⑾⑾⑾ | MEFF
M2-PRO

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MEFF is an Italian company born from a passion for TSCM. Our vision is to offer cutting-edge tools for information security and protection, while our mission is to achieve excellence in technological development and innovation, guaranteeing our customers reliable and always up-to-date solutions.

In addition to the production of TSCM devices, MEFF offers programs professional training, available both online and at our operational headquarters in Italy, to ensure the informed and effective use of our technologies.

To learn more, visit our website:www.meffproduction.com

⫴|‖ MEFF

Suitcase Contents:

1)   1 wifi antenna and 1 Bluetooth antenna

2)   1 Omnidirectional Antenna

3)   1 Charger

4)   1 Directional Antenna

5)   Adapters for LAN and telephone lines

6)   High voltage electrical system analysis probe

7)   Shoulder strap

8)   Low voltage line analysis probe

9)   USB stick with user manual

Introduction

This manual has been created with the aim of providing clear guidelines and detailed instructions for the use of the MEFF M2-PRO spectrum analyzer, an indispensable professional tool for the detection of electronic surveillance devices in the field of Technical Surveillance Countermeasures (TSCM).

The effectiveness of using the MEFF M2-PRO, as with any other TSCM solution, depends on two fundamental factors:

- The threat level to face,
- There technical expertise of the operator in the correct use of the instrument.

Legal Notices

MEFF devices are designed and intended exclusively for lawful commercial use. Regulations governing the sale and use of electronic tracking equipment may vary from state to state and from country to country.
Therefore, it is exclusive responsibility of the buyer and the operator ensure that you comply with all applicable local laws and regulations, both before purchasing that during the subsequent use of the device.

General Information

This manual contains proprietary information for exclusive use with the MEFF M2- PRO system.
The technical specifications and features described may be subject to changes without notice to ensure continuous product improvements.

All the brands he trade names. The names and addresses mentioned are used exclusively for identification purposes and remain the property of their respective owners.

Product Certifications

The MEFF M2-PRO complies with the following standards and certifications:

- · THERE IS

- · FCC

- · RoHS

- · SIAE Software Registration

- · International Legal Protection Certificate

- · *Further certifications are currently being requested.*

Device Registration

Each MEFF M2-PRO unit is identified by aunique serial number, positioned on the back of the device. It is recommended that you carefully note this number and always refer to it when contacting the manufacturer or authorized dealer.

📌 Attention:
There removal or alteration of the serial number involves theautomatic cancellationof any warranty associated with the product.

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Safety Precautions

⚠️ General Warning

To avoid damage to your device MEFF M2-PRO, use only original power supplies and accessories supplied. The use of unauthorized components may compromise the proper functioning of the device and void the warranty.

✅ Diet

·   Use only specific adapters and power supplies supplied for the different functions, correctly distinguishing between power supply high And low voltage.

·   Do not reverse the accessories or connections.

·   Never connect probes to sources with voltages higher than the limits indicated in the technical manual, to avoid permanent damage to the equipment.

✅ Ventilation

·   Always ensure adequate air circulation:

    or   keep the space around the chairs free cooling fans (entrance and exit),

    or   avoid obstructions to the front ventilation grille located at the bottom of the device.

·   Adequate ventilation helps maintain optimum performance and prevent overheating.

✅ Repairs and Maintenance

·   The MEFF M2-PRO unit contains no user-serviceable components.

·   For any maintenance or repair needs, please contact your authorized dealer or directly the MEFF technical service.

·   ⚠️ Unauthorized opening of the device or tampering with internal components will result in immediate cancellation of the warranty.

☑ Personal Safety

· Always use caution when using, especially in mode laptop.

· AND the use of the original shoulder strap is recommended included in the package to facilitate safe transport.

· During operation, handle the device with care to avoid accidents or personal injuries.

EQUIPMENT DESCRIPTION

1. Battery charging input

2. POWER (ON–OFF–RESET)

3. Audio input and output for headphones and extra speakers

4. LAN input

5. 2 USB 2.0 + 2 USB 3.0

6. VGA

7. HDMI

8. WIFI Antenna and Bluetooth Antenna

9. FULL BAND Antenna

10. Shoulder strap inputs

11. Cooling air intake

12. 13-inch Touch Display

Directional antenna:

Attach the directional antenna as shown in the photo.

Range from 600 MHz to 10 GHz.

The image above shows the vertically polarized antenna. Rotate the antenna in the clip to obtain vertical or horizontal polarization.

High and low voltage probes: two small portable probes are supplied which connect to the N connector, they are used to allow the acquisition and analysis of suspicious signals within the high and low voltage of wired systems:
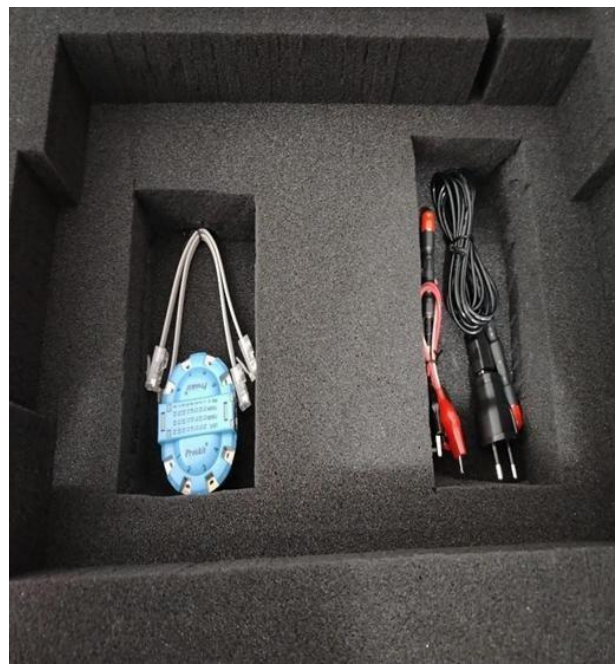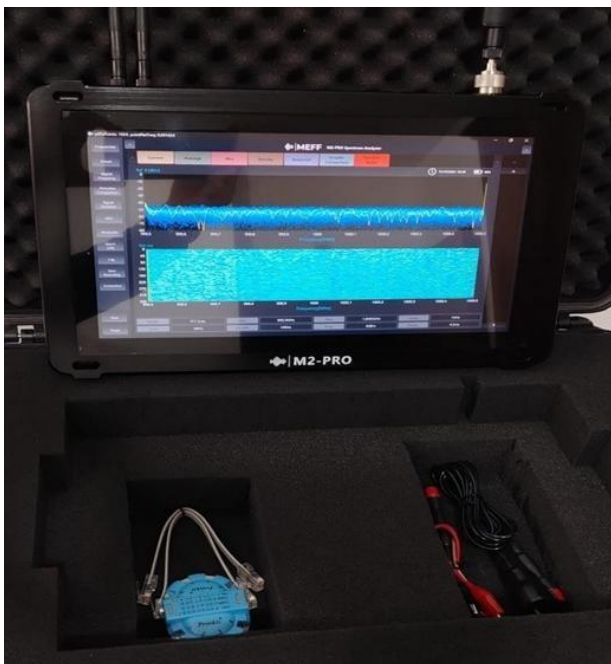
Main screen

1. Frequency: Digital, analog and wired frequency presets

2. Preset: create custom presets with frequencies of our choice

3. Digital Frequency: Examine and scan all mobile/wifi/bluetooth digital bands
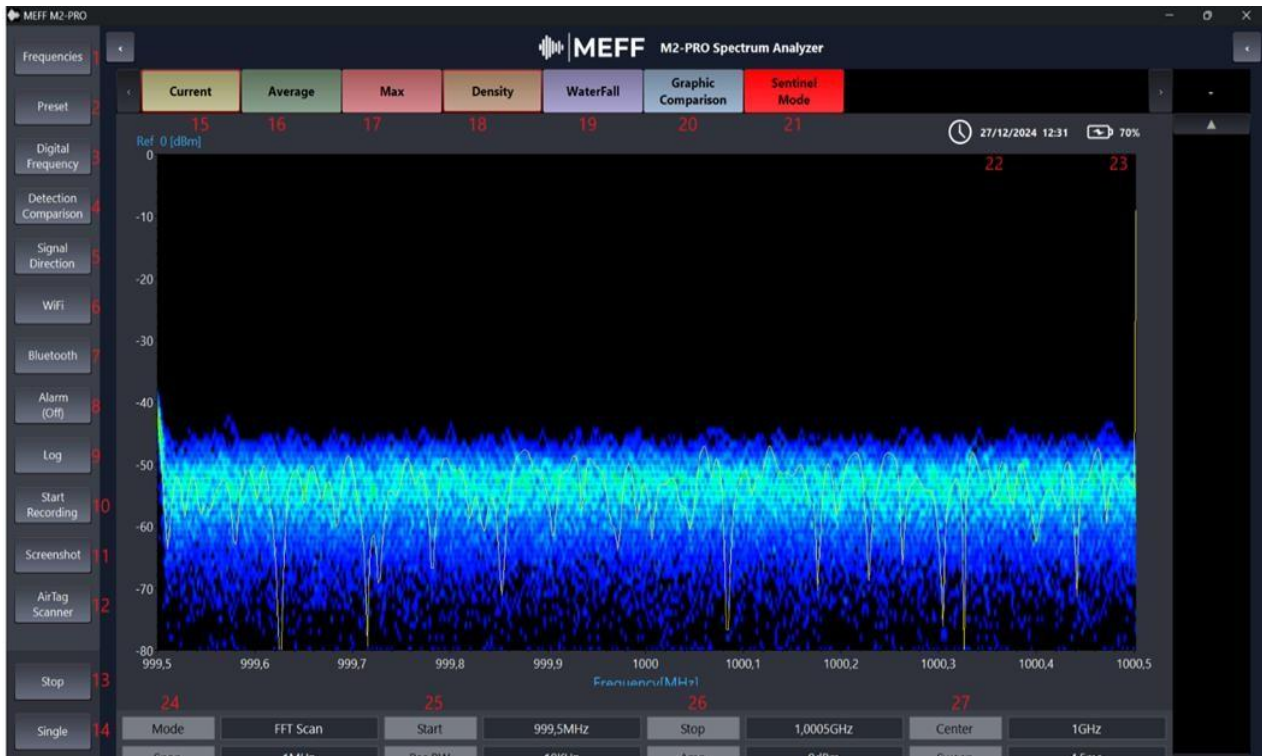
4. Detection Comparison: compare frequencies detected in different rooms or on different days

5. Signal Direction: Finding the direction of the signal

6. WIFI: Create lists of all wifi signals with details of each device

7. Bluetooth: Create lists of all Bluetooth signals with device details

8. Alarm: Set a threshold that will trigger an audible alert and log the event

9. Log: list of all events that occurred during Alarm mode

10. Start Recording: Screen Recording

11. Screenshot: take photos of your desktop

12. Air Tag: Detection of Air Tag devices – Bluetooth - BLE

13. Stop: Stop chart execution

14. Single: Single Play

15. Current: Real-time signal

16. Average: Weak signal

17. Max: Signal persistence

18. Density: Signal density

19. Waterfall: Waterfall chart

20. Graphic Comparison: Waterfall Chart vs. Frequency Chart Comparison

21. Sentinel mode: Automatic surveillance mode allows you to record all detected signals in a report

22. Date and time: Display date and time

23. Battery status: Remaining battery percentage

24. Mode and Span: Display of scan mode and inserted span

25. Start and BW: Scan start frequency and BW value

26. Stop and Amplitude: Detection stop frequency and entered dBm value

27. Center and Sweep: Center frequency and sweep speed

Starting and Shutting Down the M2-PRO Unit

✅ Turning on the Device

- For turn on the unit M2-PRO, hold down the key POWER until the button lights up green.

- When turning on, the system will ask you to enter the default password:
  ➔ 123456

- Once you enter the password correctly, the device will complete the loading and will be ready to use.

✅ Turning Off the Device

- For turn off the device, hold down the button POWER until the unit shuts down completely.


Starting the Operating Software

After the operating system starts, click on the MEFF M2-PRO icon located at the bottom of right of the desktop to open the management and analysis software.

🚨 Emergency Manual Reset

If the software freezes or becomes unresponsive during startup:

- Press and hold down the POWER button until the forced shutdown of the unit.

- Once turned off, press the button again POWER button to turn the device back on. This procedure allows the manual firmware reboot, useful for quick recovery in case of software anomalies.

🕐 10/07/2025 13:03   🔋 100%
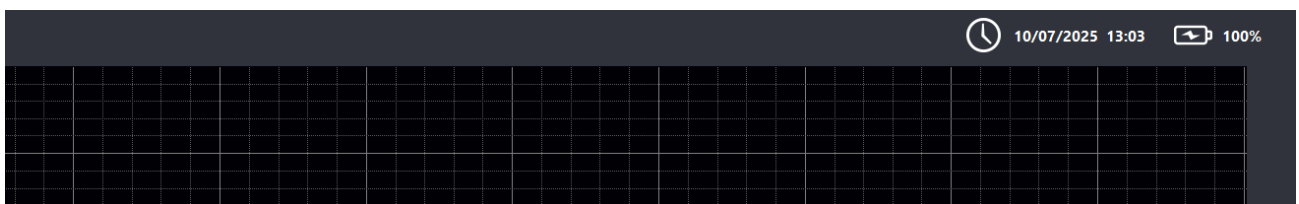
⚠️ Important Battery Notice

When the battery charge drops below 10%, the system will display a red warning on the screen.
This notice indicates the immediate need to recharge the device, since below this threshold the unit it can no longer be used correctly.

💡 Important:

Never use the unit below 10% charge, as the high energy absorption. The M2-PRO system does not allow for operational functions to be maintained at such low battery levels.

➡️ If the battery drops below this threshold:

· The system will automatically lock,

· the unit will remain not operational until recharged adequately.

To ensure proper operation and prolong the life of the device, we recommend that you Always recharge the unit before reaching the critical level.

🚀 Quick Start Exercises

This section provides a series of practical exercises to help the user quickly familiarize themselves with the main functions and operating capabilities of the MEFF M2-PRO. The exercises are presented in a simplified form, with essential explanations, and assume the unit is turned off before starting.

For a more in-depth description of all features and settings, please refer to the following sections of this User Manual.

📌 Exercise 1: Basic RF Transmitter Detection

Objective:
Learn to detect suspicious signals through the basic scanning functions of the M2-PRO.

✅ Operational Steps:

1. Turning on the Device

- To turn on the M2-PRO, press and hold the POWER button until the button lights up green.

- Enter the default password➡️ 123456

2. Starting the Software

- Access the MEFF M2-PRO software via the icon located at the bottom right of your desktop.

3. Preparing for Scanning

- Make sure you have a transmitter active in the environment to run a simulation (for example a wireless device or a small RF test bug).

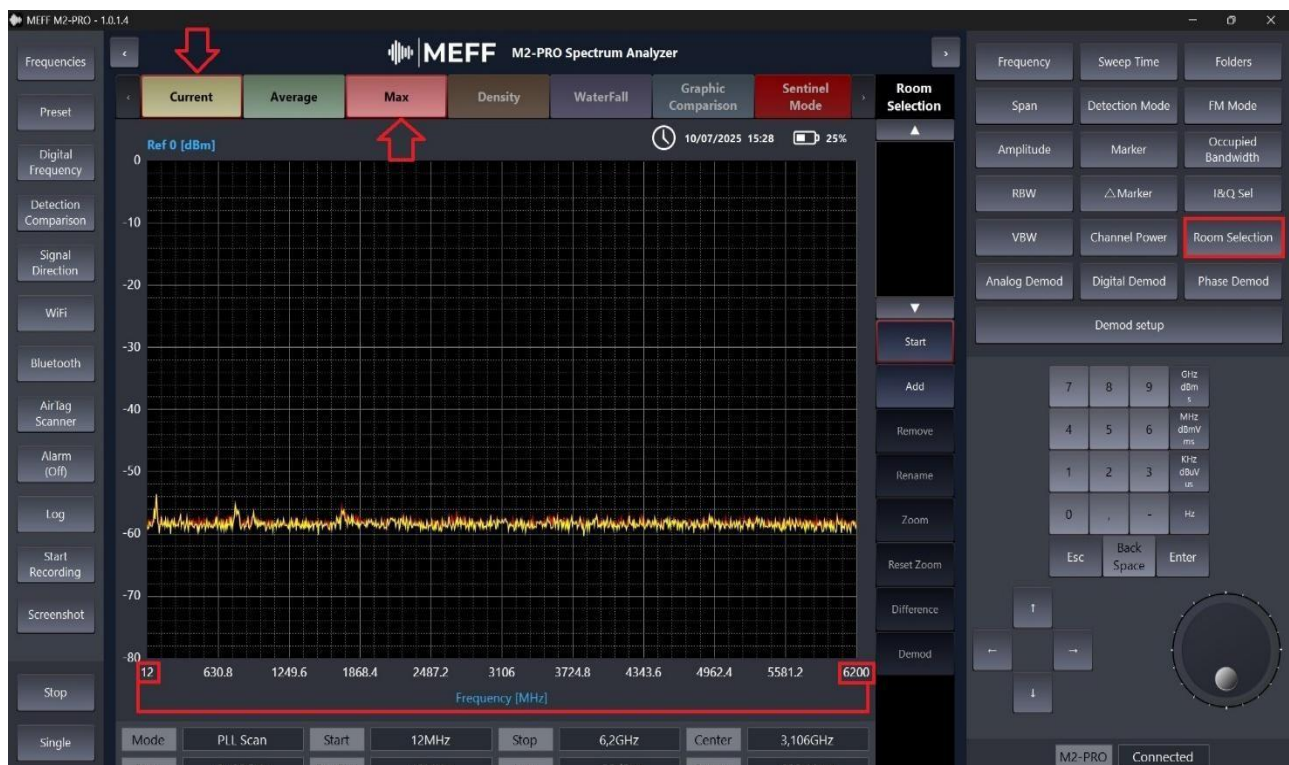## 4. Starting the "Room Selection" Function

- Select and start the mode "Room Selection" from the main menu of the M2- PRO software.

- or This function allows a quick scan of the environment to detect the presence of active signals.

5. Observation of Results

- Monitor the instrument's response: any suspicious signals will be highlighted graphically on the display, allowing for a rapid identification of emissions.

💡 **Please note:**

This exercise is designed for a quick and intuitive approach. In-depth signal analysis, the use of filters, recording, and other advanced features will be explained in subsequent chapters.

☑ Using the "Room Selection" Function

When starting the function Room Selection on the device M2-PRO, the system initially displays a red color peak, which represents the modality MAX HOLD. This mode highlights the signals persistent detected during scanning.

To also view the real-time signals, just press the button "Current", which will activate the display of the yellow track:

· 🔴 Red→ signals register (persistent)

· 🟡 Yellow→ signals currents detected in real time

The system automatically sets a scanning range between 12 MHz and 6.2 GHz, covering most of the operating frequencies used.

During this phase the real-time signal spectrum.

Practical example:

If you activate a RF bug (for example a device transmitting to 408.00 MHz), the system will show immediately a double peak:

· 🟡 Yellow for the current signal being transmitted

· 🔴 Red for the signal stored in MAX HOLD

In this way, the user can quickly identify and differentiate active signals from any previous signals or background interference.

To activate the alarm function, we press the button Alarm to receive an automatic notification whenever the threshold we define is exceeded. Click on Alarm (off), we set the desired threshold value (example -55.00 to -50.00) and we confirm with OK. When a signal exceeds the set threshold, both a visual and audible alarm will be generated, indicating the details of the detected frequency. To deactivate the function, click on Alarm (on).
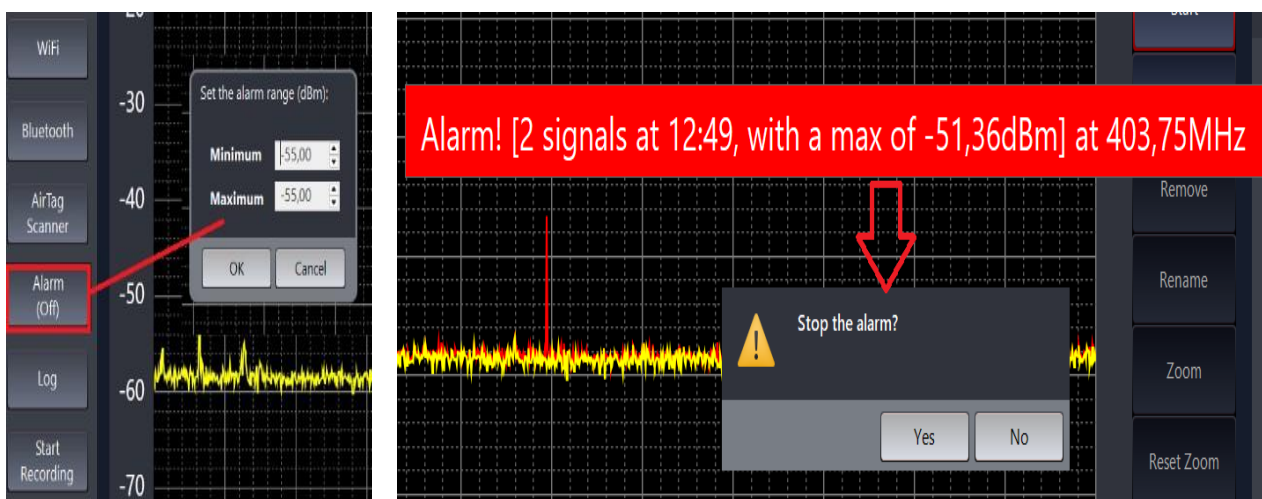
✅ Access the Alarm Report

Let's access the report generated by the function Alarm by clicking on the button Log. All detected signals are displayed in the report, updated second by second, complete with all relevant information.

✔ You can filter the signals by clicking on Filter, conducting research for date And Now.

✔ We can choose whether to display all signals detected or only those who fall within the set alarm range.

To close the menu Filter, click on the X.
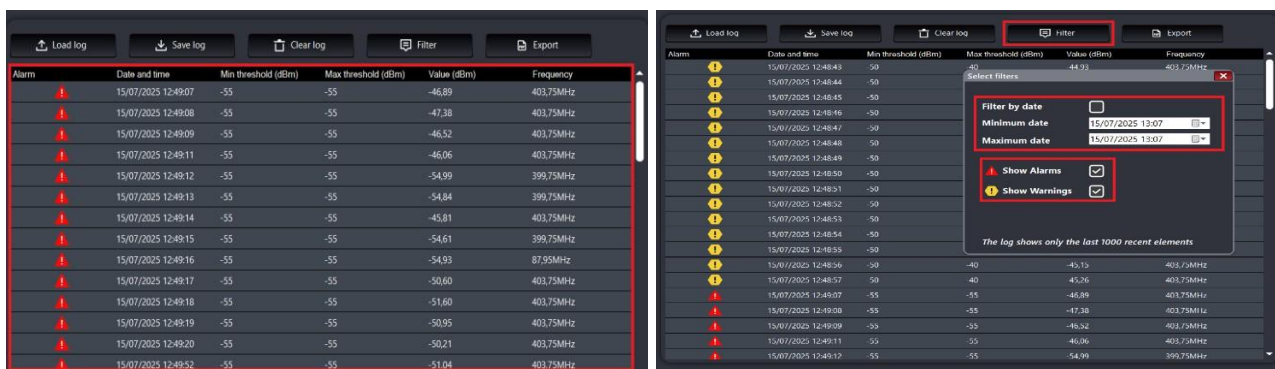
✅ Log and Report Management

It is possible save the log to consult it at a later time.

✔ Click on Save Log, give the file a name and save it to the desktop in the folder M2-PRO.

For recall a saved log:

✔ Click on Load Log, select the desired file in the folder M2-PRO and click on Open.

For delete the list of displayed logs: Click on

✔ Clear Log.

Furthermore, it is possible create and export an automatic report generated by the MEFF M2-PRO by clicking on the button Export and enter the required data and then click on Save *(See page 81 for the report.)*
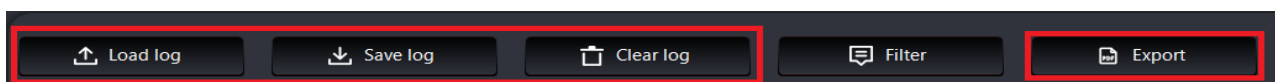
To exit the function, simply click on the button LOG.

As we can observe, the simulated signal is clearly visible inside the graph, with all the details relating to the survey.

✅ Zoom and Graphical Signal Demodulation

To analyze the detected signal in detail:

✔ Touch the display signal detected and press the button Zoom to enlarge and observe more precisely the signal spectrum.

To proceed with the graphic demodulation:

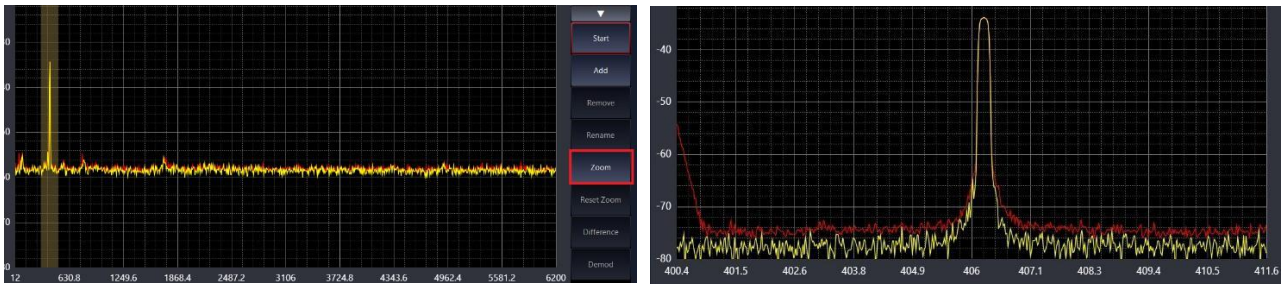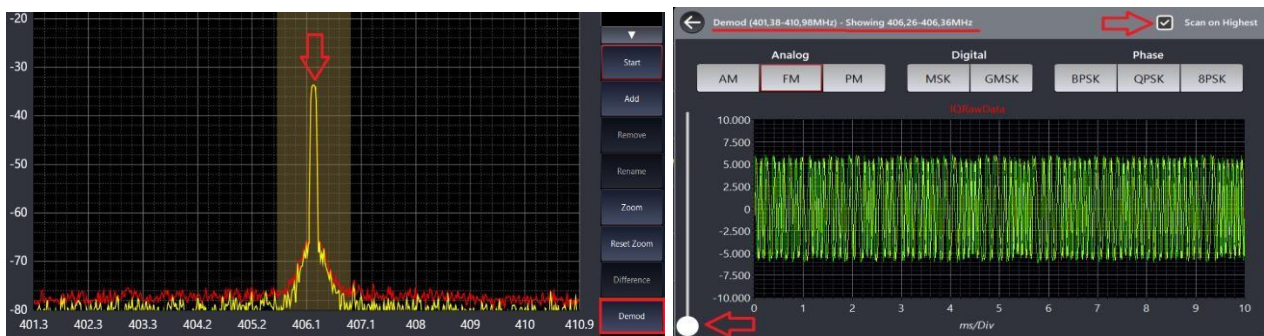✔ Select the again signal of interest via touch and click on the button Demod. It will open the demodulation window, which allows you to view the audio content transmitted on the frequency selected in graphic mode.

✅ Audio signal demodulation and detection

At the top left you can see the currently demodulated frequency At the top right, select the option Scan on Highest, which allows you to automatically demodulate the entire previously selected frequency band.

After selecting the demodulation of interest — in this case FM—the audio signal will be demodulated and reproduced in form graphics in the viewing window.

It is possible to adjust the amplitude of the signal scale using the adjustment bar at the bottom left, to optimize the display.

Thanks to this procedure, the presence of a RF bug operating at 408 MHz, and the transmitted audio has been graphically demodulated. To go back, click the arrow in the top left.

✅ Location of the transmission point

To precisely locate the signal source, perform the following steps:

Zoom in on the suspicious signal by touching it on the display and pressing the button Zoom.

Activate the modes Current, Average and Max Hold for a complete and stable display of the signal over time.

Hold the device M2-PRO and move within the environment, monitoring signal strength changes in real time to precisely locate the transmission point.
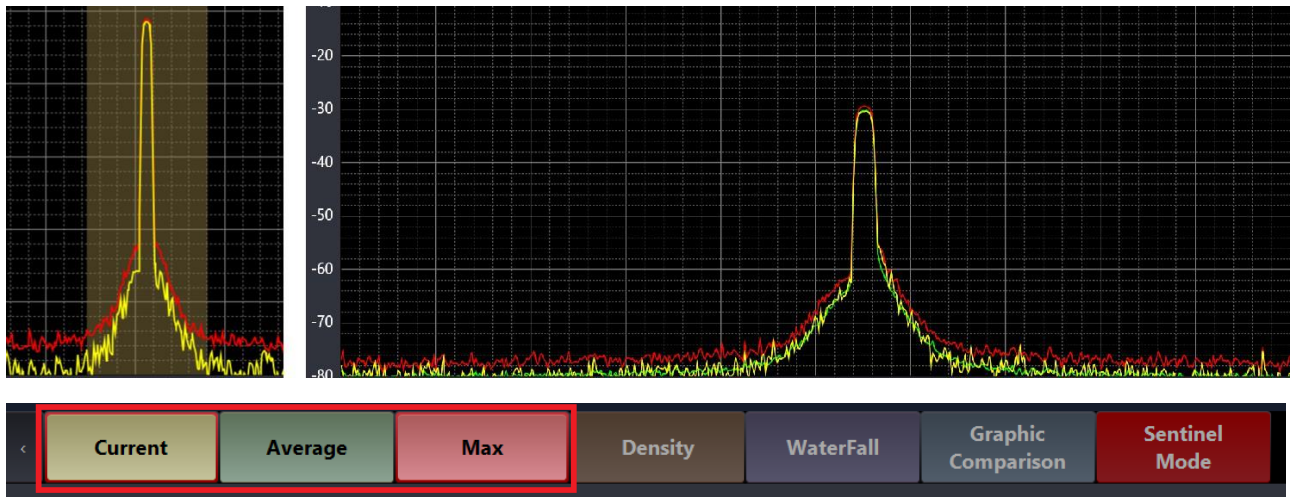
Interpreting the graph while searching for the signal

While moving with the M2-PRO, you can observe in real time the variations of the graph as a function of the distance from the transmitter:

Getting closer at the signal source, the graph is intensifies and the signal amplitude increases, indicating a greater proximity to the transmitter.

Moving away, the graph is reduces and the signal level gradually decreases.

The RSSI value (Received Signal Strength Indicator) will increase with proximity to the transmitter and will fall as we move away.

These variations allow the position of the transmitting device to be precisely determined.

