iPROTECT 1217
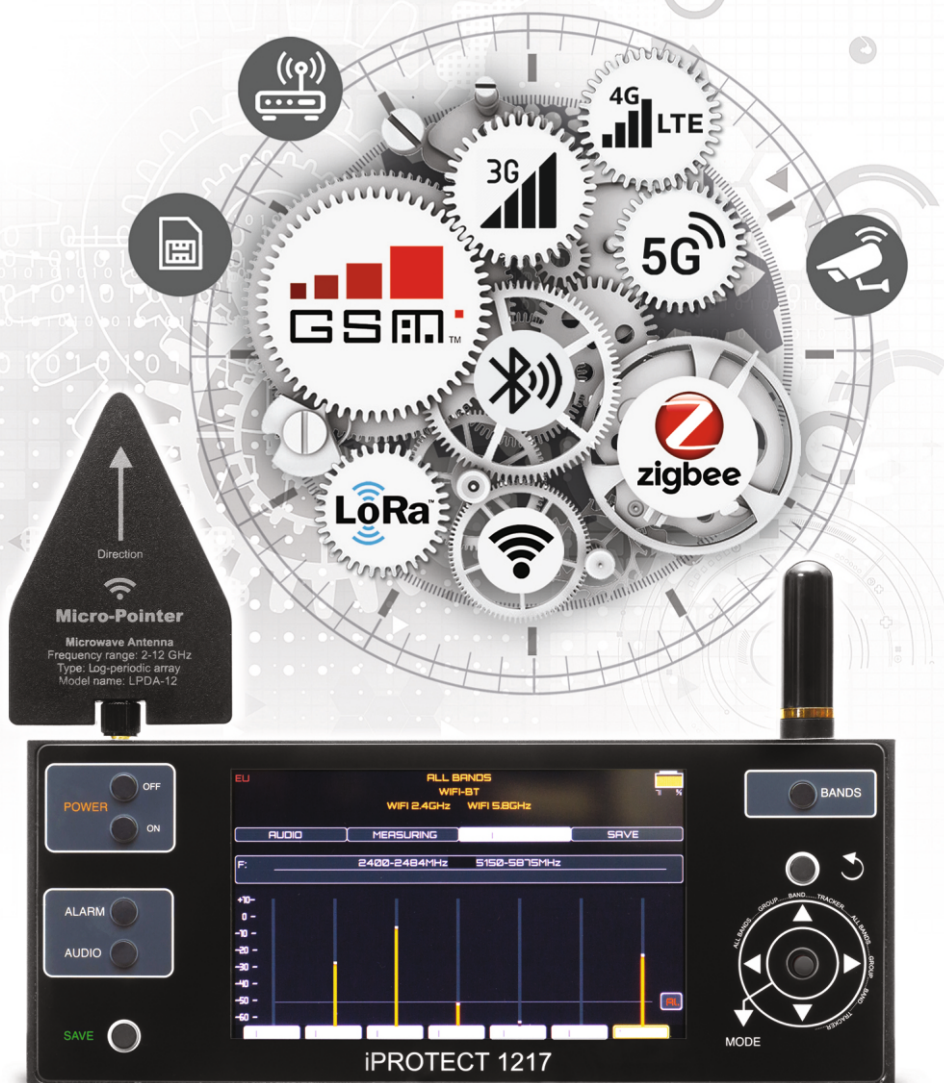
THE ANTI-TRACKING MOBILE SYSTEM

/ DETECTOR OF MOBILE AND WIRELESS SIGNALS /

Searching for the illegal use of mobile signals is becoming an increasingly important task during counter surveillance sweeping. It is connected with the numerous means of eaves-dropping that transmit information via mobile networks. The mass production of components for developers, such as GSM, 3G, 4G/LTE and 5G modules, enables them to develop cheap and quick surveillance methods which have ultra-high quality of sound, video or location trans-mission. Hidden cameras camouflaged as household appliances, toys or interior objects, will most likely transmit data via mobile networks or Wi-Fi. Spy listening devices quite often have a slot for SIM-cards for functioning on a cellular network. A GPS tracker is a device that is installed in a vehicle and informs about its location, these also send coordinates via mobile communication.

Unfortunately, wide range RF detectors or near-field receivers have a low sensitivity and are not very suitable for the detection of mobile devices. This is caused by the ability of the RF detectors to receive all signals simultaneously and display them cumulatively on a bargraph, and as a result, stronger signals prevent the detection of weaker ones.

