

## MEFF M2 -PRO SPECTRUM ANALYZER

**The MEFF M2-PRO Spectrum Analyzer is a high-performance portable TSCM device that offers advanced spectrum analysis capabilities up to 24 GHz.**

It is designed for both professional and demanding users, combining accuracy, speed and a robust feature set to meet the challenges of signal-intensive environments. The M2-PRO is designed to meet a variety of signal detection and spectrum management needs. It is constructed from durable aluminum alloy, making it lightweight yet rugged, and features the latest technology to ensure accuracy, durability and versatility.

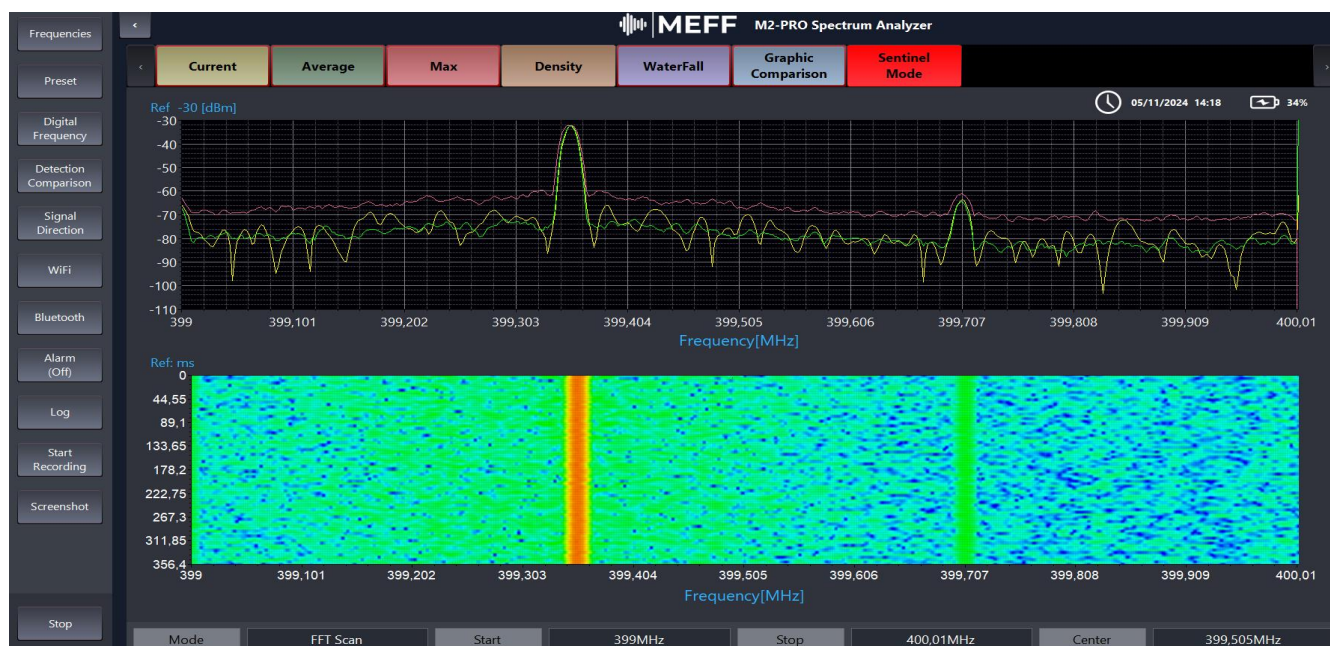


With its AI-enhanced capabilities, ultra-wide frequency coverage and intuitive user interface, the M2-PRO delivers unmatched performance for Technical Surveillance Countermeasures (TSCM), RF analysis and electronic threat detection.

Whether protecting critical infrastructure, sensitive information, or advanced spectral analytics, M2-PRO provides the tools and security needed to quickly and effectively detect and neutralize illicit electronic surveillance threats.

## MEFF M2-PRO Main Features:

- Detects a wide frequency range: Scans from 100 Hz to 24 GHz with microsecond-level scan speeds.
- 13-inch Full HD touchscreen: Ensures ease of control and clear visual representation of detected signals.
- Customized spectrum monitoring: Allows selection or exclusion of EU and US frequency bands.
- Frequency comparison and change detection: Enhances monitoring accuracy and responsiveness.
- Direction locating function: Accurately pinpoints the location of signal sources.
- Wi-Fi and Bluetooth detection: Provides detailed MAC address and manufacturer information.
- AirTag recognition: Enhances security by identifying AirTag devices.
- Real-time logs with alarm functions: Notifies users of anomalies as they occur.
- Detailed reporting capabilities: Enables generation, downloading, and sharing of comprehensive reports directly from the device.
- Accurate signal strength measurement: Facilitates better analysis and validation of detected signals.
- Constant readiness monitoring: Continuously tracks specific triggers or conditions.
- Supports analog and digital demodulation: Ensures versatile signal processing.
- Wired line signal detection: Identifies signals from 220V, 3.7/12V, and LAN connections.
- Online updates: Offers free updates for the first year to keep the device current with new features and capabilities.
- Remote control functionality: Allows full operation from any PC worldwide when connected to the Internet.
- Portable and durable design: Housed in a sturdy aluminum alloy enclosure, providing both durability and ease of transport.



<b>Specifications</b>	
<b>RF SYSTEM</b>	RF up to 24Ghz
Frequency	100Hz to 24GHz
Displayed Average Noise	Displayed Average Noise Level (DANL) (27KHz resolution bandwidth)
Without preamplifier	- 140dbm
With preamplifier	- 140dbm
Scanning speed	Up to 6.2 (820 ms) - from 6 to 24 Ghz (maximum speed 250 ms)
Attenuation	Automatic
<b>Sound system</b>	
demodulation	Analog domod: AM, FM, PM; ASK;FSK;PSI Digital demo: MSK,GMSK,BPSK,QPSK,8PSK I&Q data, EVM, Eye diagram, Constellation
Filter Size:	Specification for Analog demodulation Demod Frequency range: AM demodulation index range: FM demodulation deviation range: PM demodulation phase range: 10Hz~50KHz 5~95% 100Hz~100KHz-160~+160 degree ASK data rate: FSK (GFSK)data rate: PSK data rate: 50b/s to 50Kb/s 50b/s to 50Kb/s 50bps to 50Kbps
Built-in speakers	Yes
<b>Video system</b>	
Formats: NTSC, PAL, SECAM	the device does not have video modulation in these frequencies because now all devices transmit encrypted digital bands and it is not possible to see the decrypted video in these frequencies. Through graphical audio demodulation we can see if there is a video signal using the constellation graph and others shown above. (graphic representation of the face)
<b>Antenna system</b>	
Integrated auto-switching antenna system	yes
Frequency	The device has 3 antennas offering the range from 10 kHz to 24 GHz + probes for coverage from 100Hz to 1KHz
Expansion: Aux control port for MPP	has 1 HMDMI - 1VGA - 4 USB - 1 AUX input and output
<b>User Interface</b>	
Integrated touch screen with 8.4" display	Integrated touch screen with 13" display

Function keys and rotary optical encoder	yes
USB port (Type A): for peripherals (keyboard, mouse) Ethernet port for VNC remote access	yes
<b>Power supply</b>	
Universal power supply included: 100-240 VAC, 50-60 Hz. European plug	Universal power supply included according to the country of destination
Battery	fixed battery with 7 hour autonomy
<b>External storage capacity</b>	
Memory	128 GB fixed internal memory
USB-A port	possibility of connecting 256 GB USB stick (not included)
<b>Mechanical</b>	
Dimensions	36.50 cm x 24 cm x 3.8 cm
Unit weight with battery	Unit weight with battery: 3.8 kg
Case weight with drive and accessories	Case weight with unit and accessories 5 kg
Operating temperature	Operating temperature: -10 C to +50° C

#### Frequently Asked Questions about MEFF M2-PRO

##### What is the MEFF M2-PRO?

The MEFF M2-PRO is a high-performance portable spectrum analyzer designed for advanced signal detection and analysis. It is used by professionals to monitor, identify and manage signals over a wide frequency range.

##### What is the frequency range of the MEFF M2-PRO?

The MEFF M2-PRO detects signals over a wide frequency range, from 100Hz to 24GHz, providing comprehensive coverage for various signal types, including low and high frequency bands.

##### What is the Direction Find function and how does it work?

Direction Find allows users to precisely locate the location of signal sources. This capability is especially useful for identifying signal sources in complex environments, improving efficiency in spectrum analysis.

##### Can all spectrum analysis activities be performed exclusively on the device?

Absolutely. From frequency scanning to signal detection, report generation and log access, all tasks can be performed independently on the MEFF M2-PRO.

##### Can I generate reports directly on the MEFF M2-PRO without a laptop?

Yes, the device allows users to generate, view and download detailed technical reports directly from its interface, eliminating the need for external devices.

##### What is the purpose of the Wire Analyzer function?

The Wire Analyzer function allows the detection of signals on wired lines, including 220V, 12V-3.7V and LAN connections. Using the supplied probes, it identifies potential threats or irregularities on these lines

### **Can I customize spectrum monitoring with the MEFF M2-PRO?**

Yes, MEFF M2-PRO allows users to select or exclude EU and US frequency bands, enabling customized spectrum monitoring tailored to specific regional or operational requirements.

### **How does MEFF M2-PRO support remote access?**

The device offers optional remote control and access capabilities. When connected to the Internet, it can be used from any PC in the world, allowing real-time monitoring, diagnostics and troubleshooting.

### **Can the MEFF M2-PRO detect Wi-Fi and Bluetooth signals?**

Yes, it detects Wi-Fi and Bluetooth signals, providing detailed information such as MAC addresses, manufacturer details, and location tracking via directional function.

### **Can the MEFF M2-PRO detect AirTag devices?**

Yes, the MEFF M2-PRO is equipped to detect AirTag devices. This capability allows users to locate AirTags in their surroundings, providing an effective solution to identify potential tracking devices and improve personal or operational safety.

### **Who is the MEFF M2-PRO designed for?**

This device is intended for professional and demanding users, including TSCM (Technical Surveillance Countermeasures) experts, who are looking for high-performance spectral analysis

### **What reporting and logging features does MEFF M2-PRO provide?**

The MEFF M2-PRO includes advanced reporting and logging features, such as real-time logs to monitor activity, alarm functions to alert users of anomalies, and options to generate, download and share detailed technical reports.

### **Does MEFF M2-PRO provide real-time logs and alerts?**

Yes, MEFF M2-PRO offers real-time logs with built-in alarm functions. These features alert users to anomalies as soon as they occur, ensuring early awareness and the ability to respond effectively to potential problems.

### **Does MEFF M2-PRO support demodulation?**

Yes, it supports both analog and digital graphic demodulation, allowing for in-depth signal analysis across a range of signal types.

### **Is MEFF M2-PRO suitable for continuous monitoring?**

Yes, the MEFF M2-PRO supports a standby mode, known as Sentinel Mode. In this state, the device remains in standby or actively monitors its environment for specific triggers or conditions, ensuring constant readiness. This feature enables continuous monitoring and real-time response to specific triggers or conditions.

### **What is included in the MEFF M2-PRO package?**

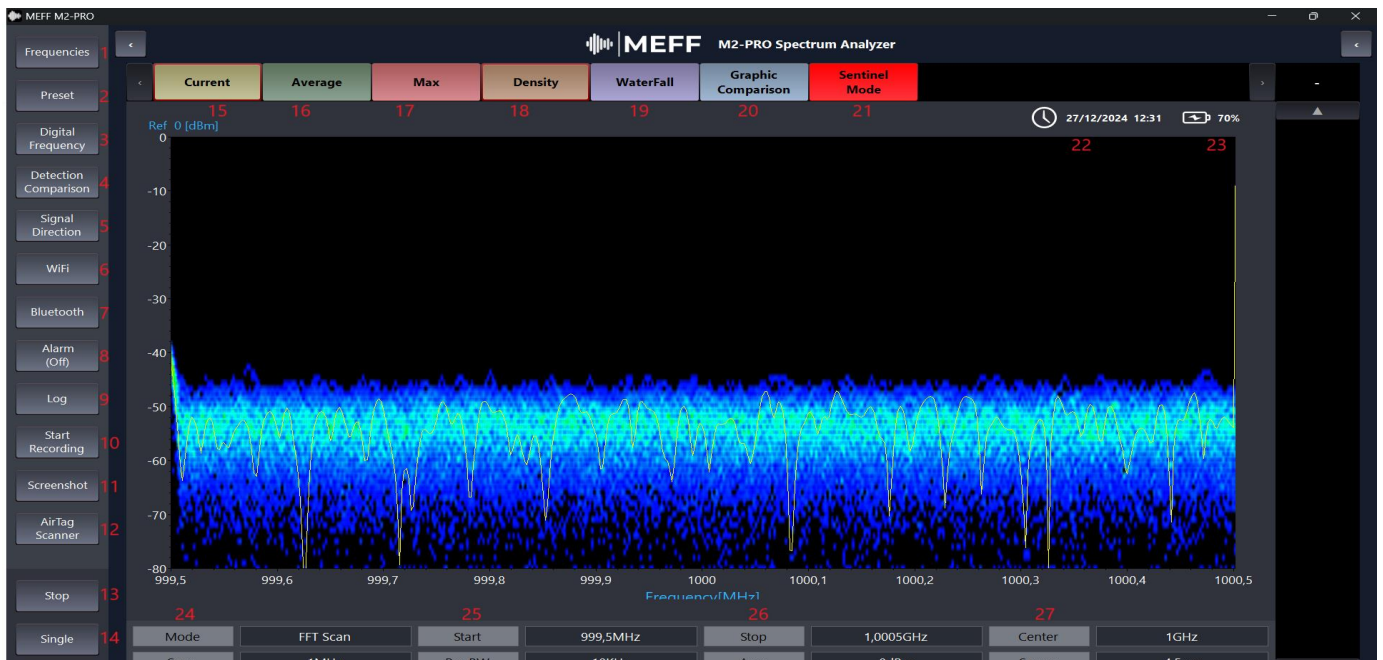
The MEFF M2-PRO package includes the spectrum analyzer, a custom military-grade carrying case, three antennas, a shoulder strap, a power charger, probes for 220V, 12V-3.7V and LAN, a LAN splitter with cables and a user manual. This set provides everything you need for professional spectrum analysis and signal detection.

Spectrum analyzer is a crucial tool for preventing illegitimate surveillance and safeguarding information. Its ability to analyze signals in real time and provide detailed information enables TSCM analysts to operate effectively, thus contributing to maintain a safe environment.



1. Battery charging input
2. 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

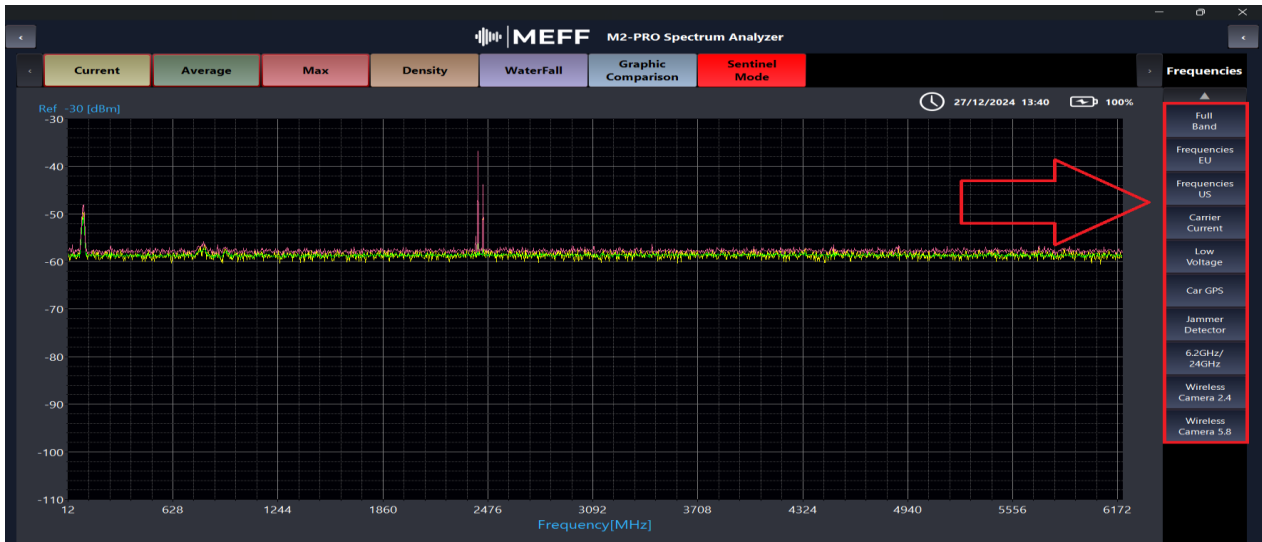
## MAIN SCREEN



1. **Frequency:**scan all digital, analog and wired frequencies
2. **Presets:**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:**Analog and digital signal direction search
6. **WIFI:**Create lists of all wifi signals with details of each device and location possibilities
7. **Bluetooth:**Creates lists of all Bluetooth signals with device details and location capabilities
8. **Alarm:**Allows you to 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 pictures of your desktop
12. **Air Tag:**Air Tag and BLE device detection with device list and detection option
13. **Stop:**Stop chart execution
14. **Single:**
15. **Current:**Real time signal
16. **Average:**
17. **Max:**Signal persistence
18. **Density:**Signal Density
19. **Waterfall:**Waterfall chart
20. **Graphic Comparison:**Waterfall and Classic Chart Comparison
21. **Sentinel mode:**automatic sentry mode where all signals will be recorded in the report
22. **Date and time:**Date and time display
23. **Battery status:**Remaining battery percentage
24. **Mode and Span:**scan mode display 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 scanning speed

## Frequency Mode

In this mode we can detect all RF frequencies up to 24 GHz and all digital frequencies such as GSM LTE 2G 3G 4G 5G Wifi Bluetooth we also have the ability to specifically analyze wired devices in low and high voltage, GPS, Jammer and we have a specific section for high frequencies.



Full Band Mode: detection of analog and digital frequencies from 12mhz to 6.2 Ghz EU

Frequencies: detection of all mobile and digital bands in European frequencies US

Frequencies: detection of all mobile and digital bands in American frequencies

Carrier Current: Detection of audio signals present in the high voltage electrical system

Low Voltage: Detection of signals present in low voltage such as LAN cables, Telephone cables and 3.7v-12v

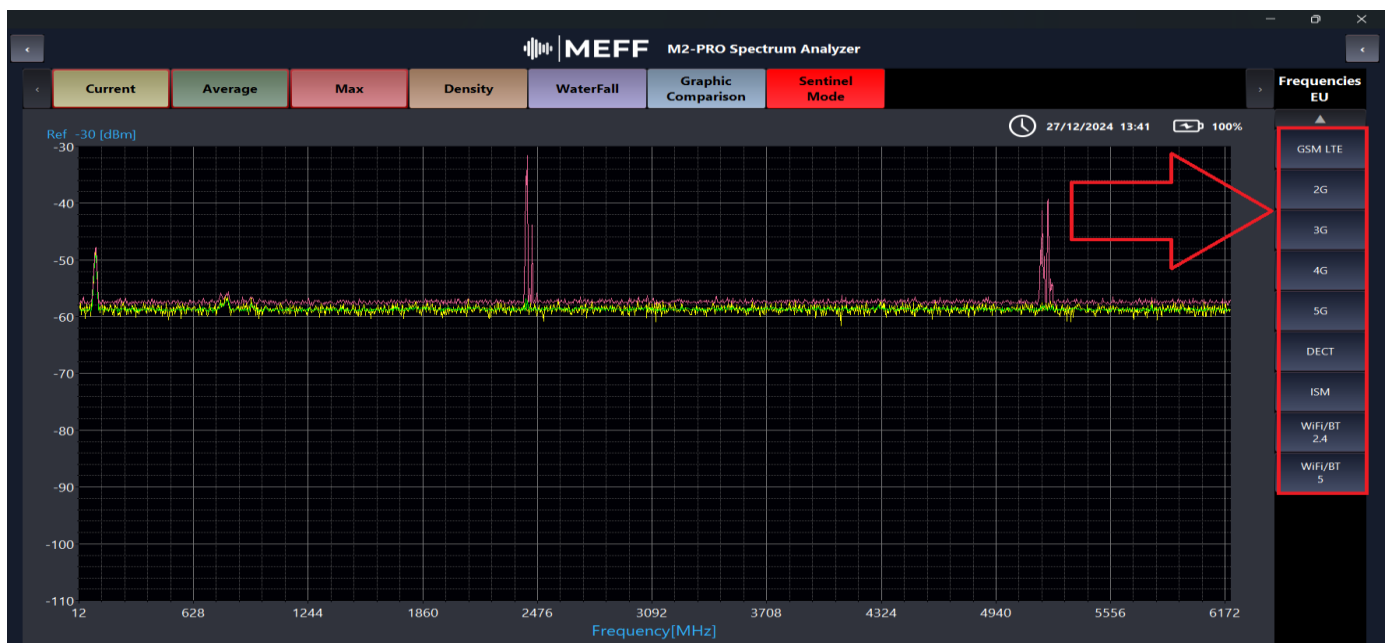
Car GPS: Detection of GPS frequencies such as GSM-LTE-2G-3G-4G-5G

Jammer Detector: Detection of jammer frequencies 6.2 GHz /

24 GHz: Detection of high frequencies up to 24 GHz

Wireless Camera 2.4: detection of wireless frequencies used by micro cameras via 2.4Ghz radio

Wireless Camera 5.8: detection of wireless frequencies used by micro cameras via 5.8Ghz radio





## Examples of findings:

Carrier Current: Detection of audio signals present in the high voltage electrical system

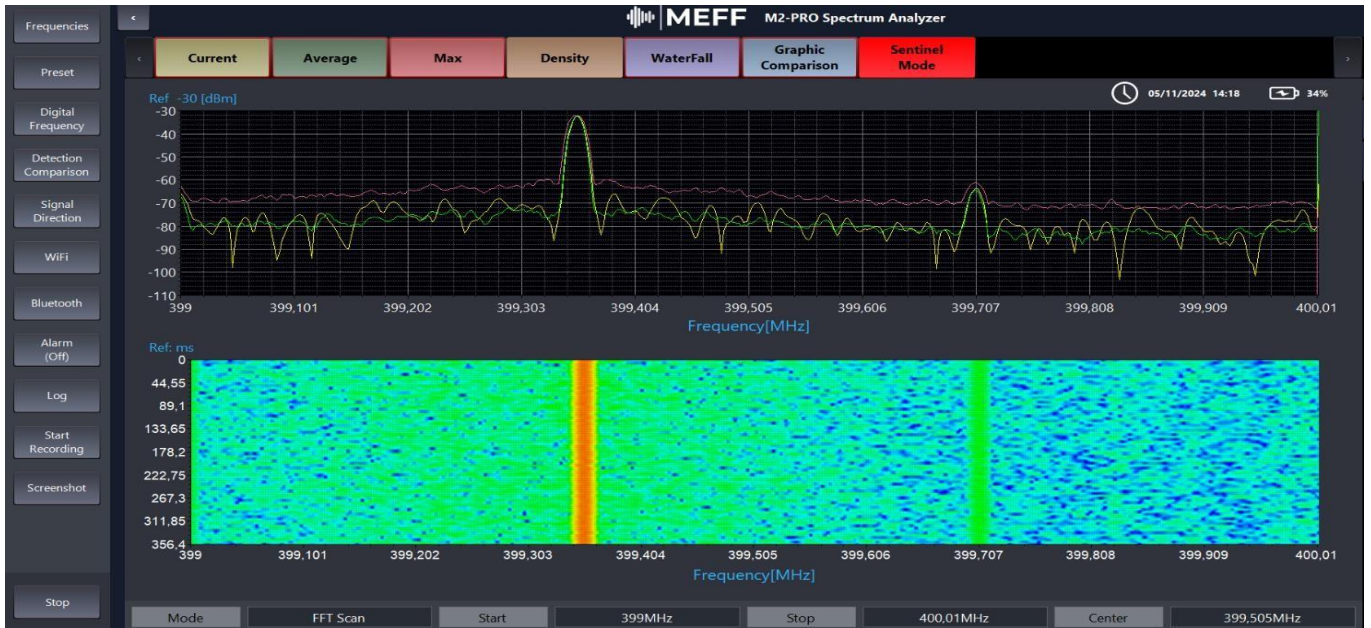
Low Voltage: Detection of signals present in low voltage such as LAN, Telephone and 3.7v-12v cables