To exit the function press Reset Zoom
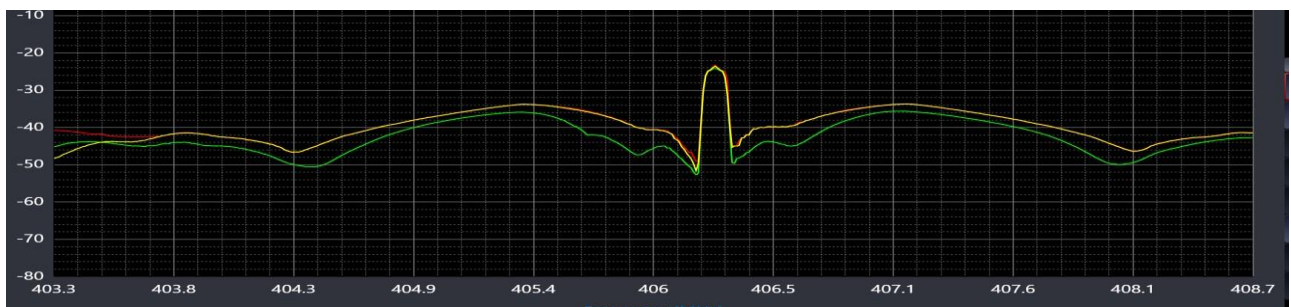
✅ Comparing broadcasts between multiple rooms

To compare transmissions detected in different rooms, follow the procedure below:

Access the first room and perform a scan of the signal in Room Selection mode

Select the frequency and press the button Add, enter the name of the room (e.g. Room 1) and confirm with the button OK.

Repeat the same procedure for the other two rooms, thus creating three separate profiles: Room 1, Room 2 and Room 3.

Once the scan for each room is completed and saved, you can start the comparison of the data:

Select the three rooms to compare.

Turn off options Current and MAX HOLD to view only the data recorded during previous scans.

The system will display the signals detected in each room with distinct colors By positioning the cursor or touch on a signal, the room name corresponding. If the signal has been detected in multiple environments, the following will be indicated: all rooms where that signal was recorded.
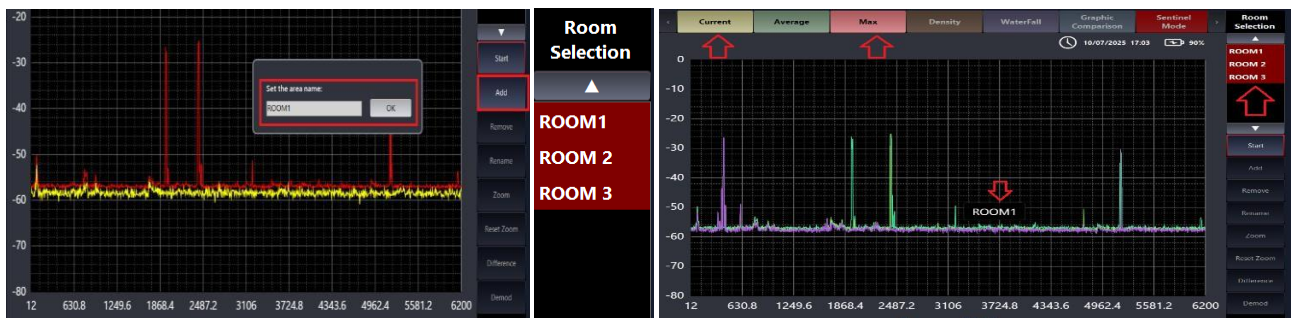
✅ Differential Signal Analysis – Real-time Mode

To compare in real time the current signals with those previously detected in the *Room 1*, follow the procedure:

Make sure the options Current and Max Hold are active.

Select Room 1from the list of saved detections.

Press the button Difference to start the differential analysis.

At this point, the screen will show two graphs:

Chart 1 (upper): displays the recorded signal of the Room 1 in light blue, the signal real time In yellow and the MAX Hold in red.

Graph 2 (lower): shows the difference between the current MAX Hold signal and the saved one of Room 1The graph is displayed in reverse mode

The part superior represents the MAX Hold detected in real time.

Part I lower shows the previous finding relating to the Room 1.

This mode allows you to identify significant differences between the two detections, highlighting any new transmissions or signals not previously present in the room.

✅ Exiting Differential Mode and Managing Saved Rooms

To exit Difference mode, press the button again Difference. It is

also possible modify or remove previously saved rooms:

For rename a room, select the corresponding entry (e.g. Room 1), click on the button Rename, Enter the new name and confirm.

For eliminate a saved room, select it and press the button Remove.

Final note

This exercise of quick start illustrates just some of the main features of the unit M2- PRO.

The goal is to provide an initial overview that will help the user become familiar with the device's interface and operating features.

<h1 style="text-align:center">MEFF M2-PRO – Portable Spectrum Analyzer</h1>

The MEFF M2-PRO Spectrum Analyzer it's a device High-performance portable TSCM, designed to offer advanced spectral analysis capabilities down to 100 Hz 24 GHz.

Ideal for professional and demanding users, the M2-PRO combines precision, operating speed and a complete set of features, designed to address the challenges posed by high-density radio signal environments.

☑ Main features:

Ultra-wide frequency coverage: from 12 MHz up to 24 GHz.

Sturdy and lightweight structure: made in high-strength aluminum alloy, ensures durability and portability.

Intuitive user interface: designed to simplify complex operations even in critical contexts.

Advanced technologies: supported by intelligent algorithms for automatic analysis and efficient detection of suspicious signals.

☑ Operational applications:

The M2-PRO is designed to meet a wide range of operational needs, including:

- Technical surveillance countermeasures

  (TSCM) RF Spectrum Analysis and

  Monitoring Identifying and detecting

  electronic threats

- Protecting critical infrastructure and sensitive information

With its advanced capabilities and system reliability, the M2-PRO represents a complete solution for detection, localization and neutralization of illegal or unauthorized transmissions.

☑ Power and battery charging

To turn on the unit M2-PRO:

Make sure the battery has sufficient charge or connect the included AC adapter.

Press the power button (POWER).

To turn off the unit, press the button Start from the desktop and click on the shutdown button.

If it freezes or becomes unresponsive, you can perform a hard reset of the firmware by holding down the power button until the unit shuts down.

Note: This method should only be used if normal shutdown attempts are unsuccessful.

✅ Charging the battery

The M2-PRO unit has an internal charger. To charge the battery:

Connect the included AC adapter with the battery inserted into the unit.

The full charging time is approximately 3 hours.

The estimated operating autonomy is approximately 5-6 hours.

Battery maintenance tips

It is recommended to regularly recharge the battery during long periods of inactivity (over 3 months) to avoid degradation and maintain optimal performance.

✅ Software and firmware update

Updates to the MEFF M2-PRO are free and are released regularly to improve features, performance, and software, also based on user feedback.

Update procedure

The update occurs automatically and remotely. We recommend connecting the device via LAN cable at least once a month and launching the management software. If an update is available, a message will appear and the automatic download will begin. Once the update is complete, you can reopen the software normally.

Remote assistance

MEFF offers a remote assistance service: if necessary, and with the user's consent, technicians can connect to the device remotely to analyze and resolve any issues directly.

User Benefits

Thanks to versatile and constantly updated software, every customer benefits from a product that is constantly evolving and improving.

MEFF also provides direct support and organizes training courses for the use and maintenance of the device.

Setting the Time Zone, Date and Time

Correctly configuring your time zone, date, and time is essential to ensure the consistency and reliability of reports, log files, and, in general, all data recorded and processed by the MEFF M2-PRO system.

To proceed with the setup, follow these steps:

1. Access the menu Start and select the icon Settings (represented by a gear).

2. Inside the settings panel, select the item Date/Time and language, then click on Date and time.

3. To change the time zone, click on the drop-down menu Jet lag and select the appropriate option based on the geographic location of your device.

4. In case you want to set the date and time manually, you need to disable the option Set time automatically. Next, click on Change under the voice Change date and time.

5. Enter the desired values for date and time, then confirm the operation by clicking on OK.

Accurate device time synchronization is a prerequisite for the reliability of advanced system features, particularly in contexts where traceability and chronological accuracy of data are a regulatory or operational requirement.

✅ Saving Screenshots and Videos

Start Recording and Screenshot Functions

The MEFF M2-PRO allows you to easily capture both still images (screenshots) and video recordings of your screen. These functions are useful for documenting activities, analyzing events, or generating reports.

Starting Video Recording:

To start a recording, click the button Start Recording Once activated, the system will automatically start recording all visible content on the screen.

Active Recording Indicator:

During recording, the text Start Recording will be highlighted in red, clearly indicating that the feature is active.
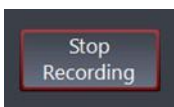
✅ Saving Files

Stop Recording: to end video recording, click the button again Stop Recording to confirm the interruption, the red highlighting of the text will disappear.

Saved File Location: Once recording is complete, the video file will be automatically saved to your M2-PRO folder, located on your desktop. From there you can view it, archive it, or attach it to technical reports.

✅ Screenshot function

Image Capture:

The function *Screenshot* Allows you to capture a still image of the currently displayed screen. This is useful for documenting operations performed and can be used in any section of the MEFF M2-PRO software.

Capture Mode:

To take a screenshot, click on the appropriate button Screenshot Once pressed, a message will appear confirming that the save was successful.
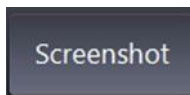
Saved File Location:

The captured image will be automatically saved in the M2-PRO folder present on the desktop.


Exporting Data via USB

You can export all the data saved on the MEFF M2-PRO using a USB stick. The device features four USB ports on the side: simply insert the stick into one to start the transfer process.

To quickly access all the information stored during an operational service, you can use the button Folders, located in the drop-down menu at the top right of the software interface. This function allows you to view the files stored in the system's internal memory.

From Folders we can have access to Report–Screenshot–Video–Comparison–Sentinel
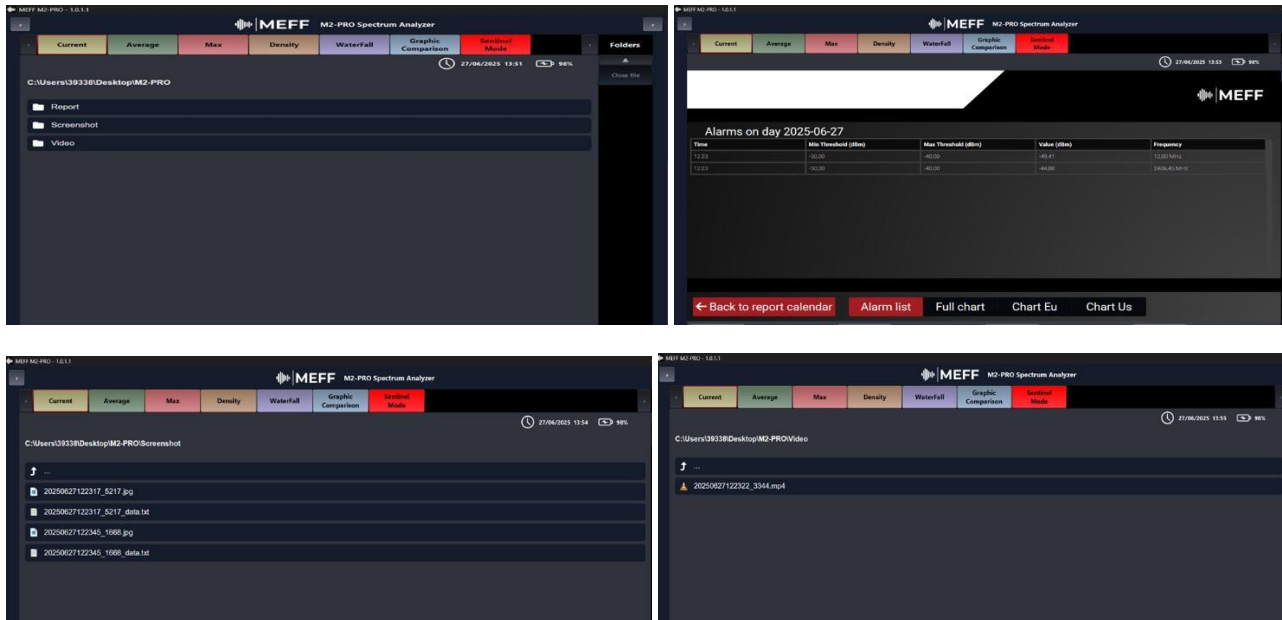
✅ Initial Operation

Preset Frequency Ranges

The MEFF M2-PRO is equipped with the function Frequency, which allows access to a series of Frequency presets and preconfigured scan modes, ready for immediate use.

In this mode, the system is able to detect:

- All frequencies RF
- Digital frequencies such as: GSM, LTE, 2G, 3G, 4G, 5G, Wi-Fi, Bluetooth
- Transmissions wired operating both in low that in high voltage
- Frequencies used by GPS
- Saturated frequencies caused by noise or jammers
- A section specifically dedicated to high frequencies

You can also set the automatic detection frequencies by selecting a geographic profile among:

· EU(Europe)
· USA
· ASIA

Upon customer request, it is also possible to configure specific frequencies for other continents or custom geographical areas.

✅ Mode *Full Band*

To activate Full Band mode, access the function Frequency and select the button FULL BAND This mode enables full spectrum scanning from 12 MHz to 6.2 GHz, with a sweep time of 820.44 ms.

Once activated, the interface will display two curves on the graph:

🟡 Yellow line: represents the signal in real time (Real Time)

🔴 Red line: highlights the maximum values detected over time (MAX Hold)

When signals are emitted within this range, the system automatically detects and stores them in the red trace, allowing for immediate and precise visual analysis.

To precisely identify a detected signal, you can use the function Marker, Available in the drop-down menu at the top right. The Marker allows you to read the frequency of the selected point on the graph, thus facilitating signal classification.

☑ Using Markers

To accurately analyze a detected signal in the mode Full Band, you can use the function Marker.

Access the side menu at the top right and click on Marker 1, then activate the selected marker button Enable ON.

It is possible to activate up to 5 markers simultaneously, each assignable to a different signal.

Drag the desired marker onto the signal of interest inside the graph.

At the top right, the details of the selected marker will be displayed (e.g. Marker 1), including:
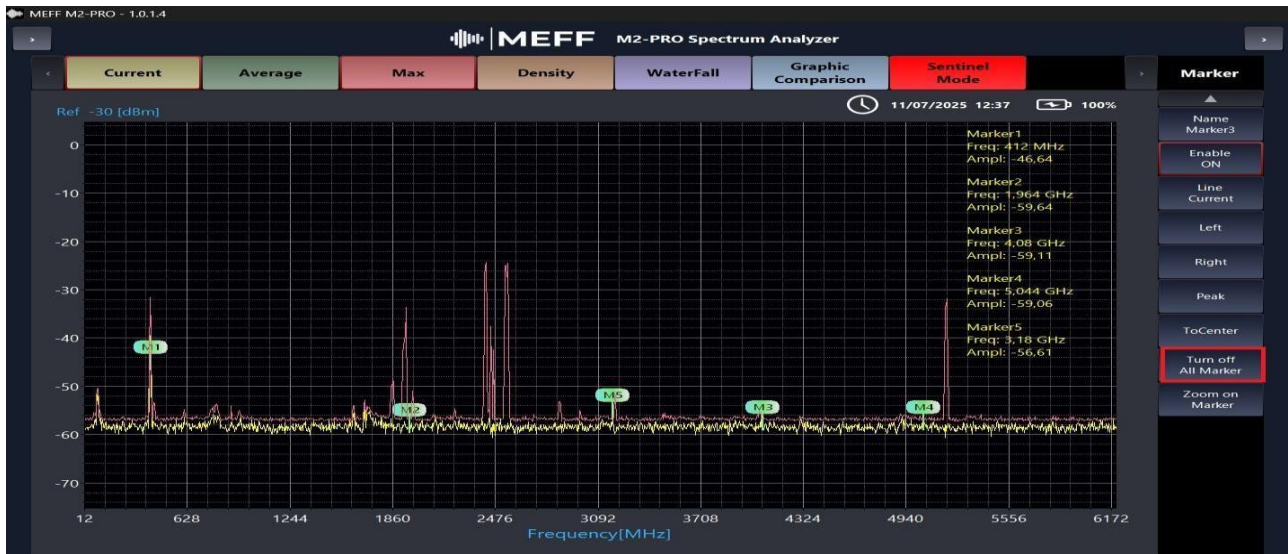
- Frequency: e.g. 412.00 MHz
- Width: e.g. -41.91 dB

To examine a signal more closely, click the button Zoom On Marker: The graph will focus on the range around the selected frequency, allowing for detailed analysis.
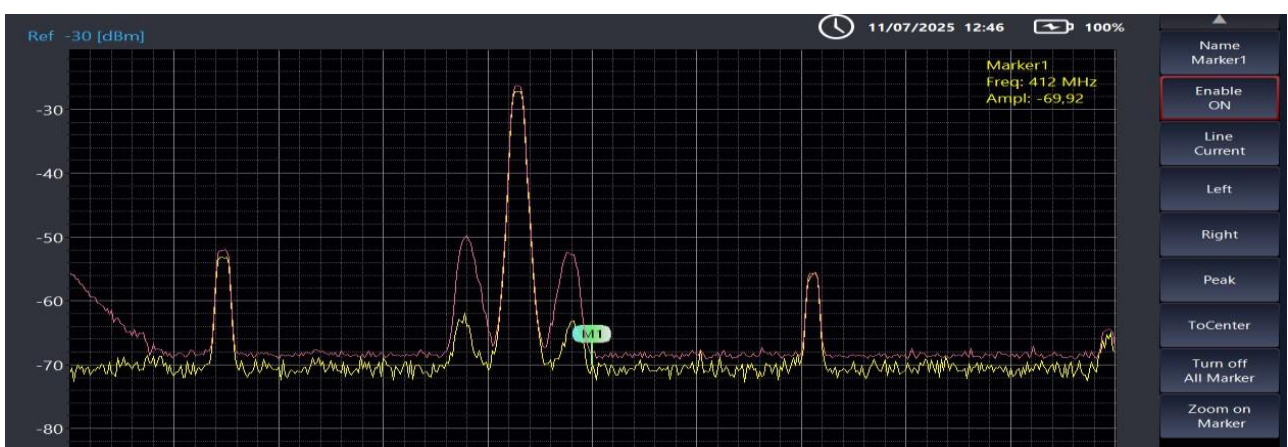
To exit the selected mode, click on Reset Zoom

You can activate additional markers following the same procedure, up to a maximum of five simultaneous markers.

✅ **Marker Management – Activation and Deactivation and Advanced Features**

Once you understand the basic operation of Markers, you can manage them flexibly to adapt the analysis to your operational needs.

It is possible to activate up to 5 Markers at the same time, always following the same procedure:

1. Select the Marker desired (from Marker 1 to Marker 5).
2. Press the button Enable ON to activate it.
3. Move the marker to the signal of interest.

Note: It is essential to ensure that the button Enable both to ON for each active marker, otherwise the system will not detect it or display the corresponding data.

Disabling Markers

You can deactivate a single marker by clicking the button again. Enable, bringing it back up OFF.

Alternatively, to deactivate all active markers at once, simply press the button Turn Off All Markers.

This option is useful for quickly clearing the graph of all ongoing analyses and starting a new monitoring session.

Detailed Analysis of the Commands in the Marker Function

Let's now proceed with an in-depth analysis of each button and function available in the Marker panel, useful for taking full advantage of the advanced measurement capabilities of the M2-PRO.
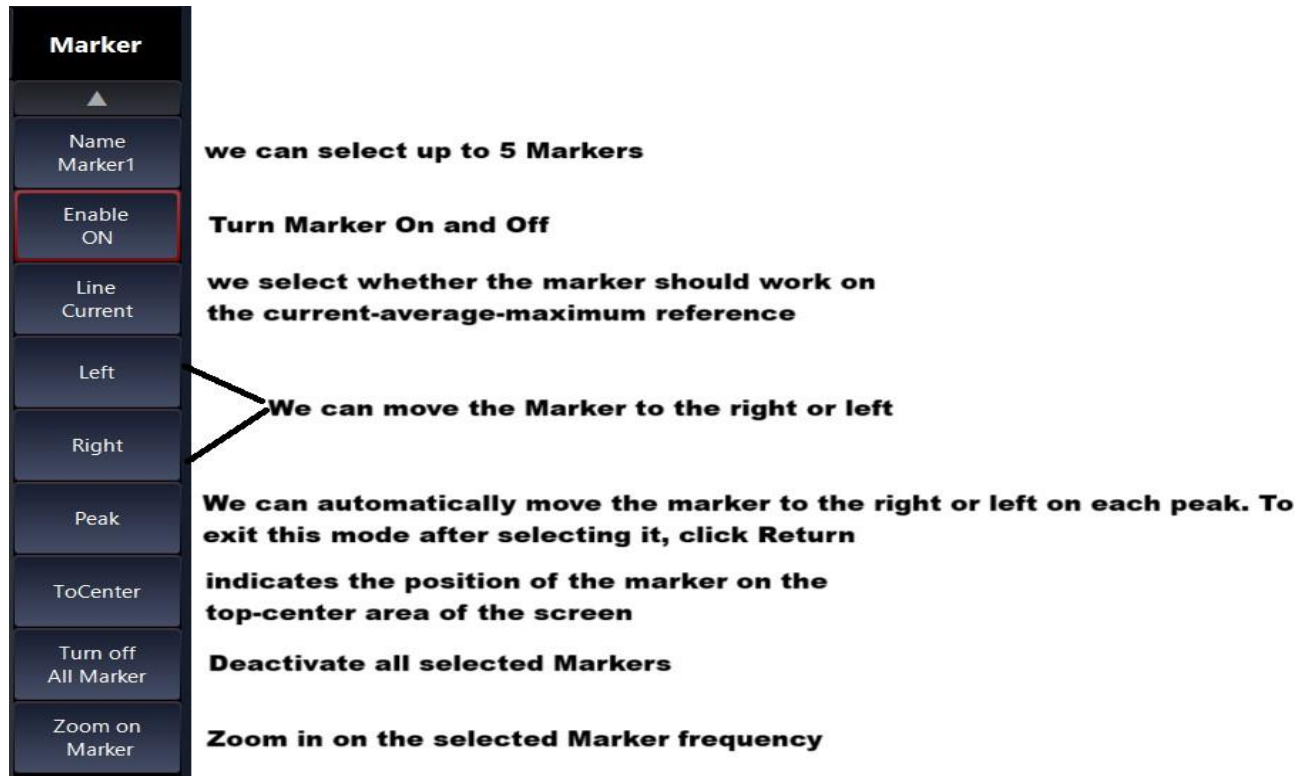

The MEFF M2-PRO allows you to analyze the spectral distance between two signals using active markers, a feature that is particularly useful for evaluating:

- · The bandwidth of a signal or transmission
- · The difference in power between two points
- · The presence of multiple signals close together within the spectrum

Operating Procedure

1. Open the menu Marker in the top right side panel.
2. Select Name Marker 1, then press Enable ON to activate it.
3. Repeat the same procedure fo rMarker 2.
4. Place:
- Marker 1 on the frequency of 240 MHz
- Marker 2 on the frequency of 536 MHz
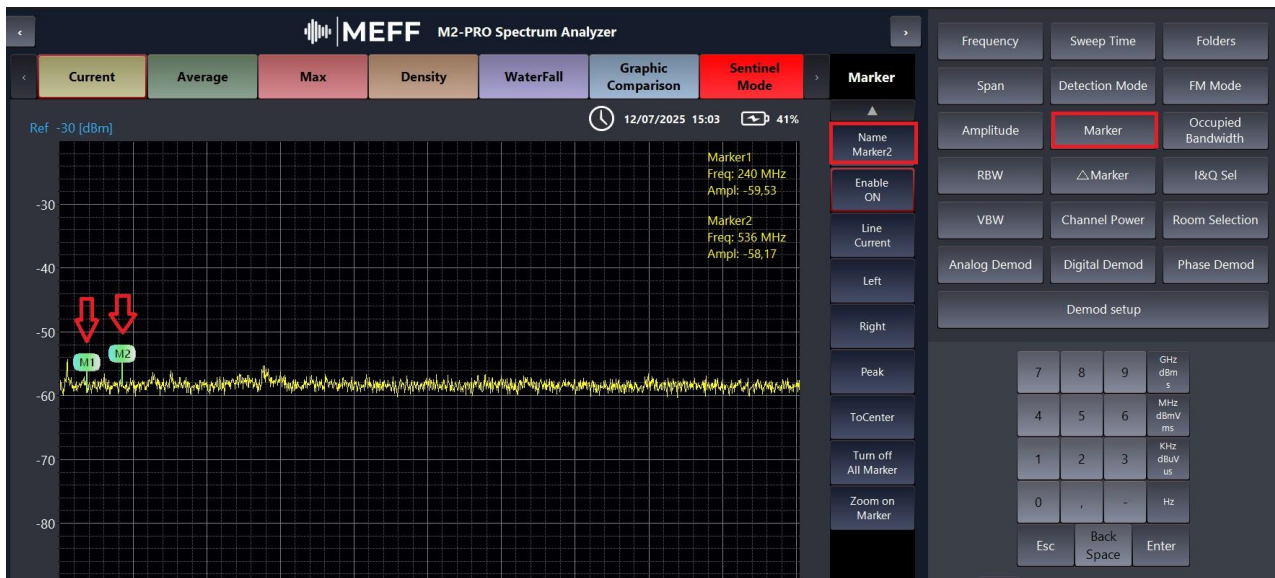
We click on the button **ΔMarker**
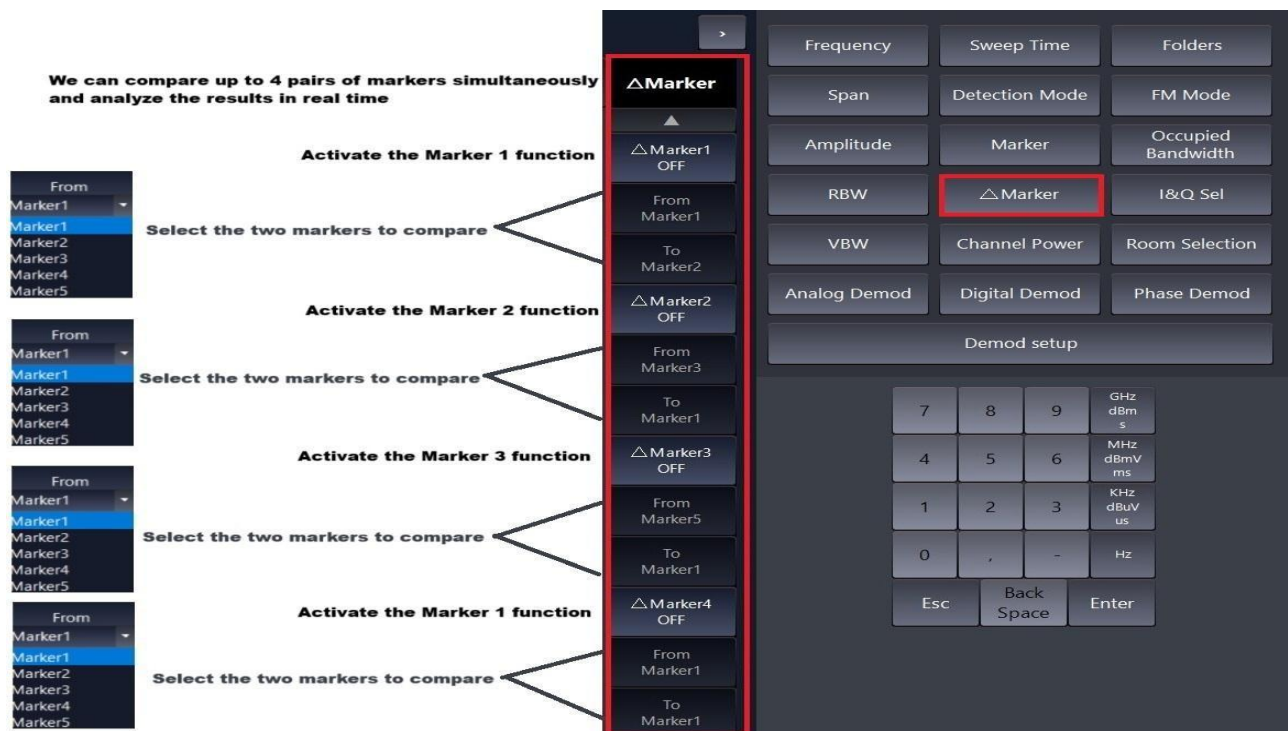
✅ **Comparison of Two Markers – Frequency and Amplitude Analysis**

After placing Marker 1 and Marker 2 on the two signals of interest, we can proceed with the comparative reading of the data.

Comparison Procedure

1. Check that Marker 1is active. If not, click on Marker 1 OFF to bring it up ON.

2. Select From Marker 1 to Marker 2

☑ Analysis Result

The system automatically displays the values of frequency and breadth of both signals, in addition to the difference in frequency and in power.

In our example:

- · Marker 1→ Frequency:240 MHz, Width: -58.72 dB
- · Marker 2→ Frequency:536 MHz, Width: -58.35 dB

Amplitude difference (ΔdB):

The 536 MHz signal is approximately0.37 dB louder compared to that of 240 MHz.

Frequency difference (ΔF):

The two signals are far apart 296 MHz.