Selective detectors have a much greater distance of detecting mobile signals because they only accept them, and ignore other frequencies. Unfortunately, during the development of a selective detector, one nuance appears. It is very difficult to create a detector able to receive all mobile bands at the same time. As is well known, more and more mobile bands are being used worldwide. The GSM standard works on two bands. Then 3G appeared, occupying one more band. The introduction of the 4G/LTE standard required a wider frequency spectrum for functioning; therefore 3-7 frequency bands were allocated for it in each country. Later still 5G appeared, which requires an even wider spectrum so more wide bands have been allocated for its functioning. Thus, currently, in most countries, there are up to 10-15 different frequency bands of mobile communication according to the national frequency allocation.

It is very difficult to create a selective detector which is able to detect signals from all mobile bands which will work in all countries. Thankfully, the designers of the iProtect 1217 have achieved this. The iProtect 1217 is the only detector in the world which is able to detect all the existing mobile standards on all continents. Its table includes at least 26 bands, which can be selected automatically or manually.

In addition to mobile communication, the 1217 detects signals of Wi-Fi, Bluetooth, DECT, ISM 434 MHz, ISM 868 MHz and ISM 915 MHz. It is well known that these standards can be used by hidden surveillance devices for audio and video signal transmission, and therefore such transmitters must be found and identified.

Apart from a high sensitivity, selective detectors have one more significant advantage compared to wide-band detectors. This is, the user is able to see exactly which signal has been detected. This greatly improves the ability to distinguish suspicious signals from external inter-ferences and enables the user to perform a physical search for a certain transmitter. Such an ability is not available for wide-band detectors which mix up all the signals. The iProtect 1217, as a selective detector, can inspect one separate band, which is why it is irreplaceable during professional searches.

One more important advantage of the iProtect 1217 is the TRACKER mode (searching for GPS trackers). In this mode, the device is adjusted for detecting only mobile signals and accumulates a history for finding the periodic sending of data with coordinates.

MAIN FEATURES

- Able to detect mobile and wireless signals at a much greater distance compared to conventional RF detectors (at least,10 times more)
- Selective: interference resistant and with a high sensitivity
- Has worldwide coverage of mobile standards – can detect all existing bands of GSM, CDMA, 3G, 4G/LTE and 5G in the range up to 6 GHz
- Able to detect all types of wireless signals,including Wi-Fi 2.4 GHz, Bluetooth, Wi-Fi 5 GHz, DECT, ISM 434 MHz, ISM 968 MHz and ISM 915 MHz
- Able to detect satellite signals
- Detection of at least 27 mobile, satellite and wireless bands
- Can be adjusted to the frequency allocation of the country of use
- A selective multi-band principle of work informs the user of exactly which signals were found
- The mode of analysis of a certain band facilitates the physical search of a transmitter
- A separate mode for the detection of GPS trackers with history accumulation (TRACKER)
- ALARM function warns the operator about exceeding the threshold, both with sound and visually
- 43 threshold levels for setting optimal sensitivity
- Can be set up for specific tasks, for example, for the detection of Wi-Fi only, etc.
- Operation modes:
  - **ALL BANDS** (detection on all bands)
  - **GROUP** (detection on the selected group of bands)
  - **BAND** (analysis of a separate band)
  - **TRACKER** (detection of GPS trackers)

- Two antenna inputs and two antennas in the set for ensuring maximum sensitivity
- The high-band directional antenna facilitates locating of transmitters above 2400 MHz
- The built-in rechargeable battery provides an operational time of up to 5 hours
- USB recharging

SPECIFICATION

Number of bands	27
Antenna inputs	Input 1: SMA, 2400 – 6000 MHz
	Input 2: SMA, 600 - 2400 MHz
Average sensitivity	-60 dBm
Operation modes	ALL BANDS (detection on all bands)
	GROUP (detection on the selected group of bands)
	BAND (analysis of a separate band)
	TRACKER (detection of GPS trackers)
Alarm function	Visual or audio
Number of alarm threshold levels	43
Sound signals	Alarm, depression of buttons
Regions	US (bands of the USA)
	EU (European bands)
	TOTAL (all bands)
Operating and control elements	Joystick: move left-right, up-down, threshold adjustment, mode selection
	Button POWER OFF: switch off
	Button POWER ON: switch on
	Button ALARM: alarm
	Button AUDIO: sound
	Button BANDS: band set up
	Button BACK: exit to the previous mode
	Button SAVE (storing the current state)
Power supply source	USB 5V
Power	Built-in rechargeable battery 6800 mA*h 3.7 V
Battery operational resource	Up to 5 hours
Mass	The device without antenna: 750 g
	Packed: 1500 g
Dimensions	The device without antenna: 208 x 86 x 41mm
	Packed: 27 x 22 x 10 cm
Operating temperature range	-5…50 °C