Car GPS: Detect GPS frequencies such as GSM-LTE-2G-3G-4G-5G

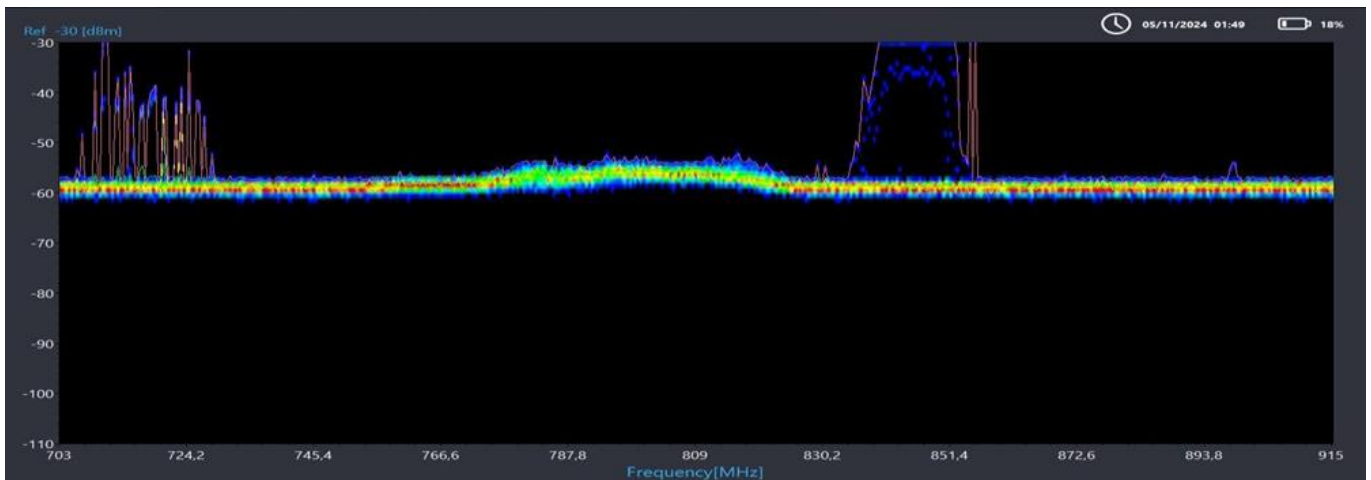
Jammer Detector: detection of jammer frequencies of disturbers



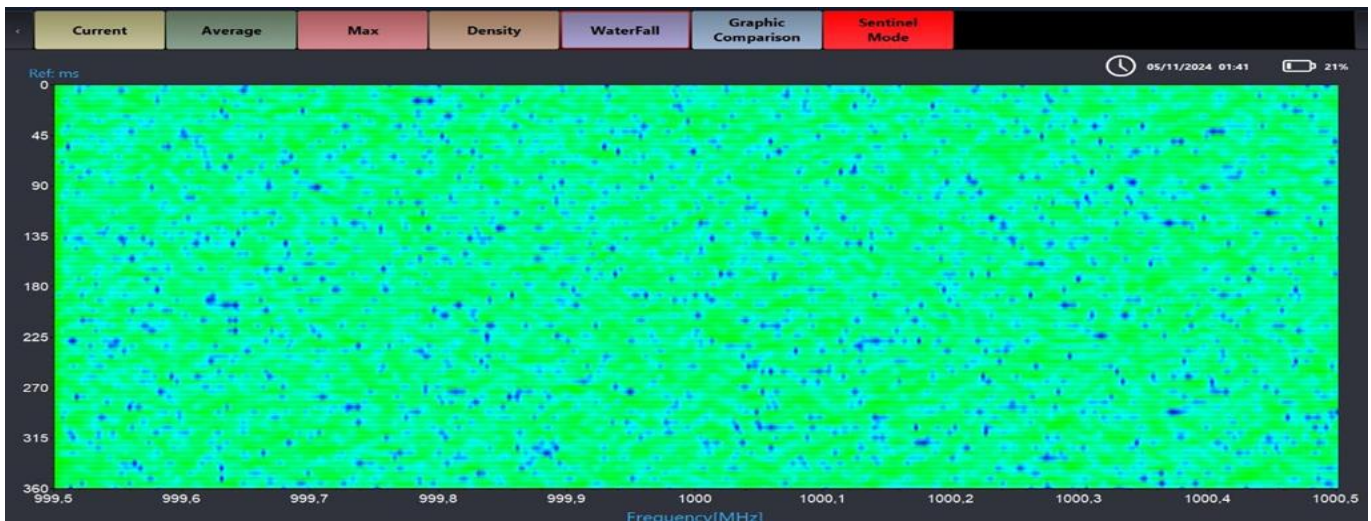
## Chart Comparison



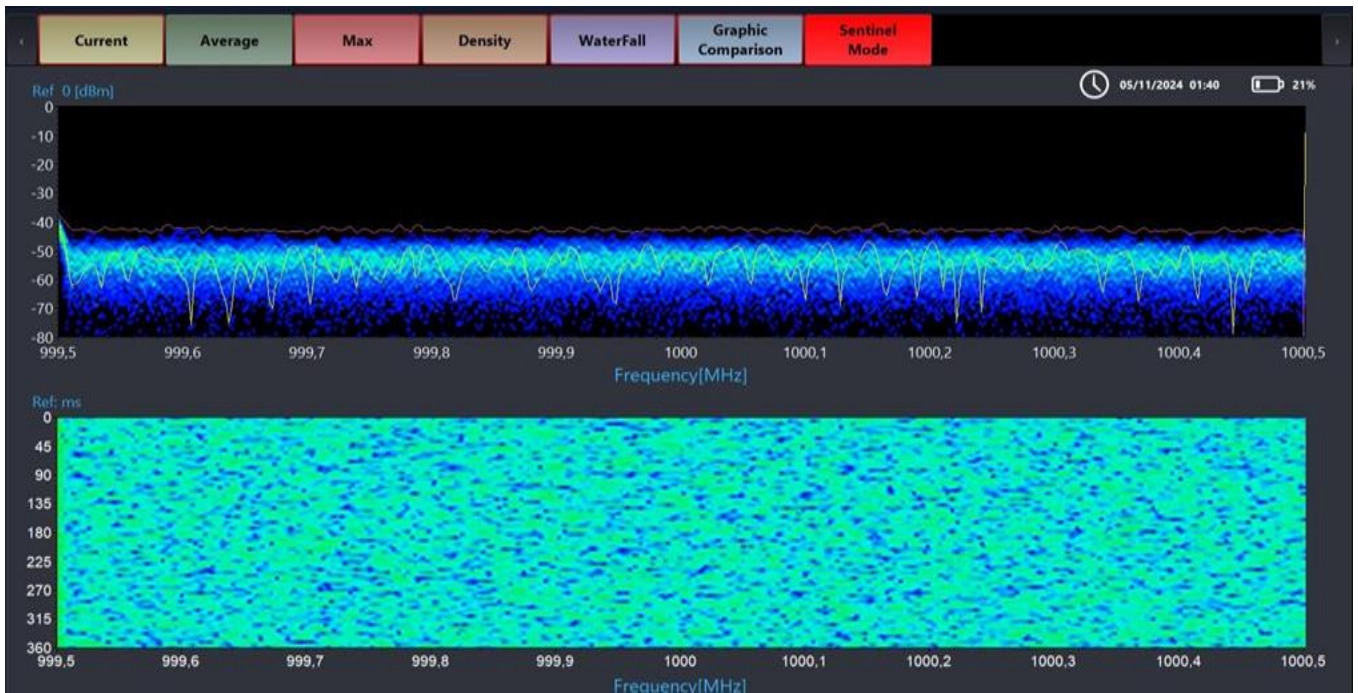
## GSM - LTE signal detection



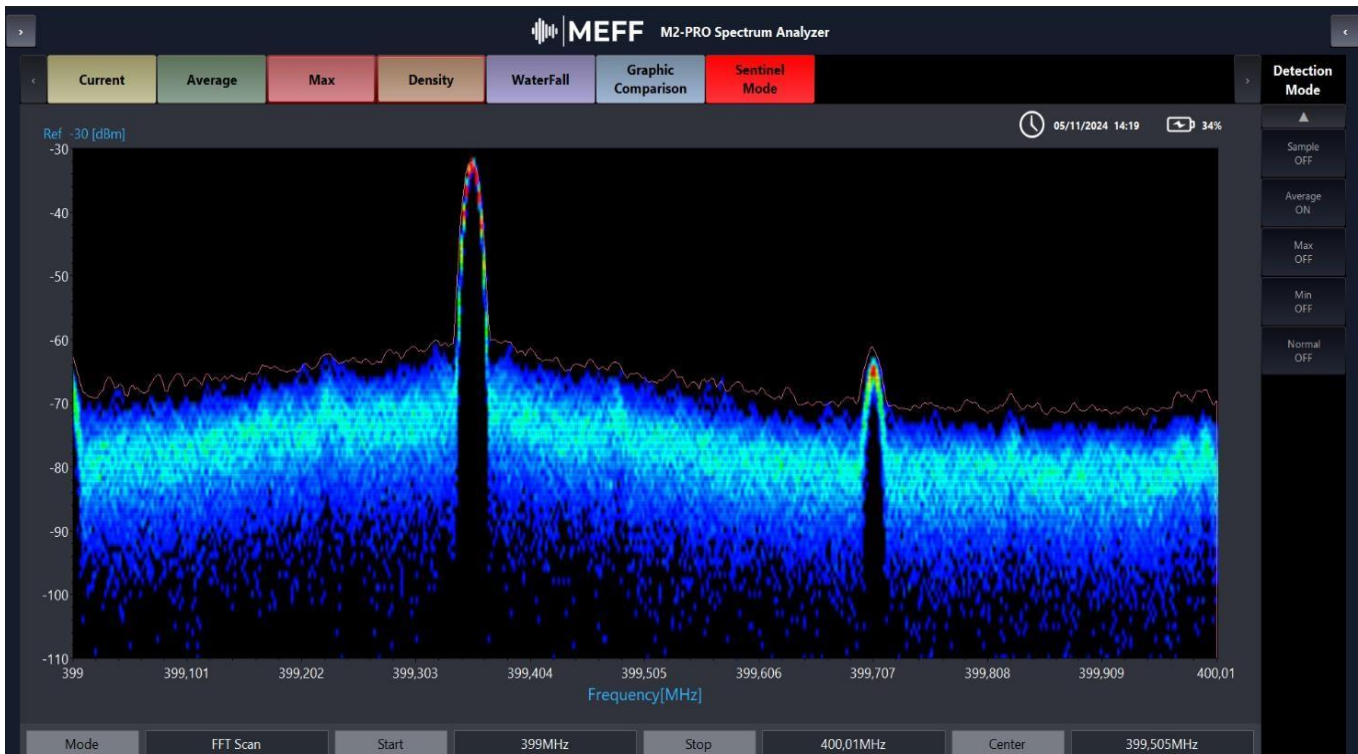
## Waterfall Graph



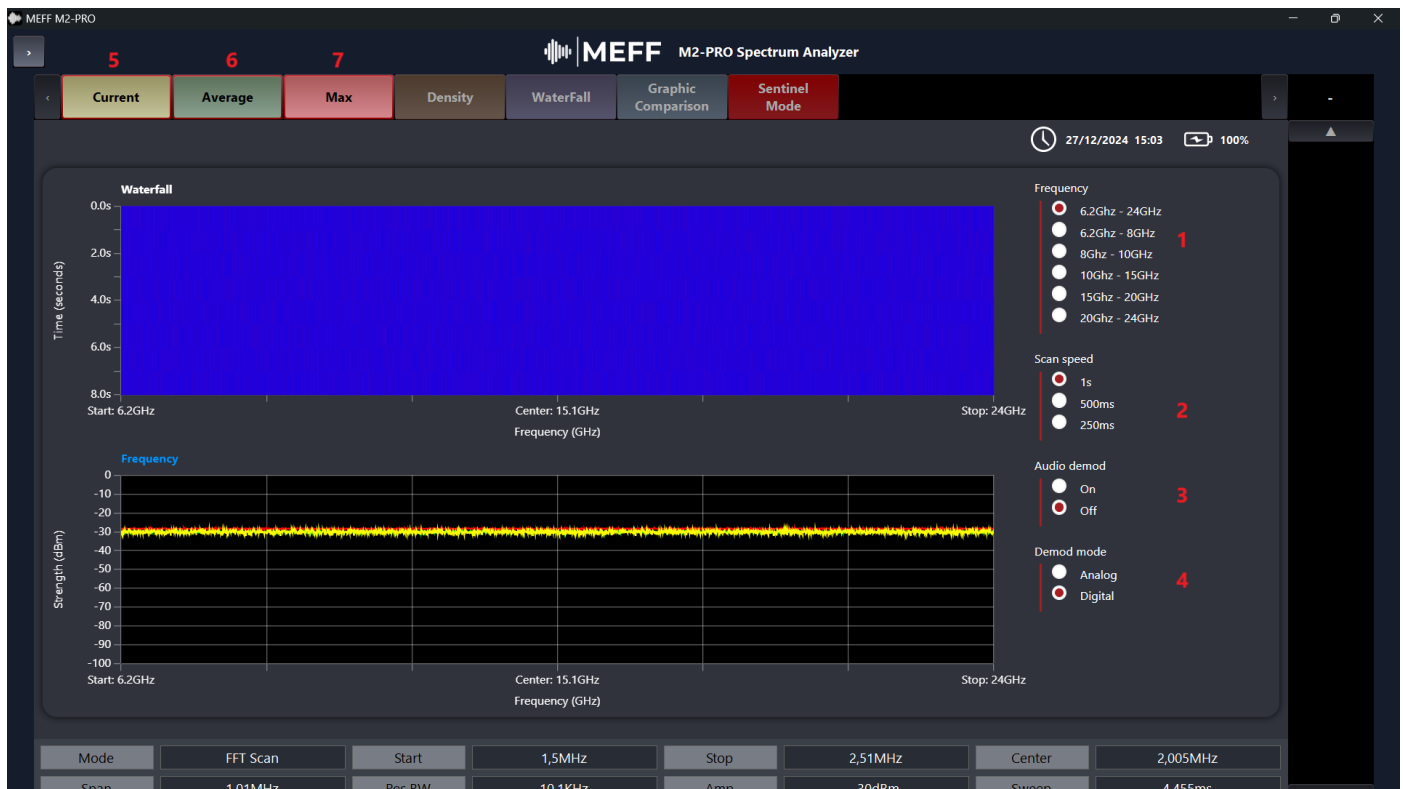
## Density graph compared with waterfall



## Signal Density Persistence Graph



## Detection from 6.2GHz to 24GHz



1. Frequency division from 6.2 GHz to 24 GHz
2. Scanning speed
3. Analog and digital audio demodulation

The 6.2GHz to 24GHz frequency sensing function is typically used in various fields, such as communications, radar, surveillance and measurement applications.

It covers a wide range from 6.2 GHz to 24 GHz, useful for detecting signals in different bands, such as those used in wireless communications and radar.

### High Sensitivity:

The ability to detect weak signals, even in the presence of background noise, is critical for accurate analysis.

### Spectral Analysis:

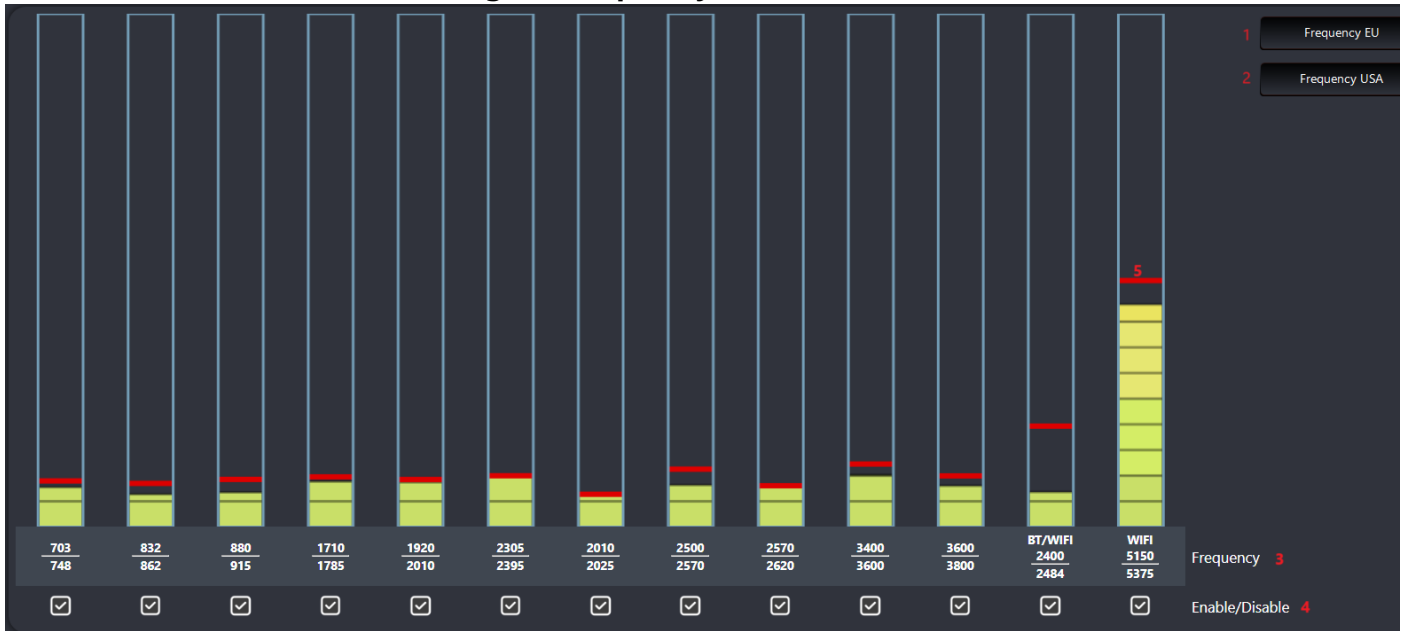
It allows you to perform detailed spectral analysis, visualizing signal energy at different frequencies to identify potential interference or sources of unwanted signals.

### Applications:

Used in communication systems (Wi-Fi, satellites), telecommunications, defense, meteorology (weather radar) and scientific research.

The 6 GHz to 24 GHz range is crucial and diverse, with numerous uses ranging from everyday communications to more technical and scientific applications. Specific bands are regulated by government agencies to prevent interference and ensure efficient use of the spectrum.

## Digital Frequency Function



1. European Frequencies
2. US Frequencies
3. Frequencies set automatically
4. Single disabling of each frequency
5. Indication of the maximum peak detected (it will be visible until it is exceeded)

Digital Band Function is an advanced tool for managing mobile frequency bands from GSM LTE 2G 3G 4G 5G WIFI and Bluetooth, designed to improve the effectiveness of mobile monitoring and communications. This function allows users to select specific bands for EU and US regions, adapting to different spectrum regulations in each geographical area.

Users can easily view the available bands and choose which region they would like to analyze. A key aspect of this feature is the ability to exclude individual bands, allowing you to avoid unwanted interference and focus on signals of interest.

This exclusion option improves the reception quality and the effectiveness of detection operations. With the intuitive user interface, the Digital Band Function offers customization that optimizes the performance of the device, allowing a targeted approach in surveillance and communication operations.

Due to its flexibility and adaptability, this function is essential for TSCM analysts and telecom professionals, ensuring more secure communications and compliance with local regulations. In short, the Digital Band Function is a key element to improve the management of frequency bands in various application contexts.

### Key Benefits:

**Flexibility:** The ability to select and exclude specific bands enhances the versatility of the device, adapting to various operational needs.

**Efficiency:** Focusing on relevant bands reduces background noise and improves the quality of information received.

**Regulatory Compliance:** Easily comply with local regulations.

## Detection Comparison Function



The frequency comparison function allows you to analyze and compare signals received from multiple rooms and over multiple days, making it easier to detect anomalies and patterns over time. This function is particularly useful in surveillance and security contexts, where it is essential to monitor the presence of suspicious signals or interference in different environments.

Users can select the desired rooms and specify the days to compare, obtaining a clear visualization of the frequencies detected in each context. With detailed graphs and reports, it is possible to identify significant variations in signals over time and space.

The feature also supports the generation of comparative reports that highlight the differences between rooms and detection times, helping to identify any unauthorized surveillance devices. This tool is essential for TSCM analysis, as it allows for proactive and systematic monitoring of frequencies.

In summary, the frequency comparison feature provides an analytical and organized approach to improving security, ensuring that suspicious signals are detected and addressed promptly. The ability to compare data across multiple rooms and days is a significant advantage in maintaining safe and secure environments.

### **Main strengths of the frequency comparison function:**

**Detailed Analysis:** Provides in-depth insight into signal variations over different periods and environments.

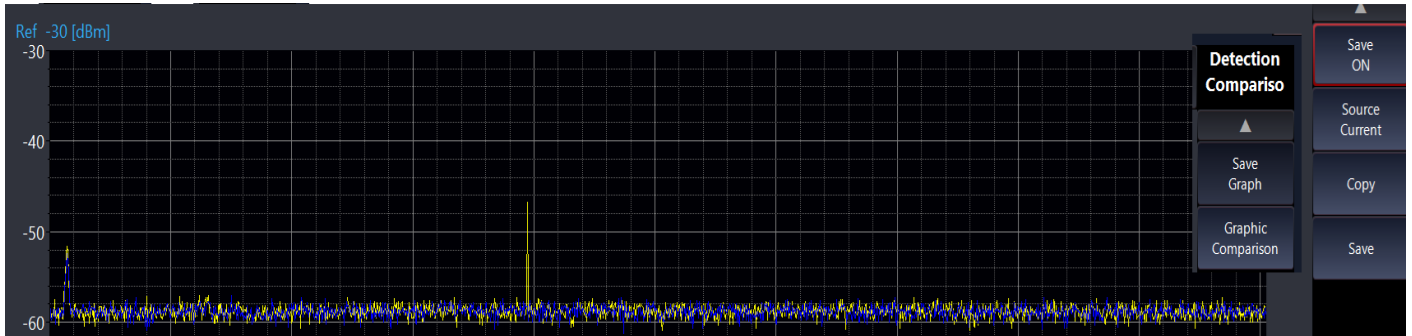
**Anomaly Identification:** Facilitates the detection of suspicious signals or interference in time, helping to uncover unauthorized surveillance devices.