Usefulness of Comparison

This feature is essential for:

- · Check the stability and relative power of multiple transmitters
- · Analyze the signal distribution in the spectrum
- · To detect anomalies or interferences between broadcasts
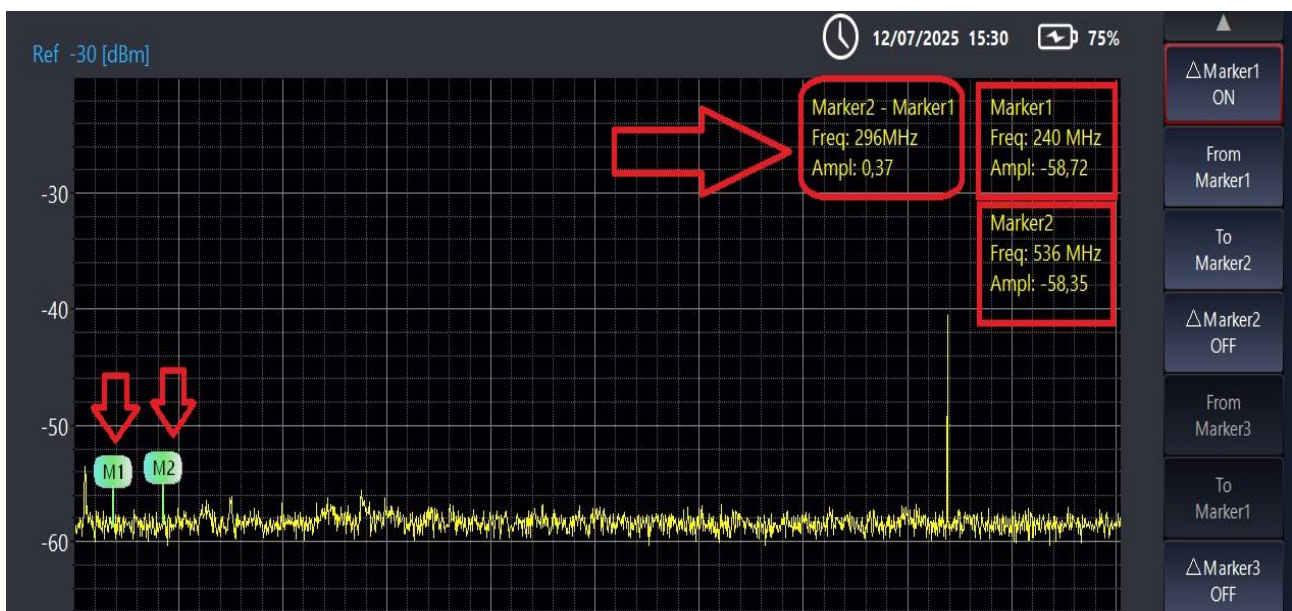
You can compare multiple signals by activating up to 5 marker at the same time, following the same procedure already described for Marker 1 and 2.

The system shows in real time the frequencies, the amplitudes and the differences between the signals.
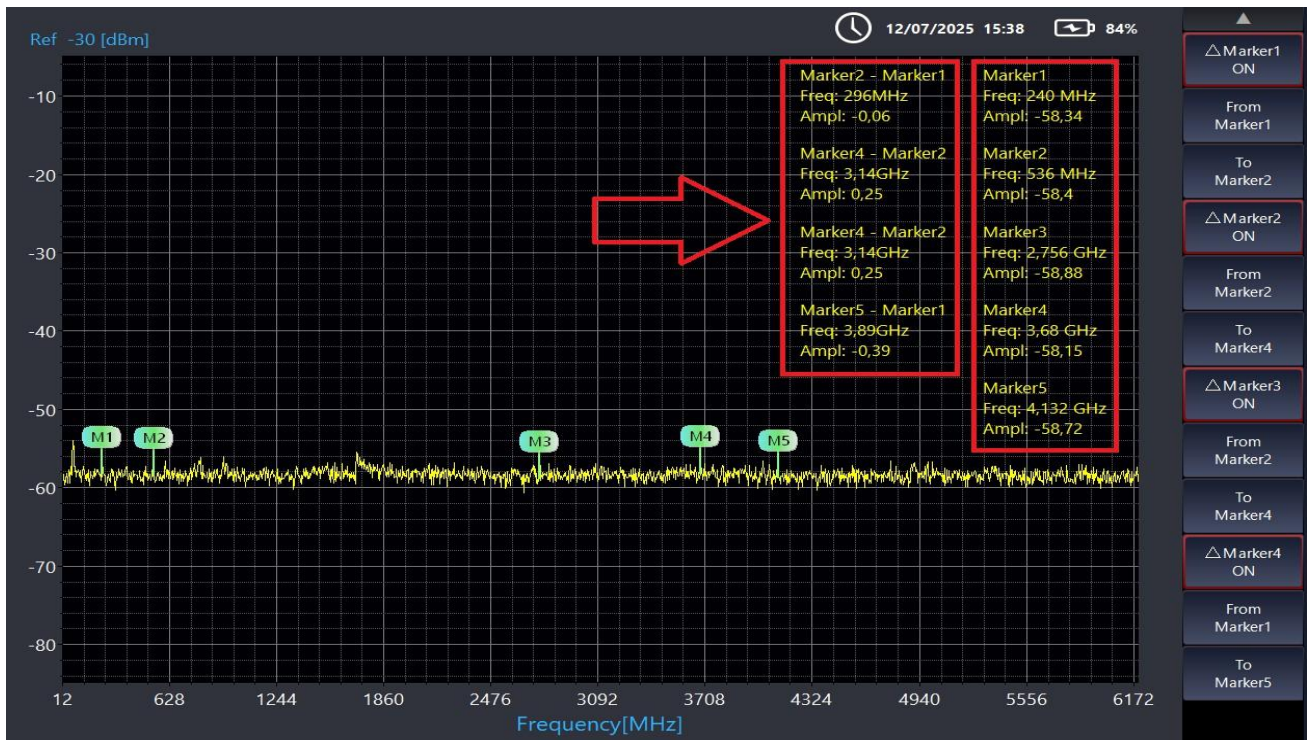
✅ Disabling Markers

After completing the analysis, you can deactivate all markers manually:

1. Click on each Marker → OFF to deactivate them individually.
2. Or use the button Turn Off All Markers to turn off all Markers at once.

✅ Manual Variations and Creating Custom Presets

Inside the Frequency mode, M2-PRO also allows advanced manual editing. You can:

- · Manually vary the frequency bands to analyze
- · Set specific intervals
- · Adjust the sensitivity or scanning speed
- · Create and save new custom presets based on the type of business or geographic area

These functions allow you to adapt the analysis to specific scenarios, improving the effectiveness and precision of the intervention.
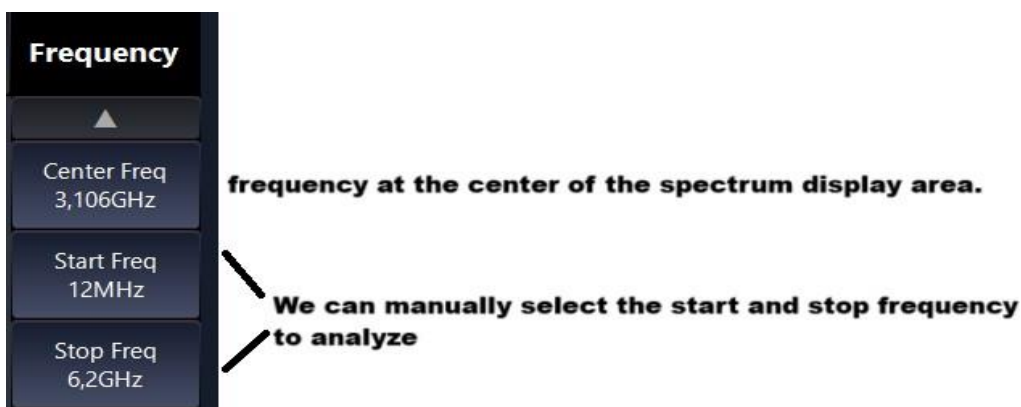
✅ **Manual Frequency Search**

To perform a manual search:

1. Click on the button Frequency.

2. Enter the desired values in the fields Start and Stop to define the scan range.

IMPORTANT:

Always check that the unit of measurement of the Span is set to MHz.
Otherwise, the value entered in Start it will not be applied correctly and will
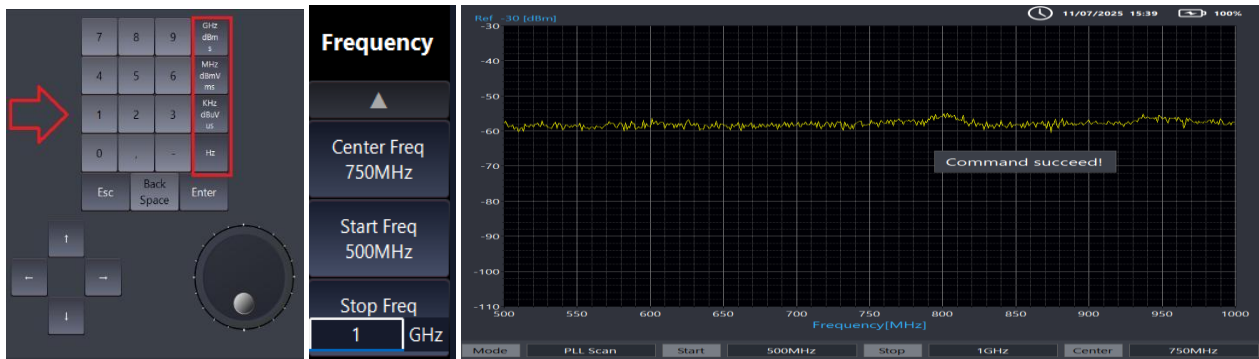remain unchanged (see page *).


Manual Frequency Entry

To enter a frequency manually:

1. Access the section Frequency.
2. Use the virtual keyboard of the software to enter the values.
3. Enter for example:
   · Start Freq: 500 MHz
   · Stop Freq: 1 GHz
4. Press Enter on the keyboard to confirm.

The system will immediately start detecting on the selected frequency band.



We can also save the entered frequency range by creating a Manual preset: just click on the button Presets, give it a name and confirm saving.
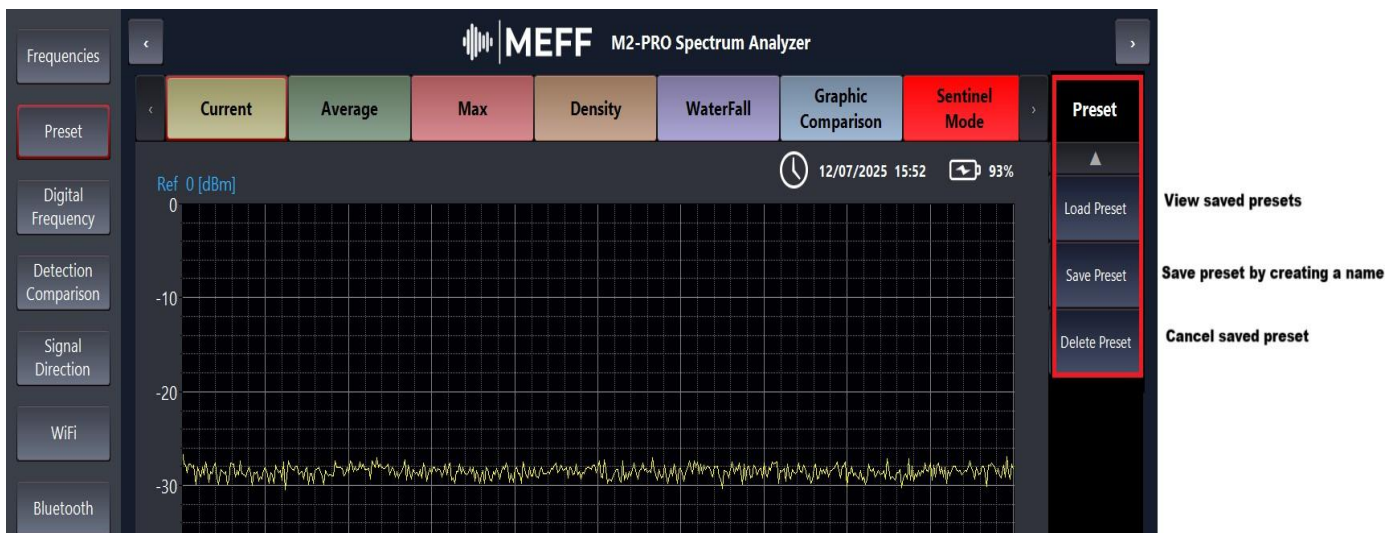
Let's click on Save Preset, enter the desired name and press OK: the preset will be saved and will be available in the section Load Preset.

To delete a preset, click on Delete Preset, select the preset you want to remove and confirm the deletion.
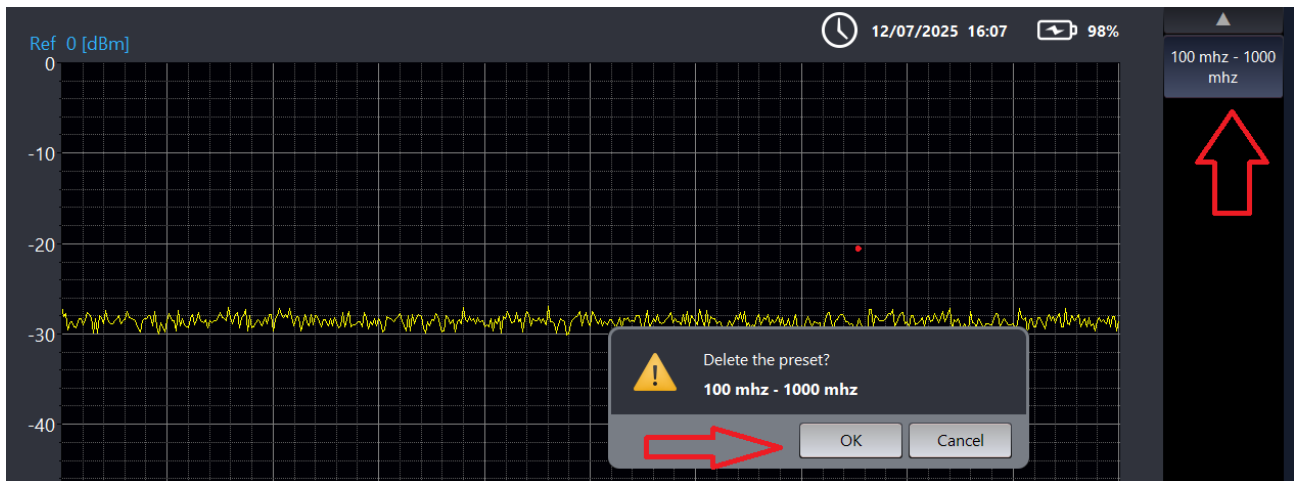
We can vary the parameters of the Span by clicking on the relevant button and entering the desired value to adjust the amplitude of the displayed spectrum.

We enter the value of the Span using the virtual keyboard and confirm with the key Enter. Next, to change the scanning speed, let's click on Sweep Time: we can reduce the scanning time by entering the new value with the keypad at the bottom right, then press Enter to confirm.
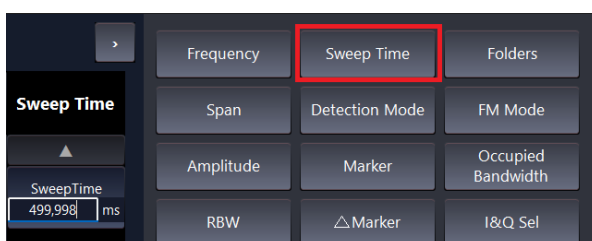
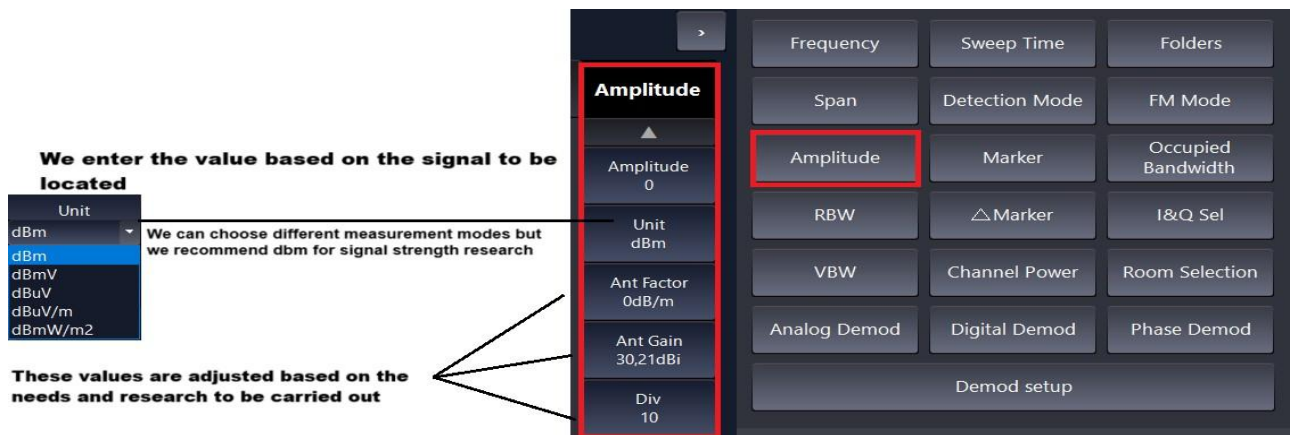To change the background noise of the signal, we use the button Amplitude The value may vary from 0 to -50 dB, depending on the type of signal to be analyzed. Values between -30 and -50 dB for the detection of signals low power.

The M2-PRO is equipped with the control RBW, active by default in automatic mode, which enables more accurate and reliable spectral measurements.

The parameter RBW (Resolution Bandwidth) represents the width of the frequency band that the analyzer uses to filter the incoming signal before displaying it. Narrower RBW allows you to distinguish signals that are very close to each other in frequency, significantly improving the spectral resolution.

Although it is possible disable automatic mode and manually set the RBW value according to your operational needs, **It is recommended to keep it active** (mode ON) to ensure optimal performance in most situations.
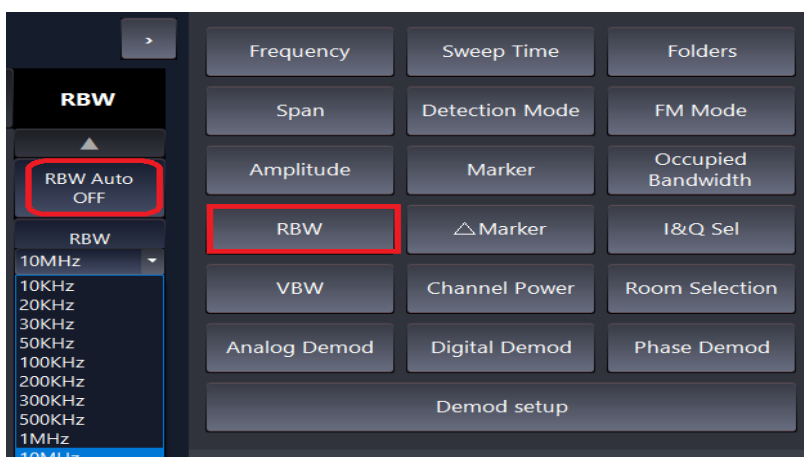
To manually change the value of RBW, we click on the button RBW, then on RBW Auto ON: the button will switch to mode OFF, allowing us to manually enter the desired value.

The value Recommended default is 10 MHz, but it is possible to set, for example,1 MHz to observe an immediate change in the spectrum, with greater precision in separating closely spaced signals.

Once the analysis is completed, It is strongly recommended to re-enable automatic mode pressing again on RBW Auto, so as to ensure maximum stability and consistency in subsequent measurements.
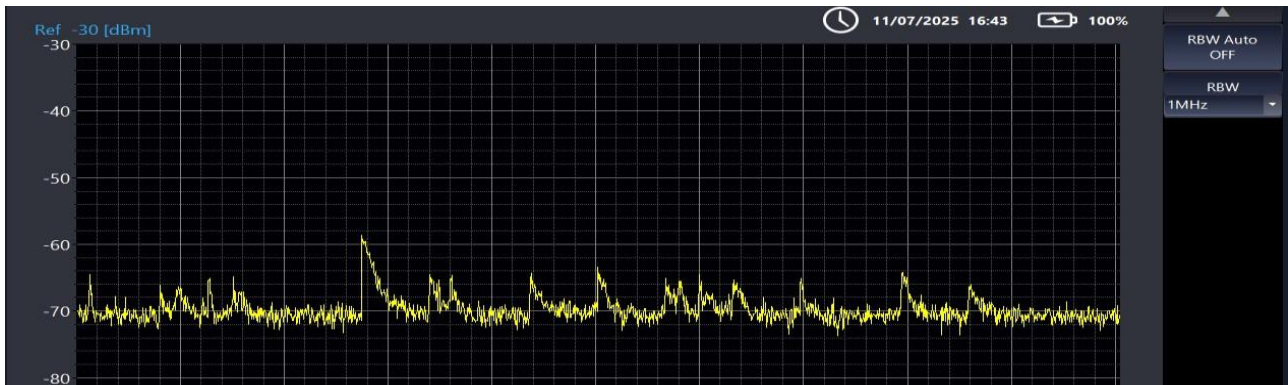
The M2-PRO also features the control VBW, active by default in automatic mode This parameter refers to the video filter bandwidth applied to the signal after spectral analysis and affects the final display of the signal on the screen.

Although yes advice to keep VBW on automatic, it is possible to vary it manually according to operational needs:

- Reducing the value you get a more fluid and stable visualization, useful for the analysis of
complex or variable signals.

- Increasing it, instead, the update speed is improved, ideal for stable signals or for a general spectrum assessment.

The ability to manually adjust the VBW makes analysis more flexible and adaptable to different detection scenarios.

To analyze a stable signal, we can disable the automatic mode of the VBW by clicking on the relevant button (VBW Auto ON, which will pass to OFF), and manually set the desired value.

In this case, we select the maximum recommended value, equal to 150 kHz, to get a faster and more responsive display of the spectrum.
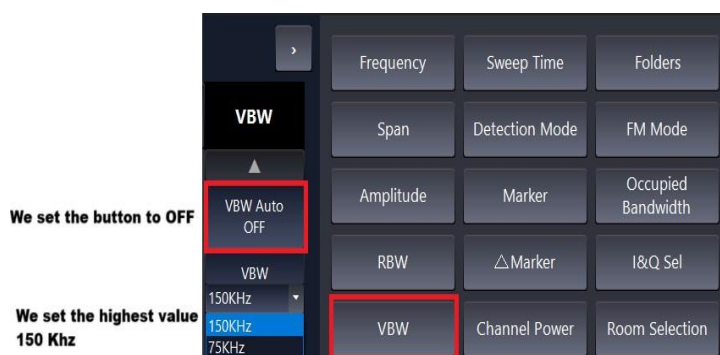
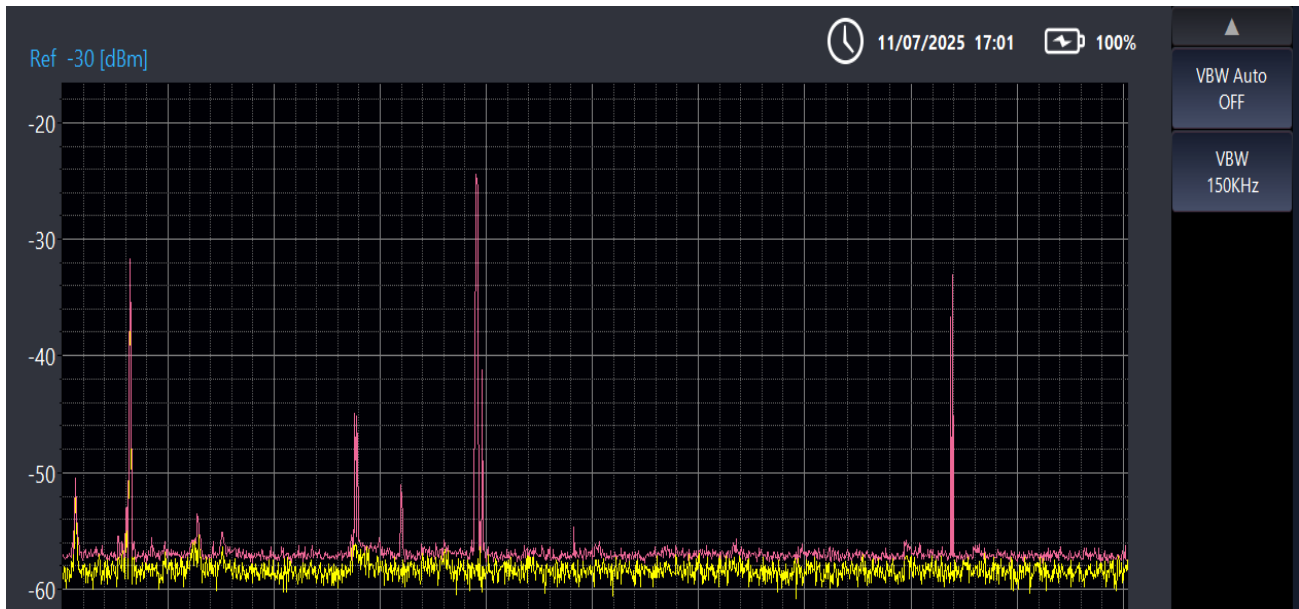Once set up VBW on the maximum value of 150 kHz, we can proceed with the spectrum analysis under optimal conditions for stable signals.

At the end of the analysis, it is important to reset VBW to automatic mode, clicking again on VBW Auto, to ensure correct management in subsequent analyses.

Now let's activate the button **Detection Mode**, which allows you to vary the graphical representation of the detection bars The available modes are:

- Current: displays the detected signal in real time;

- Average: shows the average of the signals over time;

- Max: highlights the maximum value detected;

- Density: useful for detailed analysis, it allows you to observe each item more precisely single detection peak, thanks to a more in-depth view based on predefined parameters.
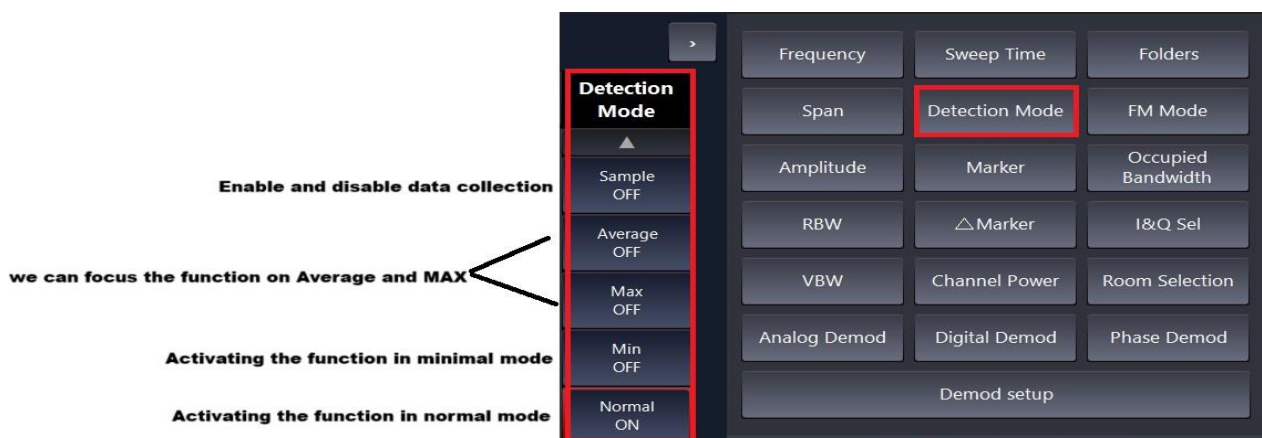
After pressing the button Detection Mode, we activate the function by clicking on Sample OFF (which will pass to Sample ON). In automatic mode, the system focuses on Current, displaying data in real time.

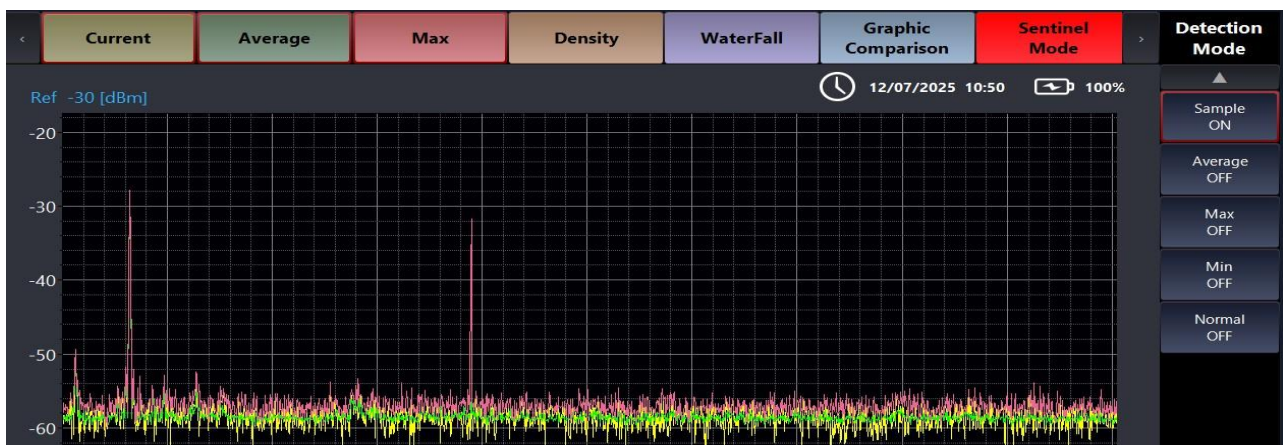However, it is possible to switch to management manual, selecting Average or MAX (using the buttons in the upper left part of the software), then clicking the button again Sample to activate the desired mode.

This function allows for targeted analysis based on the type of signal being monitored.

Once you click on Simple The system automatically sets all parameters for a simplified analysis. However, you can manually select one of two alternative operating modes: Min or Normal.

By clicking on one of these, the mode Simple automatically deactivates, activating the chosen mode. This allows you to adapt the sensitivity and display to your specific detection needs.
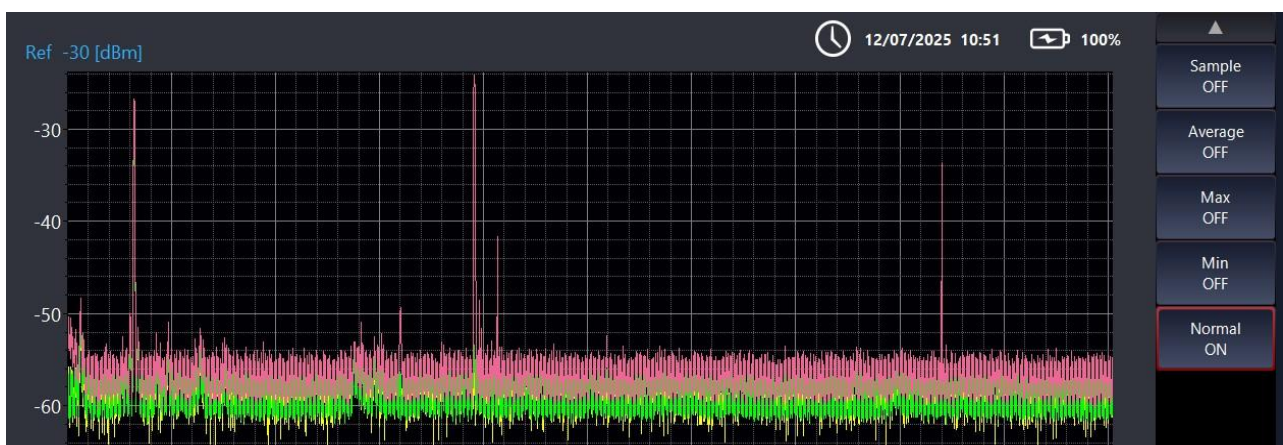
Now let's exit the current function and go back to the mode Full Band. From here, we activate the button FM MODE to configure the system with greater sensitivity in detecting FM frequencies.