Supplied set

Device	1
High-band antenna Micro-Pointer LPDA-12	1
Low-band rod antenna	1
Low-band high-sensitivity antenna	1
Charging cable USB Type C	1
Angle adapter SMA	2
A case for transportation	1

Mobile communication (MBL1, MBL2, MBL3 and MBL4 groups)

The use of mobile communication has a number of advantages for covert surveillance:

1 Broadband channels enable transmission of high quality audio or video
2 There is no need to organize a control post near the surveillance object. The data transmission is performed via the Internet. Recording into a cloud service is possible.
3 Remote control of the device is possible.
4 A convenient channel for transmitting the position of a vehicle (GPS trackers).
5 The possibility of information accumulation and a quick transmission according to a schedule, or upon request.
6 The typical nature of the signal is a contributing factor for masking any surveillance.

Thanks to a wide coverage, unlimited distance and high quality of information transmission, secret surveillance devices are using mobile communications increasingly frequently; while the mass production of components for developers, such as GSM, 3G, 4G/LTE and 5G modules, enable the development of cheap and quickly hidden bugging devices with high quality transmission of sound, video or location coordinates.

The main types of the covert surveillance devices that use mobile communication:

- A hidden wireless microphone
- A hidden spy camera (possibly with a microphone)
- An "infected" mobile telephone that transmits video and/or acoustics around itself without its owner's knowledge
- The deliberate use of a telephone for audio or video transmission
- GPS trackers (beacons), which enable tracking of a car's coordinates

The iProtect 1217 can detect all types of secret surveillance devices which use mobile communication and transmit a radio signal during a search.

Signals of DECT cordless phones (DECT group)

This standard was developed for cordless home phones. Most countries have an allocation for its frequency band. The DECT standard has a high quality of sound transmission and an element base available for the creation of a hidden spy device. It is possible to modify a household appliance, for example, a baby monitor, for the purposes of covert surveillance.

The iProtect 1217 detects DECT signals which are active during a search.

ISM signals (ISM group)

ISM bands (Industrial, Science, Medicine) do not require licensing and are used by a number of household and industrial appliances. The ISM group has the following bands:

- 433.05-434.79 MHz (Europe)
- 863-870 MHz (Europe)
- 902-928 MHz (the USA)

Remote controls, alarm sensors, Smart Home systems, various sensors, etc., function at these frequencies. LoRa, DASH7, IEE 802.11ah, CC430, NB-IoT protocols and others are used.

Besides their intended purposes, these bands can be used for transmitting information from secret surveillance devices, or for their control. The iProtect 1217 can detect all these signals.

Bluetooth, Wi-Fi and other signals in the bands of 2.4 GHz and 5 GHz (BT-WIFI group)

This is the group of bands that do not require licensing and are used by a number of wireless devices, first of all, by Wi-Fi and Bluetooth. The wireless standards can be used for the transmission of audio or video information. Their advantages are:

1. Easy development and creation of secret surveillance devices – the necessary components are readily available.
2. The bandwidth is sufficient for high-quality audio or video transmission.
3. Remote control is possible.
4. The possibility of information accumulation and its quick transmission, according to a schedule, or upon request.
5. A 'typical' signal, which can easily be mistaken for the operation of a usual router or any other household wireless appliance.

The 2.4 GHz band is more saturated and is used by different devices simultaneously. They are Bluetooth, Bluetooth LE, Wi-Fi, ZigBee and others.
The 5 GHz band is less loaded and is usually used only for Wi-Fi.