**Historical Monitoring:** Store and compare historical data, improving your forecasting and response capabilities.

**Visual Reports:** Offers clear graphs and reports that make data interpretation easy.

## Saving frequencies to compare:

- Click on Save Graph
- Click ON
- Select source (source current is recommended)
- Click on Copy
- Save the frequency by clicking Save and naming it
- You can make as many copies as you need

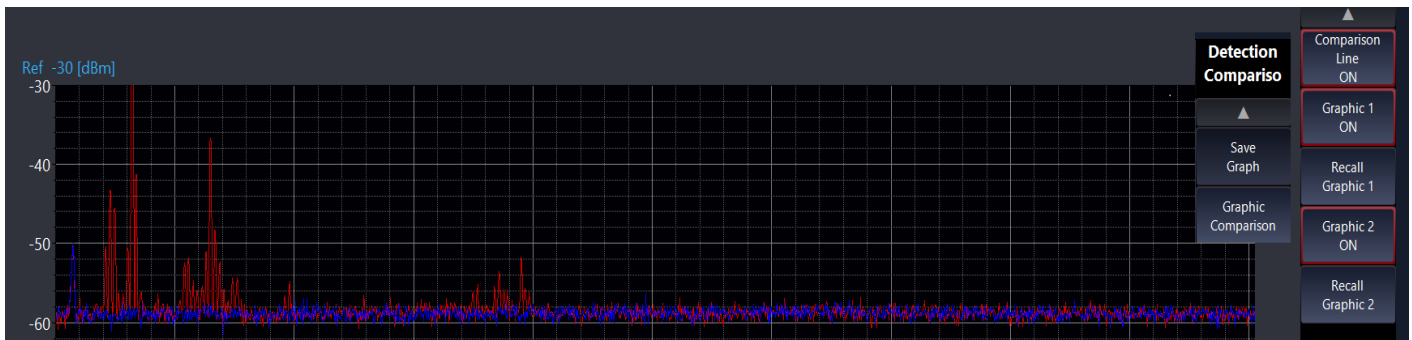


## Comparison of saved frequencies:

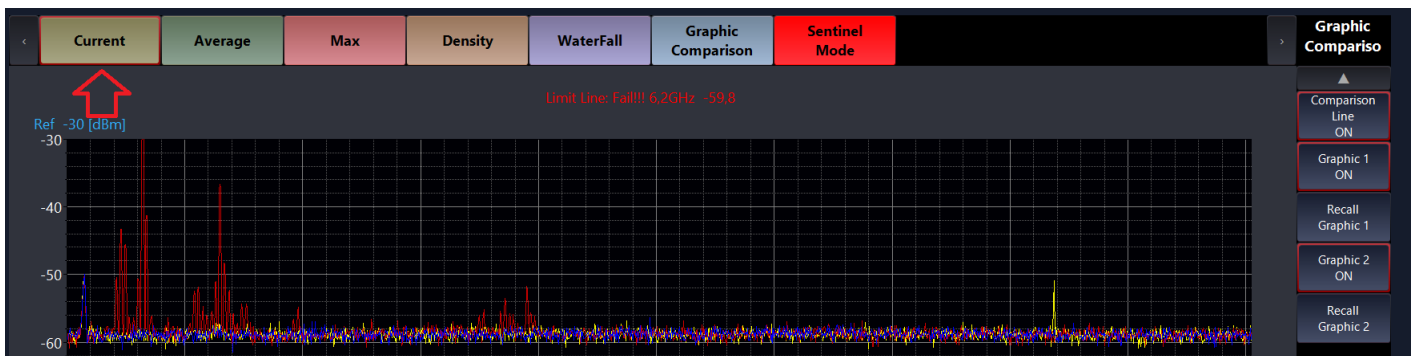
Click on Graphic Comparison

Click on ON

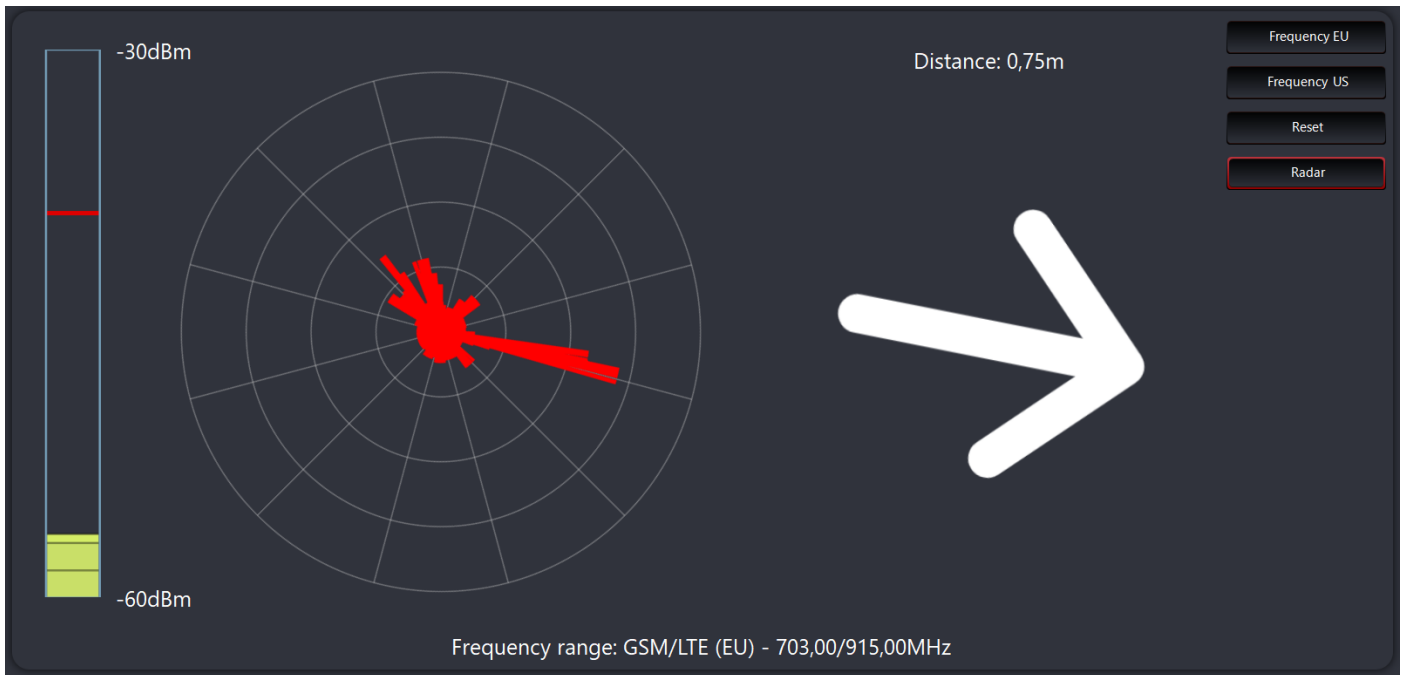
Turn ON Graphic 1 and Graphic 2 (we can compare two frequencies at once) Click on Recall Graphic 1 and recall the previously saved and named frequency Click on Recall Graphic 2 and recall the previously saved and named frequency The two frequencies will appear simultaneously



You can also click on Current to see the Real Time detection compared with the two saved frequencies



## Directional Function



The direction finding function using a digital signal radar is based on several key components. Here is a description of how it works:

### **Directional Radar:**

It uses directional antennas to capture digital signals. The direction of the antenna is crucial to determining where the signal is coming from.

### **Arrow indicating position:**

A graphical representation on the radar display shows an arrow that moves according to the direction of the received signal. When the antenna is oriented towards the signal, the arrow points directly towards it.

### **Power Bar dBm:**

This bar displays the signal strength in decibel milliwatts (dBm). A higher value indicates a stronger signal. This information is essential for assessing the quality of the signal and its distance.

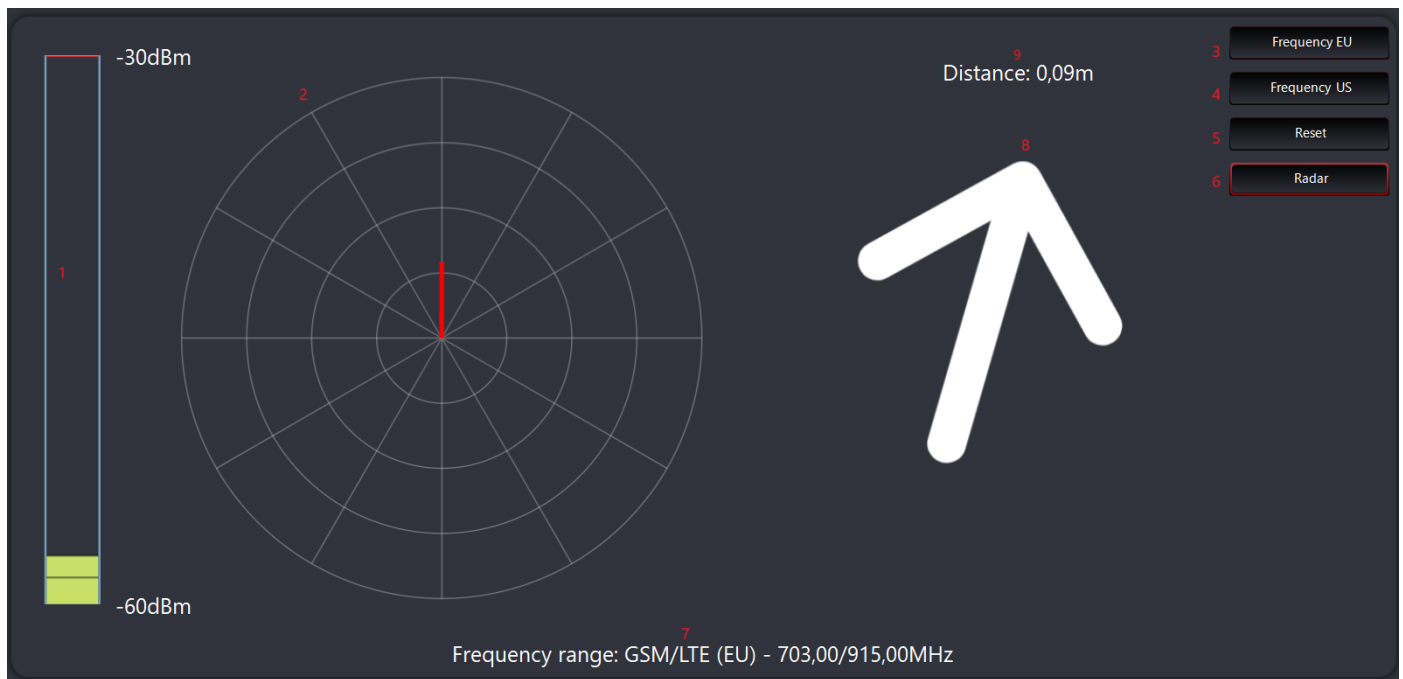
### **Real Time Variation:**

As you get closer to the signal source, the signal strength is continuously monitored and updated. The strength bar changes in real time, reflecting the change in signal strength as you get closer or further away from the source.

### **Interaction between Arrow and Power:**

As you get closer to the signal, not only does the strength increase, but the arrow aligns more and more in the correct direction, providing a clear visual indication of where the signal source is located.

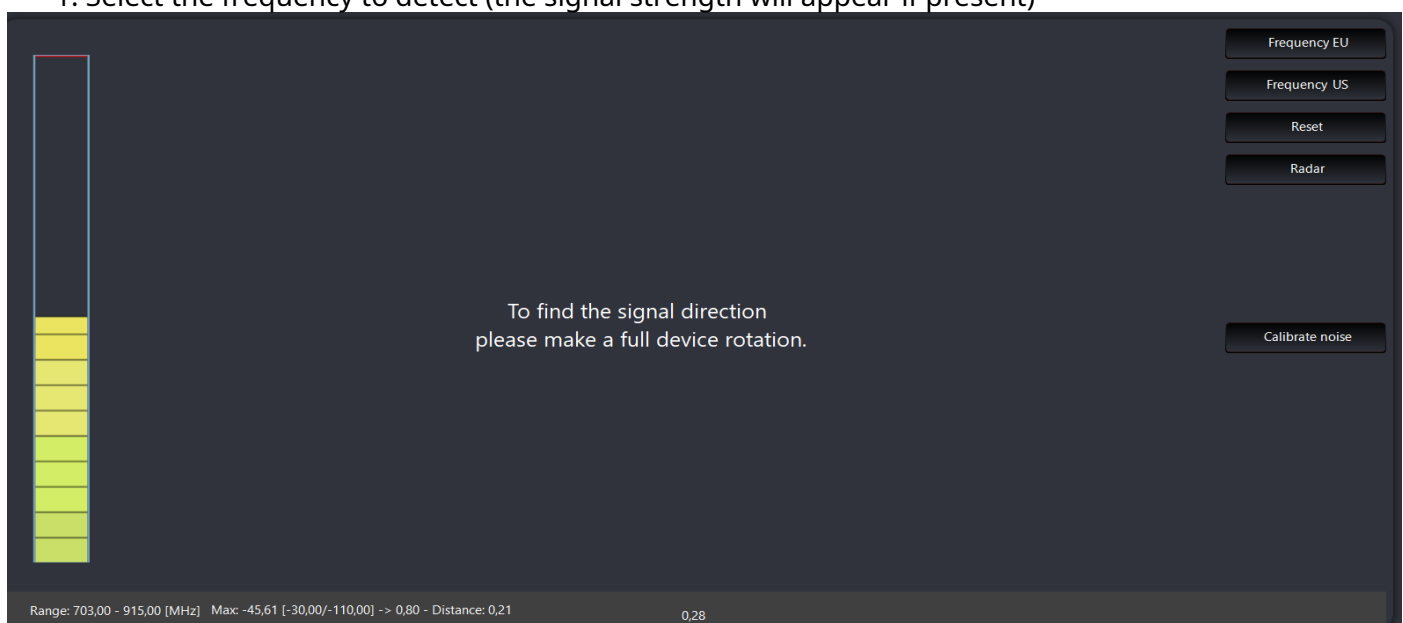




1. Selected signal dbm power detection bar
2. Signal direction locating radar
3. Key to select EU digital frequency
4. Button to select US digital frequency
5. Reset to clear the radar and take a new detection
6. Radar to activate the function
7. Indicates the set detection frequency
8. Interactive arrow senses whether to indicate and guide in the location of the signal
9. Indicates the distance in cm of the detected signal

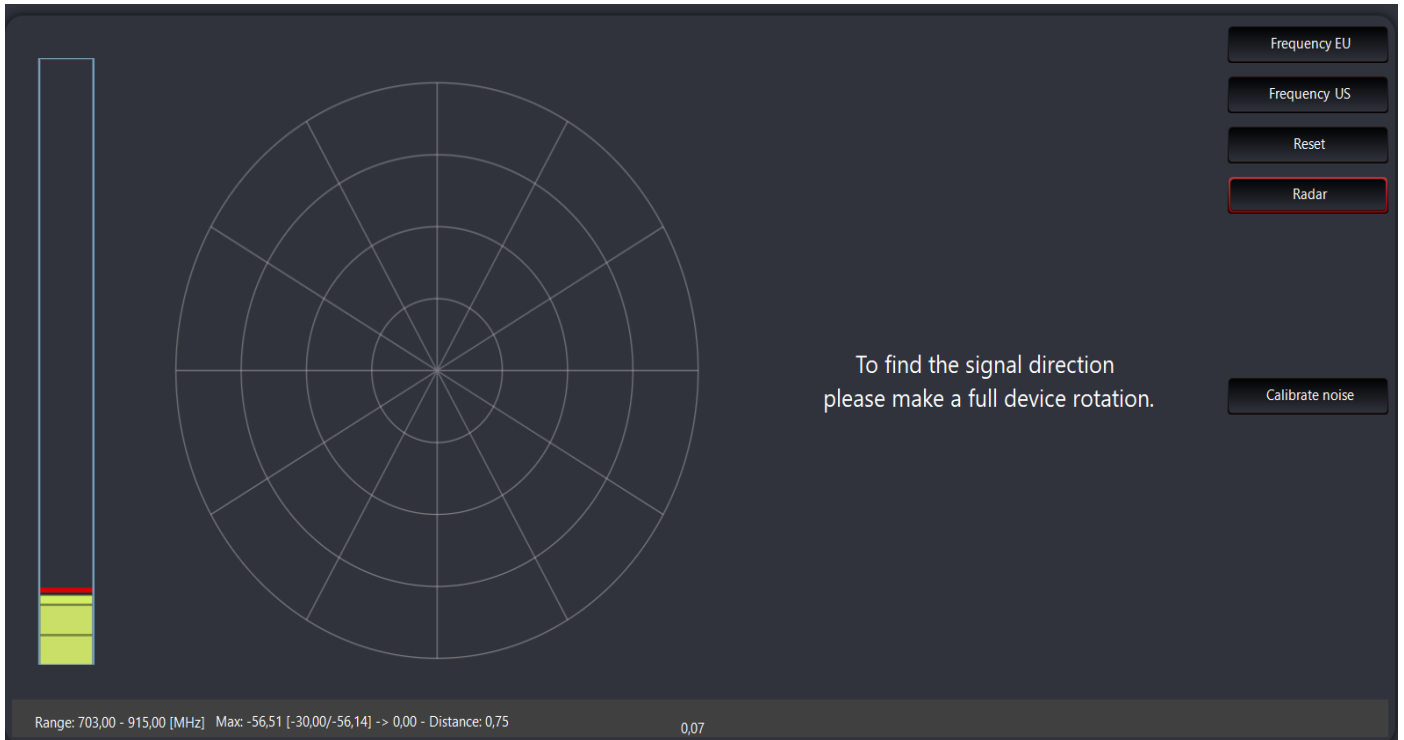
### Direction detection:

1. Select the frequency to detect (the signal strength will appear if present)

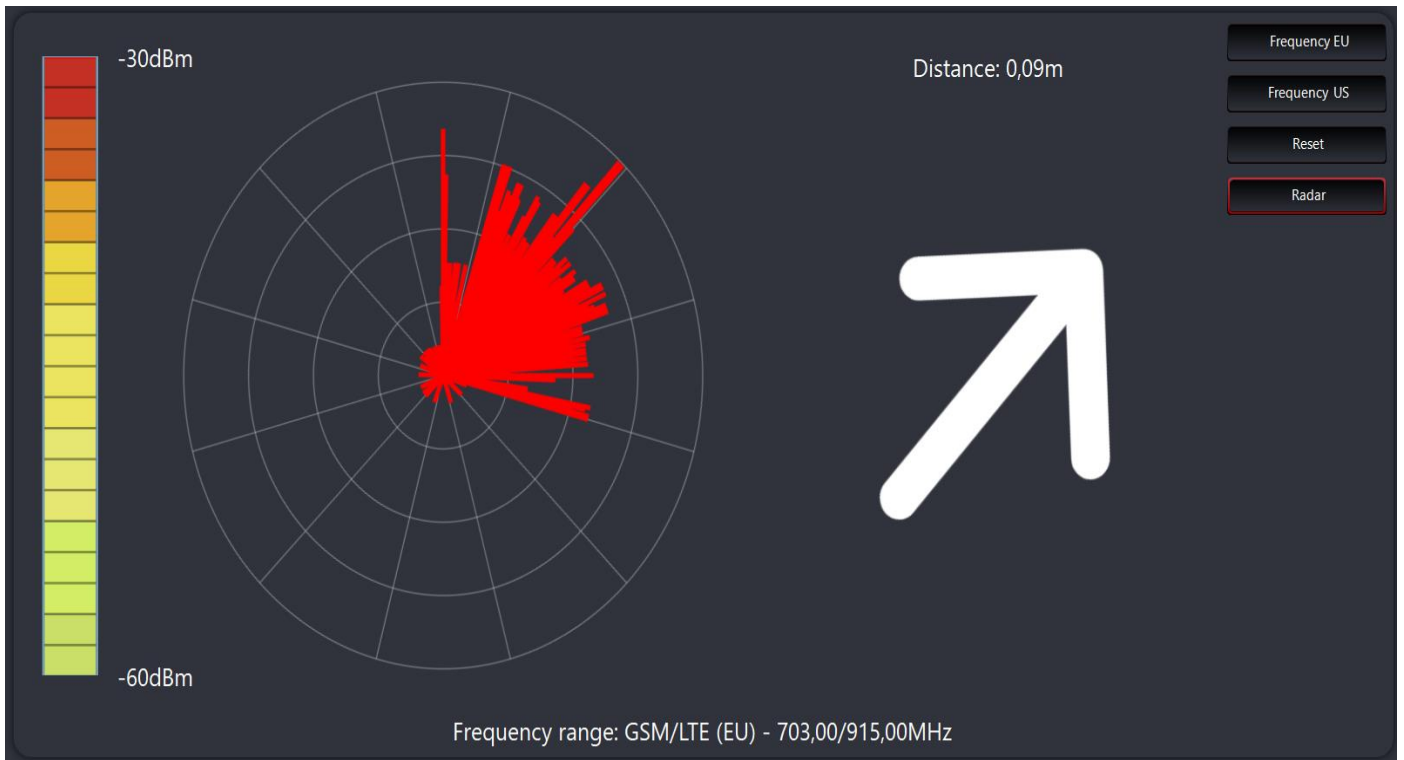


From the bar we can already understand if this signal is present in the environment we are monitoring

2. Press the radar button (the interactive 360° radar will appear)



3. Hold the M2-PRO device horizontally and rotate 360 degrees gradually
4. After performing the first 360° rotation the direction arrow will appear
5. Once we have the three values dbm bar – Radar – Arrow, gradually move towards the direction and we will see that these values update automatically until we arrive at the source of the signal having the dbm bar full and the red bar of the radar full to its maximum



## WIFI and Bluetooth detection function

The function of discovering individual WIFI and Bluetooth devices by running a list with detailed information is essential in TSCM.

This feature can provide detailed information about connected devices, including:

**Signal Strength:** Indicates the strength of the signal received by the device, useful for identifying the quality of the connection.

**MAC Address:** Each network device has a unique MAC address, which allows it to be uniquely identified within the local network.

**Manufacturer:** Through the MAC address, it is possible to trace the manufacturer of the device, as the first six characters of the MAC address identify the manufacturer.

**WIFI and Bluetooth localization:** by clicking on the network of interest you can open the frequency spectrum and find the source.

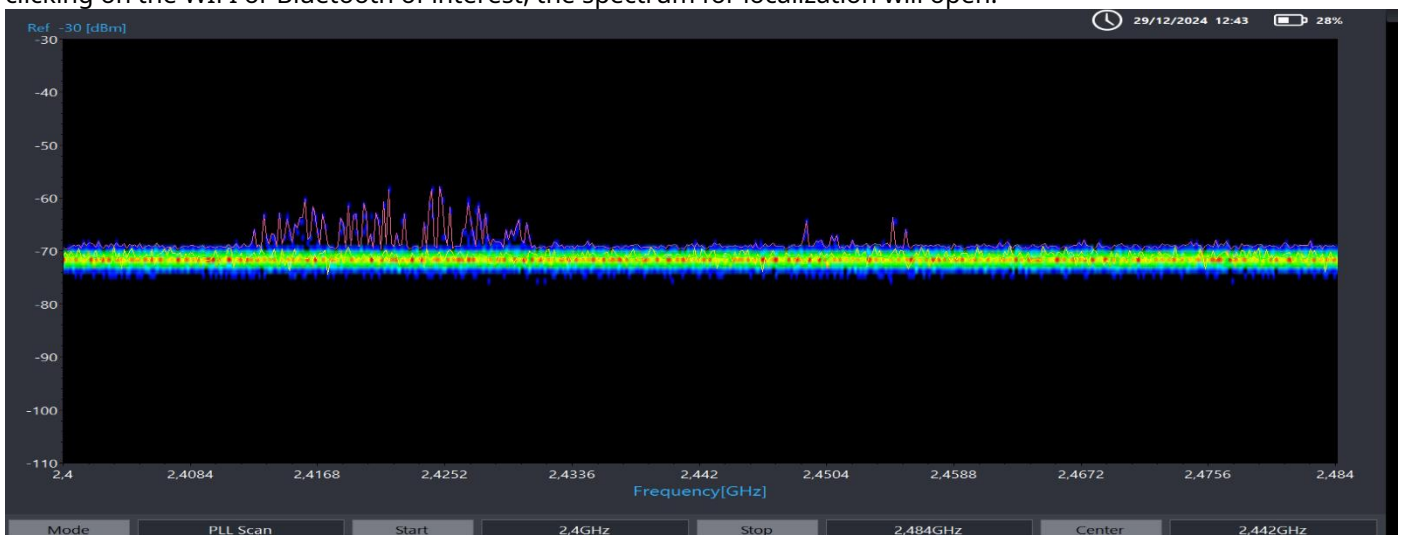
This feature is essential for managing and monitoring your environment for active threats.

The screenshot displays a list of detected devices with their respective details:

- Device 1:**
  - SSID: HONOR X8b
  - BSSID: 76:5A:6D:32:0C:C7
  - Manufacturer: (blank)
  - Signal: -57
  - Band: 2.4 GHz
  - Authentication: WPA2-PSK
- Device 2:**
  - SSID: TP-Link\_Extender
  - BSSID: 9C:A2:F4:CB:31:38
  - Manufacturer: TP-Link Corporation Limited
  - Signal: -80
  - Band: 2.4 GHz
  - Authentication: None
- Device 3:**
  - Name: TIM\_BOX
  - Mac address: F8:3B:1D:11:92:74
  - Manufacturer: Vantiva USA LLC
  - Device: AudioVideoSetTopBox (AudioVideoUnclassified)
  - Authenticated: False
  - Connected: False

### WIFI and Bluetooth detection:

By clicking on the WIFI or Bluetooth button, all available networks will appear with all associated information. By clicking on the WIFI or Bluetooth of interest, the spectrum for localization will open.