Let's simulate, for example, an FM transmission with frequency 380 MHz and power -18.5 dBm: the signal is immediately highlighted in the graph, confirming the correct activation of the FM mode and the effectiveness of the detection.

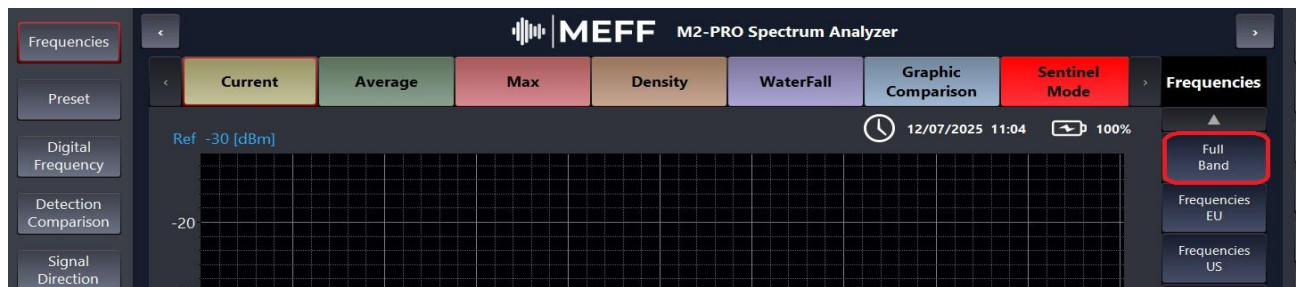We click on the button Marker and we activate the Marker 1pressing on Enable ON. Let's move the cursor on the peak of the detected signal: the displayed frequency will be 380 MHz, confirming the presence of the simulated transmission.

At the end of the survey, remember to deactivate the FM MODE button to reset the system to standard analysis settings.
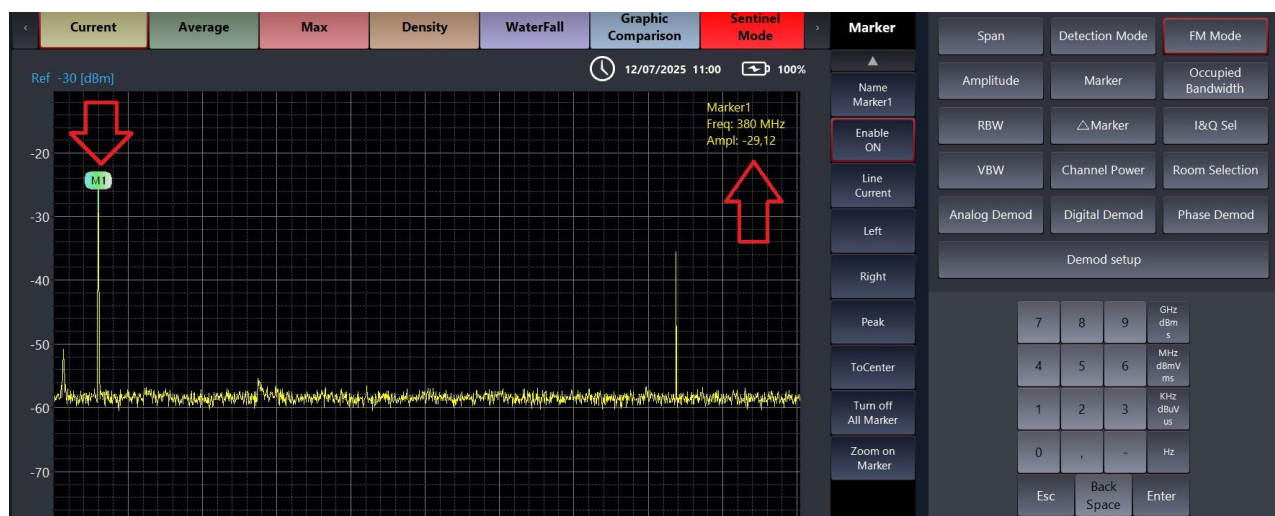
Let's turn off the Marker clicking again on Enable ON, bringing it back up OFF, now let's proceed with the measurement of the frequency range which contains a certain amount of signal strength.

This measurement corresponds to the bandwidth within which a is concentrated specific percentage of total power detected.

To continue, click on Frequency and subsequently on Full Band to return to the full spectrum view.
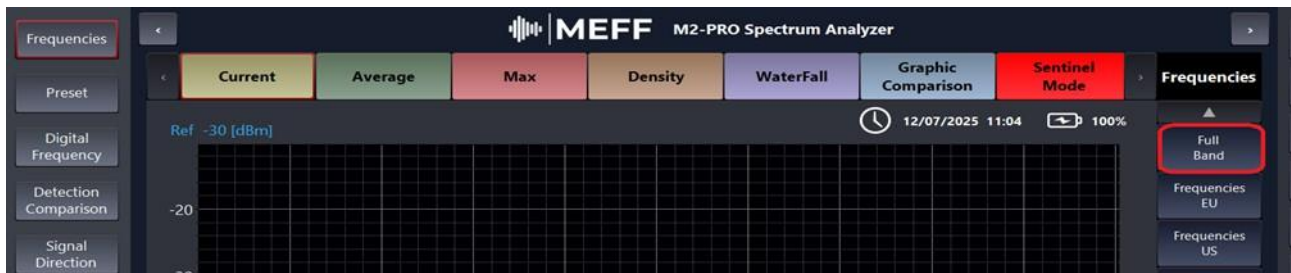
To perform the measurement of the Occupied Bandwidth(OBW), proceed as follows:

1. Press the button Occupied Bandwidth to access the function.

2. Click on the button OBW OFF: the button state will change to OBW ON.

This way, the occupied bandwidth measurement function is activated and it will be possible to display on the spectrum the frequency range that contains the percentage of the total signal power.
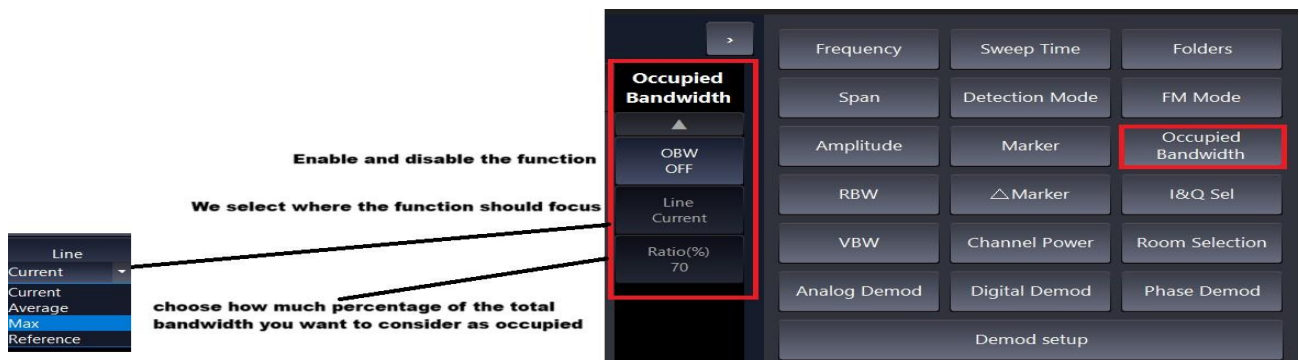
As we can observe, the function Occupied Bandwidth It was activated on the band with a width of 12 MHz centered on 6.2 GHz.

In this configuration, the system measures bandwidth based on the signals detected within this frequency window. The measured bandwidth will vary dynamically based on the distribution and power of the signals present in the spectrum.

To measure the bandwidth at a single specific frequency of interest, proceed as follows:

1. Press the button Marker to access the marker functions.

2. Click on the button Enable OFF: the button state will change to Enable ON, thus activating the marker on the selected frequency.

This will make it possible to make precise measurements localized on a specific frequency, facilitating the analysis of targeted signals.
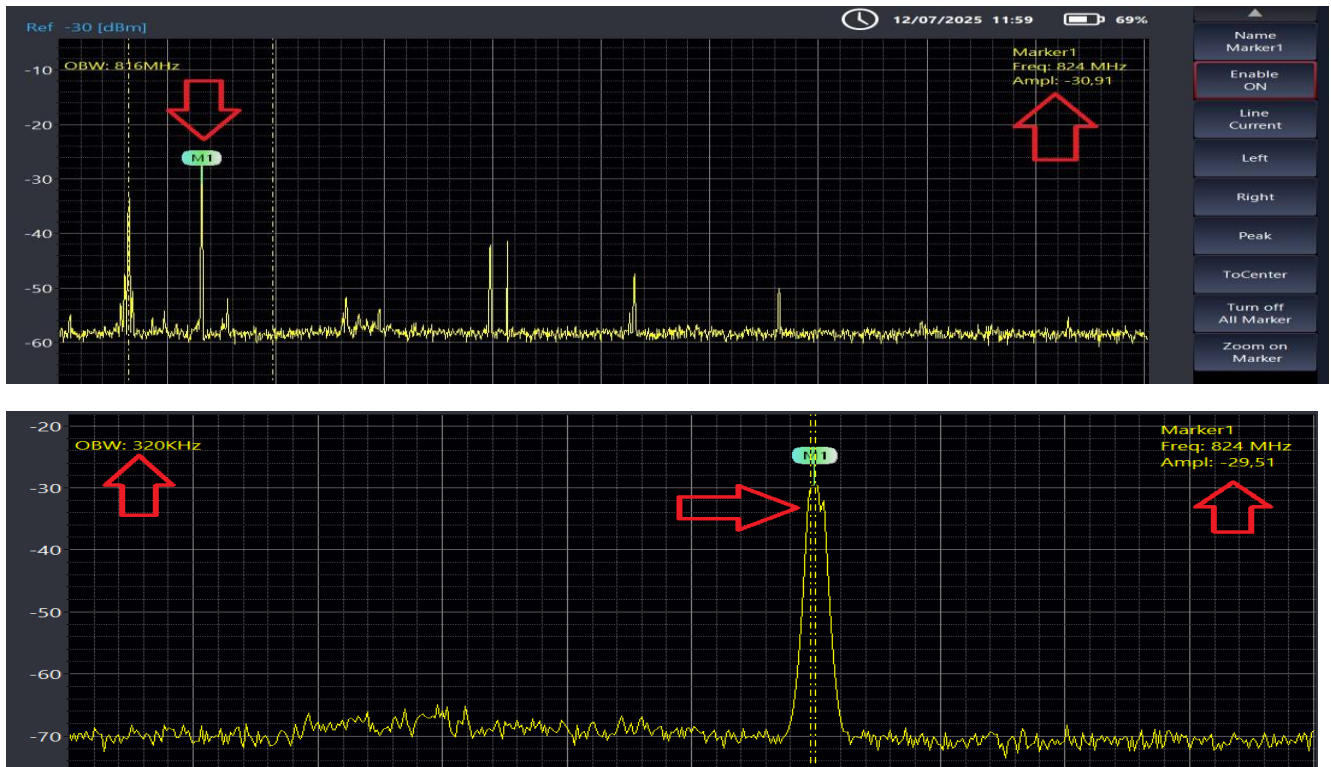
To get a visual representation of the signal density, proceed as follows:

1. Press the button Density to activate the density display mode.

Once activated, the instrument will display the distribution of signal strength over time, highlighting areas of greatest intensity. This allows you to quickly identify any persistent signals or intermittent transmissions within the analyzed spectrum.
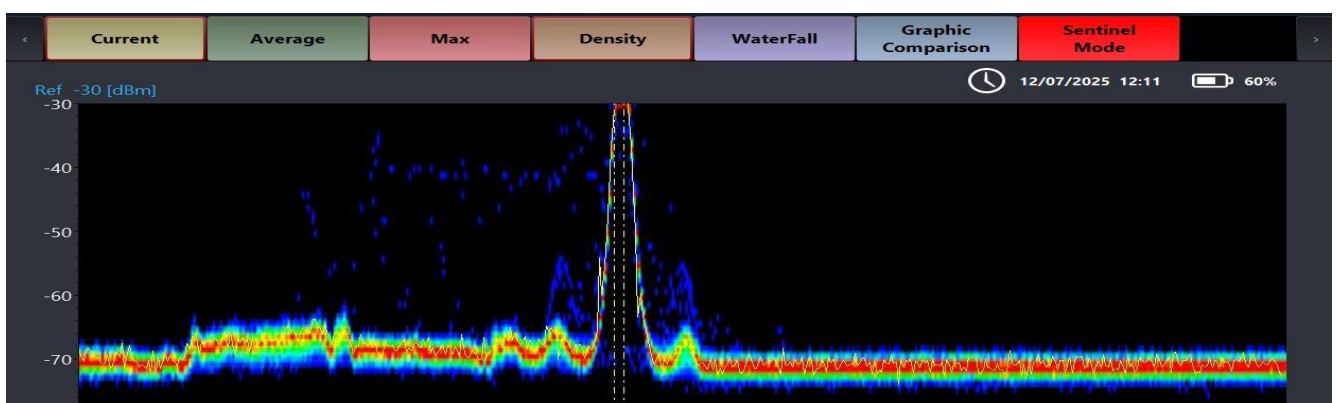
To take the measurement of the transmission power of the signal, proceed as follows:

1. Deactivate displaying the signal density by pressing the button Density (will go to inactive state)

2. Disable the function of Occupied Bandwidth by clicking on the button OBW ON, which will pass on OBW OFF.

3. Activate the function Channel Power by pressing the corresponding key.

4. Click on CH PR OFF, which will change in CH PR ON.

With this configuration the tool will show the total power transmitted within the selected band, allowing for precise measurement of the signal transmission power.

To view the power density relating exclusively to the selected signal, proceed as follows:

1. Press the button again Density to activate the density display mode.

In this way, the tool will graphically show the distribution of the power within the selected band, allowing you to visually identify variations in signal intensity over time.
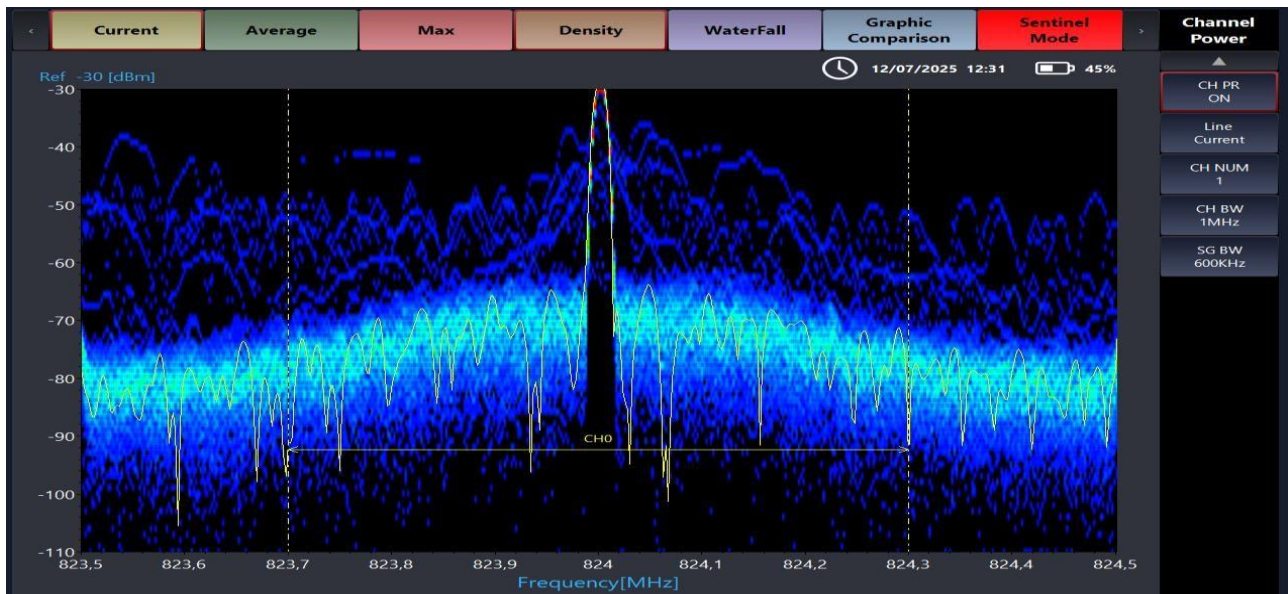
It is possible to do manual variations of the function settings Channel Power to adapt the measurement to specific operational needs, for example by changing the bandwidth, center frequency or other parameters.

For deactivate Channel Power function and exit measurement mode:

1. Click on the button CH PR ON, which will change state to CH PR OFF.

This will cause the instrument to stop measuring channel power and return to standard operating mode.

Density **Spectrum Analysis Graphs**

The MEFF M2-PRO provides several types of additional graphs, useful for further analyzing the frequency spectrum during measurement and monitoring activities.

In particular, the density graph provides a visual map of the signal intensity, simultaneously representing the variations over time and in the frequency.

This viewing mode allows you to:

- Easily identify intermittent signals;
- Detect the presence of background noise;
- Highlight the areas of the spectrum with greatest average or peak power.

The use of the density plot is particularly useful in situations where the signals are not constant or when you want to observe the dynamic behavior of the signal in the temporal domain and spectral.
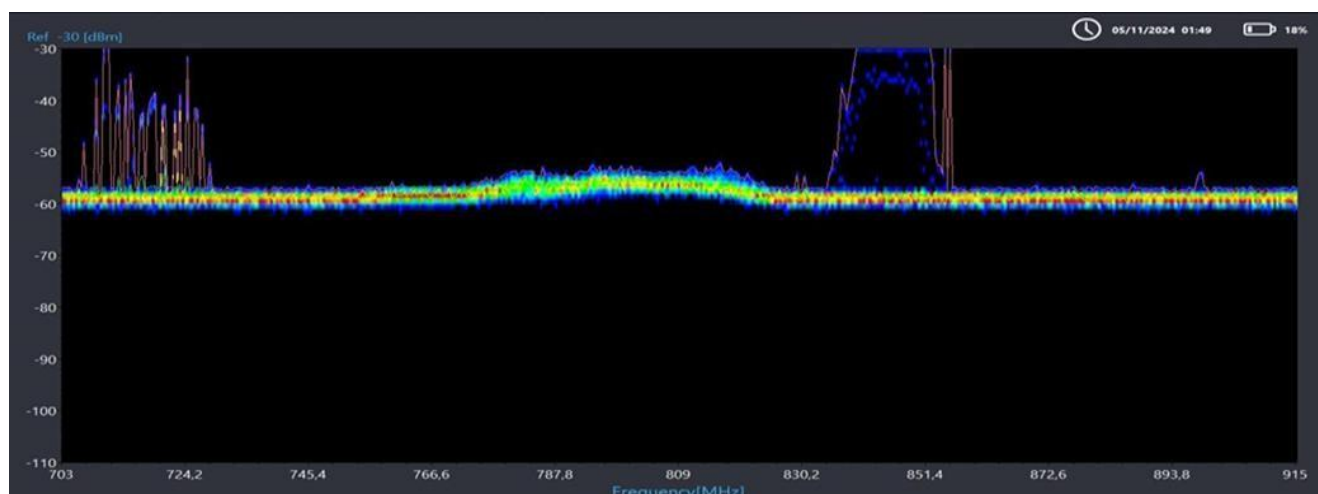
WaterFall **Dynamic Signal Analysis over Time**

The density chart allows you to observe the evolution of the signal over time, highlighting any variations, repetitive cycles or the presence of intermittent signals.

This feature is especially useful for:

- Analyze the stability of the signal;
- Individuate any periodic anomalies;
- Detect broadcasts that only occur at certain times or with cyclical patterns.
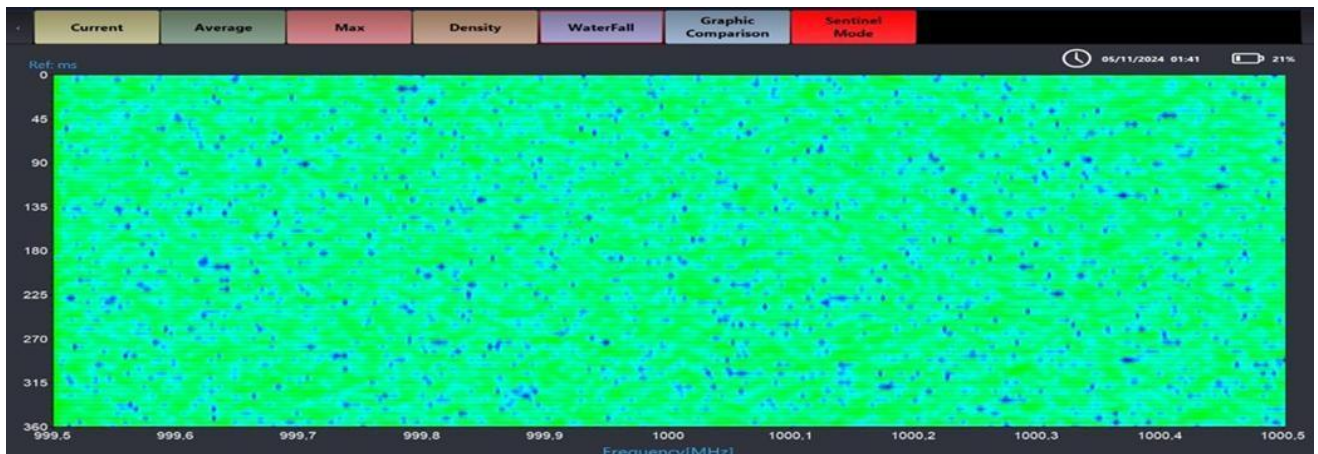
 Combined Chart View

In this mode, you can view simultaneously the graphs of Density, Waterfall and Frequency, combining them to obtain a more detailed analysis complete, immediate and intuitive of the signals.

This configuration allows you to:

- Correlate in real time the power distribution (Density),
- Analyze it history of signals over time (Waterfall),
- Monitor the spectral distribution current (Frequency).

Using these charts together improves your ability to spot anomalous signals or dynamics that may not be evident with just one type of visualization.
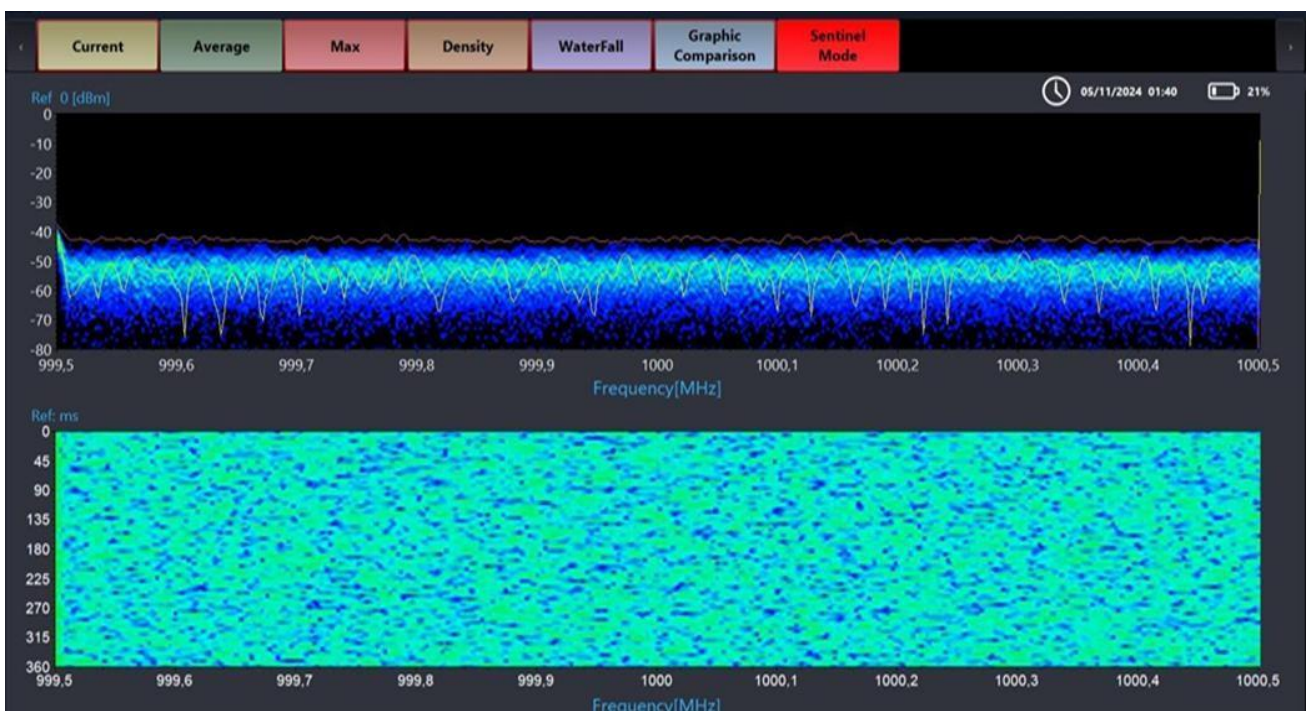
☑️ Using the Frequency Function in Full Band Mode and Continental Presets

We have just illustrated the use of the function Frequency in mode Full Band, combined with all the main functions and operating modes available in the MEFF M2-PRO.

Now we will continue with the use of the Predefined presets, specifically designed for the frequency detection in the main continents:

- EU (Europe),

- US (United States),

- ASIA (Asia).

These Presets They allow for quick and optimized configuration, automatically adapting the scanning and display parameters to the frequencies used in the respective territories.

Note: Presets for other continents and geographic regions will also be progressively added in future online firmware updates.
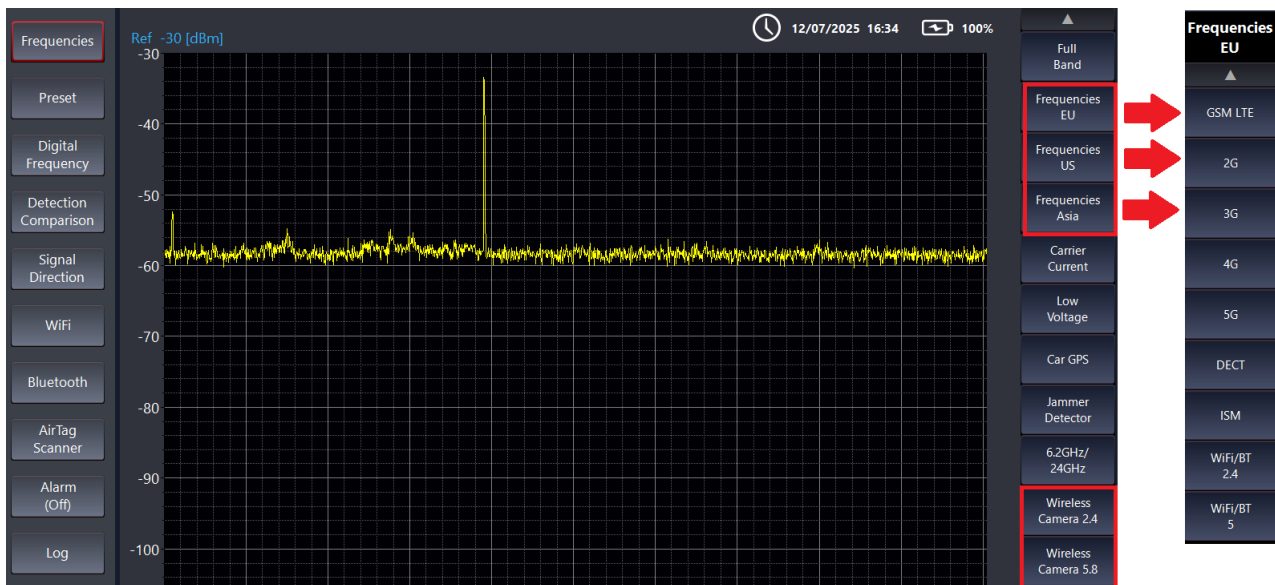
To perform a targeted survey with combined graphic display, proceed as follows:

1. Select the EU Frequency from the Preset menu.

2. Choose a frequency example GSM LTE.

3. Activate the function MAX HOLD to display and store the maximum value detected over time.

4. Press the button Graphic Comparison to enable graphical comparison mode.

When simulating a signal in the range between 700 MHz and 800 MHz, it will be possible to observe the signal detection in real time both in the section Frequency, both in the graph Waterfall.

This configuration allows you to effectively monitor both the spectral position of the signal and its persistence or intermittency over time.
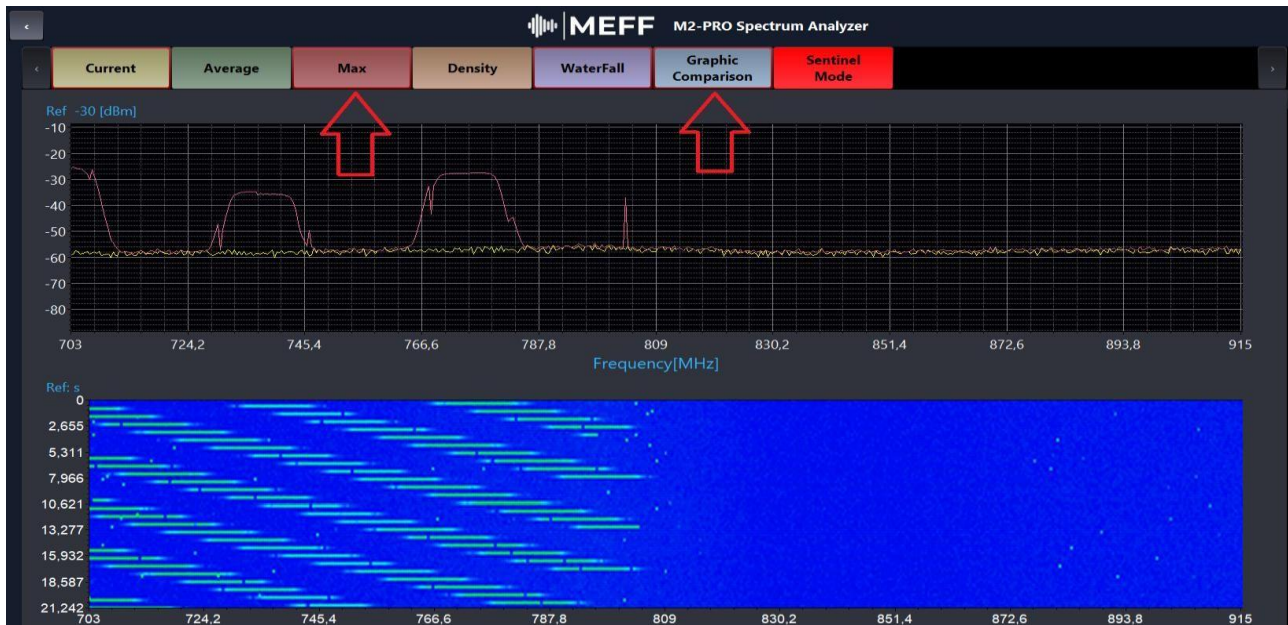
We are currently analyzing the frequency GSM LTE It is important to underline that this procedure is valid for all available Presets In the MEFF M2-PRO For each frequency or band to be analyzed, it is necessary to perform the same operational sequence, adapting it to the selection of the desired Preset.