The iProtect 1217 can successfully detect radio frequency devices that work in the bands of 2.4 GHz and 5 GHz, including those used for covert surveillance – wireless hidden video cameras, microphones, remote control devices, etc.
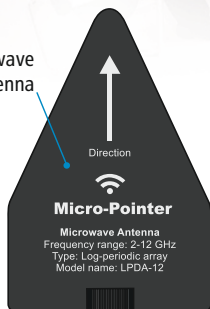
FREQUENCY BANDS

GROUP	BAND	Frequency, MHz
MBL1	B8	880 – 915
	B20	832 – 862
	B20	703 – 748
	B12/17	699 – 716
	B13	777 – 787
	B71	663 – 698
MBL2	B1/65	1920 – 2010
	SAT/B3	1610 – 1627, 1710 – 1785
	B14	788 – 798
	B5/26	814 – 849
MBL3	B7	2500 – 2570
	B34	2010 – 2025
	B38	2570 – 2620
	B4/66	1710 – 1780
	B2/25	1850 – 1915
MBL4	B42	3400 – 3600
	B43	3600 – 3800
	B30/40	2300 – 2400
	B7/41	2496 – 2690
DECT	DECT-EU	1880 – 1900
	DECT-US	1920 – 1930
ISM	ISM433	433 – 435
	ISM868	863 – 870
	ISM915	902 – 928
MBT-WIFI	WIFI2.4	2400 – 2484
	WIFI5.8	5150 – 5875

Alarm (red)

External power (green)

"Measuring is in progress" (orange)

Microwave antenna

Direction

Micro-Pointer

Microwave Antenna
Frequency range: 2-12 GHz
Type: Log-periodic array
Model name: LPDA-12

Alarm

Current mode

Battery status

Rod antenna

Band adjustment

Power

Alarm function

Sound indication

EU

ALARM

ALL BANDS
MBL2
SAT/B3   B1/6S   B30

B3   %

AUDIO   MEASURING   ALARM   SAVE

F: 1710-1785MHz   1920-2010MHz   2305-2315MHz

+10
0
-10
-20
-30
-40
-50
-60

RL

MBL1   MBL2   MBL3   MBL4   DECT   ISM   WIFI-BT

iPROTECT 1217

POWER   OFF   ON

ALARM

AUDIO

SAVE

BANDS

BACK
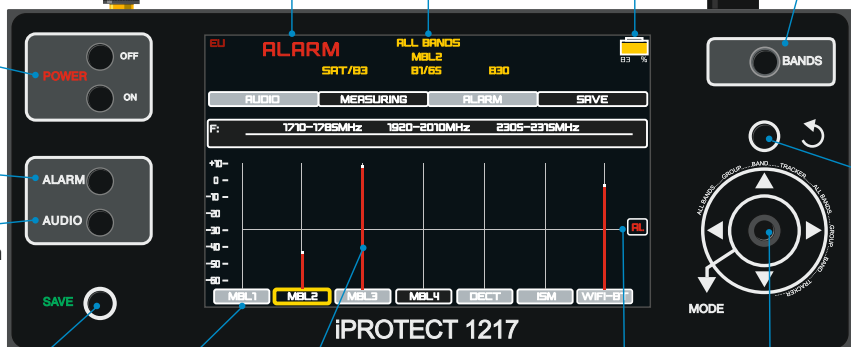
MODE

Recording of the current mode and condition
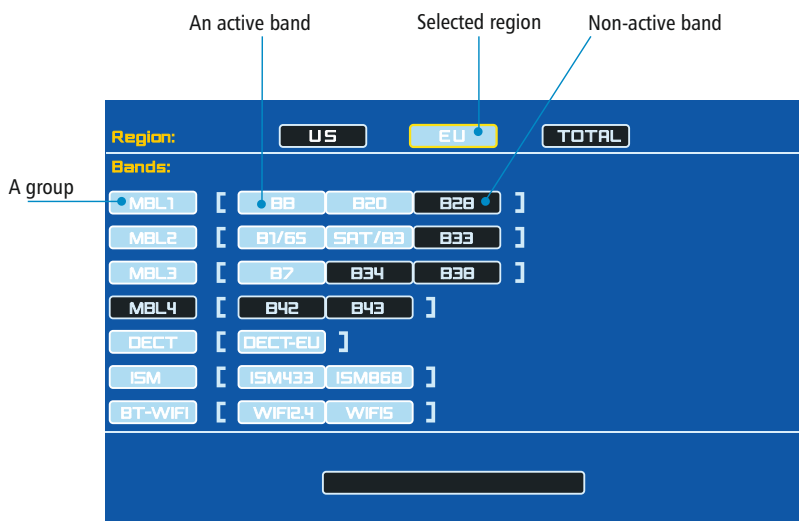
Groups or bands

Level indicator

Alarm threshold

Joystick

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BAND ADJUSTMENT

Start working with the iProtect 1217 by adjusting the device to the frequency allocation in the country of use. As mentioned above, every country has its own frequency allocation for bands of mobile communication and wireless devices. Frequencies such as 4G/LTE, 5G and other bands can differ significantly in different parts of the world. The iProtect 1217 can detect signals in almost all bands, however, in order to ensure the maximum probability and speed of detection, as well as to avoid false responses, the device should be adjusted purely to the bands which are used in the country.

