 to 7.

Line-in use

This mode is used for listening of to the audio information from ST-031M and other feature, called "audio-binding".

Take out the microSD card (pos.11).

Power on the device (pos.8) - the power led will light up.

Connect the sound generator unit to the ST-031M device using a cable supplied in the kit.

User can change volume by pressing the keys pos. 5 and 6.

Recharging

The sound generator is recharged using the PC's USB port, using a cable.

Plug in the mini USB cable into the sound generator's port (pos.10) and USB port on a PC.

If the device is powered off (pos.8), the indicating LED (pos.2) is red (the unit is being recharged). It is also allowed to recharge a powered on device. In this case the power indicator (pos.2) is blue. If the device is powered on, the recharging procedure will take longer.

6. ST-031M power supply

ST-031M is powered by a built-in lithium-polymer battery. Instrument could be operated when charging via power supply (with charger pos. 21 Figure 4).

A fully charged battery ensures continuous operation of the device for up to 7 hours. Battery status is controlled by the indicator (pos. 3, Figure 7).

Battery charging is done by charger (pos. 21, Figure 4). Full-charge time - 7 hours.

To charge the battery it is needed to connect charging adapter to device socket DC 5V on the bottom of the main unit and connect charger to the AC mains (220V/50Hz).

Indicator «POWER» on the front panel accompanies “charging” status with orange light. Upon reaching the required level of battery charge, indicator will change from orange colour to green.

It is allowed to charge the battery when the unit is running. However, the charging time will increase.

7. Technical characteristics of ST-031M

Main unit	
Channel 1. Selective HF detector	
Input impedance, Ohm	50
Operating frequency range, Mhz	140...4420
Bandwidth, Mhz	1-40
Scanning speed, Ghz/s	40
Irregularity of the frequency response, dB	±5
Minimally detectable signal in the automatic mode, dBm	≤ -65
Dynamic range, dB	50
Demodulation modes	AM, wideband FM
Channel 2. Scanning receiver	
Input impedance (symmetrical), Ohm	600
Operating frequency range, Mhz	0,05...140
Bandwidth, khz	40
Scanning speed, Mhz/s	35
Irregularity of the frequency response, dB	±5
Minimally detectable signal in the automatic mode, dBμV	25
Dynamic range (without attenuator), dB	65
Attenuation of built-in attenuator, dB	20
Demodulation mode	AM, FM
Channel 3. Low-frequency amplifier	
Input impedance, kOhm	100
Operating frequency range, Khz	0,025...100
Irregularity of the frequency response, dB	±1
Integral voltage level of noise, dBμV	-109
Amplification ratio, dB	12, 24, 36, 48
Sound path	
Frequency range, Hz	300...9000
Volume regulation range, dB	-50...+20
Max power output in the output "PHONE", mW	150
Display	
Type of display	LCD-TFT 3,2"
Resolution	240x320
Colour quantity	65000
Power supply	
Lithium-polymer battery with a voltage, V	3.7
Power consumption, W	1,2...2,5
Continuous operating time at max. power consumption, hours	>7
Time to charge a fully discharged battery, hours	7
Weight, dimensions	
Dimensions of the main unit (length, width, height), mm	175x83x36
Weight of the main unit, kg	0,430
Dimensions of the case (length, width, height), mm	390x310x170
Full weight of the set in case, kg	3,8
Multipurpose adapter for checking wire lines BWLC031M	
Maximal allowed voltage in the power line, V	300 AC, DC
Insulation resistance for "input / output", mOhm	>10
In "Channel 2" mode	
Input impedance, Ohm	100
Operating frequency range, Khz	0,05...140
Maximal allowed signal level, dBV	-10

In "Channel 3" mode	
Input impedance (symmetrical), Ohm	27
Operating frequency range, Khz	0,150...100
Maximal allowed signal level, dBV	10
In-phase signal attenuation, db	>65
Ultrahigh frequency sensor	
Operating frequency range, Ghz	3...12
Threshold sensitivity, W/cm ²	2*10 ⁻¹⁰
Polarization	Linear
Directional angle	60...90
Dimensions (length, width, height), mm	100x45x25
Weight, kg	0,07
Cable length	0,95
Induction converter (Magnetic field sensor)	
Operating frequency range, Khz	0,07...100
Measuring range of the magnetic field, nT	0,5...2000
Attenuation of a homogeneous field in the diff. mode, dB	>30
Dimensions (length, diameter), mm	205x20
Weight, kg	0,11
Cable length, m	0,95
Test sound emitting device	
Flash card slot	microSD
Audio file format	MP3
Speaker	RMS 3W, 150...18000 Hz
Power supply	Li-Ion battery 600 mAh
Continuous operating time, h	3
Charging time, h	3