   Important:

Before selecting a new Preset, disable Graphic Comparison mode, by clicking on the relevant button, to return to the single graph view Only then can you activate a new Preset.

For each single Preset selected, you can also combine all operating modes and features described by thepage no. 19 onwards, thus ensuring maximum flexibility and customization during the analyses.

✅ Using the Car GPS Preset

Let's now proceed with using the Preset Car GPS.

· This Preset covers a wide range of frequencies, from 750 MHz up to 3670 MHz.

· This range includes all bands used for GPS transmissions, starting from the frequencies GSM up to those used by 5G.

· This is a frequency preset used to match frequencies normally used by GPS, but it does not distinguish between a mobile signal and that of a tracker.

There power and the persistence of the detected signal may vary depending on the configuration of the GPS device:

· With real-time transmission, the signal will appear as a constant peak.

· With cyclic transmission (for example every 5 minutes), the signal will be visible as intermittent peaks corresponding to the transmission intervals.

Practical Example – GPS Search in 2G with Constant Transmission:

1. Select the Frequency Preset Car GPS.

2. Activate the function MAX HOLD to keep the maximum peak visible during scanning.

3. During the scan it will be possible to detect the constant transmission of the GPS operating in 2G, highlighted by a stable and continuous signal in the frequency chart and in the Waterfall.
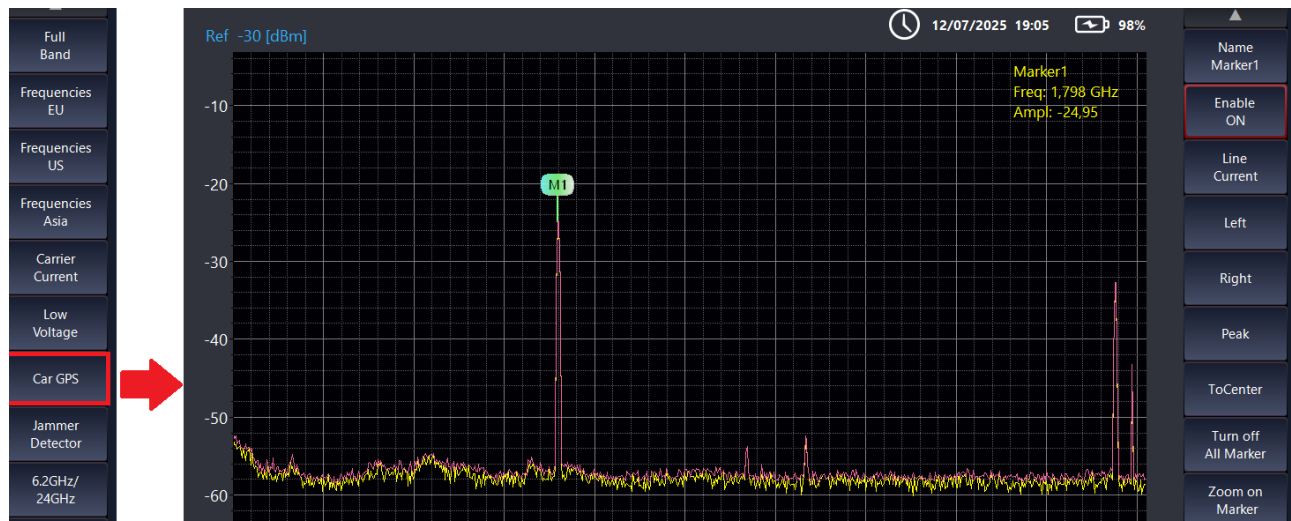
✅ **Identification and Detailed Analysis of the Suspicious Signal**

Once identified the detection peak of suspicious mobile transmission during scanning:

1. Select the suspicious peak activating the function Marker (refer to page 20 for the complete procedure on using the Marker).

2. With the Marker active, press the button Zoom On Marker For enlarge the spectral area

    surrounding the suspicious signal.

3. Proceed with a close search for the signal, moving around the surrounding environment.

In the example shown in the figure, a 2G Real Time signal, positioned at a distance of approximately 2 meters from the MEFF M2-PRO The peak is constant and clearly visible, confirming continuous transmission.
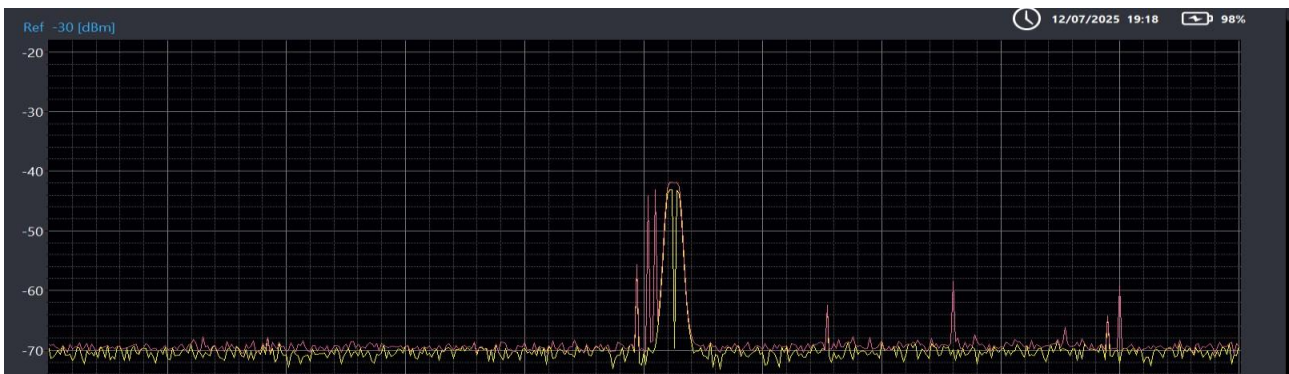
At this moment a signal is detected at a distance of 60 cm.
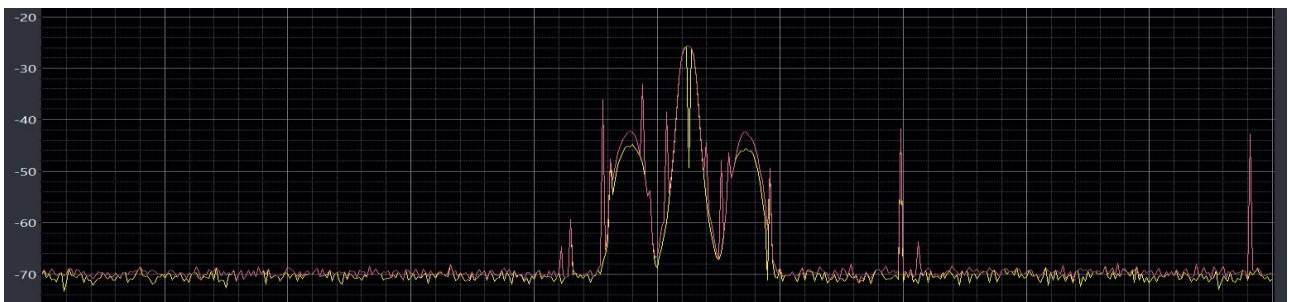
✅ Close Range Detection with Graphic Comparison Mode

At this stage of research, we are at a distance of approximately 60 cm from the signal. To get a clearer visual representation of the signal and to be visually guided When approaching the transmitting device, proceed as follows:

2. Activate the button Graphic Comparison.

3. The screen will show a real-time visual comparison between the current frequency and it signal history, allowing for a more precise assessment of the signal strength as you get closer to the source.

In the example shown, at a distance of 60 cm, the signal 2G is clearly visible, highlighting a significant increase in intensity and greater graphic definition over greater distances.
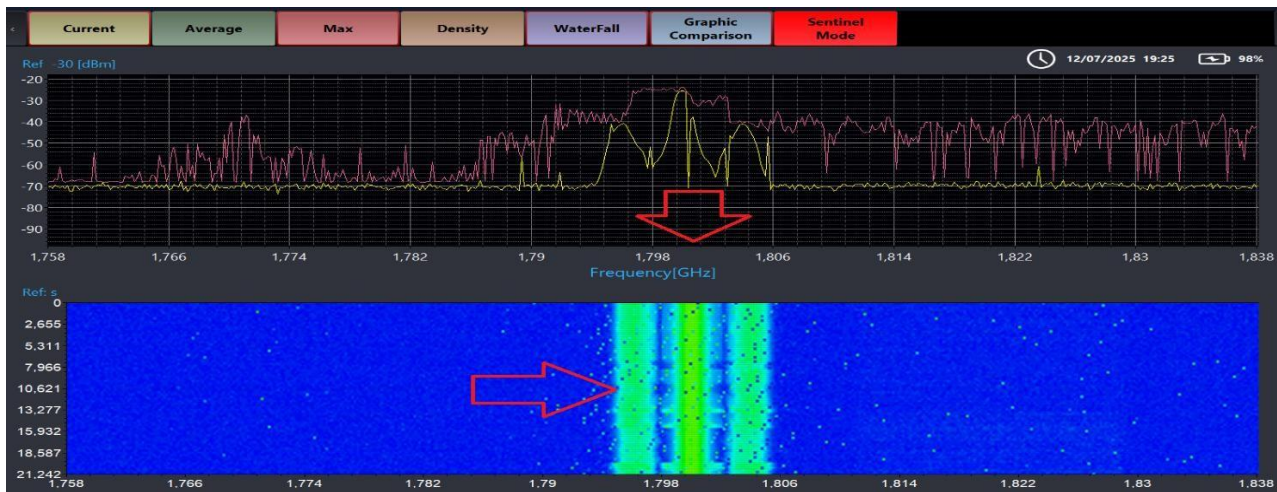
In this graph we see at a distance of 10cm:
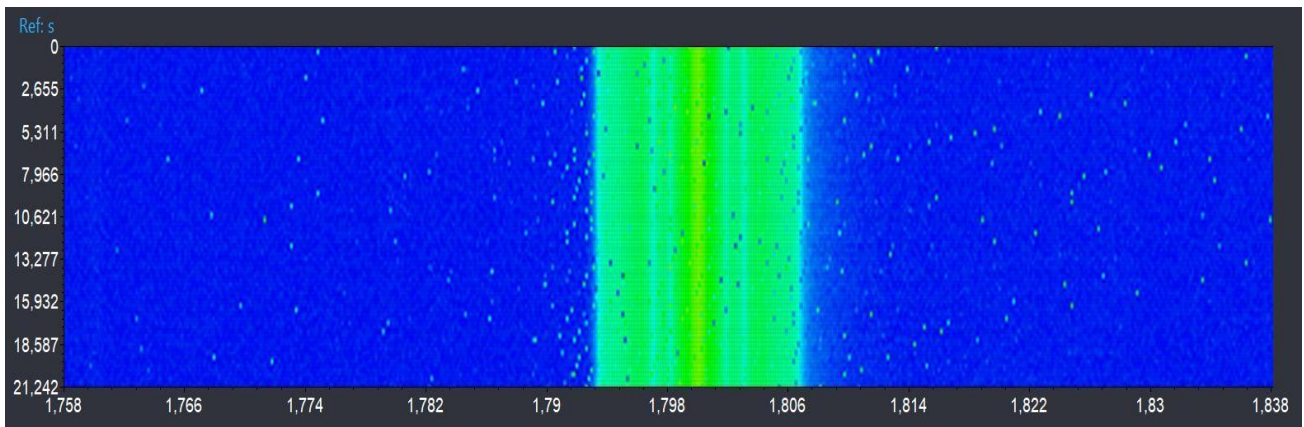
Direct Contact Detection (Distance 0 cm)

At this point in the procedure, we find ourselves at distance 0 cm, Exactly above the transmission device.

With the MEFF M2-PRO positioned directly above the transmitting source, the signal is detected with maximum power and maximum persistence in the graphs:

- · The frequency peak reaches the maximum value,
- · The Waterfall chart show a continuous and stable track,
- · In mode Graphic Comparison, the comparison highlights a signal strongly dominant relative to the spectral background.

This level of detection confirms with absolute certainty the presence and precise location of the transmitting device.
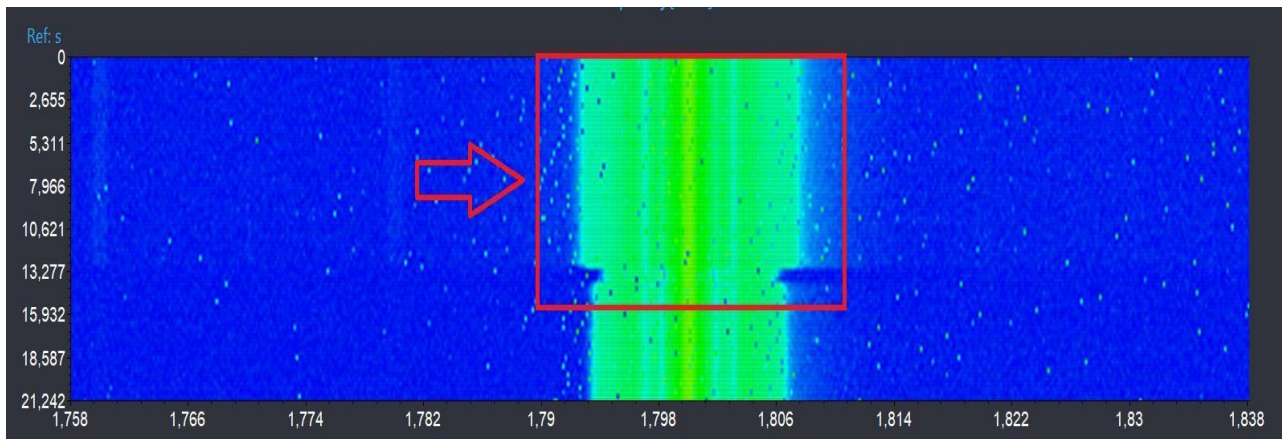
After having identified the signal at the minimum distance (0 cm), we proceed with the activation of the mode Density to visually compare the signal power density.

1. Click on the Density button to activate the dedicated view.

2. The graph will clearly show how, at close range, the signal density results much more intense and compact, confirming the continuous and stable presence of the transmitter under examination.

This mode is particularly useful for quickly comparing the spectral density compared to other areas analyzed, immediately highlighting the point of maximum emission.
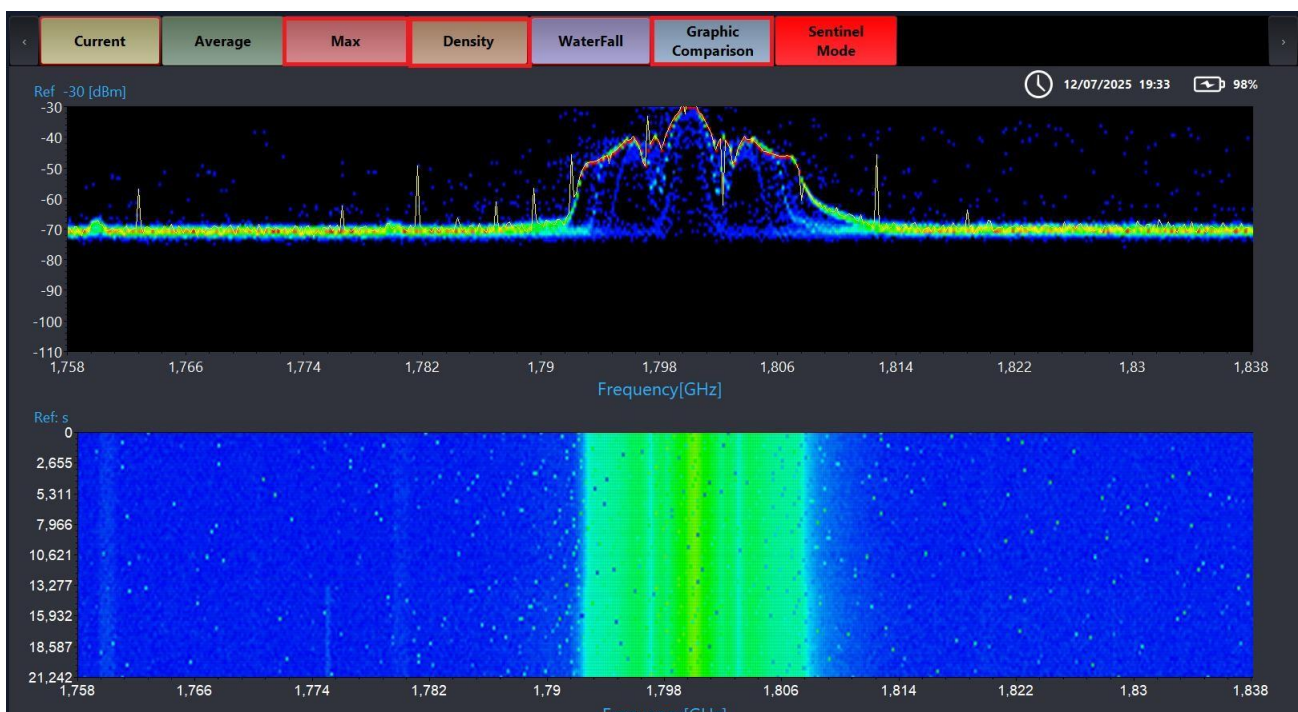
To exit search mode correctly:

· Disable the following features:

- MAX HOLD

52

- Density

- Graphic Comparison

☑ Signal Saturation Detection

We now continue with the analysis of the survey of signal saturation in environments. For demonstration purposes, we perform a saturation simulation activating a Multiband jammer on frequencies:

- GSM

- 2G

- 3G

The example screenshot highlights two distinct situations:

- In the part superior the graph shows a normal detection, with distributed and individually identifiable signals.

- In the part inferior the graph shows the condition of signal saturation generated by the Jammer we just activated, characterized by:

- Increase abnormal and constant power on multiple bands;

- Disappearance of distinct signals, replaced by a clear and uniform spectral coverage;

This visual condition makes the presence of a disturbance or saturation caused easily identifiable with the MEFF M2-PRO, allowing an immediate distinction between a "clean" environment and a "saturated" environment.
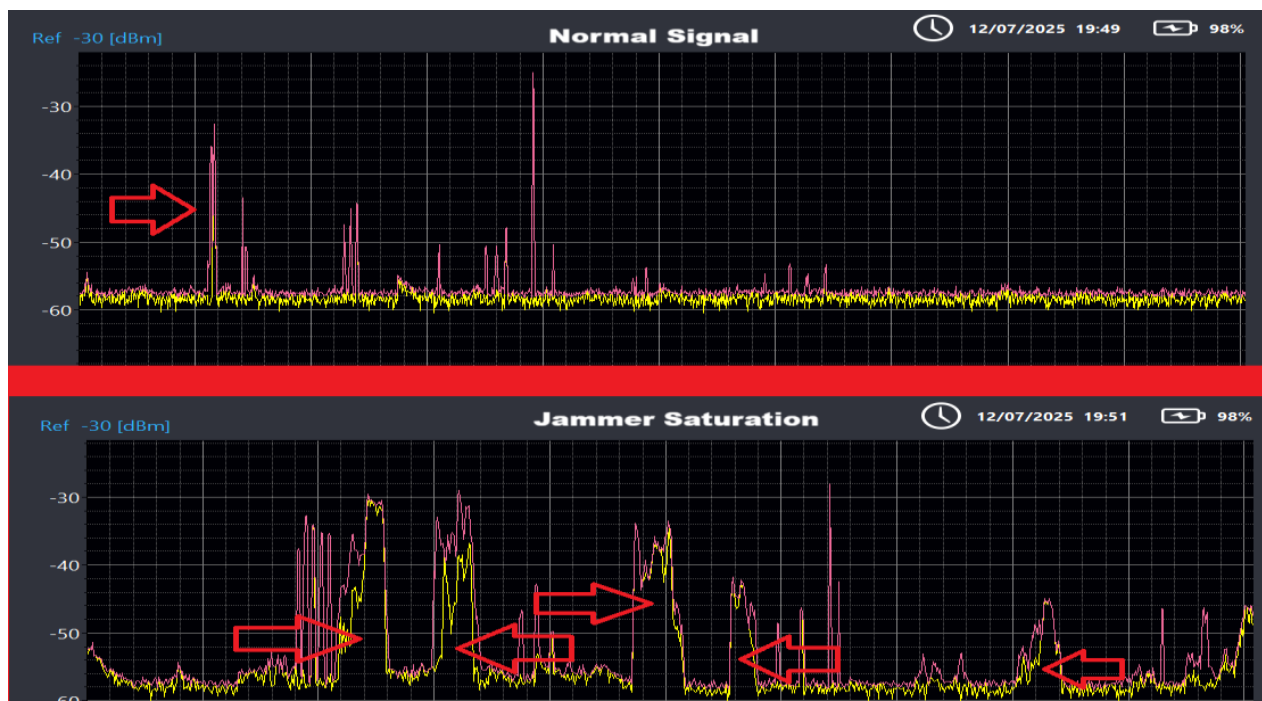
✅ Jammer Detector Frequency Preset Activation

This frequency preset is designed to operate within the standard range used by jammers, but it does not indicate the presence of a jamming device. Rather, it detects frequency saturation caused by noise and interference.

To make it easier to identify saturation, we proceed as follows:

1. Click on the "Jammer Detector" button to activate the preset dedicated to the detection of jamming devices active on multiple frequencies.

2. Activate the MAX HOLD function to highlight and keep visible the maximum value detected during the scan.

3. Enable Graphic Comparison mode to compare the current situation in real time with the history of detected signals.

With these settings active, the MEFF M2-PRO It will clearly display spectral anomalies caused by electronic saturation or disturbance, offering immediate and easily interpretable graphic feedback even in complex environments.

✅ Practical Example: We activate a GSM – 2G – 3G Jammer at 5 meters

At this stage, we proceed with the activation of a Multiband jammer configured to jam frequencies GSM – 2G – 3G, positioned at a distance of approximately 5 meters from the MEFF M2-PRO.

With the preset Jammer Detector, MAX HOLD And Graphic Comparison already active, the following is observed on the display:

· On the comparative chart a clear sign is highlighted significant increase in spectral power in the gangs involved,

· The graph shows a diffuse saturation compared to the starting situation, with uniform and persistent signals in the bands corresponding to the disturbed frequencies,

· The Waterfall highlights completely filled bands, with no distinction between legitimate signals and disturbing signals.

This visual behavior quickly and clearly confirms the active presence of a signal saturation
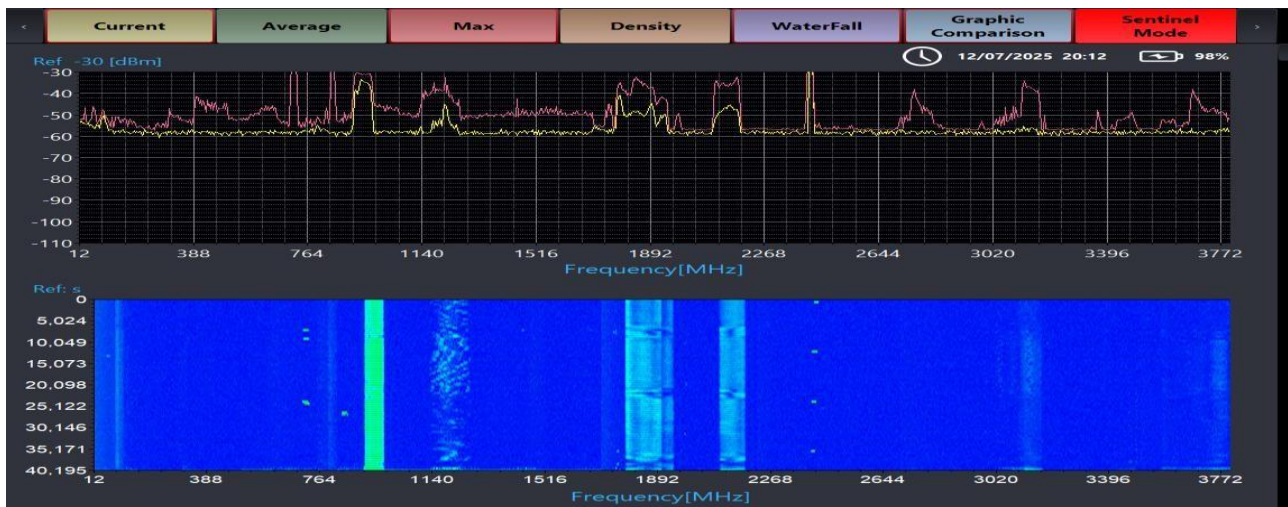
✅ **Searching for the Source of Disturbance in the Perimeter**

At this point, with the MEFF M2-PRO, we proceed to perform a scan along the entire perimeter of the environment.

Procedure:

· Move slowly within the monitored environment, keeping the device turned on and in the correct mode MAX HOLD and Graphic Comparison active.

· Constantly monitor the graph: as the proximity to the source of disturbance increases, the displayed signal will become increasingly stronger. powerful and constant.

Final result:

When you get close to the actual source of transmission of the disorder, The comparative chart will show an obvious constant power peak, The Waterfall will be completely saturated in the affected area and the signal will be dominant across the entire disturbed band.

This mode allows a precise and rapid localization of the disturbance source directly on the field.
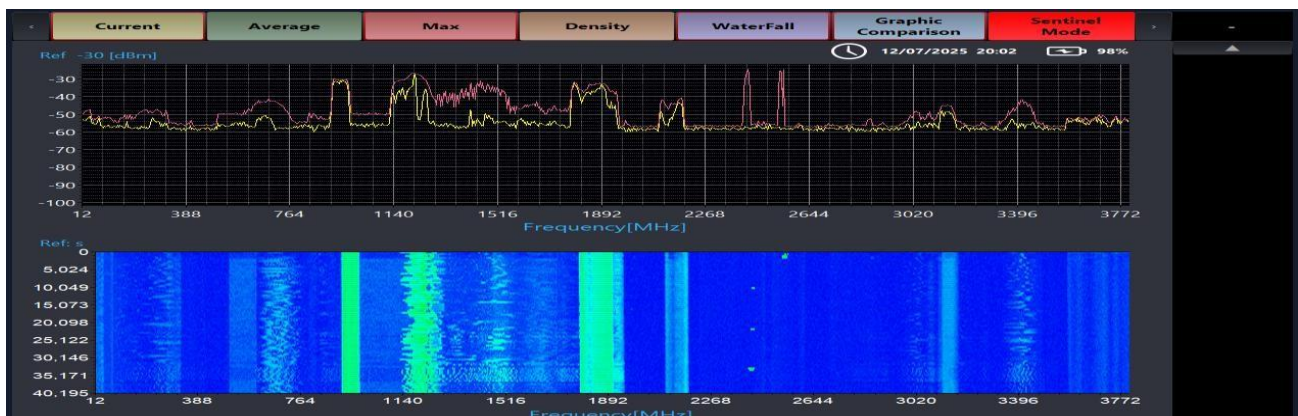
✅ Detailed Analysis on a Specific Saturation

Once the presence of has been identified saturation, we focus exclusively on the specific frequency of our interest for a more precise evaluation.

Operating procedure:

1. Activate the Marker button to select the signal peak corresponding to the suspected saturation.

2. Place the Marker exactly on the maximum peak detected.

3. Click on Zoom on Marker

In this way the MEFF M2-PRO allows a close-up view of the saturated signal, making it easier:

· Analyze the signal characteristic,

· Evaluate the breadth and stability of the disorder,

· Improve accuracy during the close-up localization phase.
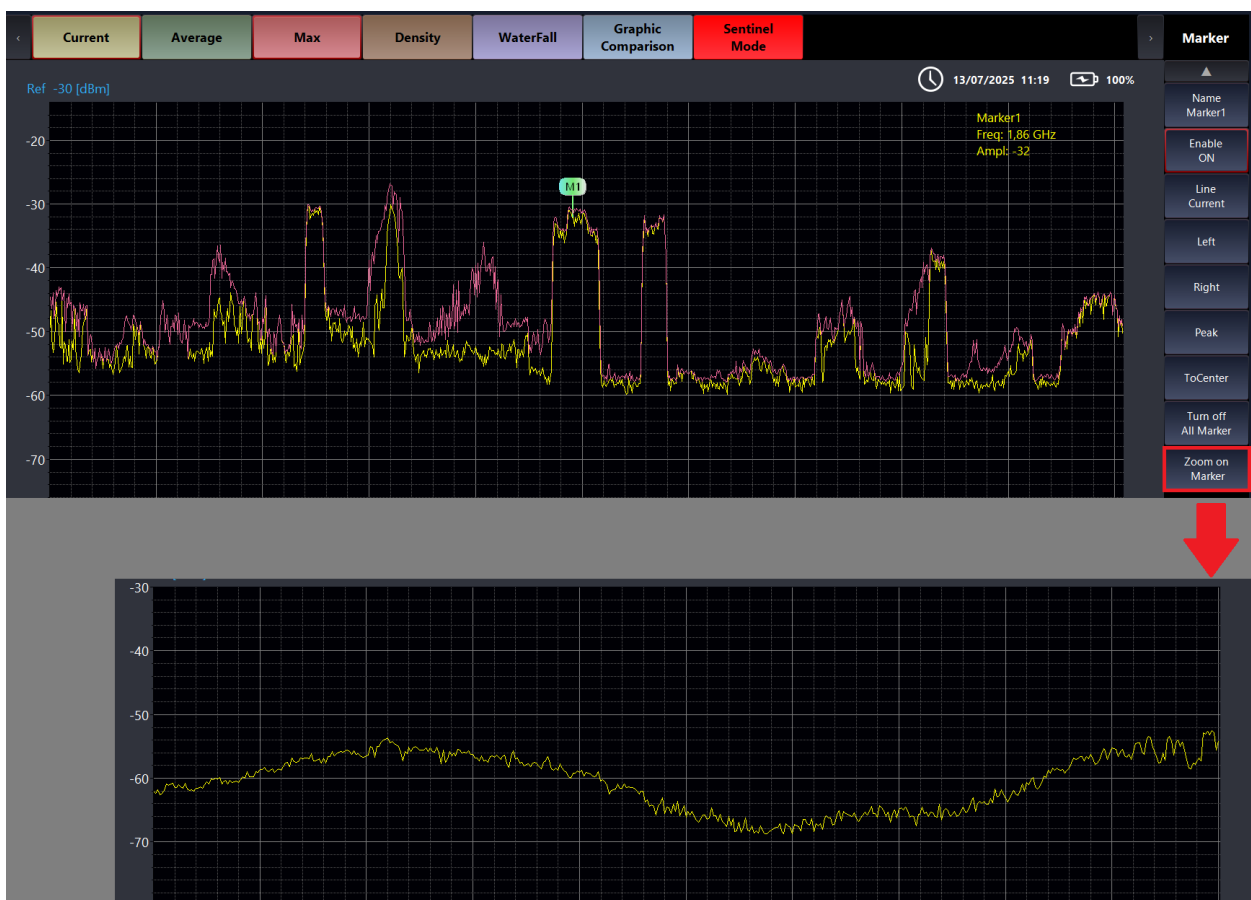
✅ Saturation Location on Specific Frequency (1.82 – 1.90 GHz)

At this stage, we are positioned exclusively on the frequency range between 1.82 GHz and 1.90 GHz, area where the suspected saturation was detected.