Press the **BANDS** button in order to enter the adjustment mode.

An active band   Selected region   Non-active band

A group

Region: [US] [EU] [TOTAL]

Bands:

MBL1   [B8   B20   B28]
MBL2   [B1/65 SAT/B3 B33]
MBL3   [B7   B34   B38]
MBL4   [B42   B43]
DECT   [DECT-EU]
ISM   [ISM433 ISM868]
BT-WIFI [WIFI2.4 WIFI5]

Move the joystick in order to go left, right, up, down or press it in order to activate or deactivate certain items. To exit, press the **BACK** button.

Start by choosing the region, and then go down to select, or unselect, groups or certain bands. Select **US** if the country of use is the USA, Caribbean or Latin American countries. Select **EU** if the device is in a European country, or any other country that a similar frequency distribution is used. Select **TOTAL** in order to open the full list of bands and to select them manually.

Follow the "Table of Bands" attached to these instructions in order to edit the list of bands in the device. Always try to set all the bands which are allocated in the country of use, and to deactivate those bands which are not used. If necessary, when a specific task arises, it is possible to switch off certain bands or groups temporarily. For instance, if you want to detect only Wi-Fi, Bluetooth and LoRa signals, or mobile communication only. Deactivation of other band groups will cause an increase in the probability of detecting active bands and will speed up the search.

You can switch on, or off, all of the group altogether by pressing the joystick when you are hovering over it (MBL1, MBL2, MBL3, MBL4, DECT, ISM, BT-WIFI). If you want to switch on, or switch off a certain band, simply go to it with the help of the joystick and then press it.
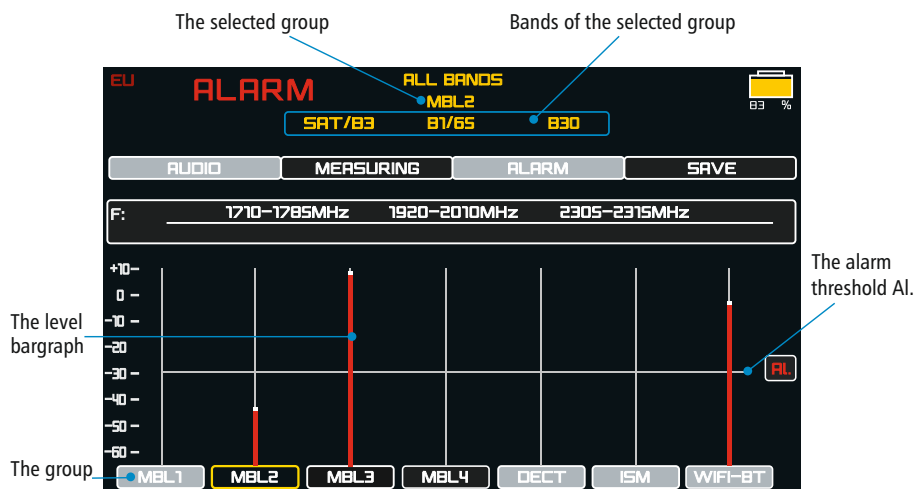
Press **SAVE** in order to save the results of the adjustment. If the changes are not saved, the device will work with the new settings until the power is shut down, then any previous settings will be chosen when next used.

OPERATION MODES

When the bands have been adjusted, you can proceed with working. The iProtect 1217 detector has several searching modes.