## AIR TAG and BLE device detection

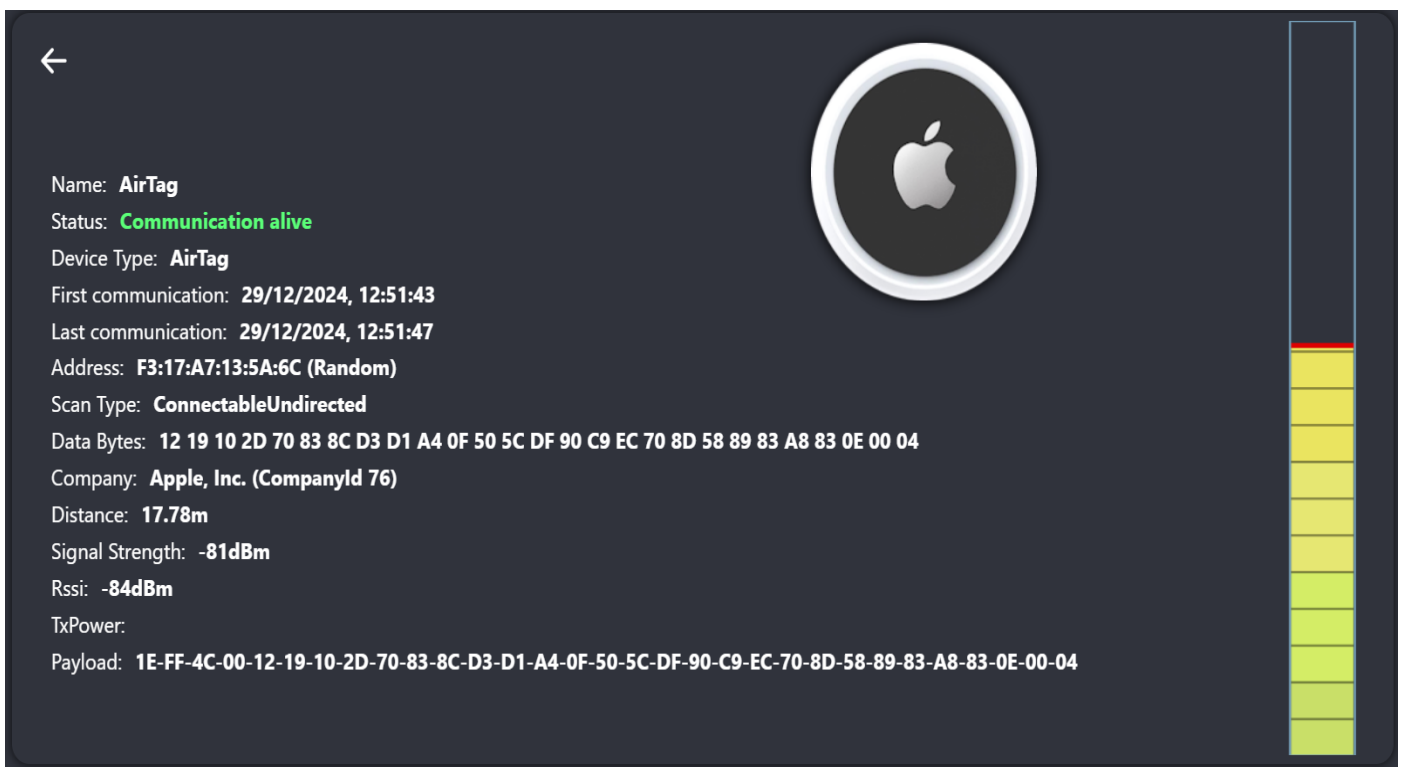
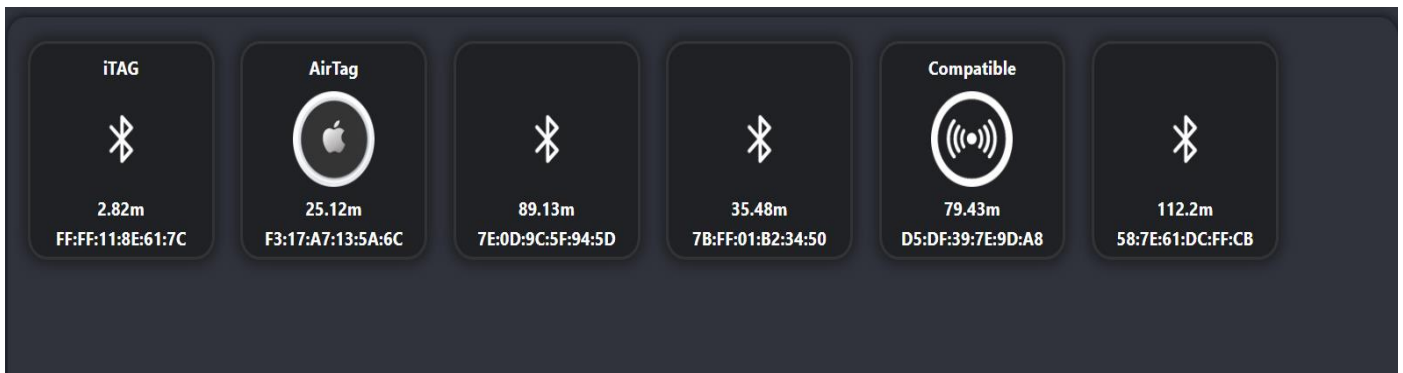
The main function of AirTags is to allow users to track lost objects, using Bluetooth Low Energy (BLE) technology. This technology and devices are used in unauthorized espionage.

Here is an overview of their functions:

**Bluetooth Low Energy (BLE):** AirTags use BLE technology to communicate with nearby Apple devices. This technology allows for low power consumption and a stable connection, making it possible to locate without quickly draining the battery.

**Find My Network:** AirTags integrate with Apple's Find My network. When an AirTag is near an Apple device (such as an iPhone or iPad), it can send a signal that is received by that device and then sent anonymously and encrypted to Apple's server. This allows the AirTag's location to be seen on a map. The AIR TAG device has become a real threat in the field of espionage.

The AIR TAG detection function has become necessary and fundamental, thanks to the M2-PRO we can have lists of these devices with all the information necessary for their individual localization in real time.




## AIR TAG Detection:


Click on the AIR TAG button (all detected devices will appear with their information)

Select the device to locate (all the information and the location bar will appear)

←

**Name:** Compatible  
**Status:** Communication alive  
**Device Type:** Compatible  
**First communication:** 29/12/2024, 12:52:28  
**Last communication:** 29/12/2024, 12:52:48  
**Address:** D5:DF:39:7E:9D:A8 (Random)  
**Scan Type:** NonConnectableUndirected  
**Data Bytes:** 12 02 00 01  
**Company:** Apple, Inc. (CompanyId 76)  
**Distance:** 79.43m  
**Signal Strength:** -82dBm  
**Rssi:** -97dBm  
**TxPower:**  
**Payload:** 07-FF-4C-00-12-02-00-01





We have very detailed information such as device name, address, manufacturer, distance in cm, power in dbm, date time and device status. We also have the bar for locating the origin point of the detected device.


←


**Name:** iTAG  
**Status:** Communication alive  
**Device Type:** GenericBle  
**First communication:** 29/12/2024, 12:51:41  
**Last communication:** 29/12/2024, 12:53:45  
**Address:** FF:FF:11:8E:61:7C (Public)  
**Scan Type:** ScanResponse  
**Data Bytes:**  
**Company:** null (CompanyId 0)  
**Distance:** 4.47m  
**Signal Strength:** -76dBm  
**Rssi:** -72dBm  
**TxPower:**  
**Payload:** 05-09-69-54-41-47







When we are close to the device we will see that the reference square will turn green:

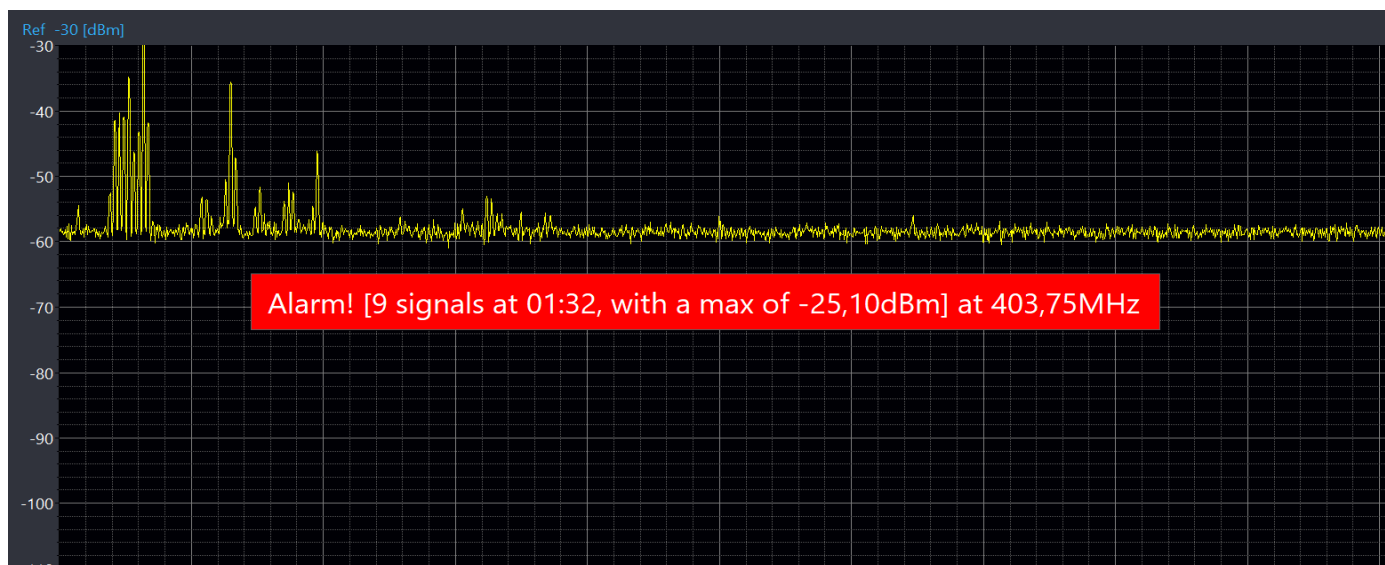
  
14.13m  
7D:4B:41:E6:37:B5

**iTAG**  
  
7.94m  
FF:FF:11:8E:61:7C

  
100m  
58:7E:61:DC:FF:CB

  
0.63m  
E2:3F:D7:B3:CB:10

## Alarm function



The frequency monitoring alarm function, which warns when a signal strength exceeds a certain threshold expressed in dBm, can be implemented with the following features:

**Real-Time Monitoring:** The system is designed to continuously monitor radio frequencies or signals of interest in real time, detecting changes in signal strength.

**Threshold Setting:** The user can set a power threshold (in dBm) that, once exceeded, will activate the alarm. This threshold can be customized, allowing the system to be adapted to different needs and situations.

**Audible and Visual Alert:** When the signal exceeds the set threshold:

**Audible Alert:** The system emits a warning sound, which can be a predefined beep.

**Visual Alert:** A visual message on the display indicates that the power level has exceeded the threshold and provides information on the frequency involved.

**Report Logging:** Whenever an alarm is triggered, the system automatically logs the details, creating a report that can include:

- The specific frequency
- The dBm power value at the time of the alert
- Event timestamp (date and time)
- Event duration (if detected over time)

**Data Access and Analysis:** Reports can be stored in a database or user-accessible file, allowing for later analysis. Users can review past events and perform statistical analysis to identify trends or anomalies in the signal.

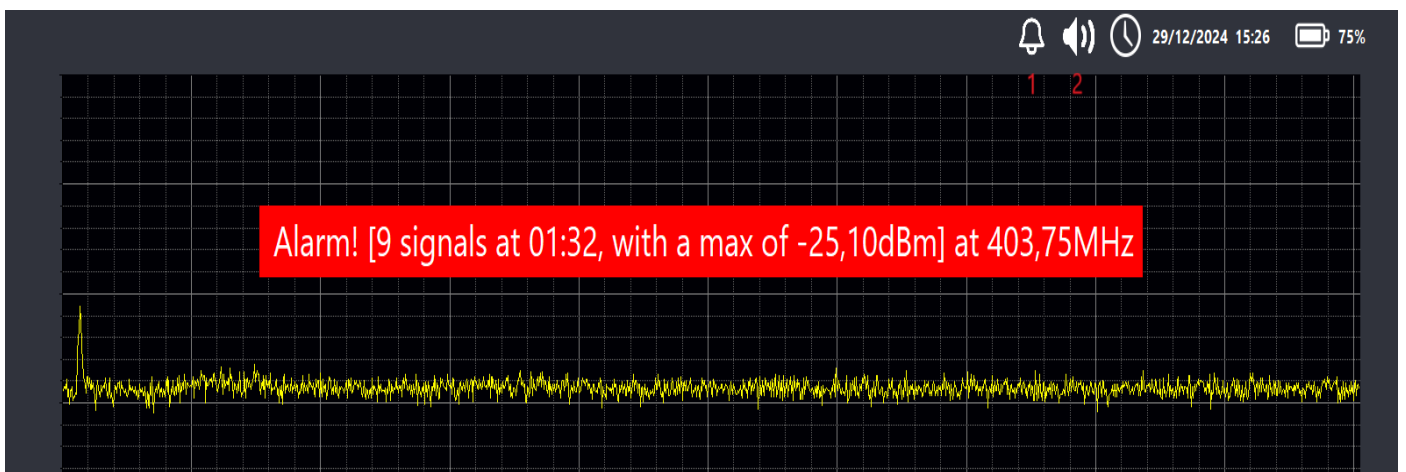
## Alarm Activation:

Click on the Alarm (ON) button

Set the minimum and maximum DBM value above which to receive alarms



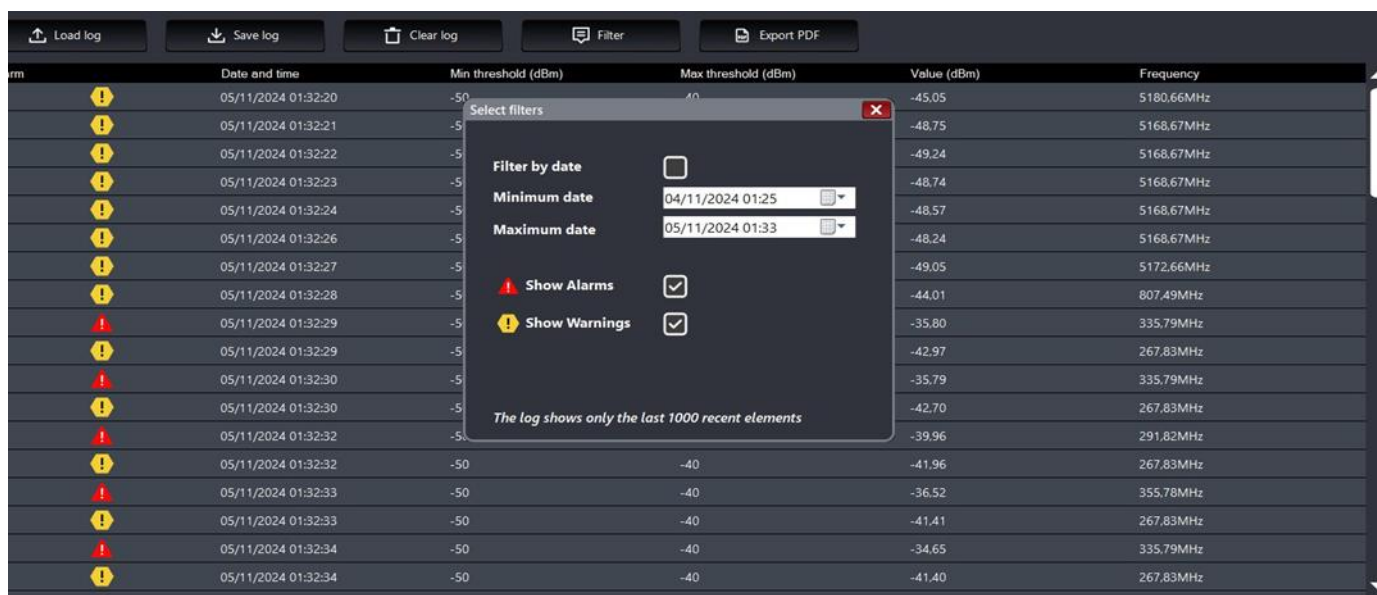
From now on, whenever a signal exceeds the preset threshold in dBm, the system will immediately trigger an alert. An audible and visual warning will be issued to ensure that the event is noticed. In addition, the alert details, including the frequency and power value at the time of the event, will be automatically recorded in a report.



After activating the alarm mode we can use sound demodulation in case of alarm:

1. By activating the bell we will have an acoustic warning every time an alarm occurs
2. By activating the speaker we will have acoustic demodulation

## LOG function



The screenshot displays the Alarm Log function interface. At the top, there are buttons for 'Load log', 'Save log', 'Clear log', 'Filter', and 'Export PDF'. Below these is a table with columns: 'Date and time', 'Min threshold (dBm)', 'Max threshold (dBm)', 'Value (dBm)', and 'Frequency'. The table contains 20 rows of data, each with a warning icon (yellow exclamation mark) or an alarm icon (red exclamation mark). A 'Select filters' dialog box is open in the center, allowing users to filter by date (with 'Filter by date' checked), minimum date (04/11/2024 01:25), and maximum date (05/11/2024 01:33). It also has checkboxes for 'Show Alarms' and 'Show Warnings', both of which are checked. A note at the bottom of the dialog states 'The log shows only the last 1000 recent elements'.

Alarm	Date and time	Min threshold (dBm)	Max threshold (dBm)	Value (dBm)	Frequency
!	05/11/2024 01:32:20	-50	-40	-45.05	5180,66MHz
!	05/11/2024 01:32:21	-50	-40	-48.75	5168,67MHz
!	05/11/2024 01:32:22	-50	-40	-49.24	5168,67MHz
!	05/11/2024 01:32:23	-50	-40	-48.74	5168,67MHz
!	05/11/2024 01:32:24	-50	-40	-48.57	5168,67MHz
!	05/11/2024 01:32:26	-50	-40	-48.24	5168,67MHz
!	05/11/2024 01:32:27	-50	-40	-49.05	5172,66MHz
!	05/11/2024 01:32:28	-50	-40	-44.01	807,49MHz
!	05/11/2024 01:32:29	-50	-40	-35.80	335,79MHz
!	05/11/2024 01:32:29	-50	-40	-42.97	267,83MHz
!	05/11/2024 01:32:30	-50	-40	-35.79	335,79MHz
!	05/11/2024 01:32:30	-50	-40	-42.70	267,83MHz
!	05/11/2024 01:32:32	-50	-40	-39.96	291,82MHz
!	05/11/2024 01:32:32	-50	-40	-41.96	267,83MHz
!	05/11/2024 01:32:33	-50	-40	-36.52	355,78MHz
!	05/11/2024 01:32:33	-50	-40	-41.41	267,83MHz
!	05/11/2024 01:32:34	-50	-40	-34.65	335,79MHz
!	05/11/2024 01:32:34	-50	-40	-41.40	267,83MHz

The Alarm Log function for frequencies detected within a certain dBm range allows you to monitor and analyze frequencies effectively. Here is a more detailed description of this feature:

**Data Collection:** The system collects power data of the detected frequencies in real time.

**Report Generation:** Once the data has been collected, the system generates a report that includes:

**Frequencies Within Range:** List of frequencies that are within the set dBm range. These frequencies indicate signals that are within acceptable parameters and are often indicative of optimal performance.

**Performance Analysis:** Based on the recorded frequencies, the report can include statistics such as average power, signal pressure and stability over time.

**Anomaly Identification:** If sudden or unexpected frequency changes occur, the system can raise alarms, even for frequencies that are near the edge of the range. These alarms can include warnings for signals that may no longer be stable or are experiencing interference.

**Automatic Notifications:** In case of detection of frequencies with power values outside the established range, the system can generate automatic notifications to inform users of the situation, facilitating timely intervention.

**User Interface:** Reports are presented in a clear and readable format, with graphs and tables that display information visually, making it easier to interpret the data.

This reporting function is essential for operators and technicians who need to ensure constant frequency monitoring, ensuring that communication systems remain at their best and that any problems are identified and resolved quickly.



🕒 29/12/2024 15:37 🔋 65%

1 Load log
2 Save log
3 Clear log
4 Filter
5 Export PDF

Alarm	Date and time	Min threshold (dBm)	Max threshold (dBm)	Value (dBm)	Frequency
⚠️	29/12/2024 15:25:29	-50	-40	-43,71	2458,42MHz
⚠️	29/12/2024 15:25:38	-50	-40	-42,59	2414,45MHz
⚠️	29/12/2024 15:26:00	-50	-40	-43,70	847,46MHz
⚠️	29/12/2024 15:26:03	-50	-40	-48,93	839,47MHz
⚠️	29/12/2024 15:26:03	-50	-40	-38,48	2414,45MHz
⚠️	29/12/2024 15:26:18	-50	-40	-47,62	2454,42MHz
⚠️	29/12/2024 15:26:22	-50	-40	-42,94	2422,44MHz
⚠️	29/12/2024 15:27:07	-50	-40	-45,11	2426,44MHz
⚠️	29/12/2024 15:27:08	-50	-40	-41,70	2410,45MHz
⚠️	29/12/2024 15:27:08	-50	-40	-36,96	2414,45MHz
⚠️	29/12/2024 15:27:09	-50	-40	-44,62	2410,45MHz

1. Load Log: Import previously saved log
2. Save Log: Save Log
3. Clear Log: Clear Log list (be careful once deleted it is not recoverable)
4. Filter: Search filter by date - time - alarm type

**Select filters** ✕

Filter by date

Minimum date

Maximum date

⚠️ Show Alarms

⚠️ Show Warnings

The log shows only the last 1000 recent elements

5. Export PDF: Export the report to PDF



## M2-PRO Spectrum Analyzer

### Log

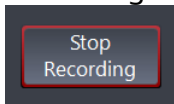
Date and time	Min threshold (dBm)	Max threshold (dBm)	Value (dBm)	Frequency
05/11/2024, 01:32:29	-50	-40	-35.80	335.79MHz
05/11/2024, 01:32:29	-50	-40	-35.73	339.79MHz
05/11/2024, 01:32:29	-50	-40	-38.54	359.78MHz
05/11/2024, 01:32:29	-50	-40	-39.11	363.77MHz
05/11/2024, 01:32:29	-50	-40	-37.66	379.76MHz
05/11/2024, 01:32:29	-50	-40	-37.43	383.76MHz
05/11/2024, 01:32:29	-50	-40	-38.58	387.76MHz
05/11/2024, 01:32:29	-50	-40	-31.76	399.75MHz
05/11/2024, 01:32:29	-50	-40	-24.68	403.75MHz
05/11/2024, 01:32:29	-50	-40	-24.66	407.74MHz

## Start Recording and Screenshot Function

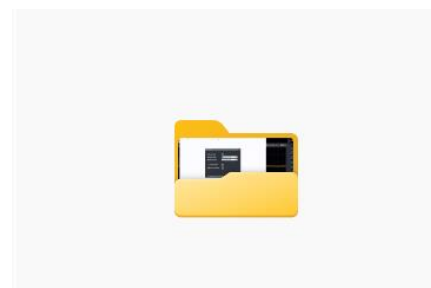
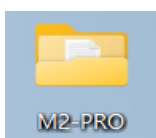
### Start Recording Function

Recording Enable: This feature allows the user to start video recording. Once enabled, the system will start capturing all the video content on the screen.

Recording Indicator: During recording the text start recording will be highlighted in red:



Saving Files: After recording, the video will be saved to the M2-PRO folder on your desktop.

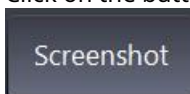


### "Screenshot" function

Screenshot: The screenshot function allows you to capture a still image of the currently displayed screen. Users can use it to save the operations performed, it applies to all screens and functions of the software.

Capture Mode:

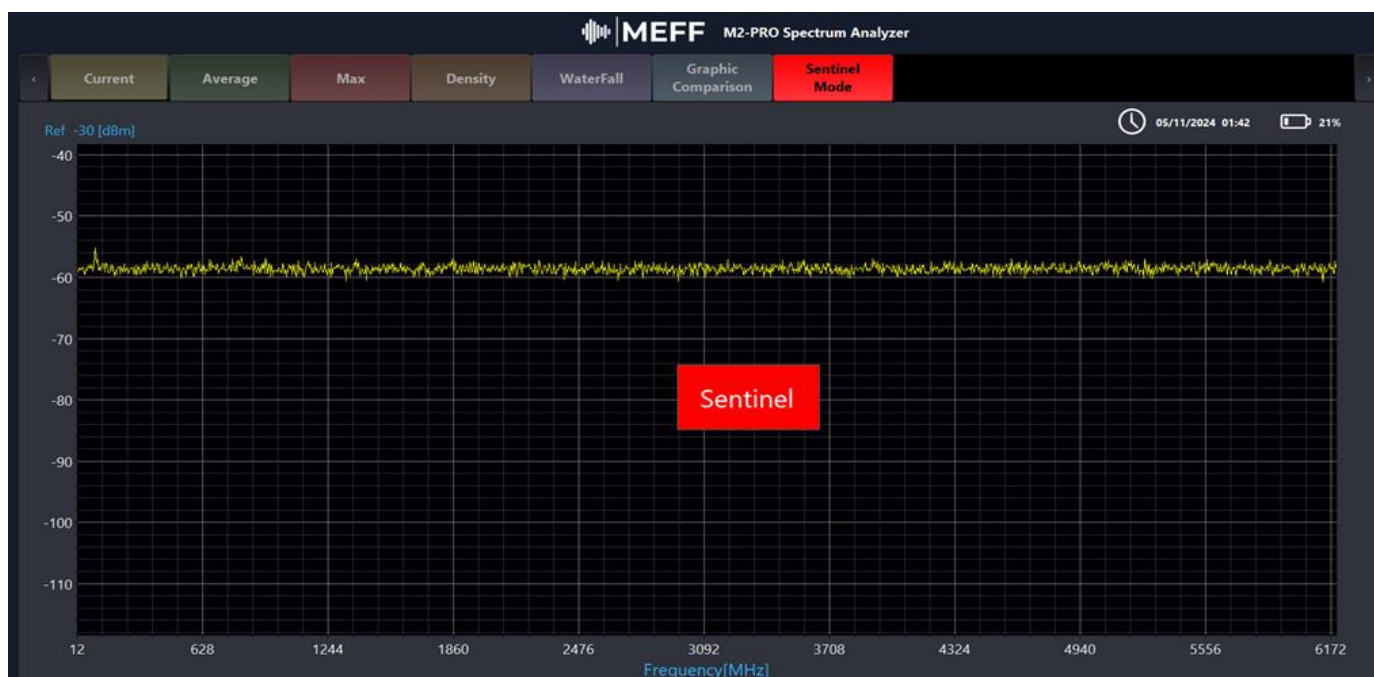
Click on the button



Saving Files: Once finished, the photos will be saved to the M2-PRO folder on your desktop.