Operating procedure:

1.Activate the Density chart by clicking on the relevant button.

2. The Density graph provides a visual representation of the signal persistence and density in this narrow range.

Expected result:

·   There signal saturation it turns out clearly visible, highlighting the constancy and power of the disturbance in the monitored band.

·   Using the Density chart allows you to visually identify the exact point where the transmission comes from, greatly simplifying the search for the physical source.
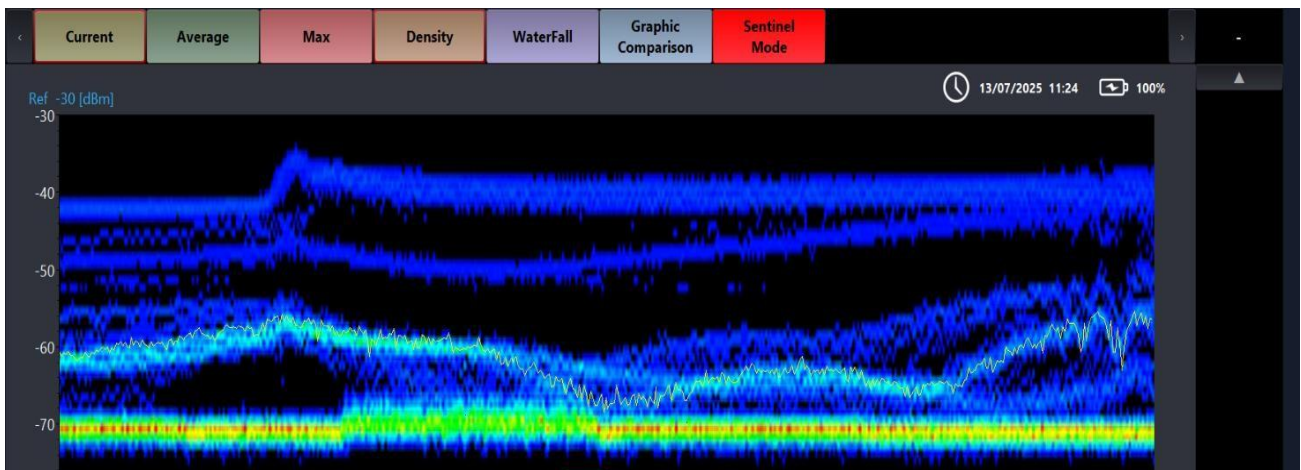
✅ Final Location of the Saturation Source

After analyzing the saturation on the band 1.82 – 1.90 GHz, let's proceed with the physical search for the transmission source.

Operating procedure:

1. Taking the MEFF M2-PRO device in hand and move slowly in the monitored environment.

2. Continue to observe the Density graph and the power level displayed on the screen.

3.Getting closer to the real source of disturbance, the saturation level on the graph will gradually reach the maximum value, becoming continuous, stable and full.

Final result:

· Once you reach the maximum power level and the most evident saturation in the graph, we find ourselves exactly above or near the source of the disturbance emission.

· At this point it is possible precisely identify the physical location of the source responsible for the saturation in the analyzed frequency.
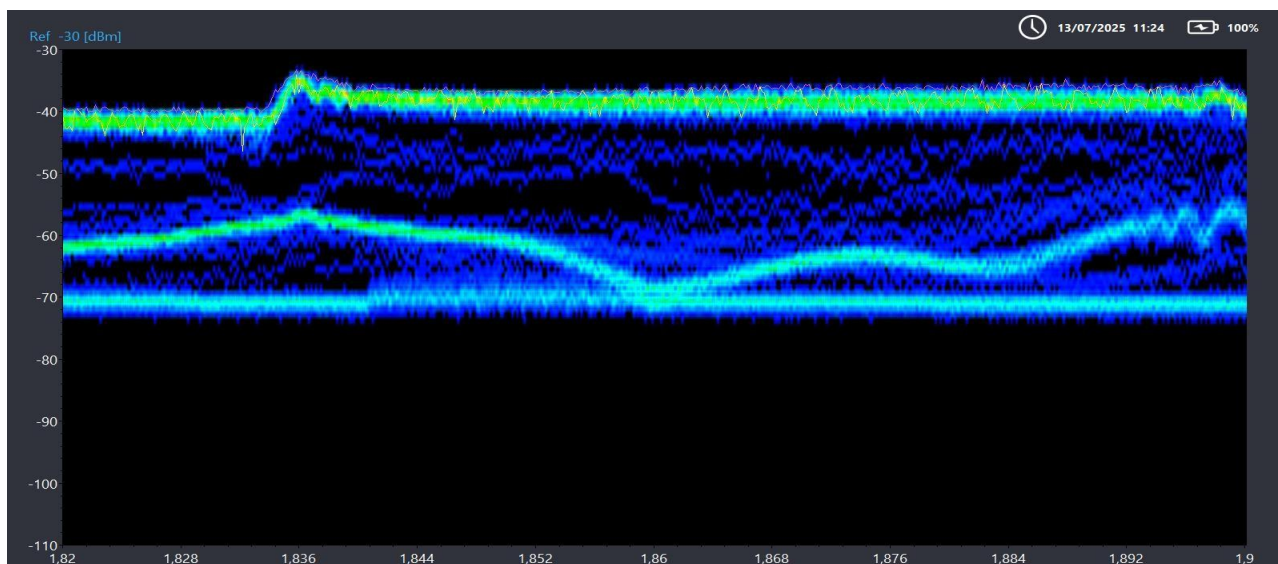
To exit Jammer Detector mode:

· Disable the Density chart by clicking on the appropriate button;

· Restore full spectrum view by clicking on the button Full Band.

✅ High Frequency Detection (6.2 GHz – 24 GHz)

The MEFF M2-PRO It is designed to detect high frequency signals in the range 6.2 GHz – 24 GHz.

This mode allows you to identify transmissions in higher bands, detecting suspicious peaks in real time with clear indication of frequency and power.

Optional Accessories:

To take full advantage of this feature's potential, you need to use the Optional KIT, consisting of:

·   Frequency converters dedicated,

·   Specific antennas for high frequency.

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MEFF will soon make these accessories available in its catalogue, covering an even wider range, from 2 GHz up to 40 GHz.

Antenna Types Available Soon:

· Laptops for quick use,

· Fixed for continuous monitoring,

· Directionalfor targeted research,

· Omnidirectional for 360° environmental detection,

· Special versions for vehicles and boats, also for use military (on request).

✅ How to activate High Frequency mode

1. Click on the "6.2 GHz – 24 GHz" button on the main display.

2. A dedicated screen will open with double graph:

- The first graph shows the waterfall chart

- The second graph shows the precise frequency and the signal strength.

This mode allows for a quick and complete analysis of the signals high frequency, ideal for advanced surveillance or technical remediation contexts.
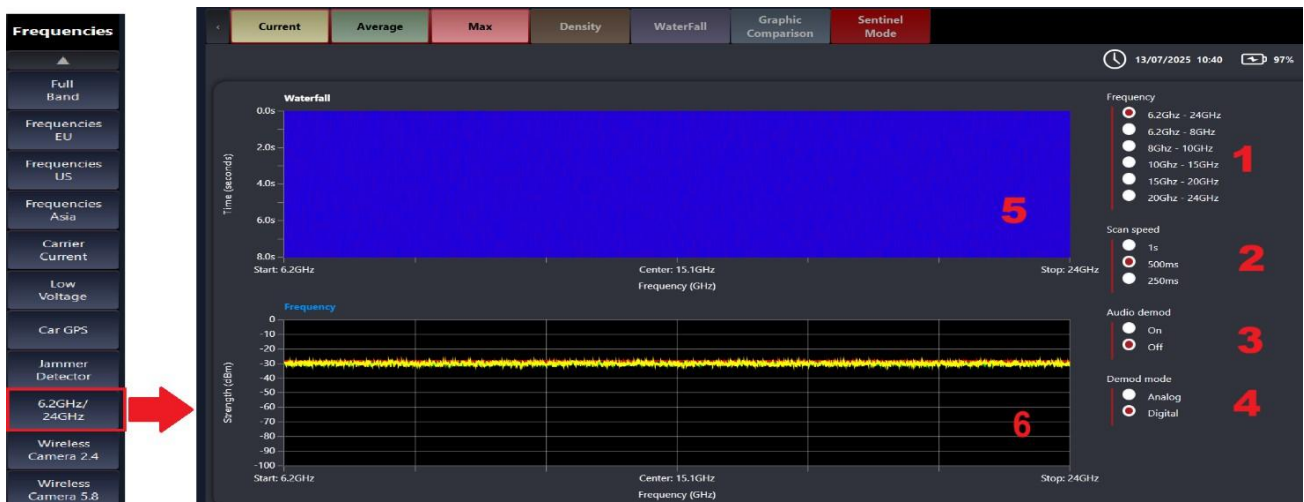
✅ Setting High Frequency Scan (20 – 24 GHz)

When we open the screen High frequency, the device automatically displays:

· Yellow line (current frequency) and red line (maximum peak),

· Double graph: frequency spectrum and waterfall chart.

✅ Configuring Operating Parameters

1. Frequency range selection Let's click on Detection range (1):

- Let's select the band as an example 20 GHz to 24 GHz.
  The graph automatically adjusts to this range.

2. Setting scan speed

   -We change the speed by clicking on Scan Speed (2) and we set 250 ms, ideal for faster and smoother detection.

3. Audio demodulation activation

   -Let's activate the function Audio Demod (3) by clicking on ON, to listen live to any demodulated signals.

4. Digital demodulation mode

   -Let's set the mode Demo Mode (4) on DIGITAL, to optimize the analysis of digitally modulated signals.

With this configuration, the MEFF M2-PRO will be perfectly set up to detect and monitor transmissions between 20 GHz and 24 GHz, with rapid graph updating every 250 ms and live listening via digital demodulation.
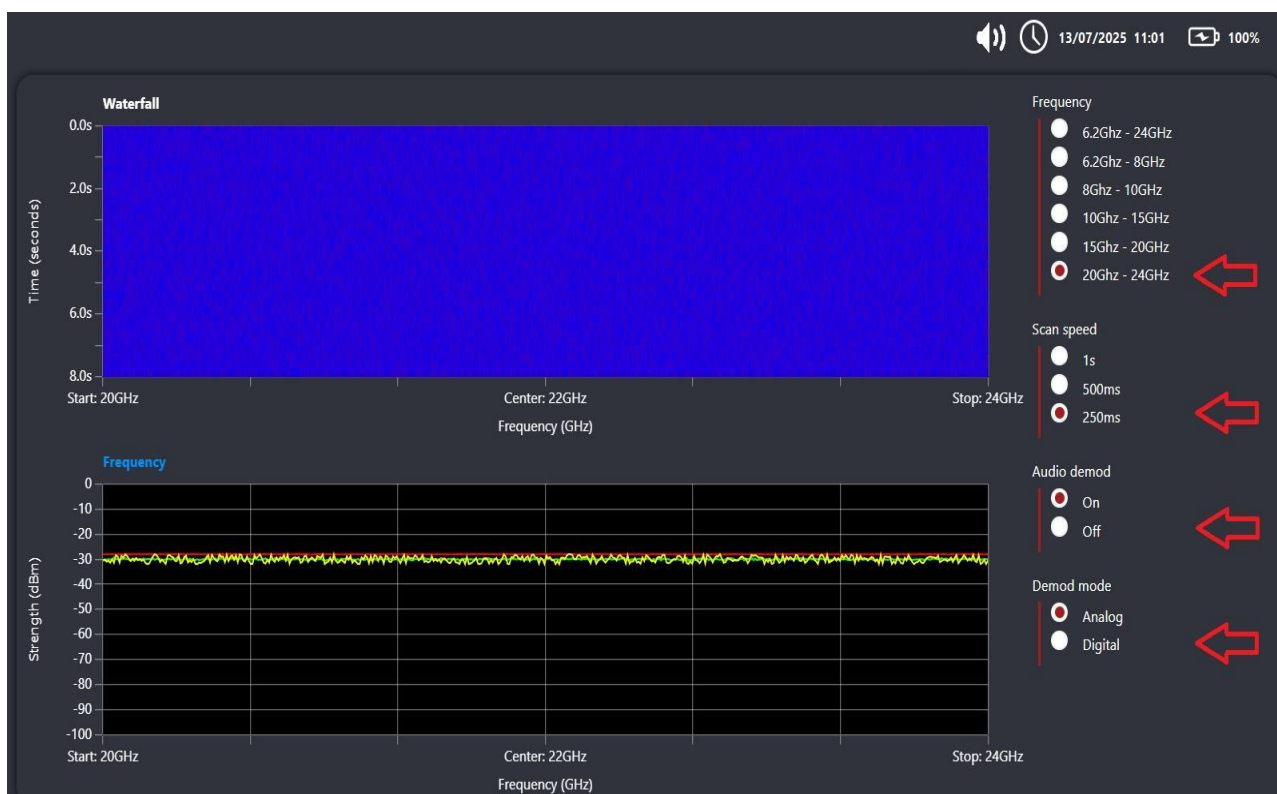
✅ Digital Band Analysis – Digital Frequency Mode

To quickly locate all the main digital bands (GSM, 2G, 3G, 4G, 5G, WiFi 2.4 GHz, 5 GHz, Bluetooth), we use the function Digital Frequency.

Operating Procedure

1. Activating Digital Frequency mode
   We click on the button Digital Frequency from the main menu.

2. Frequency Selection by Continent
   Let's click on Frequency EU to activate the profile dedicated to European frequencies.

   Other geographic profiles (US and ASIA) are also available.

3. Customization of Analyzed Bands

   - With the button Enable/Disable We can activate or exclude specific frequency bands based on operational needs.

   - Practical example: we can exclude WiFi if it is not of interest, or focus only on 4G/5G.

In a few seconds, the MEFF M2-PRO It will show on a graph all the digital bands active in the area, facilitating a quick analysis of suspicious environments.
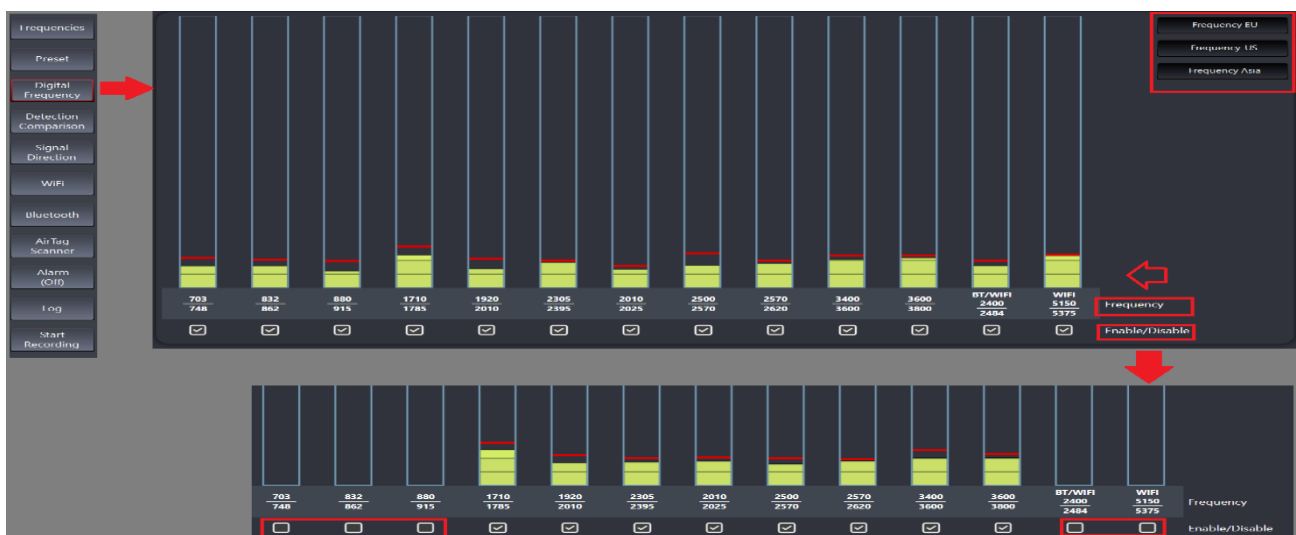
✅ Custom Analysis Example – Digital Frequency

1.Exclusion of Non-Relevant Bands

From the mode Digital Frequency:

- Let's turn off the bands GSM, WiFi, And Bluetooth using the key Enable/Disable.
- The power bar of these frequencies will be disabled and will not be analyzed.

2. Signal Simulation

- Let's run a simulation with active signals at 1800 MHz and 3500 MHz.

- The MEFF M2-PRO immediately detects the presence of active signals.

3. Graphical Indication of the Peak

- The most powerful peaks are highlighted with a red line in the graph.
- The maximum detected signal remains visible in red until it is surpassed by a new, more powerful peak.

This function allows you to monitor only the desired frequencies in real time, quickly highlighting any suspicious transmissions.
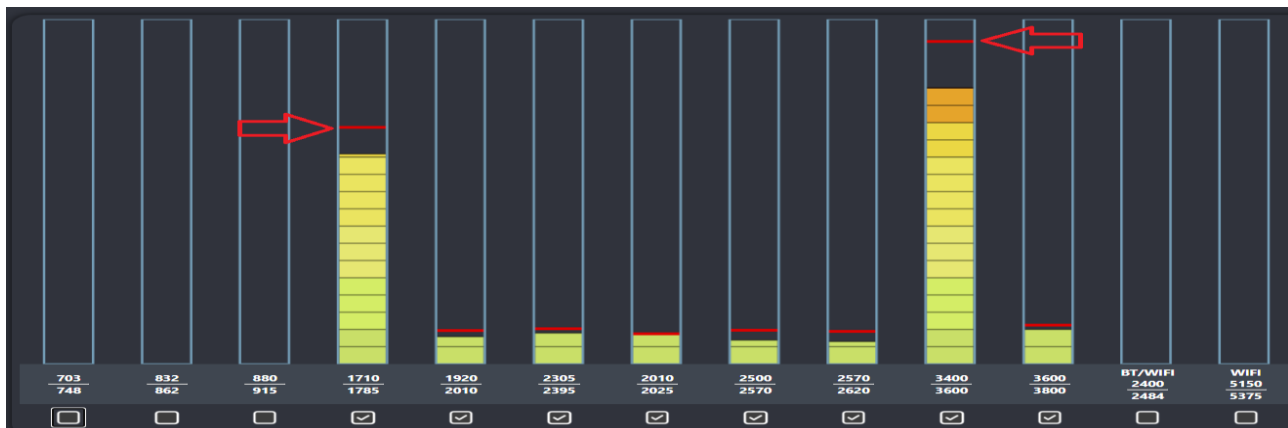
✅ Signal Behavior

·   Fixed and constant signal:

    -The signal bar remains fixed and gradually increases in intensity as we get closer to the source.

·   Intermittent or frequency-hopping signal (e.g. mobile telephony):

    - The signal bar will show variable peaks, proportional to the power and transmission mode of the signal.

·   Signals of this type can also be detected. Burst Signals or Cellular Signal Booster.

✅ Alarm Setup and Log Recording

To receive an immediate alert during scanning:

1. Click on the buttonALARM.

2. Set the alarm threshold between -55.00 dBm And -40.00 dBm

3. Press OK to confirm.

From this moment on:

· Any signal detected within the set range will trigger a acoustic alarm, one visual signal in red and will be recorded in the log with indication of the detected frequency.

Operational suggestion:

Use this feature for passive monitoring on suspicious frequencies or in sensitive environments.
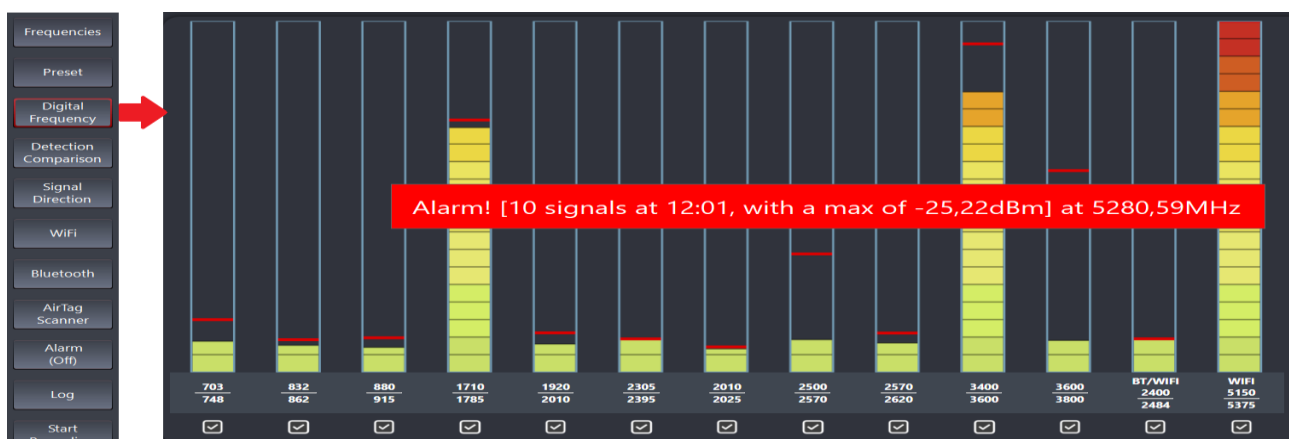
✅ **Alarm Deactivation and Insights**

· To stop monitoring alarms, simply press the ALARM (OFF) button again.

· The alarms detected will remain available in the LOG and in the REPORT For further information, see the page no. [to be inserted].

✅ **Source Location with Signal Direction**

Once you have identified a constant and persistent signal, we can locate the direction of the source using the function Signal Direction.

This function is suitable for detecting digital signals with constant and stable transmission. Signals that use frequency hopping or interval transmissions will be difficult to detect.

Operational example:

· Let's simulate a fixed transmission from GSM bug on 800 MHz.

· To activate the function: Enter the MEFF directional antenna supplied

✅ Using the Signal Direction Function

To locate the precise direction of the signal:

1. Click on the button Signal Direction.

2. Select the frequency of interest (example: GSM LTE).
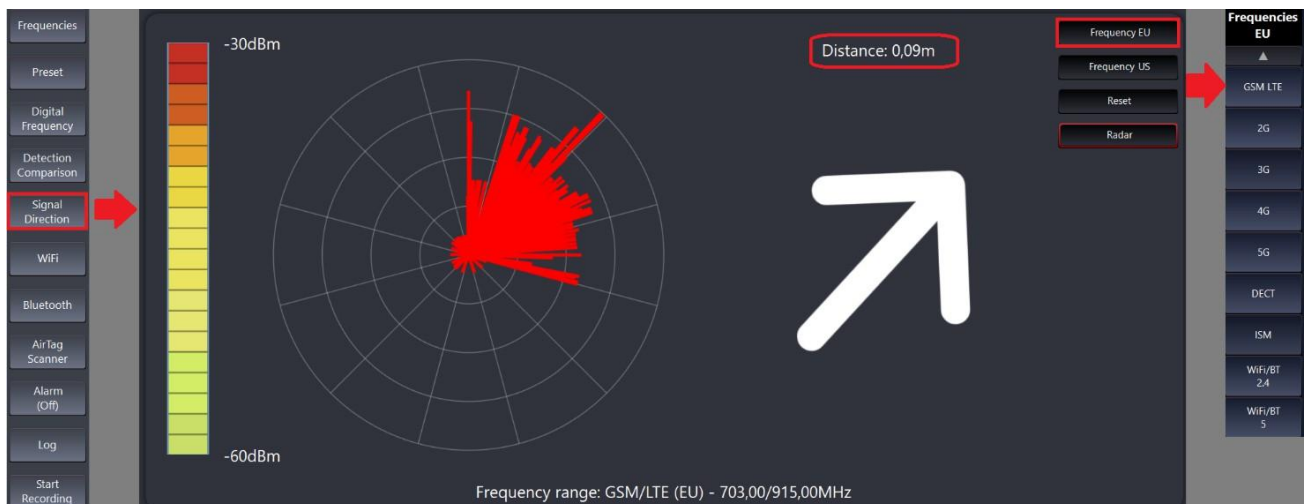
Note: You can select only one frequency at a time.

3. Activate the Radar by clicking on the Radar button.

4. Correct positioning of the device:

· Keep the MEFF M2-PRO in horizontal position, flat and linear.

· Don't tilt it Up or down: The internal gyroscope only works if the device is well balanced.

5. Environment rotation:

· Rotate slowly by performing a rotation at 360° clockwise.

· As soon as the device detects the correct direction, an arrow will appear on the screen interactive.

Helpful Hint: If the arrow does not appear immediately, continue rotating slowly to allow the sensor to align correctly with the power peak.

☑ **Advanced Analysis – Signal Direction**

The function Signal Direction It is the primary tool for accurately locating the source of a signal. Its effectiveness is based on the combined analysis of four visual indicators, which work together to guide the operator to the source.

☑ **Four Key Indicators to Monitor in Order of Importance**

No	Indicator	Operational Description	Utility
	Distance (Meters)	Calculate the estimated distance from the source in real time	Precise proximity detection
	Power Bar (dBm)	Indicates the strength of the received signal. The closer the value is to 0, the greater the strength.	Measure immediate O proximity and intensity
	Radar Interactive	Shows the directional sector from which the signal comes	Guide visual of the directional dial
	Arrow Directional	Provides direct and continuous indication of the precise direction of the signal	Signal interactive immediate management

☑ **How to Read Data Correctly**

To obtain a quick and effective localization of the source:

·   There arrow points towards the source of the (dBm)

·   When the distance decreases (e.g. from 6 m to 1 m) you are close to the source.

·   There signal bar (dBm) increases (example from -70 dBm to -40 dBm).

·   The radar shows a more stable section towards the correct direction.

If all four parameters improve simultaneously→ the direction is correct.

✅ WiFi and Bluetooth functions

The MEFF M2-PRO integrates targeted scanners for identifying Wi-Fi and Bluetooth devices present in the environment.

WiFi / Bluetooth mode

· Quick access via dedicated keys WiFi And Bluetooth.

· A complete list is generated:

- Network/device name and Manufacturer

  or   BSSID MAC

- Signal strength

- Frequency Band

Note: Only visible and active devices are shown.