ALL BANDS

This is the main searching mode that enables the detection of all mobile and wireless signals. Use this mode as the main one for all search tasks.
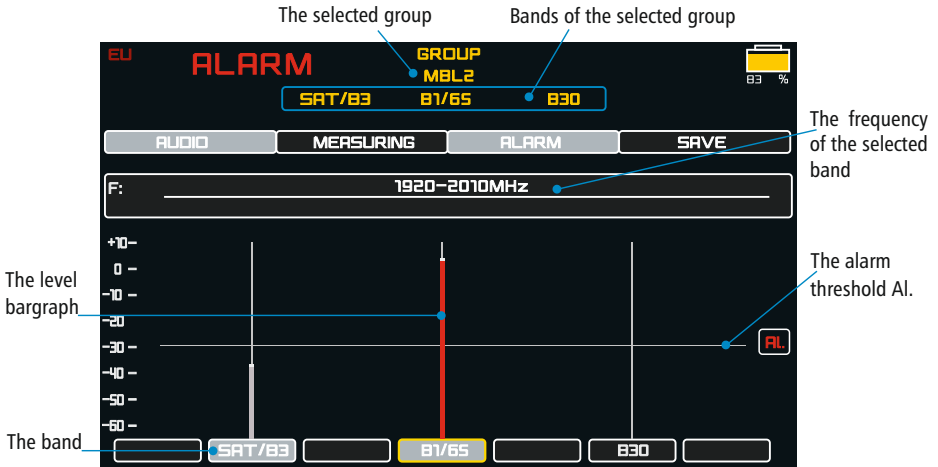
The selected group   Bands of the selected group

The level bargraph

The group

The alarm threshold Al.

The groups will be displayed at the bottom of the screen. The signal levels by groups are displayed on the bargraphs. By pressing **the joystick to the left and right,** the user can choose a group and see which bands belong to it.

It is possible to set **the alarm threshold Al** by **pressing the joystick up and down**. In case of a signal exceeding the threshold, an alarm indication and alarm sound can be displayed (**ALARM** and **AUDIO** functions).

A subsequent **pressing of the joystick button** selects the GROUP mode, in which the operator can inspect the bands belonging to the group.

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GROUP

This is used for inspection of the bands in a certain group, for example, when a high level of signal has been detected. The bands are displayed at the bottom of the screen, and the signal levels by bands – on the bargraphs. By pressing the joystick to the left and right, the user can choose a band and see its frequency.

The selected group

Bands of the selected group

The frequency of the selected band

The alarm threshold Al.

The level bargraph

The band

The alarm threshold can be adjusted, and the **ALARM** and **AUDIO** functions can be switched on. A subsequent **pressing of the joystick button** selects the BAND mode where a band can be inspected

BAND

In this mode, the signal is measured in one band only. Use it in order to explore a certain band and to perform a physical search of the transmitter.