## Sentinel Function



The sentinel function of analog and digital signals in communications and information security, particularly in the context of TSCM (Technical Surveillance Countermeasures), plays a crucial role in monitoring, detecting and recording suspicious or anomalous activities.

### Sentinel Function Characteristics in Analog and Digital Signals (TSCM)

#### Active Signal Monitoring:

The sentinel function constantly monitors digital signals to detect anomalies, such as intrusions or sabotage attempts. It can include scanning frequencies, analyzing data packets, and gathering detailed information.

#### Interference and Threat Detection:

It keeps a watchful eye on any unauthorized interference, such as spy signals or eavesdropping devices. It uses advanced techniques to analyze data traffic and identify suspicious behavior.

#### Event Registration:

Every interesting event is recorded in a detailed report. This can include unauthorized login attempts, unusual signal changes, and any other suspicious activity. The recording is essential for future analysis.

## Diagnostic Analysis:

Provides diagnostic analysis to understand the cause of an anomaly and assess risk. This can help identify vulnerabilities in systems and take appropriate countermeasures.

## Reporting:

Generate systematic reports that document all monitoring activities.

Reports include:

Date and Time: When the event occurred.

Event Type: Detailed frequency description Signal Source:

Signal source identification in dbm

The sentinel function within TSCM is vital to communications protection and information security. Through active monitoring, interference detection, and detailed event logging, organizations can maintain confidence in the security of their communications and respond promptly to threats. In-depth reporting provides a basis for continuous evaluation and optimization of security practices.

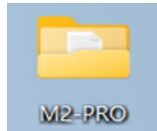
## Activating Sentinel Function:

Click on the red "Sentinel Mode" button



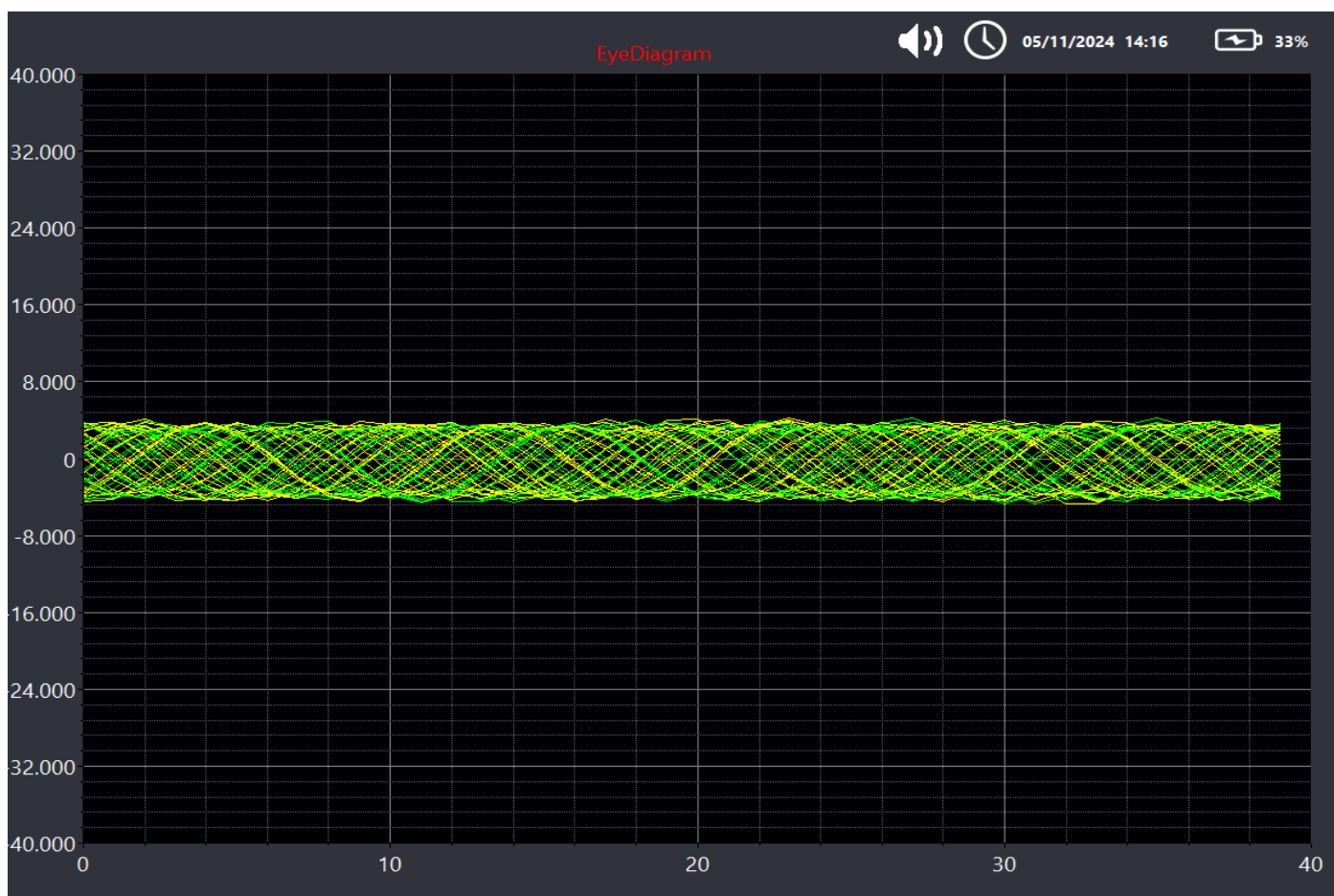
The system will go into automatic mode and start monitoring and recording all activities, in this mode you cannot use any function until we disable the Sentinel

Once the Sentinel function is disabled, the report will be automatically saved in the M2-PRO folder on the desktop.



```
[2024-11-05 01:41:44.776] warning: -49,39dBm at 2430,44MHz
[2024-11-05 01:41:50.878] alarm: -36,14dBm at 2454,42MHz
[2024-11-05 01:41:52.912] warning: -47,94dBm at 5180,66MHz
[2024-11-05 01:41:55.963] warning: -48,33dBm at 5180,66MHz
[2024-11-05 01:41:55.963] warning: -49,75dBm at 5184,66MHz
[2024-11-05 01:41:56.98] warning: -47,34dBm at 5180,66MHz
[2024-11-05 01:41:56.98] warning: -48,80dBm at 5184,66MHz
[2024-11-05 01:41:59.015] alarm: -38,70dBm at 2442,43MHz
[2024-11-05 01:42:01.048] warning: -48,95dBm at 5180,66MHz
[2024-11-05 01:42:01.048] warning: -48,39dBm at 5184,66MHz
[2024-11-05 01:42:02.066] warning: -49,87dBm at 5168,67MHz
[2024-11-05 01:42:02.066] warning: -49,00dBm at 5172,66MHz
[2024-11-05 01:42:03.082] warning: -49,02dBm at 5168,67MHz
[2024-11-05 01:42:03.082] warning: -49,09dBm at 5172,66MHz
[2024-11-05 01:42:03.082] warning: -49,60dBm at 5176,66MHz
[2024-11-05 01:42:03.082] warning: -48,87dBm at 5180,66MHz
[2024-11-05 01:42:03.082] warning: -49,63dBm at 5184,66MHz
[2024-11-05 01:42:04.1] warning: -48,95dBm at 5180,66MHz
[2024-11-05 01:42:05.116] warning: -47,70dBm at 5180,66MHz
[2024-11-05 01:42:05.116] warning: -48,94dBm at 5184,66MHz
[2024-11-05 01:42:06.134] warning: -48,94dBm at 5184,66MHz
[2024-11-05 01:42:11.218] warning: -49,12dBm at 5168,67MHz
[2024-11-05 01:42:11.218] warning: -47,30dBm at 5180,66MHz
[2024-11-05 01:42:11.218] warning: -47,04dBm at 5184,66MHz
[2024-11-05 01:42:13.252] warning: -45,53dBm at 2462,42MHz
[2024-11-05 01:42:29.523] warning: -48,95dBm at 2434,43MHz
[2024-11-05 01:42:31.558] warning: -45,28dBm at 2458,42MHz
[2024-11-05 01:42:33.592] warning: -48,43dBm at 5180,66MHz
[2024-11-05 01:42:33.592] warning: -47,87dBm at 5184,66MHz
[2024-11-05 01:42:34.609] warning: -49,25dBm at 5176,66MHz
[2024-11-05 01:42:34.609] warning: -47,41dBm at 5180,66MHz
[2024-11-05 01:42:34.609] warning: -47,75dBm at 5184,66MHz
[2024-11-05 01:42:38.676] warning: -47,96dBm at 2454,42MHz
[2024-11-05 01:42:42.749] warning: -43,76dBm at 2430,44MHz
[2024-11-05 01:42:42.749] alarm: -36,31dBm at 2434,43MHz
[2024-11-05 01:42:42.749] alarm: -38,42dBm at 2438,43MHz
```

## HIGH AND LOW VOLTAGE ELECTRICAL SYSTEM ANALYSIS



In the context of technical surveillance countermeasures (TSCM), the audio detection function in low- and high-voltage electrical installations is a key aspect of communications protection. These installations can become vulnerable points for unauthorized interception of information. Here is a detailed description of the audio detection function:

### **Monitoring Electrical Signals:**

The detection function involves monitoring electrical signals within the installations, both low and high voltage, to identify any audio signals that may be transmitted inappropriately. This may include analyzing interference caused by unauthorized devices.

### **Interferant Detection:**

Electrical systems can be used as conduits for unauthorized audio transmission. Specialized detection systems monitor electrical circuits for unauthorized audio signals, such as those from microphones or recording devices.

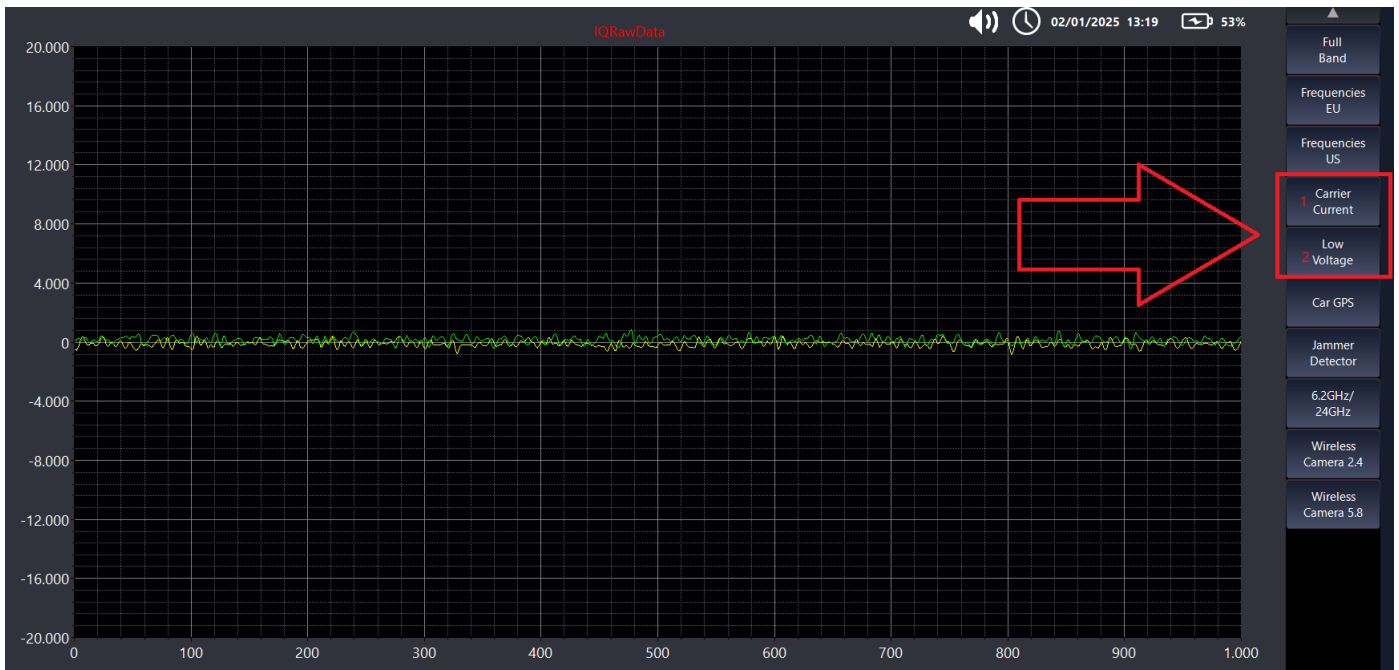
### **Spectral Analysis:**

Using spectral analysis tools, specific frequencies associated with audio signals can be identified. These analyses help distinguish legitimate signals from suspicious ones, such as interference or clandestine transmissions.

### **Identifying Anomalies:**

The feature includes the ability to identify audio graphic anomalies. These anomalies can be the result of the use of hidden eavesdropping devices that exploit electrical wiring.

The audio graphical detection function in low and high voltage electrical systems is essential to ensure communication security. Through careful monitoring and analysis of electrical signals, potential threats can be identified and necessary measures can be taken to protect sensitive information from unauthorized interception, helping to maintain operational security in sensitive environments.



1. Carrier Current: Button for detecting signals in the electrical system
2. Low Voltage: Button for detecting signals in low voltage

Click on the Carrier Current button after connecting the probe



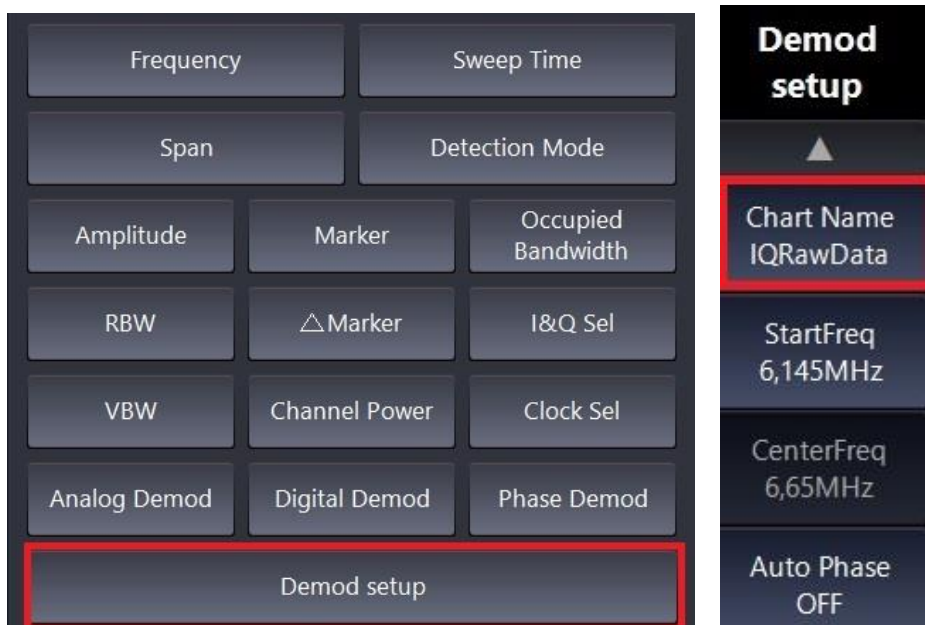
You will see the electrical signal present, if the audio is analog and not encrypted/digital you will be able to listen to it, but if the signal is encrypted or digital you will see significant variations in the graph that will indicate the presence of anomalies and danger.

Click on the Low Voltage button



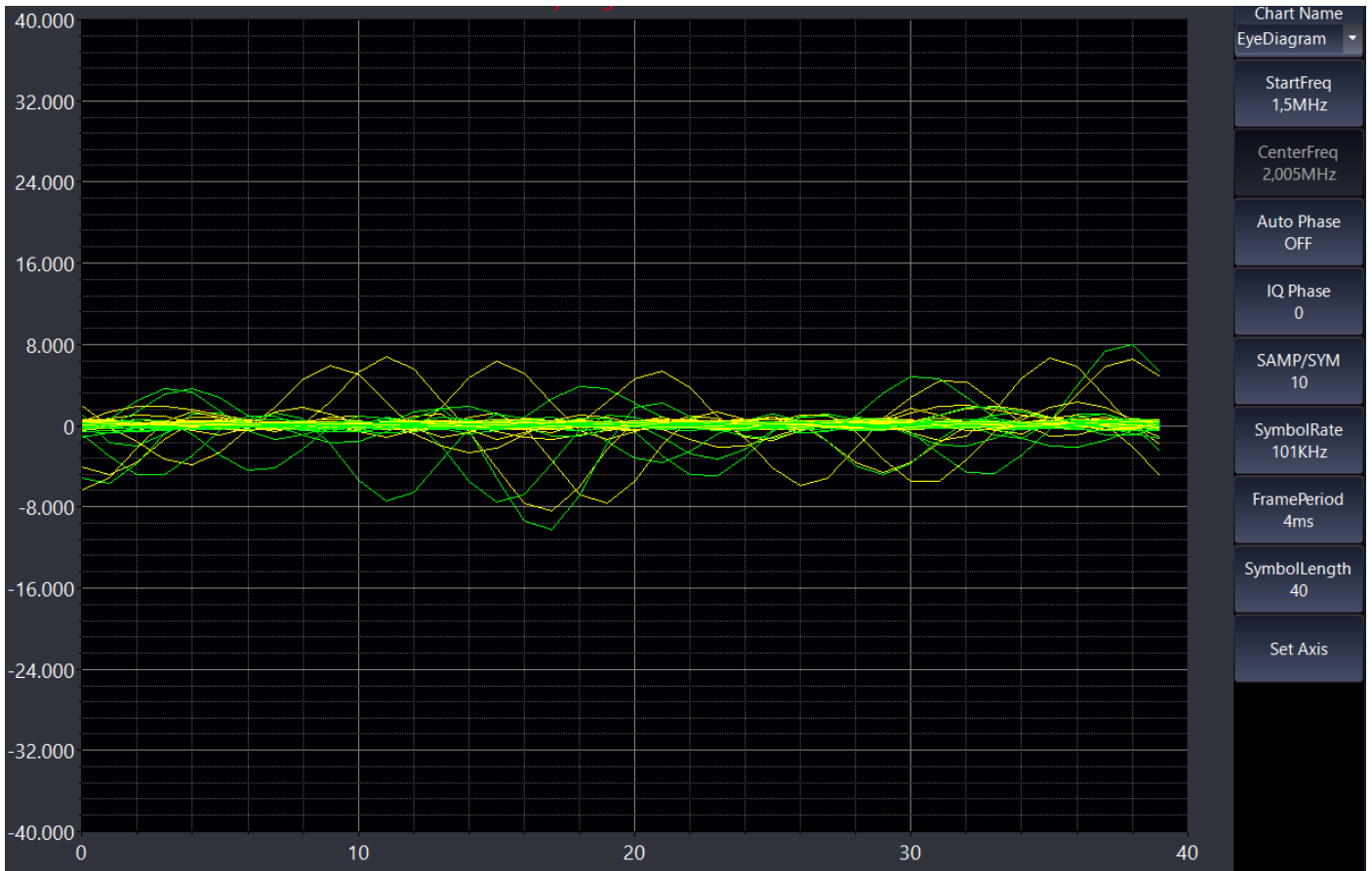
You will see the low voltage electrical signal present, if the audio is analog and not encrypted/digital you will be able to listen to it, but if the signal is encrypted or digital you will see significant variations in the graph that will indicate the presence of anomalies and danger.

In Carrier Current mode and Low Voltage mode we can choose different audio graph modes by clicking on the button in the right drop-down bar:

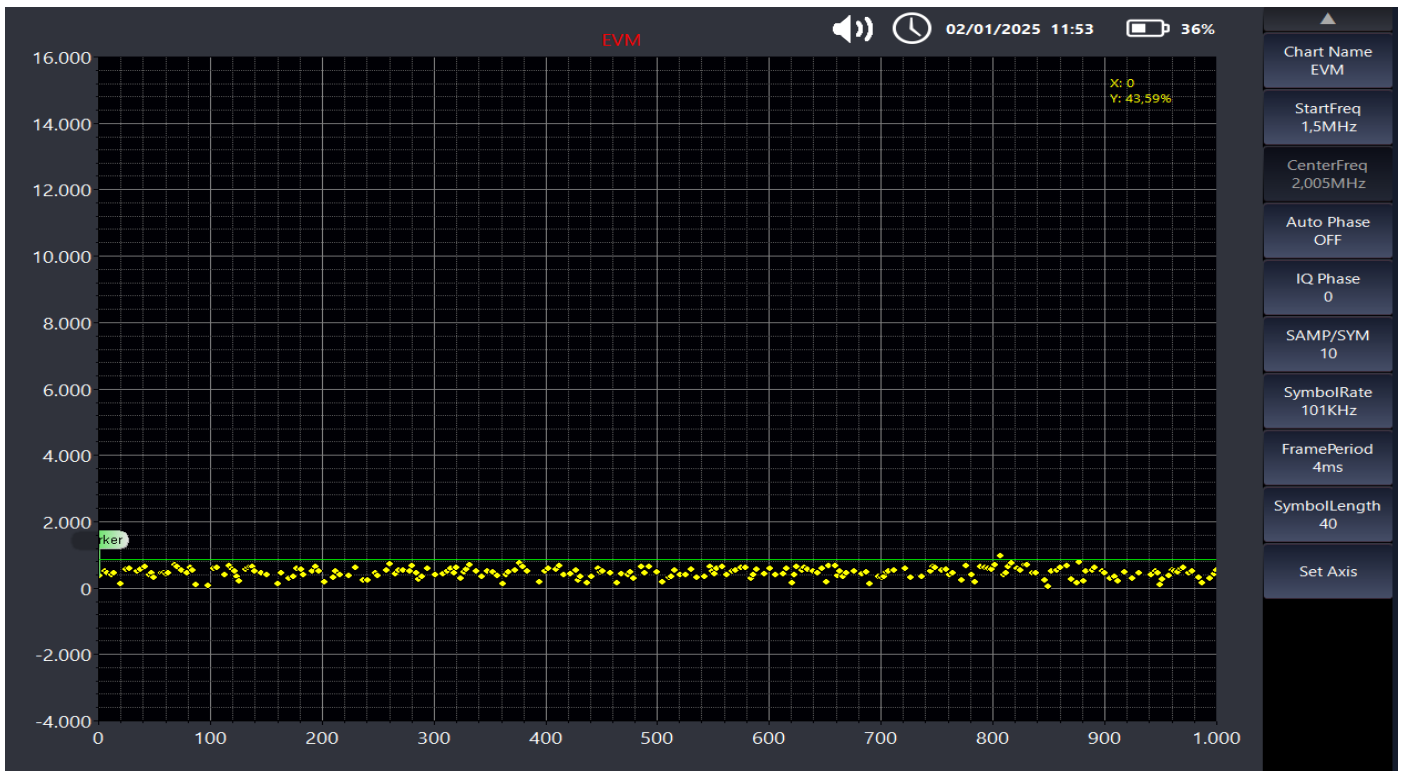


We will have the possibility to choose between different technical graphs:

### 1. EyeDiagram Graph (In this mode we can see the electrical signal clearly)

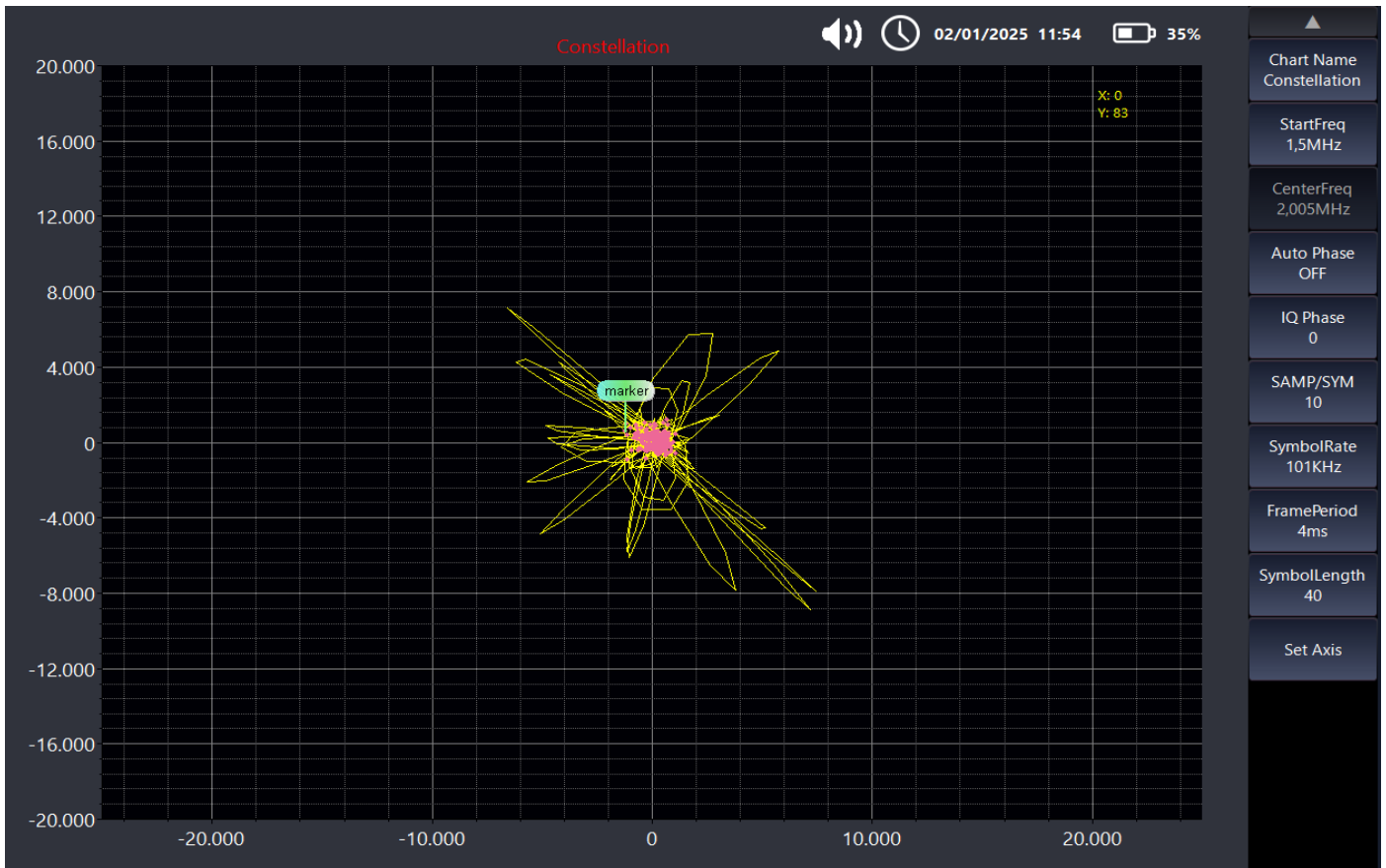


### 2. EVM graph (in this mode we can clearly see variations in the electrical signal)

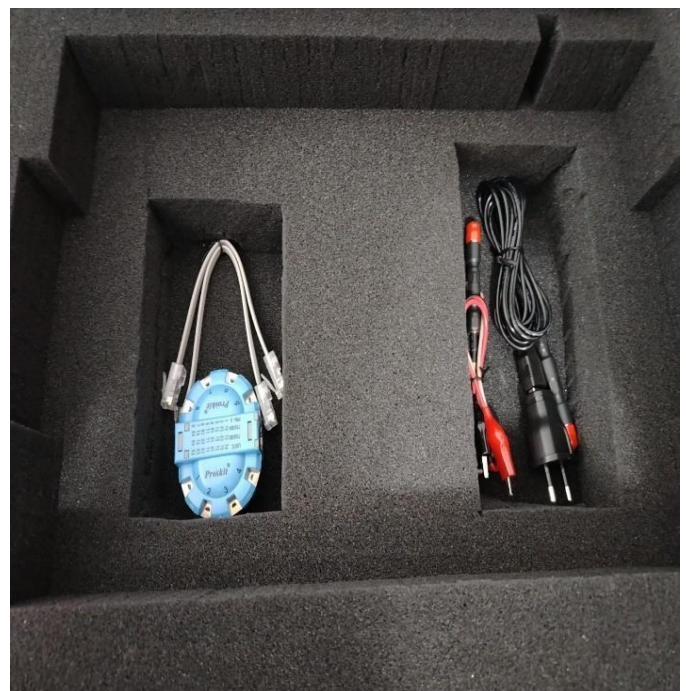
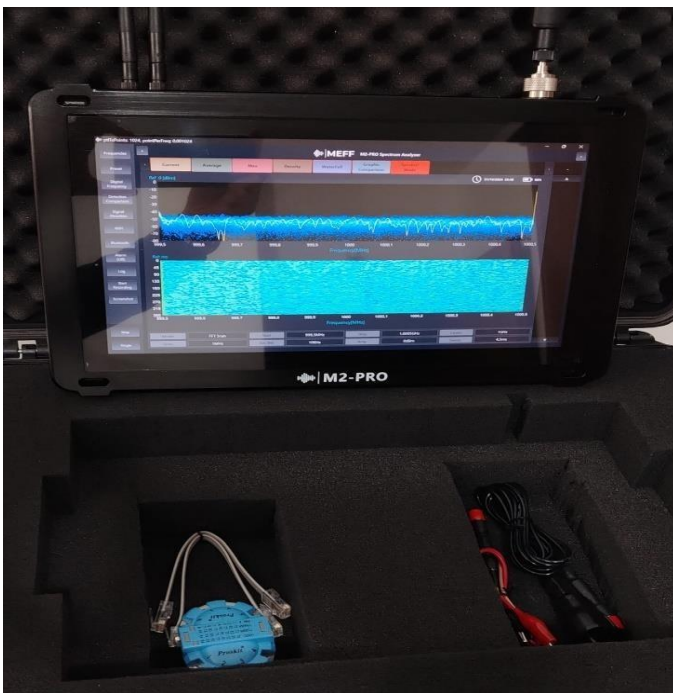




3. Constellation Graph (in this mode we can clearly see the variations in the persistence of the electrical signal with the representation in the constellation)



Using low and high voltage probes:



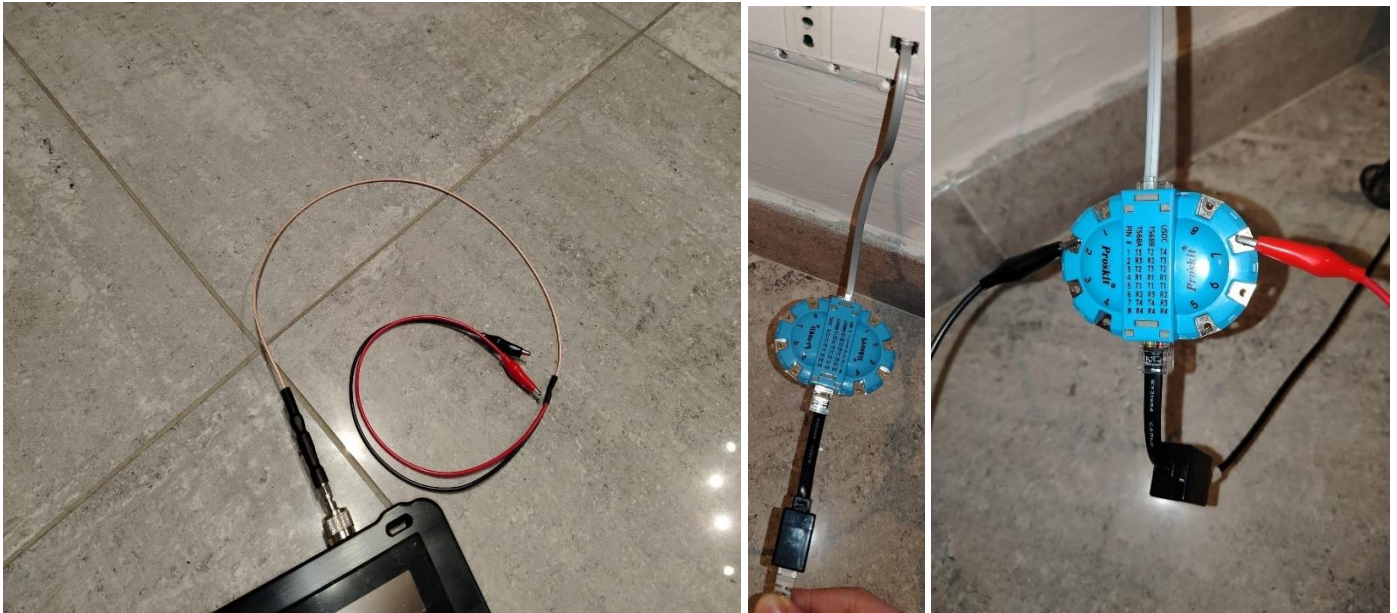
## Using the high voltage probe:

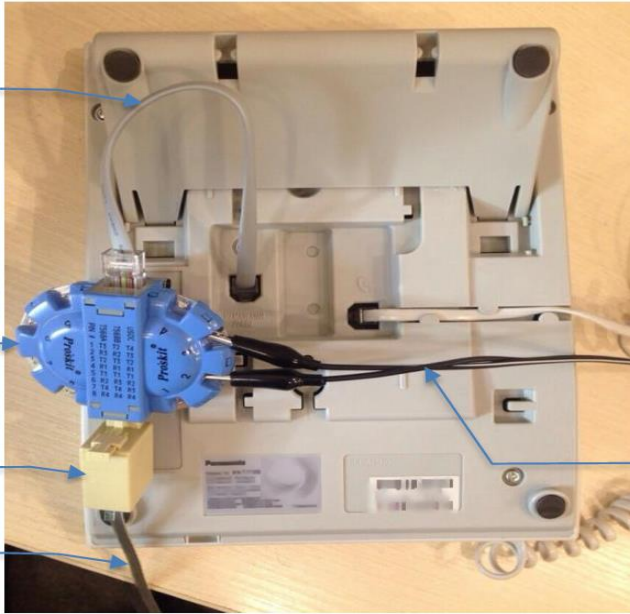
Connect the probe with SMA connector instead of the omnidirectional antenna and insert the plug:



## Using the low voltage probe in telephone equipment:

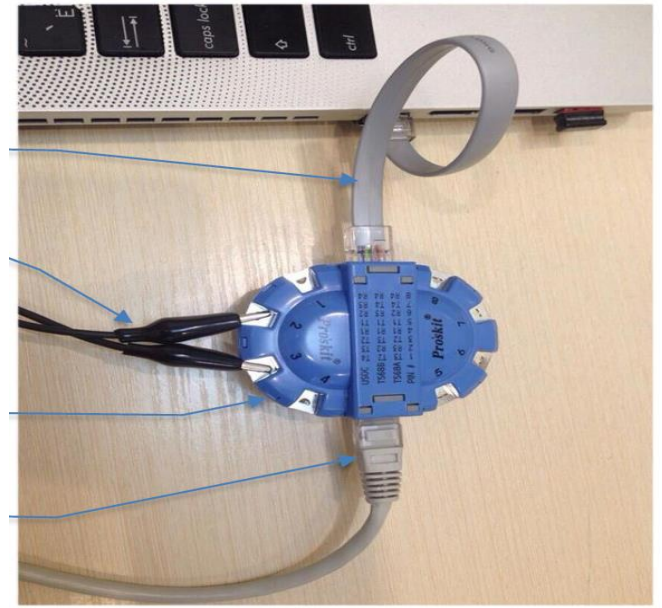
Connect the probe with SMA connector instead of the omnidirectional antenna and connect the telephone or LAN cable to the socket, using the crocodile probe we can check all the PINs in the cable one at a time:





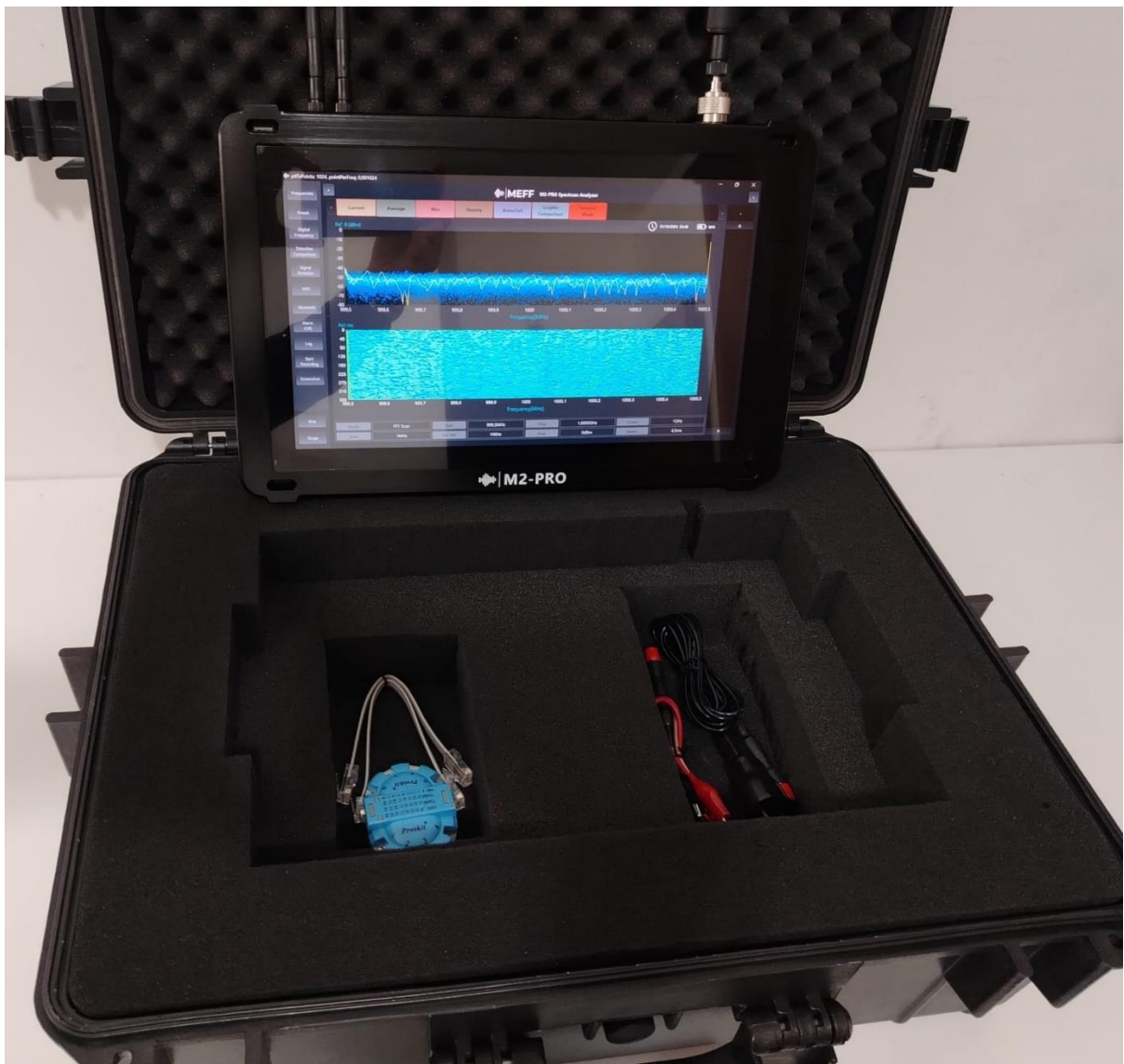
**Telephone line analysis**

**Connect the input cable in the phone to the ProsKit**

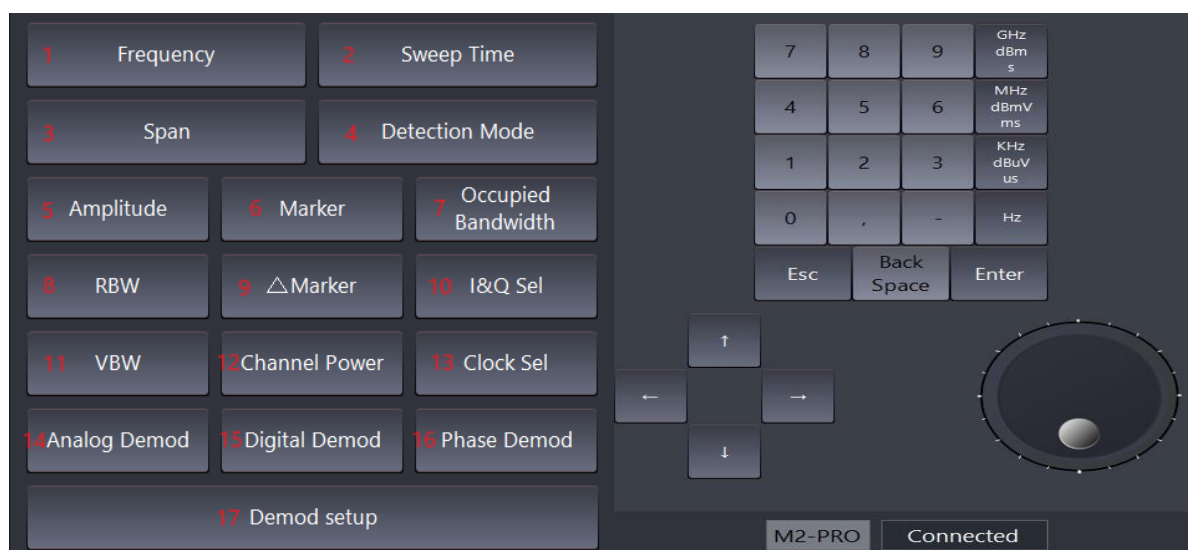


**LAN Line Analysis**

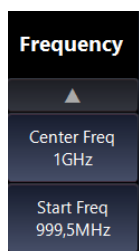
**Connect the LAN cable from the PC to the ProKit**



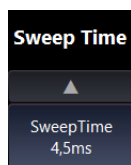
## Advanced functions



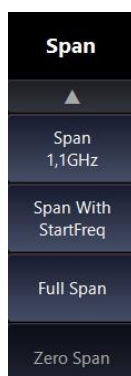
**1. Frequency:** we can manually select a frequency to analyze



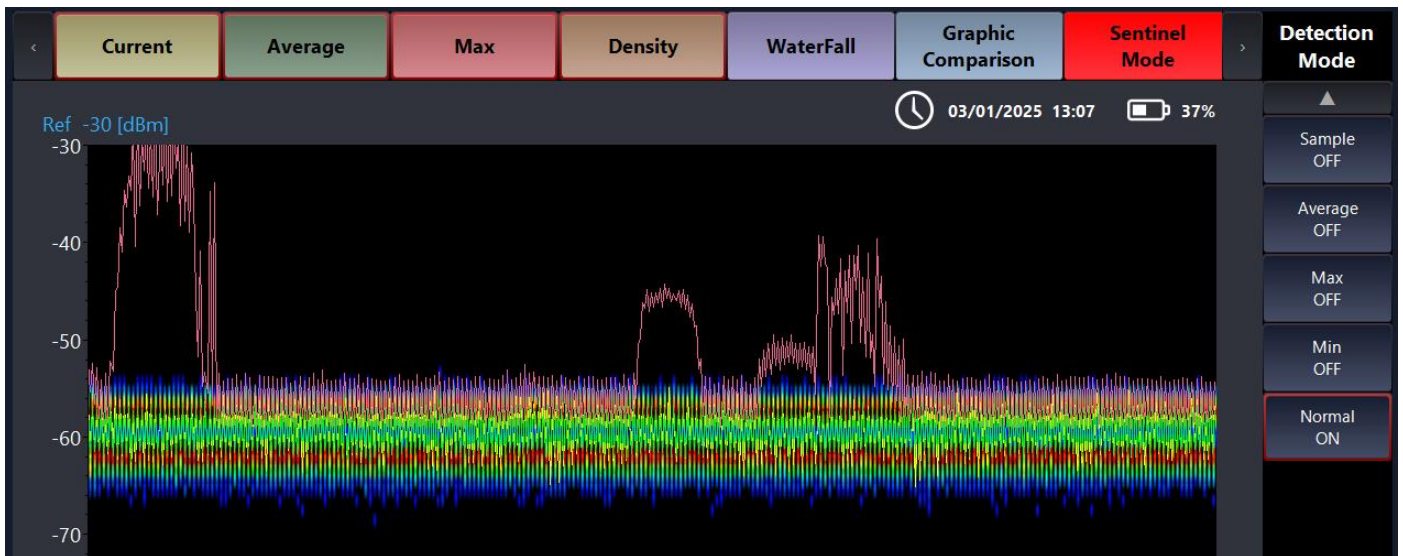
**2. Sweep Time:** we can manually select the scanning speed



**3. Span:** refers to the range of frequencies that the analyzer can display at one time. It indicates the width of the band of frequencies being analyzed and can affect the spectral resolution: a wide span allows you to see more frequencies, while a narrow span provides greater resolution of specific frequency details.



4. **Detection Mode:** This function determines how the device acquires and displays signals of a set frequency. We can vary the way the detection bars are graphically represented in the Current – Average – Max – Density modes

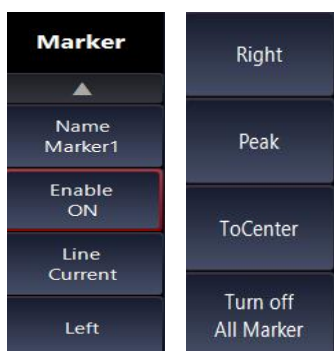


5. **Amplitude:** indicates the intensity level of signals in a given frequency range. Usually represented in units such as decibels (dB), amplitude provides crucial information about the strength of the signal and its presence relative to background noise



6. **Markers:** is a tool that allows you to identify and annotate specific points on the displayed spectrum. Markers can be used to:

- Identify Frequencies: Place a marker on a frequency of interest to monitor its amplitude level.
- Comparative References: Compare different signals or identify specific peaks.
- Automatic Measurements: Some analyzers can provide automatic measurements based on markers,



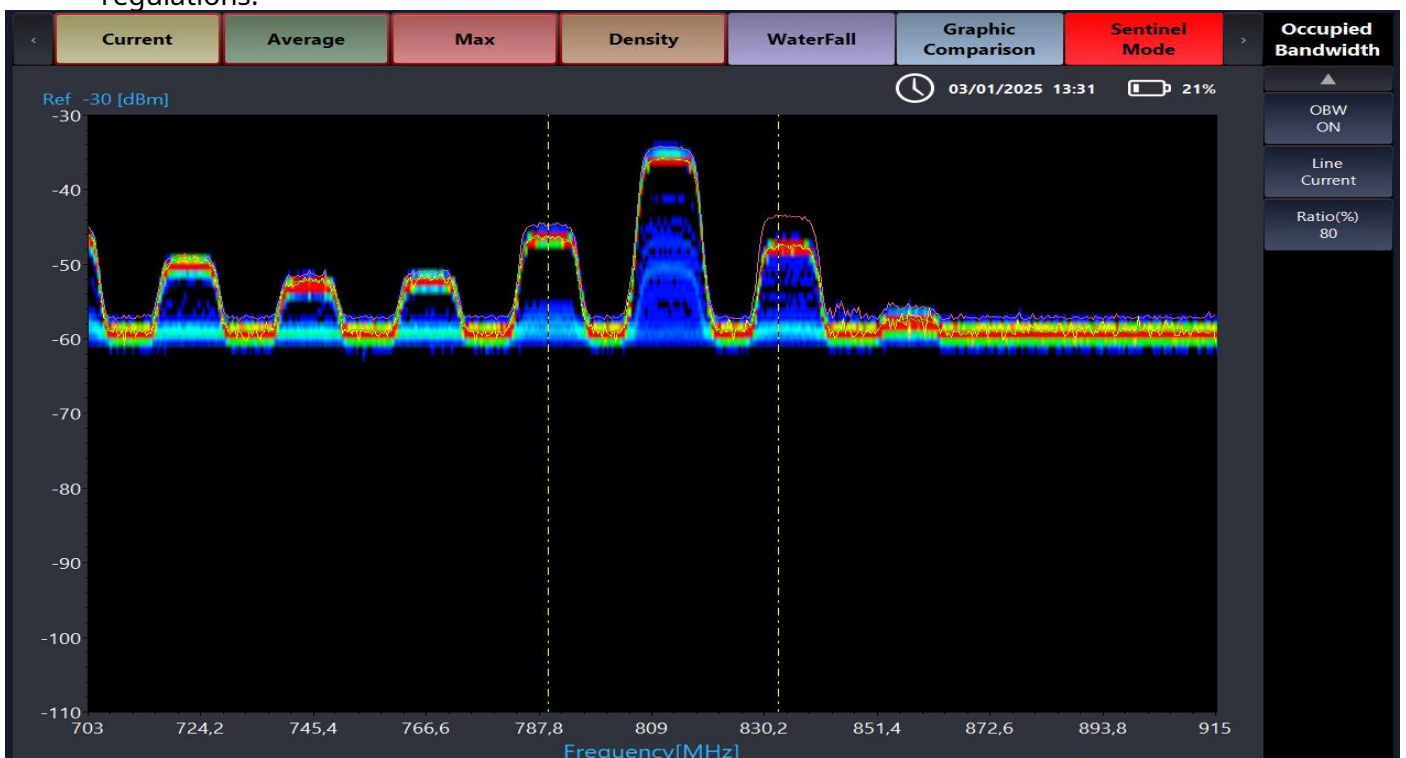


You can activate up to 5 Markers at the same time, to view the precise frequency of detection of a peak, choose the marker and then place it on the peak of interest, the marker number and the frequency with the dbm value will appear in yellow on the top right

**7.Occupied Bandwidth:**measures the range of frequencies in which a certain amount of signal power is present. It is defined as the bandwidth in which a specific percentage of the total signal power is found.