Remote or stealthy WiFi devices are not detected in this mode
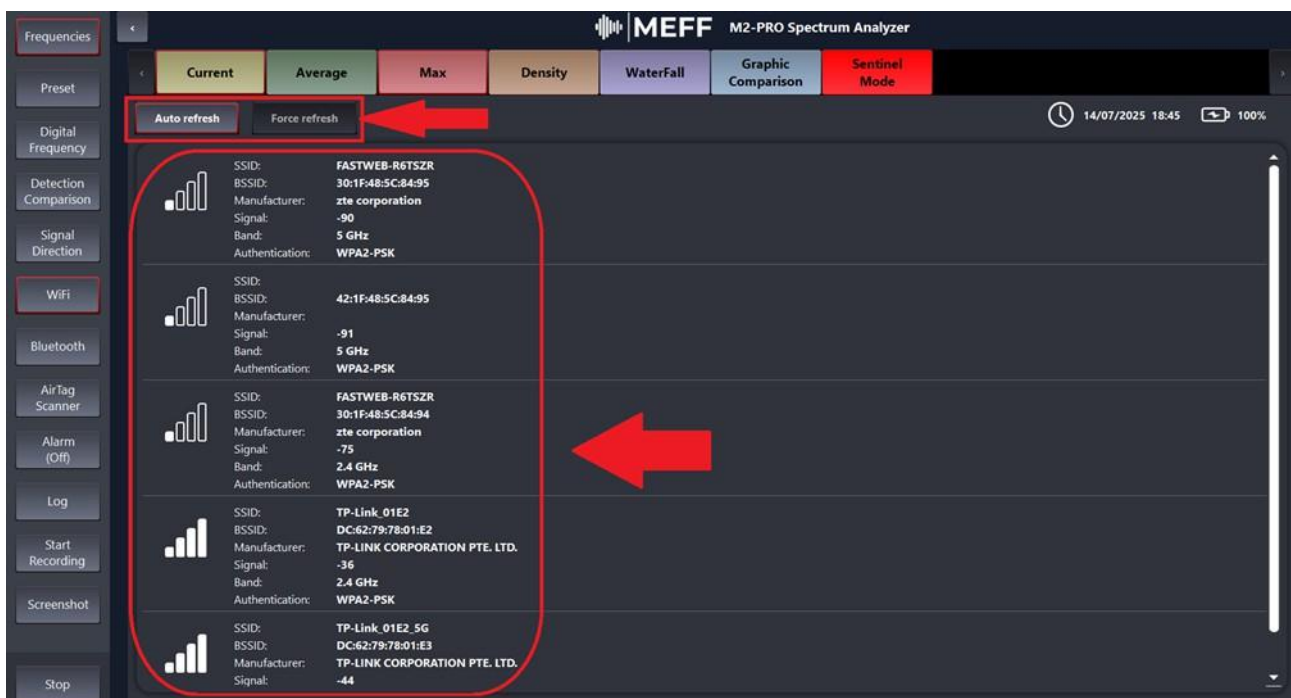
Auto Refresh Option

By enabling Auto Refresh you can automatically refresh the device list every few seconds without having to manually refresh.
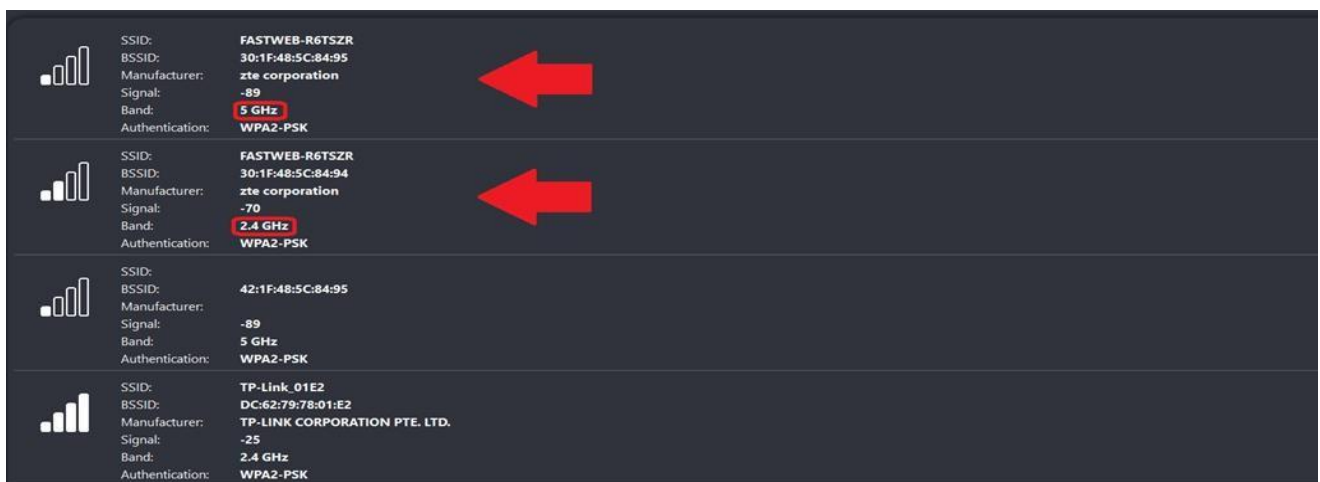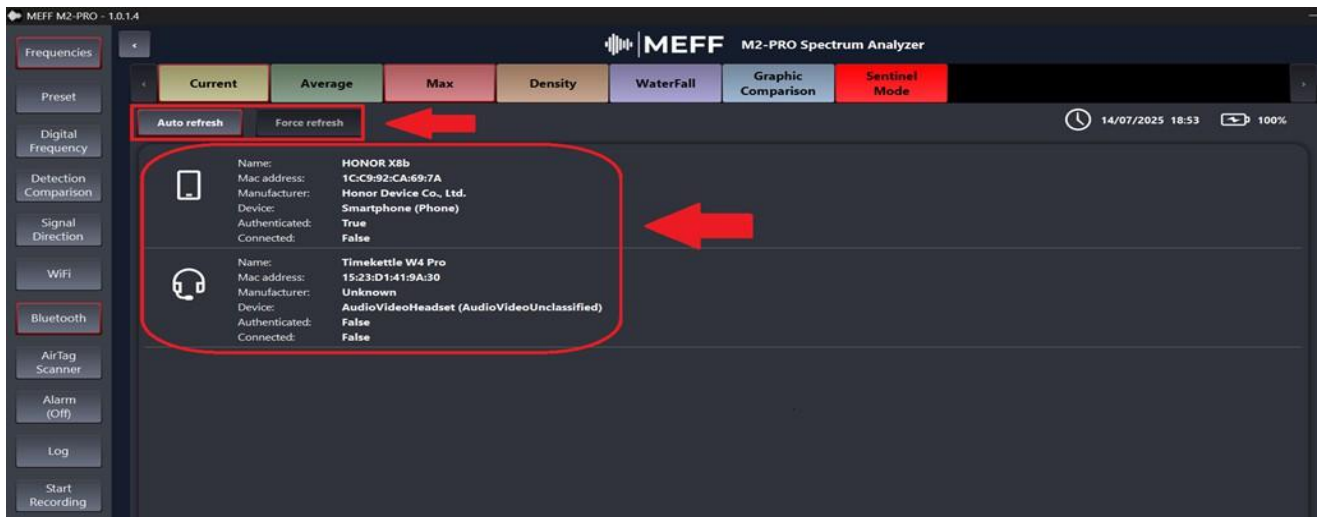
☑ WiFi and Bluetooth Device Analysis

When we access the WiFi or Bluetooth modes, the MEFF M2-PRO interface allows us not only to view the list of active devices but also to open the frequency spectrum of the 2.4 Ghz or 5 Ghz WIFI signal, just click on the device we are interested in.

Attention Important:

In this mode the system does NOT perform targeted tracking towards the single selected device but towards the strongest or closest signal in the selected 2.4 GHz or 5 GHz band.

Operational Note:

When you want to locate hidden Bluetooth and BLE bugs, it is always recommended to use the AIR TAG Scanner mode.

✅ **AirTag & BLE Scanner mode**

- Locates Bluetooth BLE and Air Tag devices

- Ideal for:
  - AirTag Detection
  - Hidden BLE bugs
  - BLE devices not paired
  - Bluetooth devices

In AIR TAG Scanner mode, instead:

· You can select a specific device

· The system focuses exclusively on finding the single selected device

· Tracking will be unique and directed only towards the chosen target

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✅ **AIR TAG Mode – Precise Location of BLE Devices**

By accessing the function AIR TAG using the appropriate button, we activate one of the most advanced modes of the MEFF M2-PRO system for detection and localization specific and targeted of BLE (Bluetooth Low Energy) devices, including:

- AirTag

- BLE bugs

- Any standard Bluetooth or BLE device (all generations)

- BLE devices in stealth mode or intermittent transmission

Operational Features:

Once you click the button AIR TAG, the M2-PRO performs a deep scan of the environment and displays in real time:

- The complete list of detected devices

- There approximate distance (in meters) from each device

- Device identification codes

- Color-coded graphic indicators for quick visual identification
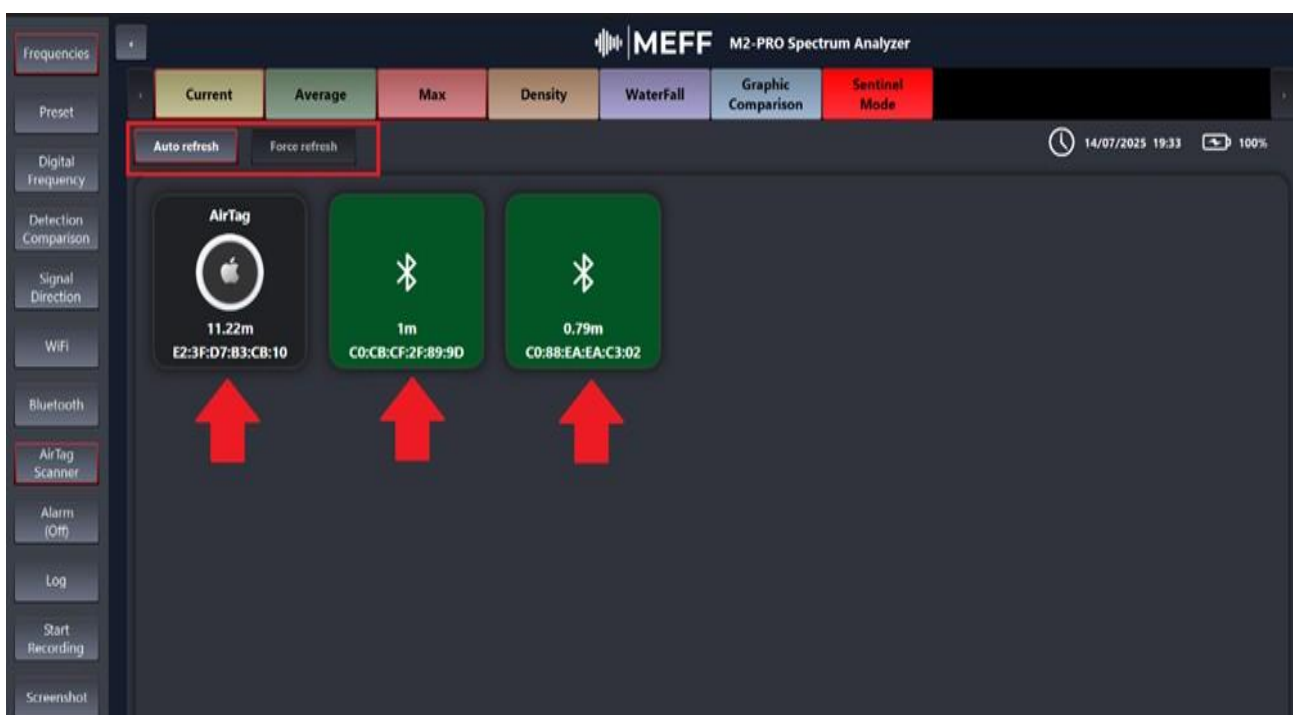
✅ **Practical Example:**

We have activated two Bluetooth devices And an AirTag in the environment:

- The MEFF M2-PRO immediately detected all three devices

- The AirTag is identified as 11.22 meters away, indicated on the screen with its relative distance

- The two Bluetooth devices, being very close (1 meter and 79 cm), are marked with the green color, visual indicator of proximity.

☑️ Unique Function of AIR TAG Mode:

- Dedicated tracking for the single selected device: By clicking on one of the devices in the list, the MEFF M2-PRO activates DIRECTIONAL tracking for that specific device

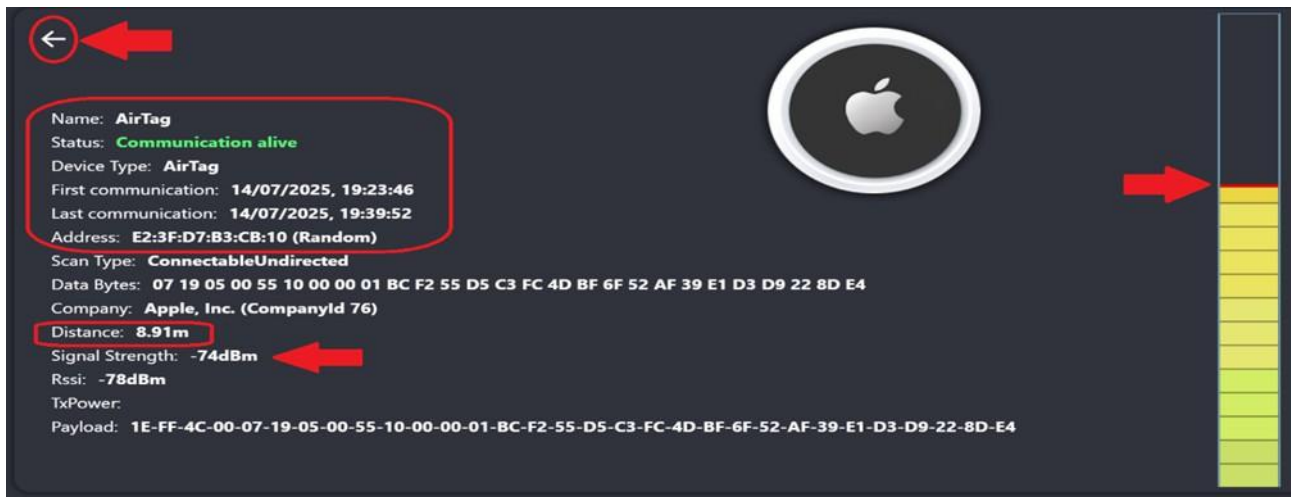- The screen will show the approximate distance and power, helping the operator to physically reach the signal source

- You can search mobile with the device to find the source

How to Search for Your Device

Now let's take the M2-PRO in hand and we begin to walk slowly through the environment. During the search:

- Let's look at the distance: should decrease as we get closer.

- Let's check the power bar: the more the dBm value increases, the closer we are.

Practical advice: Move slowly to get a stable and accurate reading. Avoid sudden movements.

Research Conclusion

Once the minimum distance (0-1 meter) is reached and maximum power is detected, we will have identified the exact location of the Bluetooth device.

To exit the mode AIR TAG:

Click on the top left arrow and you will return to the full list of devices.

To perform a targeted search for Bluetooth and BLE devices, proceed with the same procedure indicated for the search for the AIR TAG
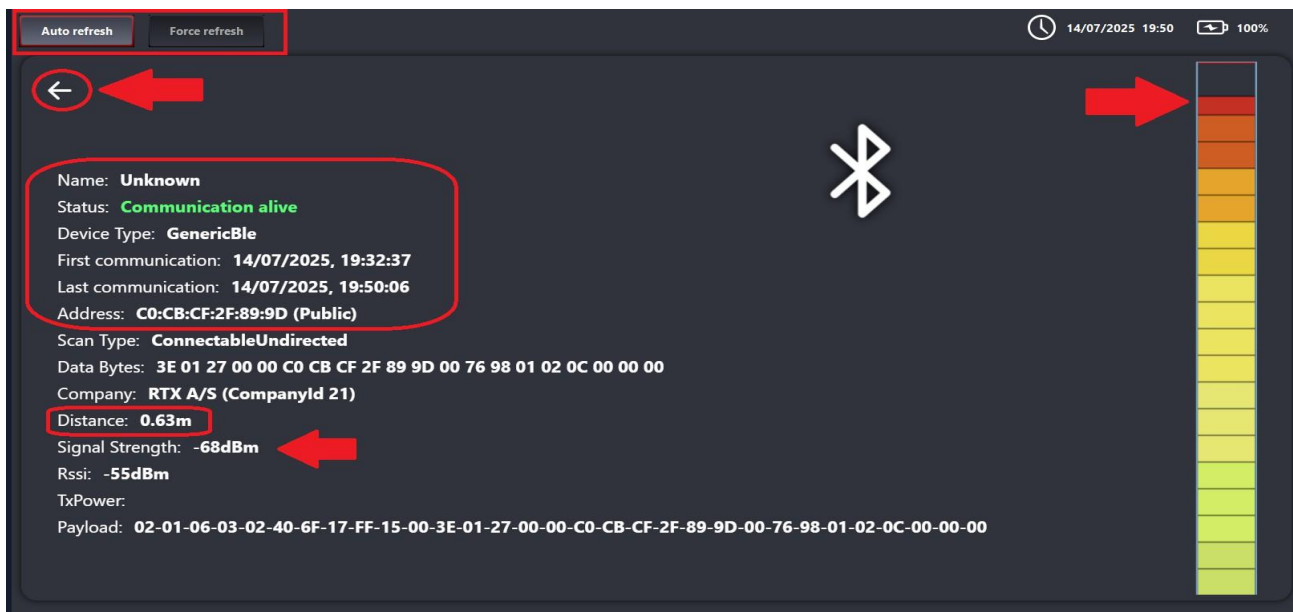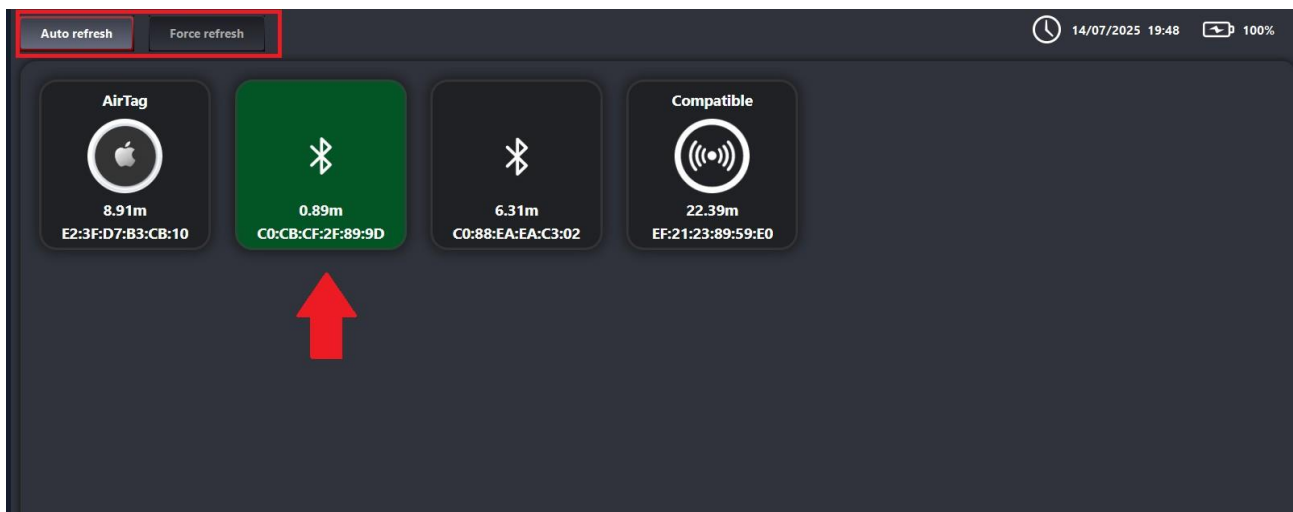
To exit Bluetooth mode:

Click the arrow in the top left and you will return to the full list of devices.

SENTINEL MODE

The MEFF M2-PRO It is equipped with the function Sentinel Mode, which allows you to automatically analyze and save all suspicious signals and generate a detailed report of the monitoring performed. Once activated, the system operates in fully automatic mode, disabling any manual intervention.

To start the function, click on Sentinel Mode and fill in the following fields: Operator name , VAT/Corporate TAX, indicate the place of service (for example Car, Office, House or Other) and, optionally, load the company logo. Finally, click on Start to start automatic mode.
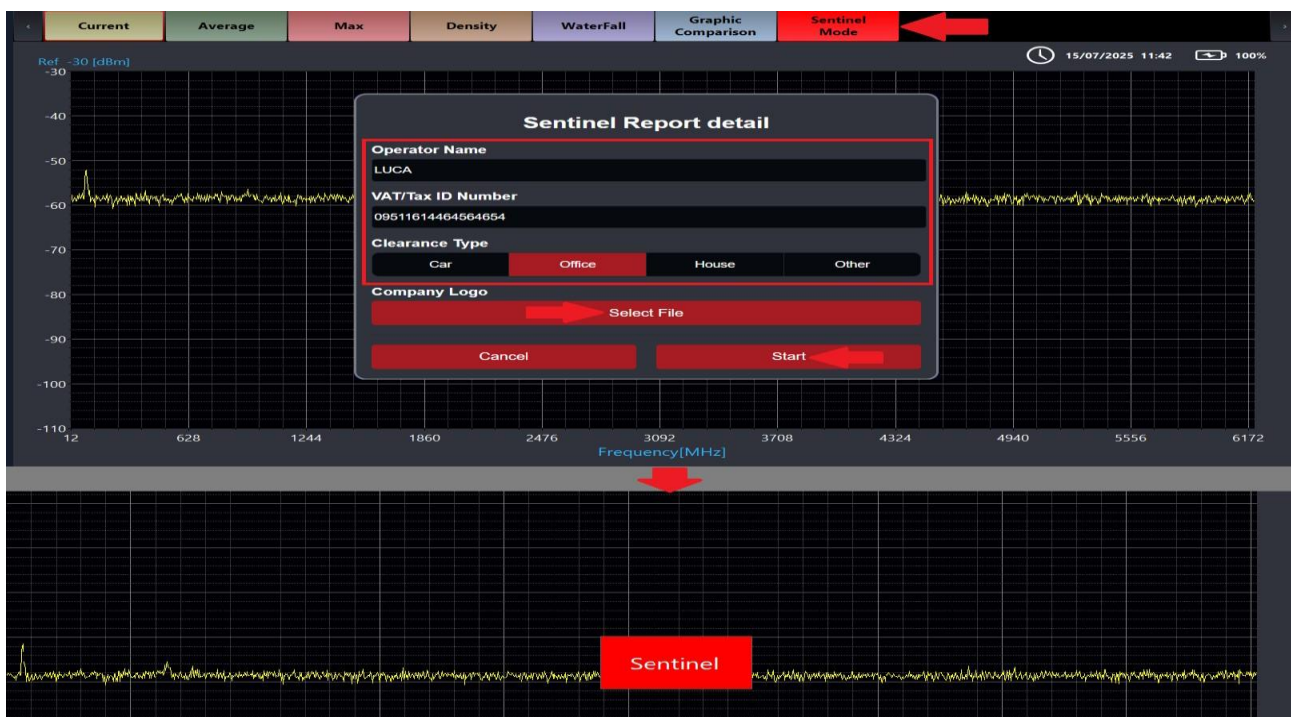
To deactivate the function, simply click the button again Sentinel Mode. A message will appear saying Report Save to confirm that the report has been saved.
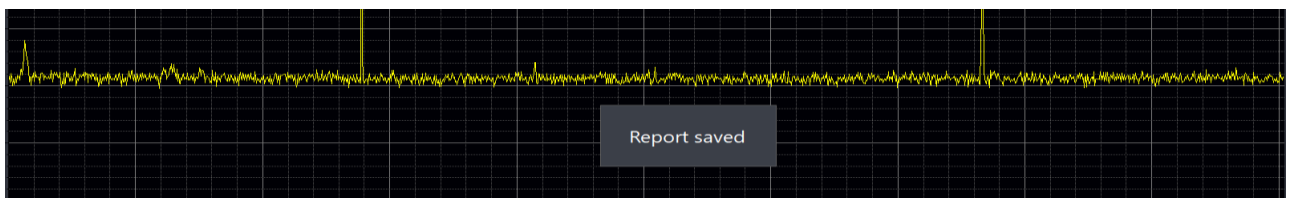
We can view the report saved and generated by the functions Sentinel Mode or Alarm accessing in two ways:

· Through the folder M2-PRO present on the desktop, located at the bottom left;

M2-PRO
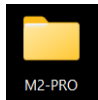
· or by clicking on the Folders button within the software
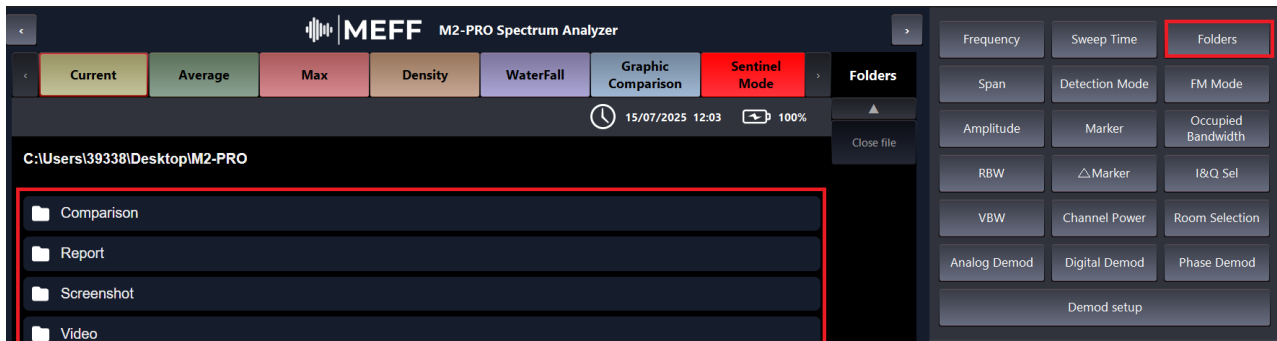
Let's click on Report and select the latest generated report from the available list.

On the home screen, we see the data we previously entered. To continue, click on the date of the selected day.

As we can see, a detailed list of each individual detection is shown, with the time, signal level in dBm and relative frequency indicated.

Alarms on day 2025-07-15

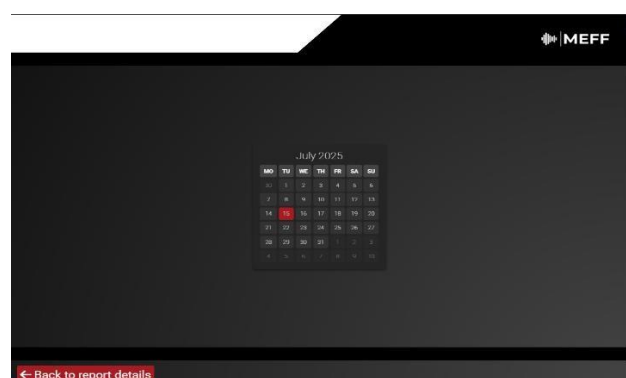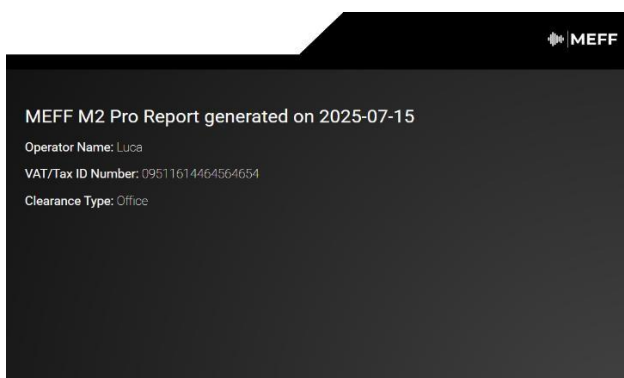| Time	Min Threshold (dBm)	Max Threshold (dBm)	Value (dBm)	Frequency
11:49	-50,00	-40,00	-47,61	5188,65 MHz
11:49	-50,00	-40,00	-26,83	2430,44 MHz
11:49	-50,00	-40,00	-48,27	4716,96 MHz
11:49	-50,00	-40,00	-37,15	383,76 MHz
11:49	-50,00	-40,00	-37,79	427,73 MHz
11:49	-50,00	-40,00	-42,78	335,79 MHz
11:49	-50,00	-40,00	-47,86	359,78 MHz
11:49	-50,00	-40,00	-25,05	1730,89 MHz
11:49	-50,00	-40,00	-24,60	403,75 MHz
11:50	-50,00	-40,00	-49,62	335,79 MHz
11:50	-50,00	-40,00	-49,40	383,76 MHz
11:50	-50,00	-40,00	-31,78	407,74 MHz
11:50	-50,00	-40,00	-42,90	3673,63 MHz
11:50	-50,00	-40,00	-49,53	103,94 MHz
11:50	-50,00	-40,00	-46,69	3581,69 MHz
11:50	-50,00	-40,00	-27,93	715,55 MHz
11:50	-50,00	-40,00	-25,92	1690,91 MHz
11:50	-50,00	-40,00	-49,20	1251,20 MHz
11:50	-50,00	-40,00	-47,24	1586,98 MHz
11:50	-50,00	-40,00	-38,40	5928,18 MHz
11:50	-50,00	-40,00	-39,14	5168,67 MHz

← Back to report calendar   Alarm list   Full chart   Chart Eu   Chart Us

We click on the button Full Chart to view the progress of the readings, with the time and the graphic representation of the values in dBm.

We can click on EU Chart to view the graph related to the Digital Mode on European frequencies, or on US Chart to view frequencies used in the United States.

Attention: the graphs EU Chart and US Chart are only available in the report generated by the function Sentinel Mode. In the reports generated via Log, these graphs will not be visible.

To exit this mode, click on the Close File button at the top right.