The group

The band

The frequency of the selected band

The level bargraph

The alarm threshold Al.
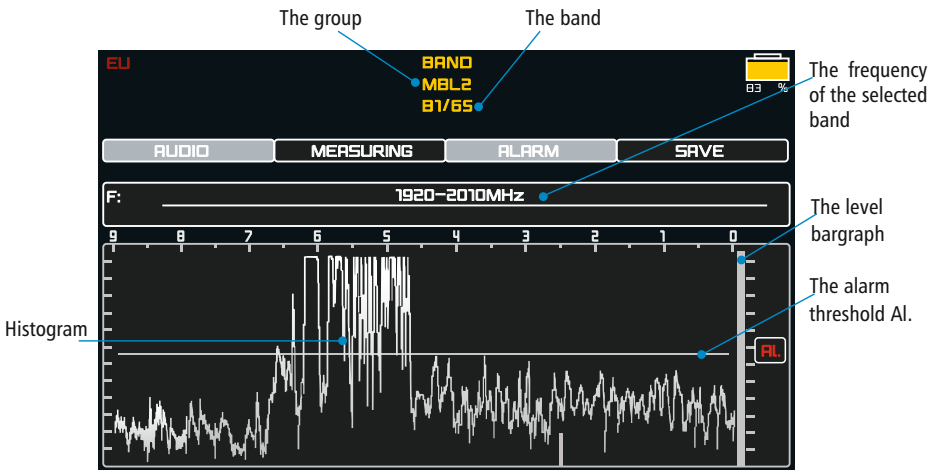
Histogram

In addition to the level bargraph, a **histogram** is displayed in this mode. The histogram is a graph where the history of the signal level for a certain time period is shown. It allows you to not miss the signal when you approach, or move away from the transmitter, or when it has a non-continuous mode of operation.
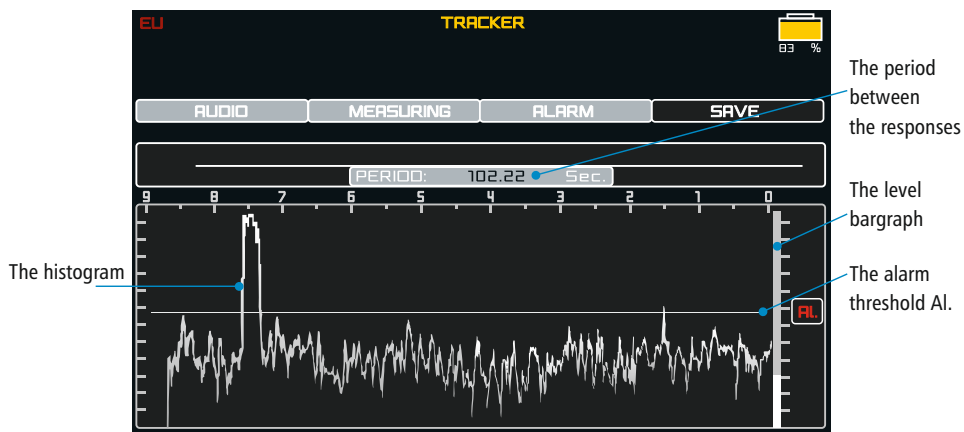
The alarm threshold can be adjusted, and the **ALARM** and **AUDIO** functions can be switched on. A subsequent **pressing of the joystick button** selects the TRACKER mode.

TRACKER

In this mode a search for GPS trackers (beacons) on vehicles or other mobile devices can be performed.

The measuring is performed on active mobile bands only, that is, those belonging to MBL1, MBL2, MBL3 and MBL4 groups.

The histogram is displayed, which enables you to not miss short-time signals and to see an increased time period (1 minute).

The period between the responses

The level bargraph

The alarm threshold Al.

The histogram

The alarm threshold can be adjusted, and the **ALARM** and **AUDIO** functions can be switched on. A subsequent **pressing of the joystick button** selects the ALL BANDS mode.

The histogram in TRACKER mode can operate at two accumulation speeds:
- Normal
- Slow (24 hours)

At normal speed, the histogram accumulates and displays the history of approximately 6 minutes.

At slow speed, the histogram accumulates and displays a much longer history of events (24 hours). This helps to detect those tracking devices that accumulate route coordinates over a long period of time and transmit the collected data only from time to time.

If the tracker transmits data less than once a day, its activity can be detected by regularly checking the detection history every 24 hours.

To enable the slow accumulation speed (24 hours), press and hold the ALARM button when turning on the device. To check if the option has been activated, start the TRACKER mode and check the horizontal time scale. It will show marks from 0 to 23. At this speed, the histogram will accumulate very slowly, approximately 1 pixel every 2 minutes.

Before switching the iProtect 1217 to TRACKER mode for low-speed measurement, make sure that all known and friendly mobile devices are deactivated. It is also advisable to choose a measurement location without mobile devices nearby (no IoT devices, no GSM/3G/4G/5G alarm systems, etc.). This will help to avoid multiple false detections and make it easier to understand the results obtained over a long period of time.

Provide a power source (USB 5V) and use the charging cable so that the iProtect 1217 can work during a longer period of time.

To return to normal speed, turn off the device, press and hold the ALARM button again and turn on the device. At normal speed, the horizontal time scale shows marks from 0 to 9, and the histogram scrolls faster and the scrolling process is visually noticeable.

RECOMMENDATIONS FOR USE

Connect the high-frequency antenna LPDA-12 to the left socket, and the rod antenna – to the right socket. If necessary, connect the device to its charger and recharge it for some time.

The device comes with 2 rod antennas: one of a standard sensitivity (short) and one of a high sensitivity (long). To ensure maximum sensitivity of mobile signal detection, use the long antenna. In case the signal level is too high (the scale shows close to the maximum value), using the short antenna can reduce sensitivity and help in physically locating the signal source.

Searching for covert surveillance devices

Switch off all the known radio frequency devices which are situated in the target premises and nearby, including mobile telephones, Wi-Fi routers, radio telephones, devices with Bluetooth and others. This will enable the avoidance of interference, reduce the number of false responses and increase the probability of detection of a real dangerous signal.

Position the device close to the target premises, switch it on and select the ALL BANDS mode. Note the background level that exists in this place. Adjust the alarm threshold in such a way that it is slightly higher than the background. Switch on the ALARM function to see visual warnings about the detection of a high level of signal, and the AUDIO function – in order to hear the sound alarm signal if desired. If you want to maintain the secrecy of the sweeping operation, do not switch the sound on.