This measure is useful for:

- Evaluating Spectral Efficiency: Understanding how extensively a signal utilizes the available spectrum.
- Interference Analysis: Identify potential overlaps with other transmissions.
- Regulatory Compliance: Ensure that signals fall within the bandwidth limits imposed by regulations.



Bandwidth analysis helps ensure effective management of spectrum resources

8. **RBW:** represents the resolution bandwidth, that is, the width of the frequency band that the analyzer uses to filter the incoming signal before displaying it.

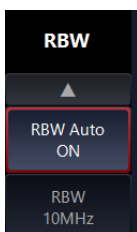
Key aspects of RBW include:

Resolution: A narrower RBW allows you to distinguish between signals that are closer in frequency, improving spectral resolution.

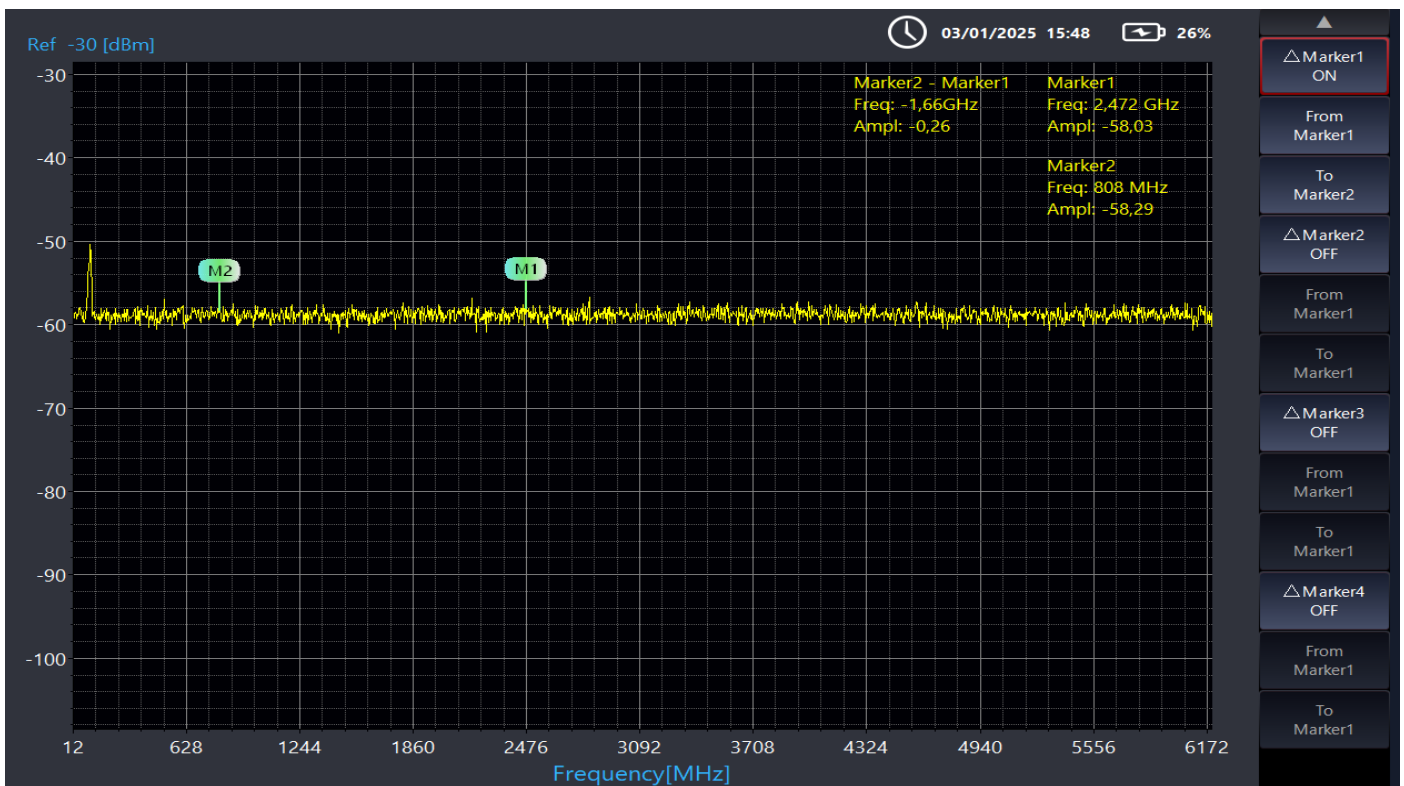
Signal Selection: By filtering signals with different bandwidths, you can emphasize or attenuate certain frequencies, making it easier to analyze complex signals.

Acquisition Time: A narrower RBW increases the time required to collect data, since the analyzer takes longer to measure power in a narrow frequency band.

Correctly setting the RBW is crucial to obtaining accurate and meaningful measurements of the signal spectrum.



9. **△ Markers:** use multiple markers simultaneously for comparative analyses and to examine interactions between two selected signal markers



- Activate two Markers in the Marker function at the previous parameter n°6
- Select Marker 1 and Marker 2 and compare the two readings
- At the top right we will have the comparison of the two markers with frequency and dbm

**10. I&Q Sel:** The I&Q SEL (In-phase and Quadrature Select) function in a spectrum analyzer is used for demodulation and analysis of complex signals. Here are some key aspects of the function:

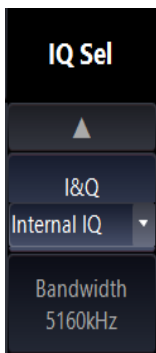
**I and Q Components:** The I (In-phase) and Q (Quadrature) signals represent the two components of a modulated signal. The I component is in phase with the carrier, while the Q component is 90 degrees out of phase. This representation allows you to analyze both the amplitude and the phase of the signal.

**Advanced Spectral Analysis:** Using the I and Q components, the spectrum analyzer can provide detailed information about the characteristics of the signal, allowing you to identify complex modulations, distortions and other phenomena.

**Signal Selection:** The selection (SEL) function allows you to choose between different I and Q signals for analysis, which is useful when working with multiple signals or in complex communication scenarios.

**Applications:** It is particularly useful in digital communication, radar, and telecommunication systems, where it is essential to analyze signal quality and system performance.

This function therefore allows an in-depth analysis of the signal characteristics, facilitating the optimization of the performance of transmission and reception systems.

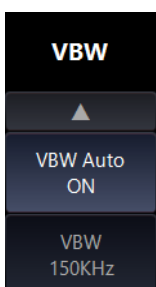


**11. VBW:** Video Bandwidth refers to the bandwidth of the video filter applied to the signal after spectral analysis. Here are some key points:

**Fluctuation Filtering:** VBW is used to reduce noise and fluctuations in the displayed signal, resulting in a more stable and clear representation of frequency components.

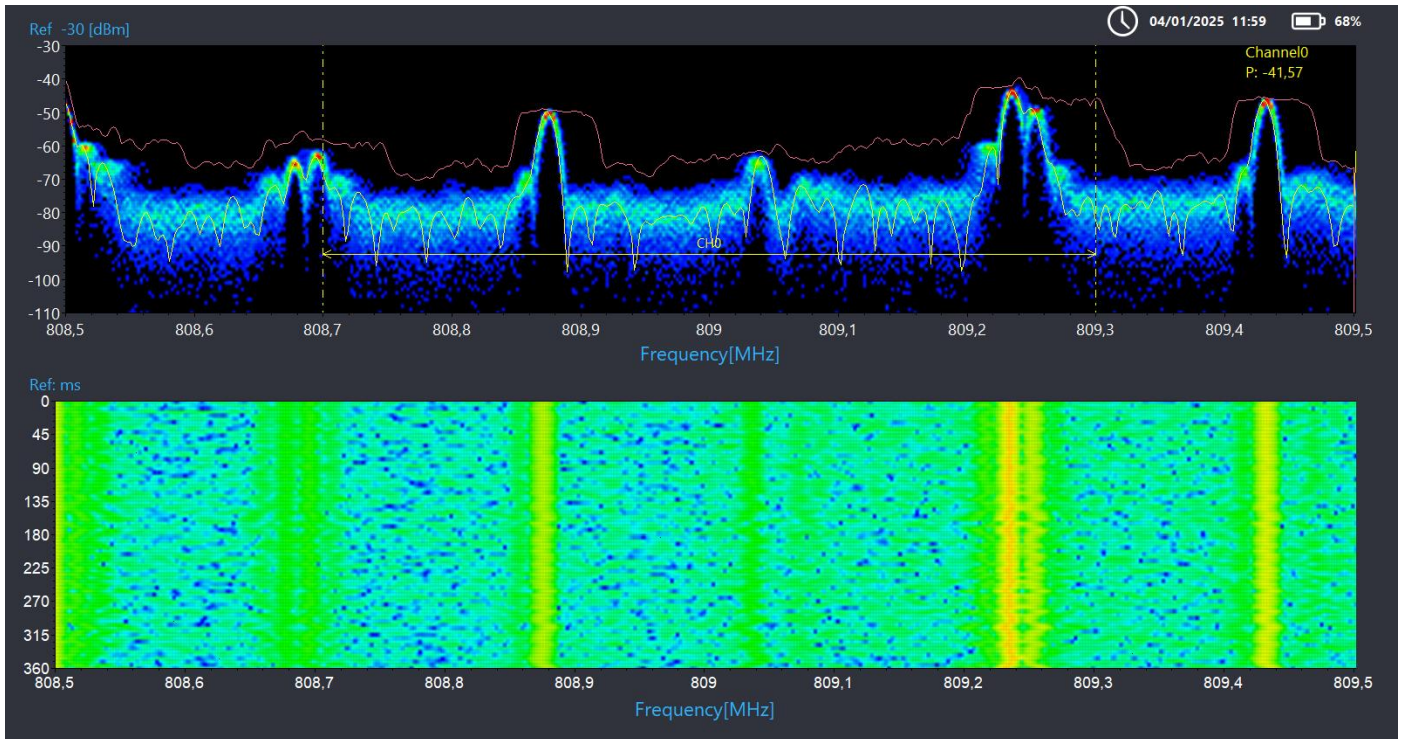
**Impact on Resolution:** A wider VBW allows you to see peaks more quickly, but may reduce resolution and detailed information about small changes in the signal. Conversely, a narrower VBW improves resolution but may slow down the analyzer's response.

**VBW Choice:** The selection of VBW depends on the specific analysis you want to perform; lower values are useful for complex signals or to identify subtle details, while higher values are better for analyzing stable signals or for general observation.





12. Channel Power: (channel power) is used to measure the total power within a given frequency range, which corresponds to a specific channel. This function is particularly important in communication applications, because it allows to evaluate the amount of power transmitted or received on a specific frequency channel.



Main features of the Channel Power function:

**Frequency range definition:**The user can set a frequency range (bandwidth) for the channel he wants to analyze. This is essential to focus only on the interested band.

**Power calculation:**The spectrum analyzer calculates the total signal power within this frequency range by adding the amplitudes of the spectral components present.

**Representation in dBm:**Results are generally expressed in decibel milliwatts (dBm), a common unit of measurement for power in telecommunications contexts.

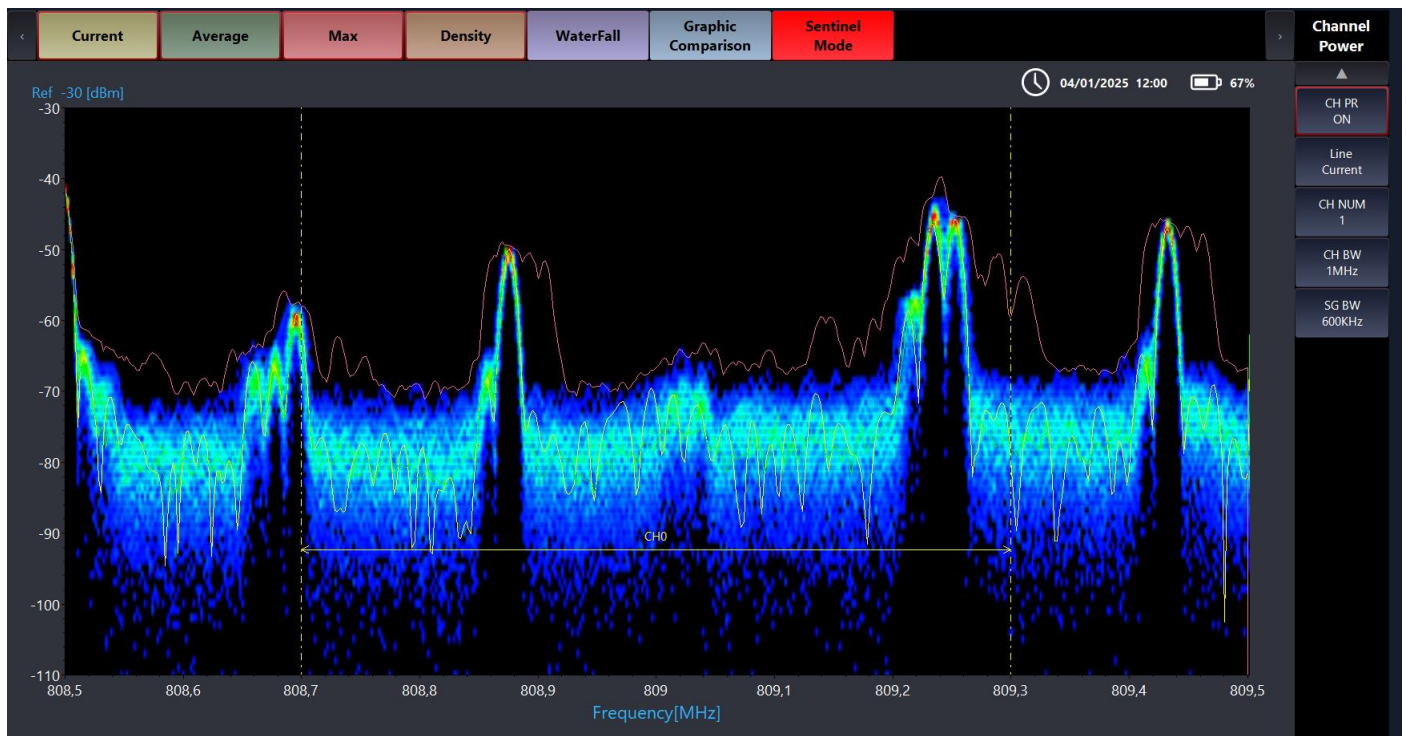
**Practical applications:**

**System Performance Analysis:** Allows you to check whether a communication system is operating properly and whether the signal strength is adequate.

**Compliance Verification:** Helps ensure that a transmitter meets regulatory power requirements for a specific frequency band.

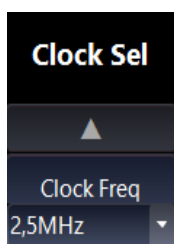
**Signal Monitoring:** Useful for monitoring and managing wireless networks, sectioning the power of specific channels in the presence of noise and interference.

In summary, the Channel Power function provides a crucial measurement of power within specific frequency ranges, facilitating the analysis and optimization of performance in communications systems.



- Once you have selected the frequency, click on Channel Power and turn ON
- Select the time bar to monitor Current is recommended
- Select Channel Number
- If necessary we can change the CH BW and SG BW parameters

**13.Clock Select:**The "Clock Sel" (clock select) function in a spectrum analyzer is an option that allows you to synchronize the analyzer with an external clock signal. This feature is essential to ensure that the analyzer operates consistently and accurately, especially when analyzing signals that require precise timing (this feature is not used in TSCM but in technical laboratory analysis)



**14.Analog Demo:** It is used to extract the original signal from a modulated signal, specifically in the cases of analog modulation such as Amplitude Modulation (AM) and Frequency Modulation (FM). This function is essential in the context of receiving and analyzing analog radio signals and communications.

Main features of the Analog Demod function:

**Basic Signal Extraction:**The function allows to restore the original signal (or information) that was superimposed on a carrier during the modulation process, allowing a clear view of the transmitted information.

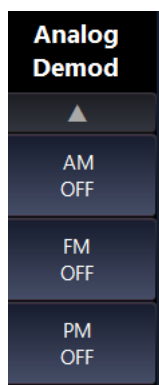
Modulation Types Supported: Designers generally support several forms of analog modulation, such as AM and FM. The demodulation type you select depends on the type of signal you are analyzing.

**Demodulated Signal Display:** Once the signal is demodulated, it can be displayed directly on the spectrum analyzer or oscilloscope, providing relevant details, such as amplitude, frequency and waveform.

**Performance Analysis:** Allows you to evaluate the characteristics of the original signal, such as signal quality, distortion, and the presence of noise or interference, facilitating the diagnosis of problems and improving the design of communication systems.

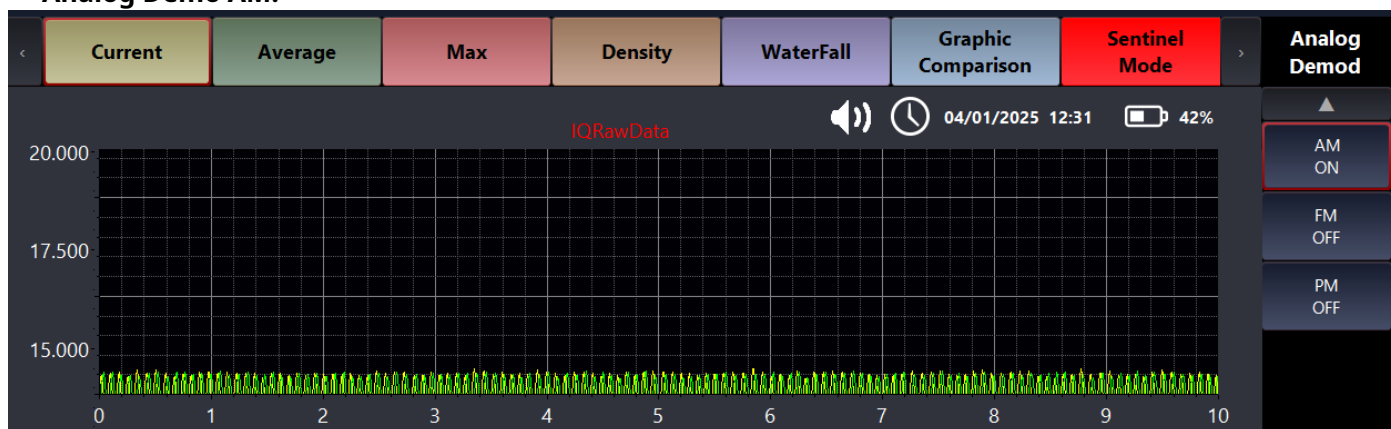
**Practical Applications:** This function is essential in many contexts, such as receiving AM/FM/PM radio broadcasts, verifying signals in communication systems, and testing radio and television equipment.

In summary, the Analog Demod function of a spectrum analyzer is a key tool for analyzing modulated signals, allowing to recover and study the original information content of a signal, facilitating monitoring and diagnostics in communication systems.

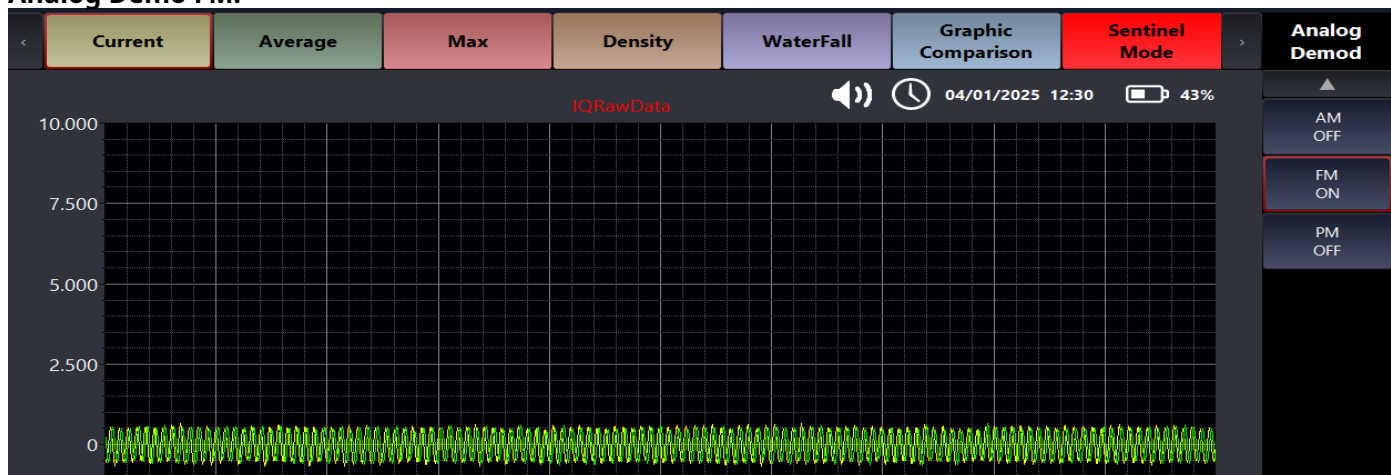


Click ON on the Demodulation to activate after setting the frequency manually

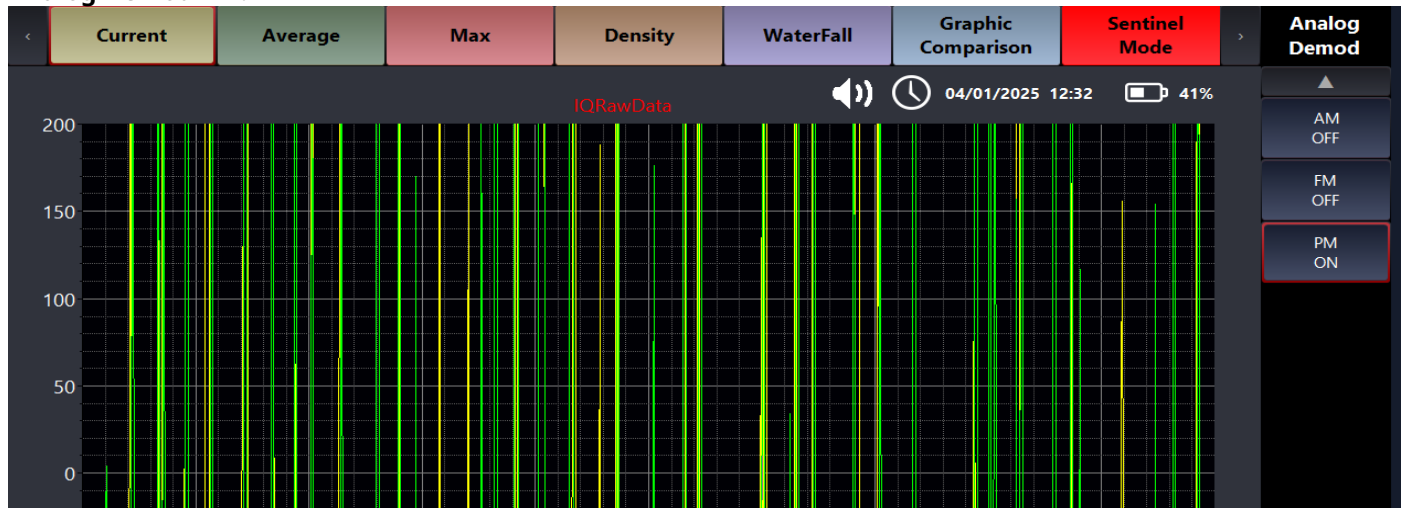
#### Analog Demo AM:



#### Analog Demo FM:



## Analog Demod PM:



**15. Analog Digital:** is used to extract modulated digital signals from a carrier wave. This function is particularly important in the reception and analysis of digital signals, such as those used in wireless communications, data transmission systems, and modems.

### Main features of the Digital Demod function:

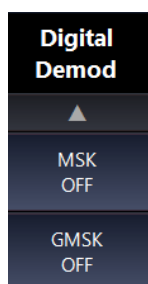
**Digital Signal Extraction:** Digital demodulation allows you to recover the original data from a modulated signal. These can be signals modulated in techniques such as Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK) and Quadrature Amplitude Modulation (QAM).

**Viewing Results:** The spectrum analyzer provides the ability to view the demodulated signal in real time, often as a waveform or eye diagram to analyze the signal performance.

**Signal Performance Analysis:** Digital demodulation allows you to evaluate the quality of the decoded signal, including the analysis of parameters such as Bit Error Rate (BER), and the presence of noise or distortion. This is useful for optimizing transmission systems and for troubleshooting.