✅ How to compare two signals with Detection Comparison

1. We click on the button Detection Comparison on the main screen.

2. The dual graph mode will open: the device will display two graphs one above the other to compare two signals.


✅ Procedure for saving graphs to compare

- When we are on the screen of the signal we want to save, we click on:

    or Save Graph

    or Save OFF → changes to Save ON (means that the save function is active).

    or Click on Copy to copy the currently displayed signal.

    or Press Save, a window will open to rename the saved file (for example, we write 001 or a specific name that helps us remember the type of signal).
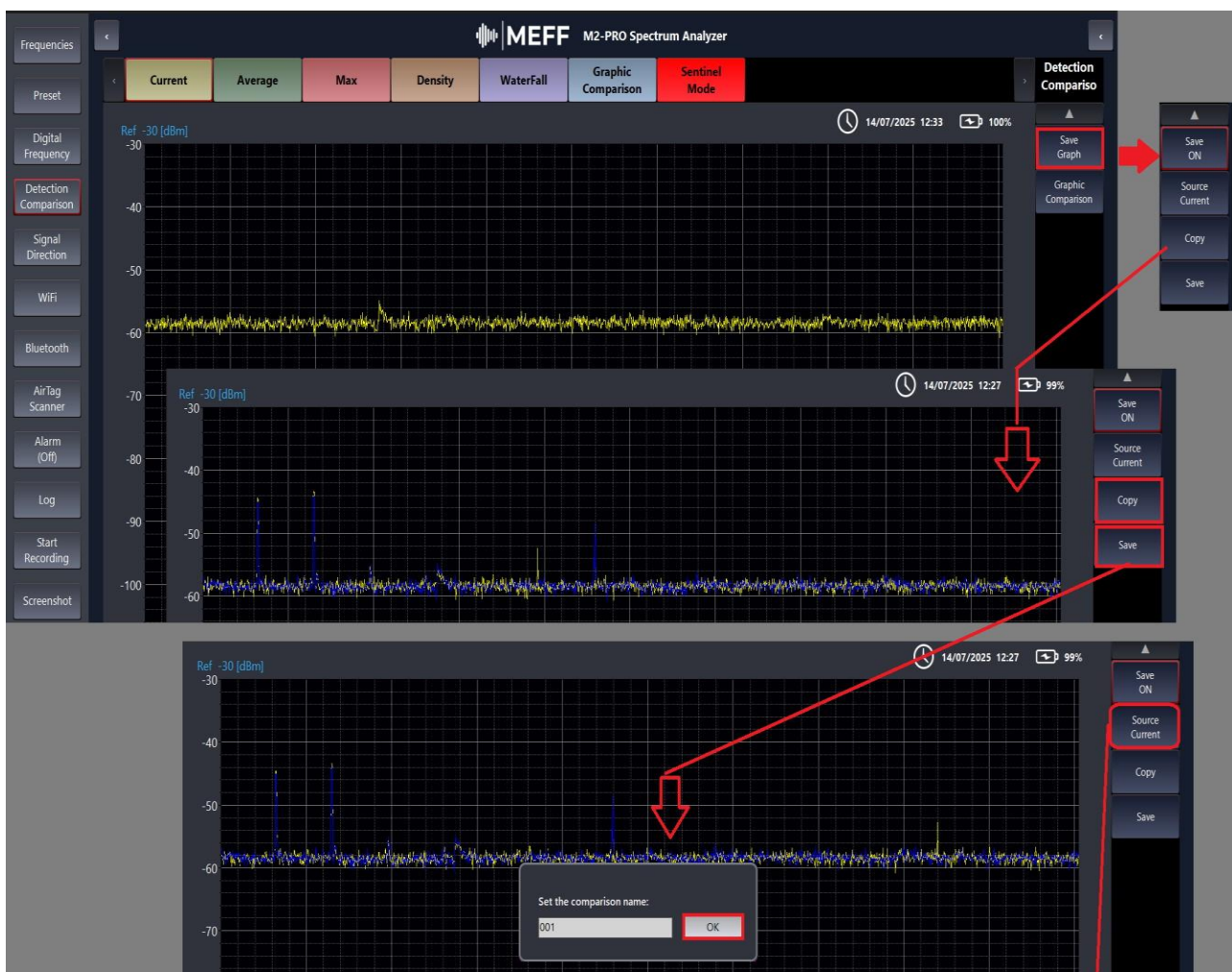
With the Source Current button we can decide whether to save the graph in Current (Real Time) or Average or MAX reception mode

Let's repeat the procedure for a second graph (example: let's save another file as 002).
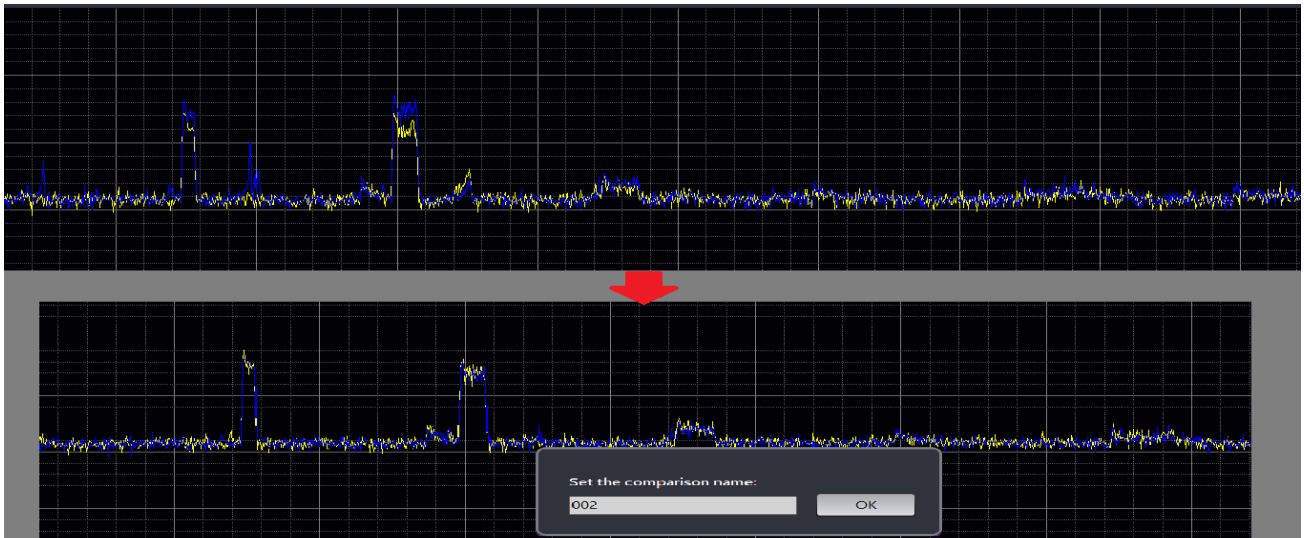
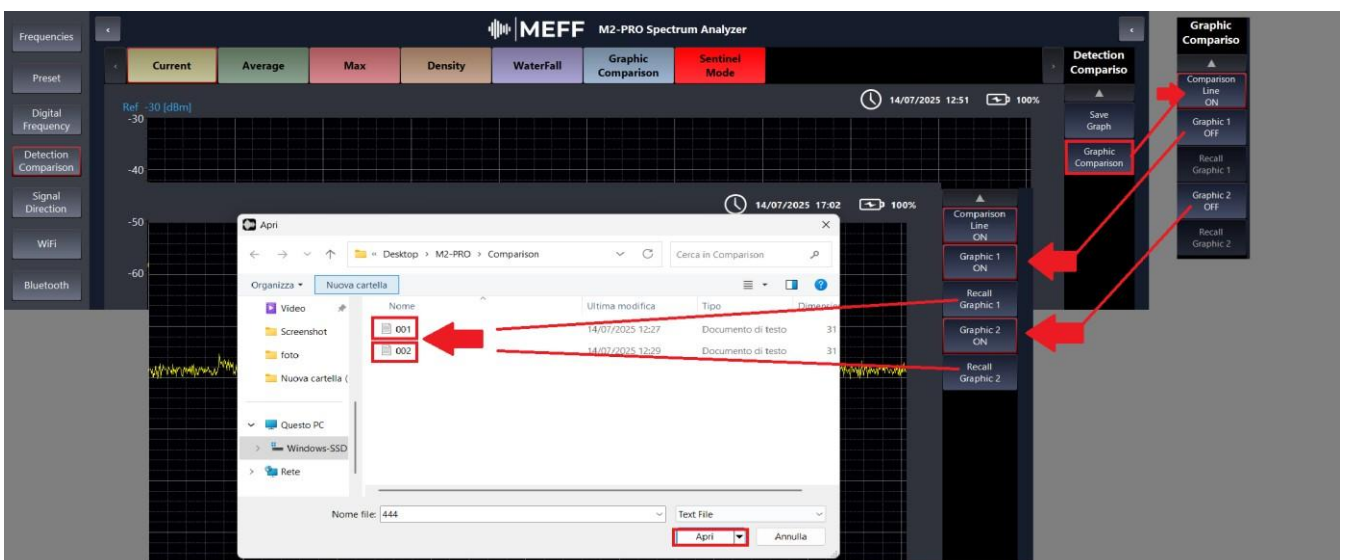### ✅ Complete Comparison Procedure with Detection Comparison

1. Disable the graphics saving function
After saving the graphs we are interested in:

- We click on the button Save ON→ will become OFF, so we disable the save mode.

---

2. Let's access the Comparison mode

- We click on the button Detection Comparison.

- We also click on Graphic Comparison to activate visual comparison.

3. Activate the comparison line

- Let's click on Comparison Line OFF, which will become ON→ this activates the comparison display of the graphic lines.

4. Select the graphs to compare

- Let's activate Graphic 1 and Graphic 2

- From the button Recall Graphic let's recall the two previously saved graphs (example 001 and 002)

✅ Viewing comparison graphs

Once called back Graphic 1 (e.g. 001) and Graphic 2 (e.g. 002) from the section Recall Graphic, to have a clear comparison without visual disturbances we must:

- Disable Current, Average and MAX, simply by clicking on the respective buttons:

  -Current→   OFF

 **Average→**   OFF

  MAX→   OFF

In this way:

- On the graph you will only see the two lines of the saved signals (001 and 002), without any other real-time reference traces.

- The comparison will be much clearer and more effective in evaluating specific differences and variations between the two signals.

Important note: Remember that you can always reactivate **Current**, **Average** or **MAX** if you need to compare the saved signals with the real time signal.
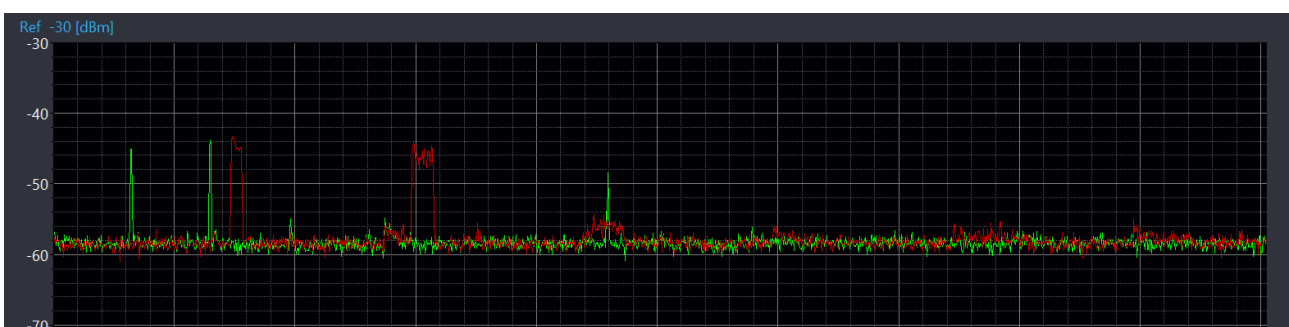
If you want to compare the two signals in real time, activate Current
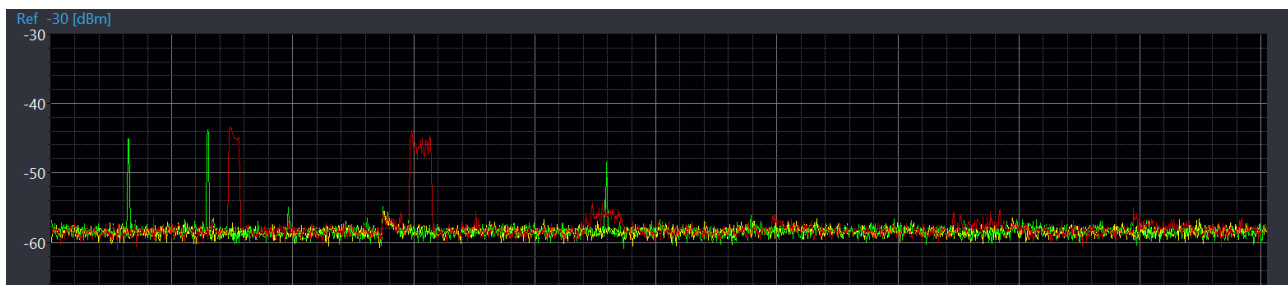
When we're done, click Exit to exit comparison mode.

✅ Manual graphic demodulation of signals

The MEFF M2-PRO allows you to perform the **manual graphic demodulation** of signals. You can select a specific frequency and perform demodulation by choosing from several graphic display modes.

Practical example – 408 MHz frequency analysis:

We follow the analysis of a previously detected signal in the mode **Full Band**, relating to the frequency of 408 MHz.

· By clicking on **Frequency** and then we insert the frequency 408 MHz in the field Start Freq so let's press Enter on the keyboard.

· Let's click on **Digital Demod**.

· Let's click on **MSK OFF** (will become ON). At this point we will hear a background noise that we can deactivate by clicking on the icon Audio.
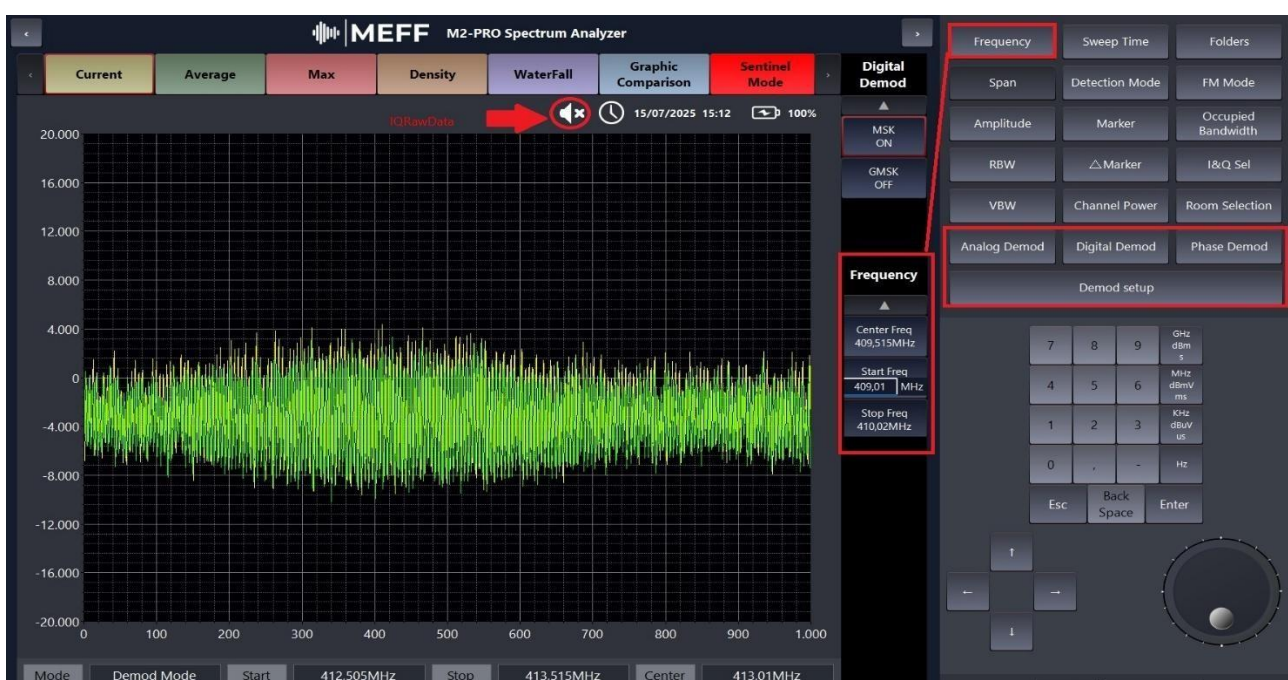
As we can see, the graphical representation of the audio transmitted within the selected frequency will be shown.

If we activate background music, we will notice that the audio graph will visually follow the progression of the song's notes.

Note: in this mode only the graphic demodulation without playing the output audio.

We can perform graphic demodulation using different modes, simply by clicking on the button corresponding to the desired mode, based on the type of signal we are analyzing.

This way, the graphic display can be adapted to the specific characteristics of the demodulated signal.

✅ Signal display with different graphic modes

We can analyze the same signal using different graphical display modes. To do so, click on Demod Setup, then on the button Chart Name and select the desired graph type, for example: EVM, Eye Diagram or Constellation.
By clicking on the chosen graph, the corresponding representation will be displayed, allowing us to observe the signal from different points of view.
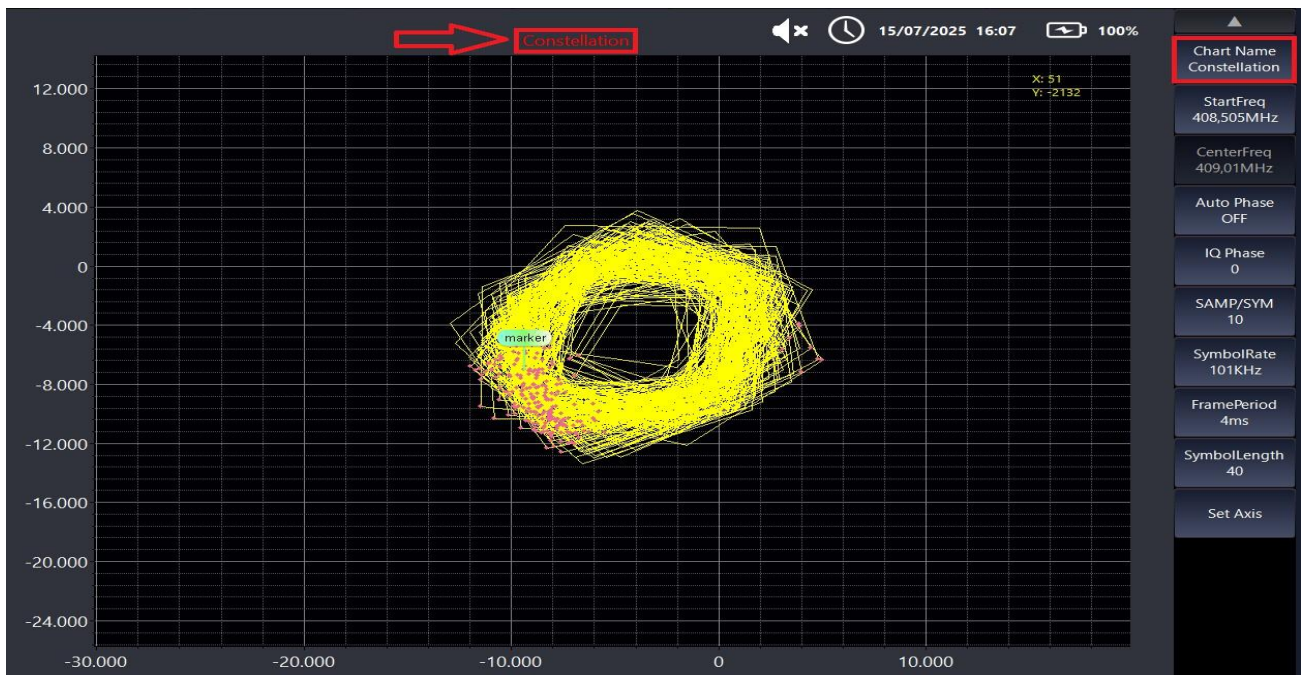
EVM chart example
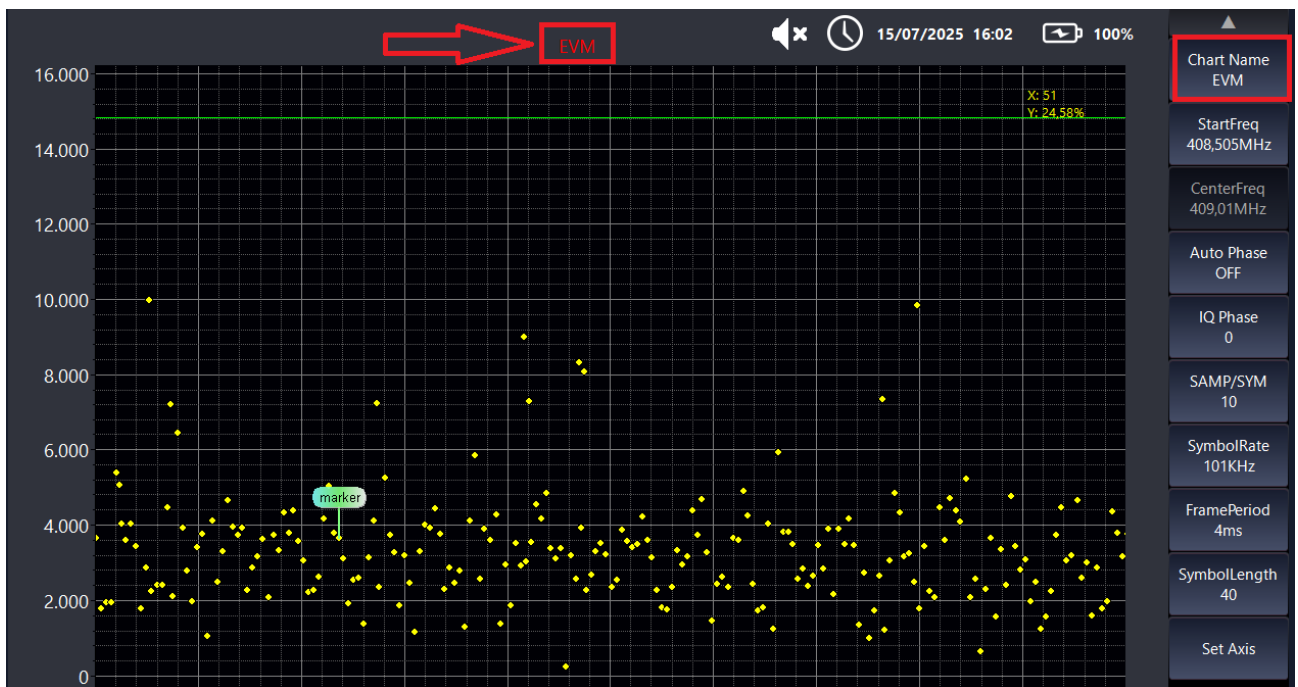
## Eye Diagram Chart Example

Constellation Chart Example

☑ Signal Analysis on Wired Systems – Low and High Voltage

We now continue with the analysis function dedicated to the signals on **power lines** through the use of **Presets "Low Voltage**" and "High Voltage" This mode allows you to:

·   Check for the presence of audio broadcasts or other anomalies within the wired lines;

·   Visually analyze the graphic demodulation of the captured signal.

Operating procedure:

1. Select the Low Voltage Preset (low voltage) or High Voltage (high voltage) depending on the type of system to be analyzed.

2. Connect the dedicated probes supplied, present in the MEFF M2-PRO case:

      or   Low voltage probe;

      or   High voltage probe.
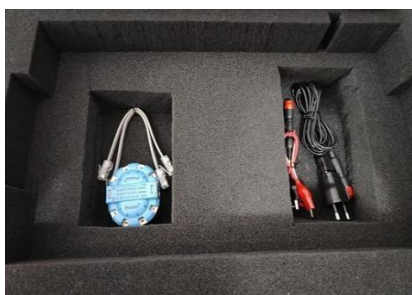
3. Monitor the chart for any audio modulations or suspicious signs indicating the presence of unauthorized devices or hidden transmission systems.

✅ Using the High Voltage Probe

To carry out monitoring of the high-voltage power lines, proceed as follows:

Operating procedure:

1. Opening the MEFF M2-PRO case and take the high voltage probe dedicated.

2. Disconnect the omnidirectional antenna currently installed on the SMA connector of the device.

3. Connect the SMA connector of the probe directly to the MEFF M2-PRO.

4. Insert the probe socket in the electrical grid or at the point of the system you wish to analyze.

✅ Graphical Demodulation with Carrier Current

After connecting the probe to the electrical network:

Procedure:

1. Press the "**Carrier Current**" preset on the MEFF M2-PRO screen.

2. The function of **graphic demodulation** It activates automatically.

✅ Practical Example of Power Line Analysis

We performed a simulation with a signal transmitted between 1.5 MHz and 2.51 MHz.

What we observe:

· On the display of the MEFF M2-PRO we see clearly the graphic representation of the transmitted audio on the power line.

· The graph confirms that there is an active signal running through the electrical system.

Conclusion:

When we detect a waveform like this intermittently, it means that on the power line there is a suspected transmission.

✅ Analysis of Low Voltage LAN and Telephone Lines (up to 5V)

Important note:

· Do not connect the MEFF M2-PRO to cables powered by voltage higher than 5V (e.g. POE or other power supplies).

· Too high voltages can damage the device permanently and void the warranty.

·   Before any connection, use a tester to check that the cable tension is within the required limits.

✅ **Connecting the Probe with Crocodile Clips – Low Voltage Lines**

Operating procedure:

1. Take the corresponding probe and connect it to input N.

2. Let's take the red and black alligator clips

3. We connect the crocodiles to the Prokit, where we find 7 numbered entrances.

4. Let's connect:

   • Black crocodile on the entrance 1,

   • Red crocodile on the entrance 2.

Connection example (here we see connection on 2 and 7)

✅ Graphical Analysis of Signal on LAN Line

Procedure:

1. After connecting the low voltage probe and the Prokit correctly, click on the "Low Voltage" button to activate the graphic demodulation.

2. We simulated a signal between10 kHz and 20 kHz connecting the signal on the pin 1 And pin 2 of the LAN cable.

Result:

· On the screen we see clearly the graphic form of the transmitted signal.

· This confirms that There is an active signal inside the LAN cable.

This procedure allows you to detect suspicious transmissions on LAN or telephone lines.
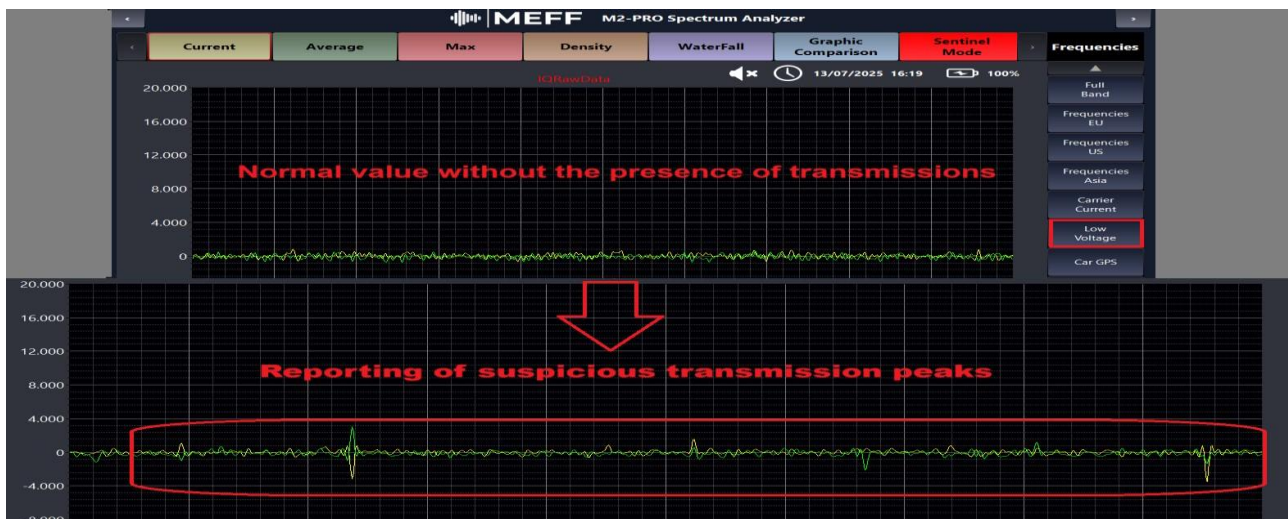
## ✅ Full Verification on All PINs

Recommended analysis procedure:

· After the first signal detection, Let's proceed with the analysis on all the PINs.

· We start by connecting the pin 1with each of the others 8 PIN, one at a time (1-2, 1-3, 1-4… up to 1-8).

· Then the same procedure is repeated with pin 2, Then pin 3, and so on until pin 8.

Expected result:

· In our example, we simulated a signal only between pin 1 and pin 2, Therefore:

· The analysis on pin 1 and pin 2 show a graph with the signal.

- All other combinations show a flat graph, a sign that there are no broadcasts on the other PINs.

Important: This procedure allows you to check every single combination and identify which wires of the cable have transmissions on them.
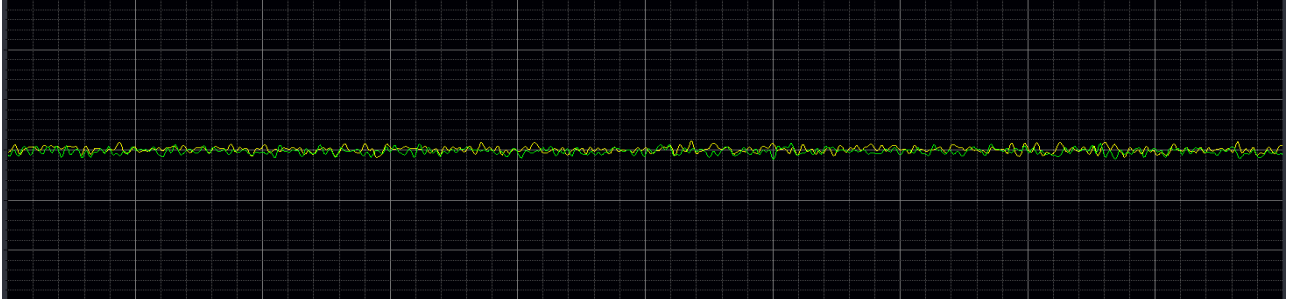
✅ Important – Check Before Connecting

The system MEFF M2-PRO it's already preconfigured and automated to facilitate analysis.

However, to obtain correct results it is essential:

- Always connect the probes correctly (high or low voltage, depending on the line to be analyzed).

- Before connecting the probe, always check the tension on the cable with a tester:

    - If the voltage is correct (within the indicated limits), you can proceed.

    - If the voltage is too high, do not connect the probe to avoid damage to the equipment.

A correct initial check ensures a safe and accurate detection.

✅ Using the Remote Control function

To use remote control of the device MEFF M2-PRO through **AnyDesk Professional,** follow the steps indicated:

· Colleague M2-PRO to the Internet using a cable LAN

· **AnyDesk** Professional It is already pre-installed on the deviceM2-PRO

· Download **AnyDesk** on the PC you want to use for remote control from the official link: https://anydesk.com/it/downloads/windows

· Start AnyDesk on your PC: your will appear on the main screen **AnyDesk ID**.

· To connect to the device, enter in the field "Enter AnyDesk address" the AnyDesk ID displayed on the device M2-PRO, then click on "Connect".

· **Accepting the connection**: at the first connection, the user will need to M2-PRO Accept the request. The device will then be programmed to automatically accept remote connections.

There default **password** for access is:

MEFFM2PRO01

· **Remote Control**: After connecting, you will have full access to the device M2-PRO and you'll be able to operate remotely as if you were physically present. You'll be able to take measurements, change settings, and view results in real time.

This configuration ensures rapid and secure remote control, facilitating technical assistance and operational optimization of the system MEFF M2-PRO.
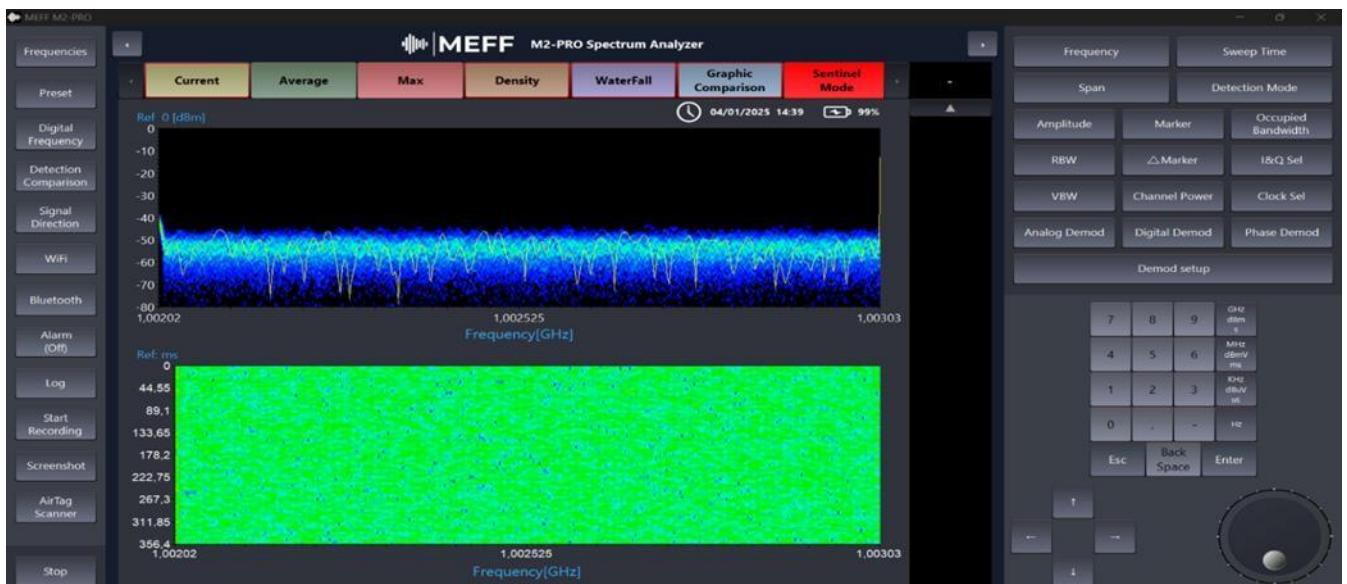
Dimensions and weight:

·   14.37 inches (Length) ≈ 36.5 cm

·   9.45 inches (width) ≈ 24 cm

·   1.50 inches (height) ≈ 3.8 cm

·   8.38 lbs – 3.8Kg

Usage strap

The package includes a convenient strap for using the MEFF M2-PRO device

Insert the fixing accessories as shown in the photo:

Insert the two ends as shown in the photo:

Wear the shoulder strap as shown in the photo:

⫿⫿⫿ MEFF

Thank you for choosing MEFF M2-PRO. Our company is committed to providing high-quality products and customer service to support you every step of the way. Your satisfaction is our priority, and we are ready to offer professional advice and support. For further information, assistance, or updates, please visit our website www.meffproduction.com. We remain at your complete disposal.