Enter the premises and start scanning in the ALL BANDS mode, moving the device. The iProtect 1217 is sensitive enough and can detect strong signals at a quite long distance, which can reach 10 meters or so. Therefore, there is no need to scan the surfaces and internal constructions too closely, – move the device and approach the surfaces at a distance of 0.5-1 metre. However, in order to find very weak signals, like Bluetooth, it may be required to move the device closer to an object.

If you detect a noticeable increase in the radio frequency level in one of the bands, start a physical search for the possible location of a transmitter.

Move the device and change the antenna direction in order to find where the signal is coming from.

It is more convenient to locate signals above 2400 MHz thanks to the directional microwave antenna. When the antenna is directed towards the transmitter, the level grows, thus the operator sees the direction towards the signal. If the band's frequency is above 2400 MHz, change the device's direction in order to understand where the signal is coming from. Then move the device and change the direction again. In such a way, you will be able to find the source of the signal.

Localization of the signals under 2400 MHz is performed by moving the iProtect 1217 and by successive approximation to the transmitter with an increase in the level. Divide the premises into approximately 4 parts and measure the level in each part. Divide the part with the highest level again into 4 parts and find the max level again. And so on. In such a way, you will be able to find the source.

Physical locating can be performed while you stay in the ALL BANDS mode, or you can go on to a more detailed inspection of a certain group or a band. In order to enter the group (GROUP mode), first select it with the joystick and then press the button on the joystick. Next, inside of the group, you can select a band and enter it (BAND mode). The BAND mode has a number of advantages:

    -the probability of detecting short-time signals (Wi-Fi, Bluetooth, 4G, 5G, etc.) increases;

    -it is more convenient to inspect a separate band when there is a high activity on the others. An audio alarm arises only from the band being inspected.

As you try to locate the transmitter, you can gradually raise the alarm threshold and thus narrow the search area, paying attention to the sound (AUDIO and ALARM functions must me switched on).

Detecting GPS trackers (beacons)

When we mention GPS trackers (beacons), we mean devices of three types:

    ❶ Those accumulating coordinates without transmitting them anywhere.

    ❷ Those accumulating coordinates and transmitting them very rarely, or upon request

    ❸ Those transmitting coordinates regularly.

Trackers of the second and the third type usually use mobile networks for data transmission. In order to detect these mobile devices, the iProtect 1217 must be together with the vehicle which moves and makes manoeuvres. It is recommended to plan a trip along a route without settlements around and/or other cars on the road.

Before the trip starts, switch off all mobile phones. If possible, deactivate the car alarm system with mobile communication, if there is any. This will reduce the number of false responses and will increase the probability of detection of a real dangerous signal.

Choose a long rod antenna for the right connector to get the maximum detection distance, which can be especially important when inspecting long vehicles.

Set the threshold level at 20-30% and start moving.

In the TRACKER mode, the device measures the levels on all the mobile bands which are activated in the settings and displays the cumulative level at the bargraph. A histogram has an enlarged period (about 6 minutes) in order to enable the user to see a short-time signal, and if possible – to discover the periodicity of a signal's existence.

In addition to the histogram, the device also measures the time between responses (MEASURING - PERIOD).

The presence of signals may inform about a mobile device nearby. In case of its detection, try to monitor if there is any connection between the signal and the car's behaviour – perform a start-stop of the engine, start moving, stop, make a turn, etc.

Continue measuring for a certain period of time in moving transport, since it is not known with what frequency the tracker will transmit data (for example, 30 min or 1 h).

Long-time monitoring
As mentioned earlier, the iProtect 1217's histogram can operate in slow accumulation mode, which makes it possible to carry out long-term monitoring of a vehicle or cargo. This helps to identify those tracking devices that accumulate route coordinates for a long time with very rare data transmission sessions (for example, 1 time in 24 hours). You can perform such inspection as a second stage if there is time and the ability to provide the necessary conditions.

To achieve success, use the following tips:
- Provide external power to the iProtect 1217 during the measurement
- Switch the device to slow histogram accumulation
- Ensure complete radio silence for the entire measurement period - place the vehicle and device in a pre-selected location, where there are no people and mobile phones
- Take measurements on stationary vehicles immediately after they have moved
- Start TRACKER mode
- Check the received histogram data at least once every 24 hours

POWER

The iProtect 1217 is powered from the built-in rechargeable battery that has an operational resource sufficient for carrying out search works during several hours. In view of the importance of the search works, we recommend to charge the device in due time.

The iProtect 1217 can work during charging. For charging, you can use a mobile phone charger, a computer USB connector, a powerbank, etc. with a power of at least 10 watts.