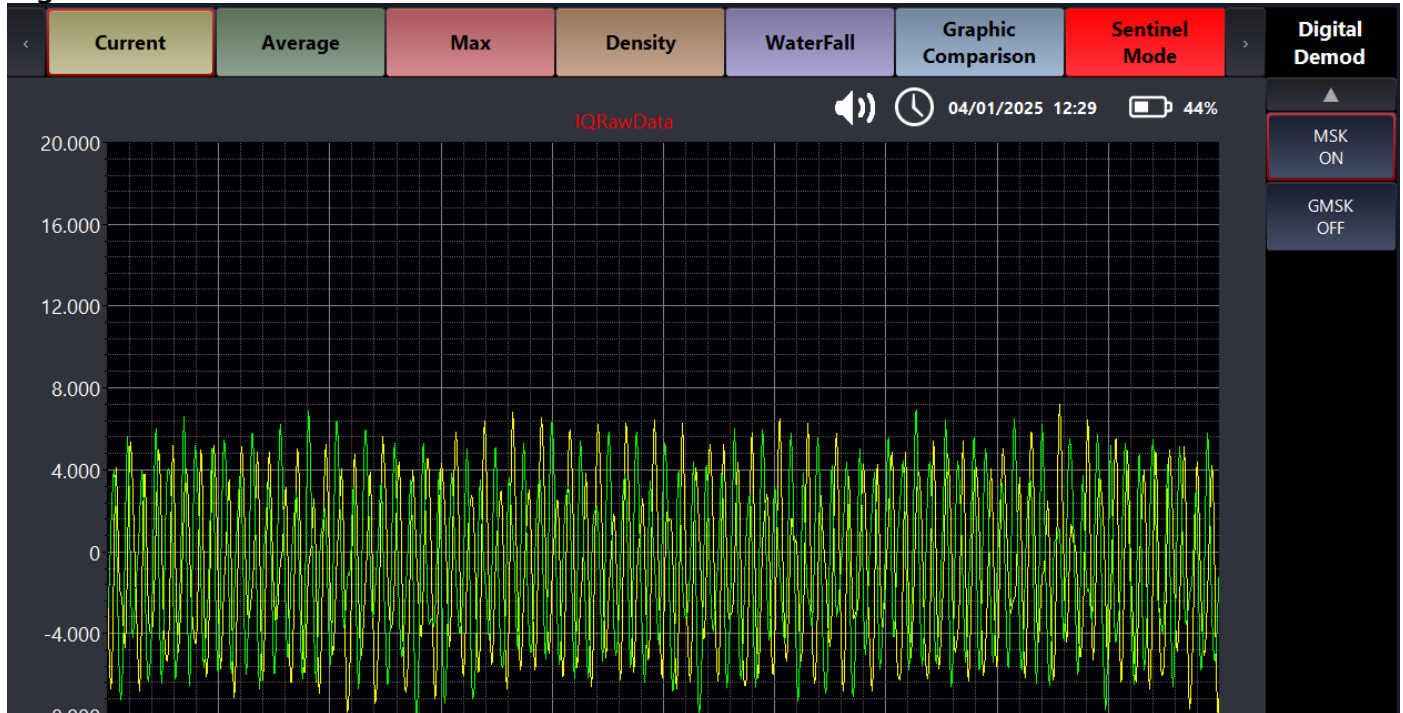
**Practical Applications:** Digital Demod is essential in many contexts, including mobile communications, wireless networks, satellite communication systems and telecommunications, where the transmission of digital information is common.

In summary, the Digital Demod function of a spectrum analyzer is a crucial component for analyzing and verifying digital signals, facilitating the understanding of transmitted data and improving performance in digital communication systems.

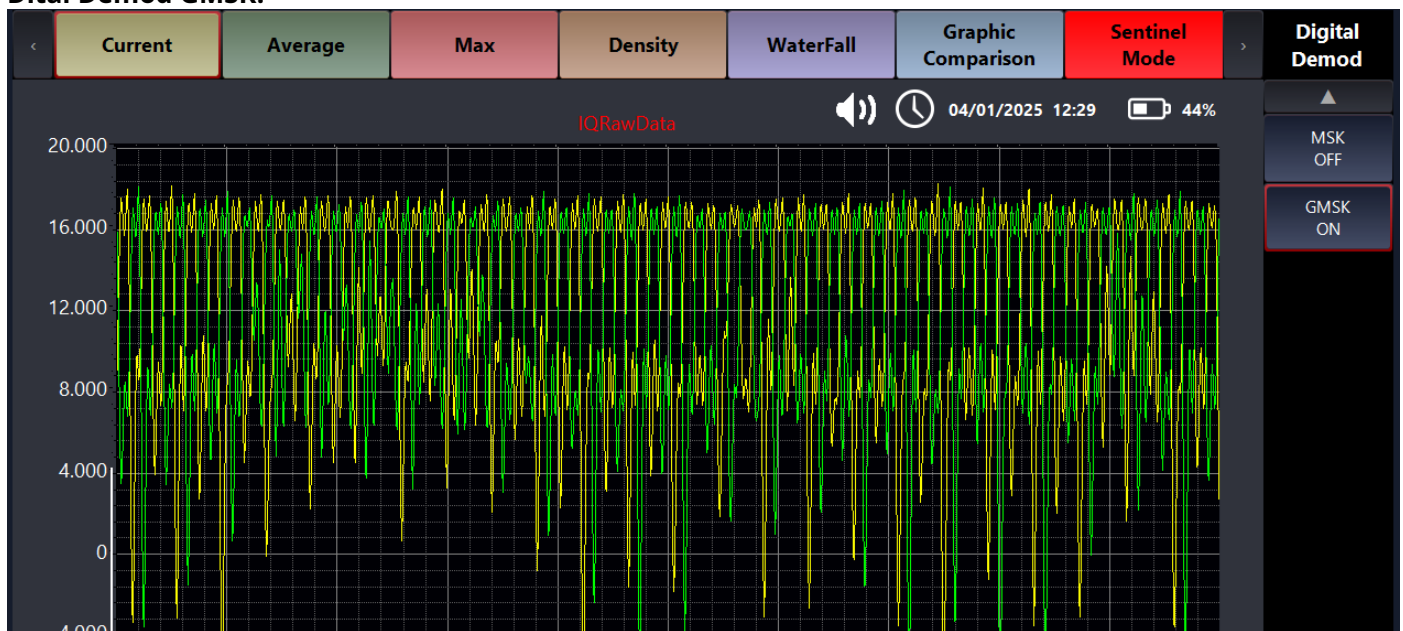


Click ON on the Demodulation to activate after setting the frequency manually

## Digital Demo MSK:



## Digital Demod GMSK:



**16.Phase Demo:** (phase demodulation) in a spectrum analyzer is used to extract the information contained in a phase-modulated signal, as in the case of phase shift keying (PSK). This modulation mode uses variations in the phase of the carrier signal to represent the data.

### Main features of the Phase Demod function:

**Phase Information Extraction:** Phase demodulation allows to recover the original information encoded in the phase variation of the transmitted signal. This function is essential for signals that use techniques such as PSK (e.g. BPSK, QPSK).

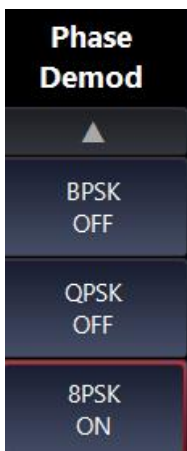
**Data Decoding:** Once demodulated, the signal is converted into a comprehensible format, allowing the original data that was transmitted to be viewed and analyzed.

**Viewing Results:**The analyzer provides advanced visualization opportunities for the demodulated signal, allowing engineers to examine the waveform and other key parameters.

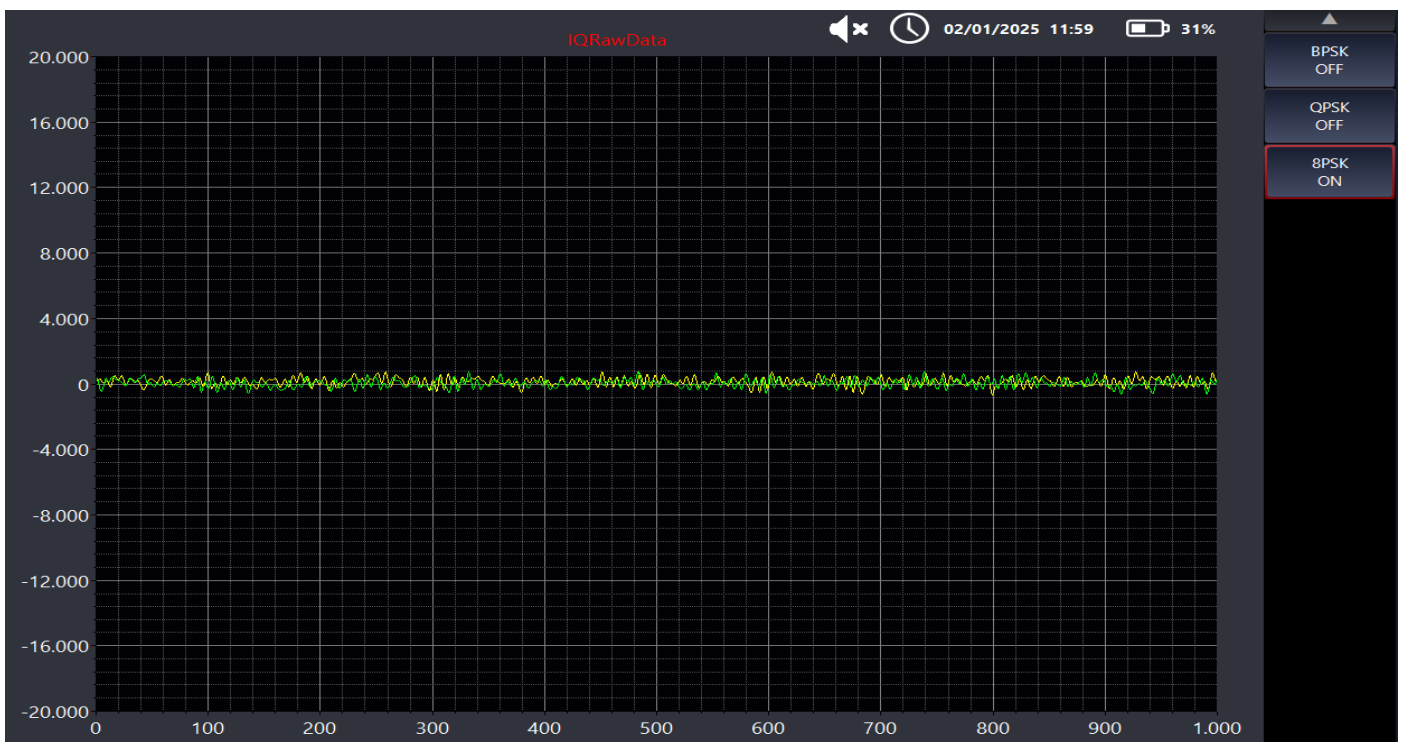
**Signal Performance Analysis:**The function allows to measure the quality of the demodulated signal, including parameters such as Bit Error Rate (BER) and the robustness of the signal against noise and interference. This is essential to ensure that the communication system operates at optimum performance.

**Practical Applications:**Phase demodulation is commonly used in digital radio communications, satellite communication systems, and numerous telecommunications applications where it is necessary to transmit data efficiently and robustly.

In summary, the Phase Demod function of a spectrum analyzer is crucial for the analysis of phase-modulated signals, facilitating the recovery and understanding of digital information transmitted through variations in the phase of the signal. This tool is particularly useful for ensuring quality and reliability in modern communications.



Click ON on the Demodulation to activate after setting the frequency manually



17. **Demo Setup:**(demodulation setup) is a critical step where the user sets the parameters needed to demodulate specific signals. This function is crucial to ensure that the signal is demodulated correctly and that the transmitted information is extracted accurately.

### Main features of the Demod Setup function:

**Modulation Type Selection:**At this stage, the user can choose the type of modulation to demodulate, which can include analog modulations such as AM and FM, or digital modulations such as PSK, FSK, or QAM.

**Setting Parameters:**It allows you to configure the different demodulation parameters, such as carrier frequency, symbol rate, modulation level and other technical details specific to the type of signal being analyzed.

**Sampling Rate:**Allows you to set the sampling frequency, which is essential to ensure correct data acquisition during the demodulation process.

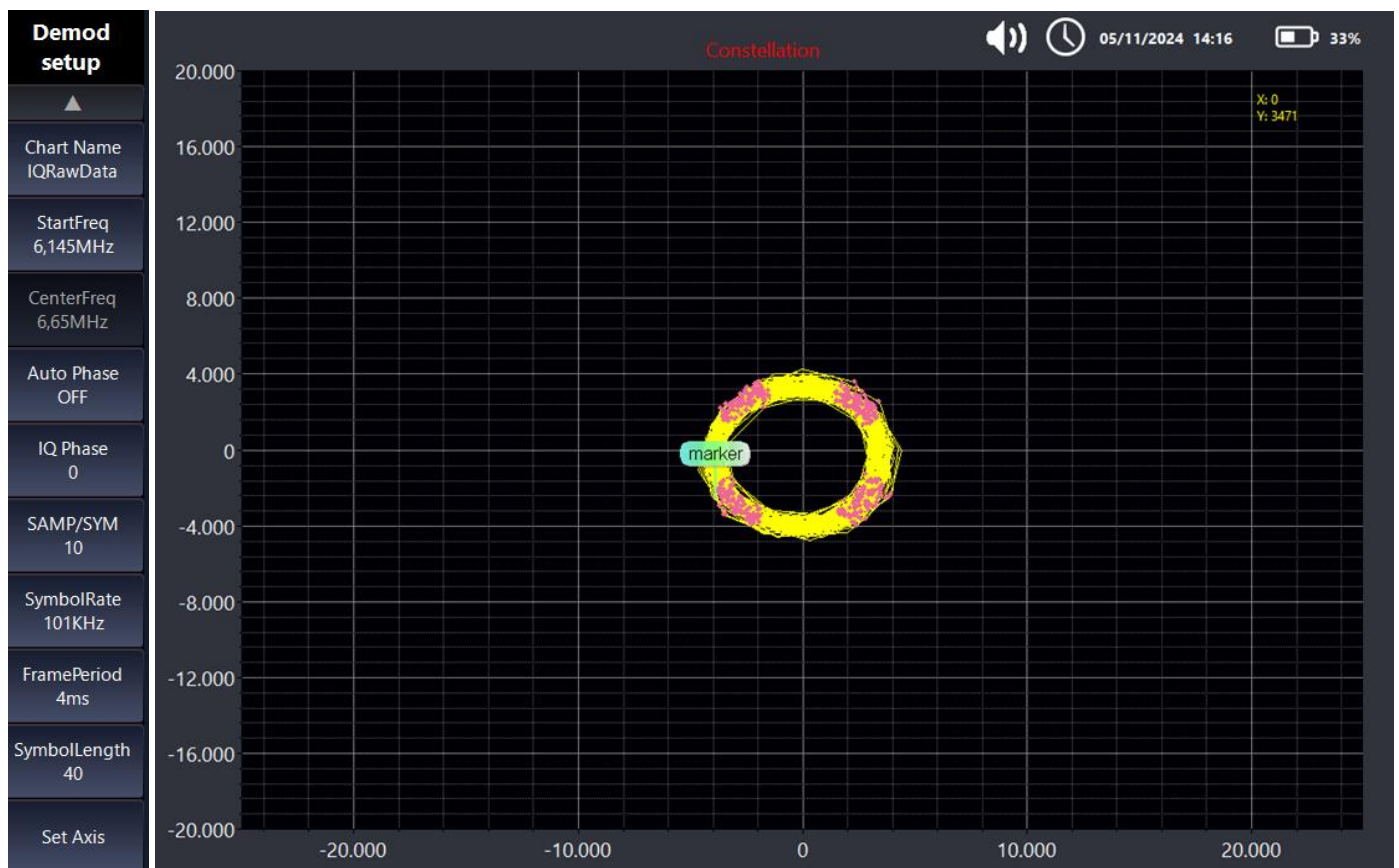
**Filters and Decoding:**This may include activating specific filters and decoding settings, which help improve the quality of the demodulated signal and reduce noise.

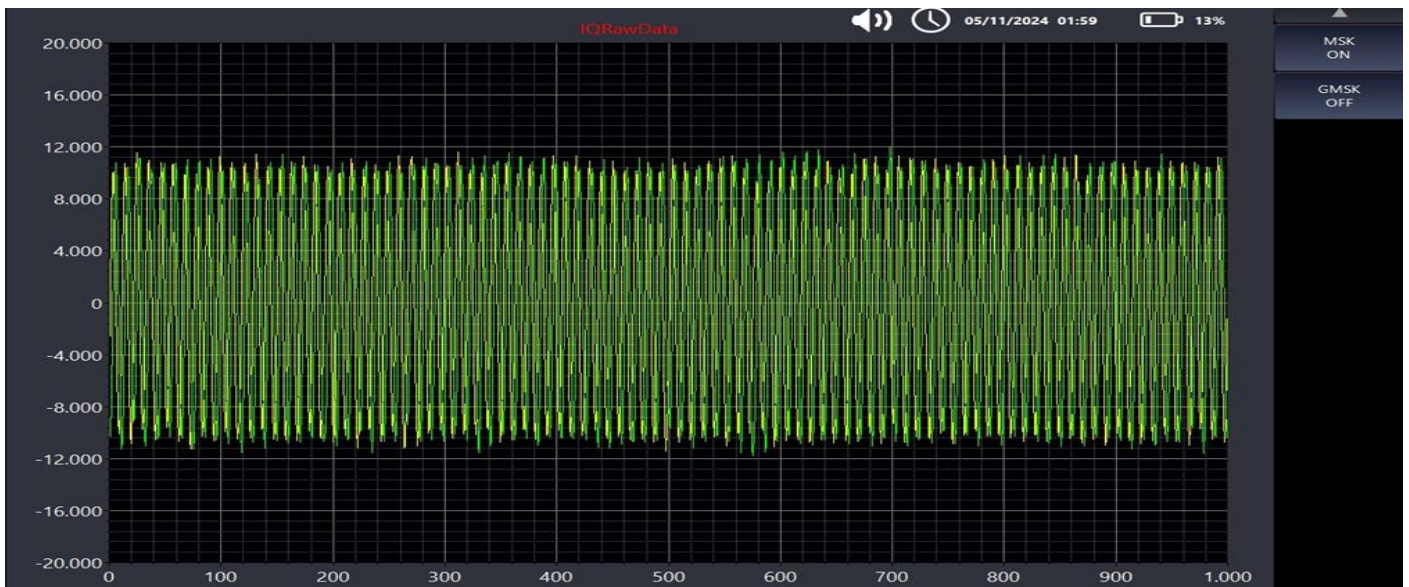
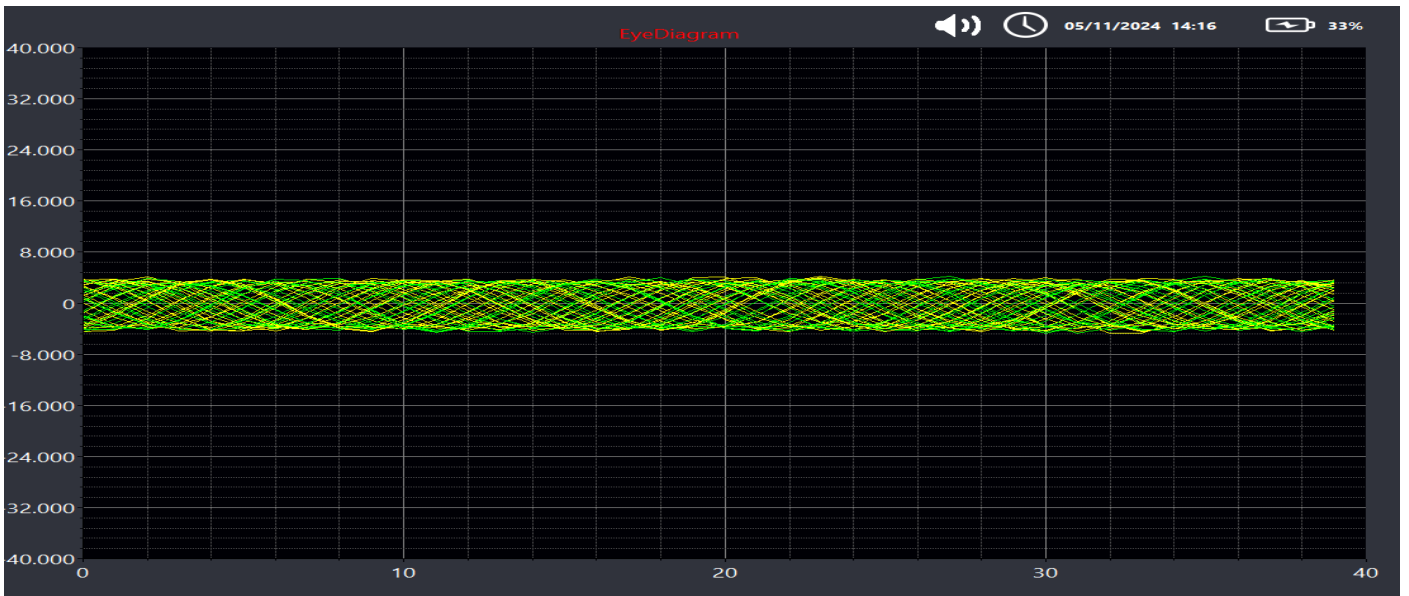
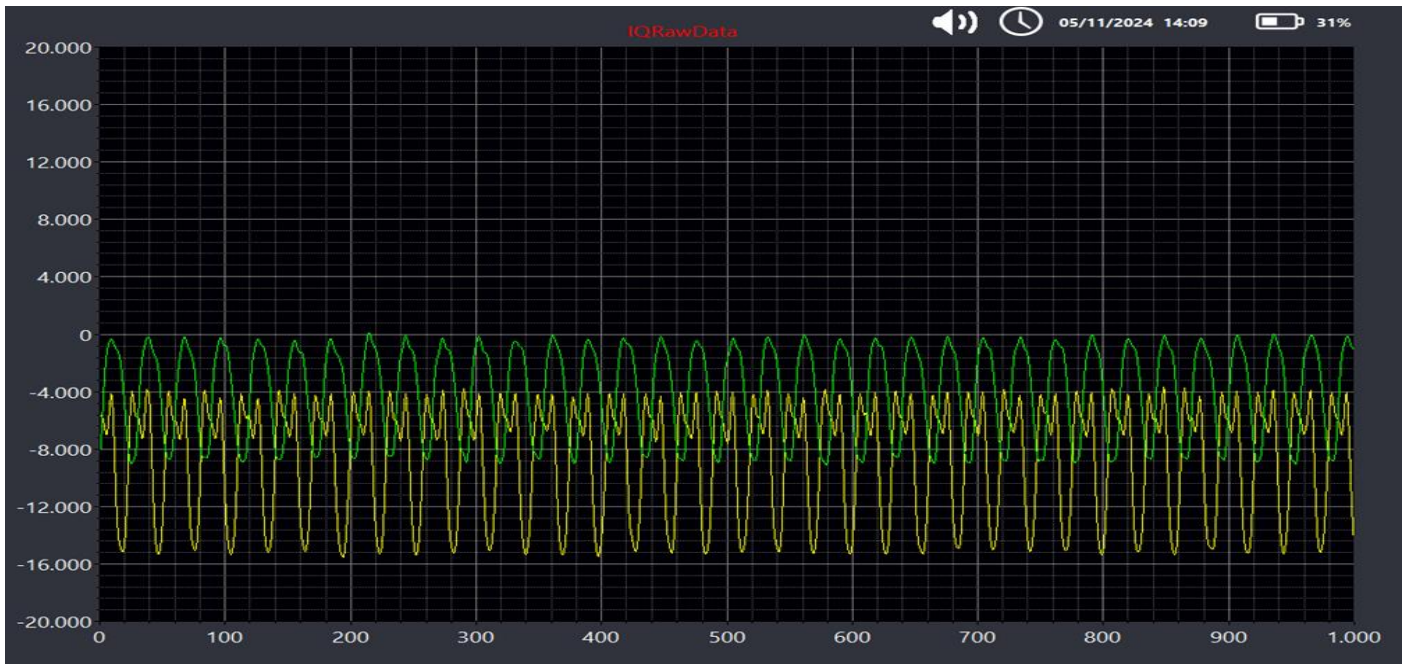
**Viewing and Monitoring:**Once configured, the spectrum analyzer can display the demodulated signal in real time, allowing the user to monitor the input and verify that the settings are correct.

**Performance Analysis:** After configuration, the analyzer allows measurements and analysis of signal performance, such as Bit Error Rate (BER) and overall quality of the demodulated signal.

**Chart Mode:**we can choose different graphic modes such as **EVM - EyeDiagram - Constellation**

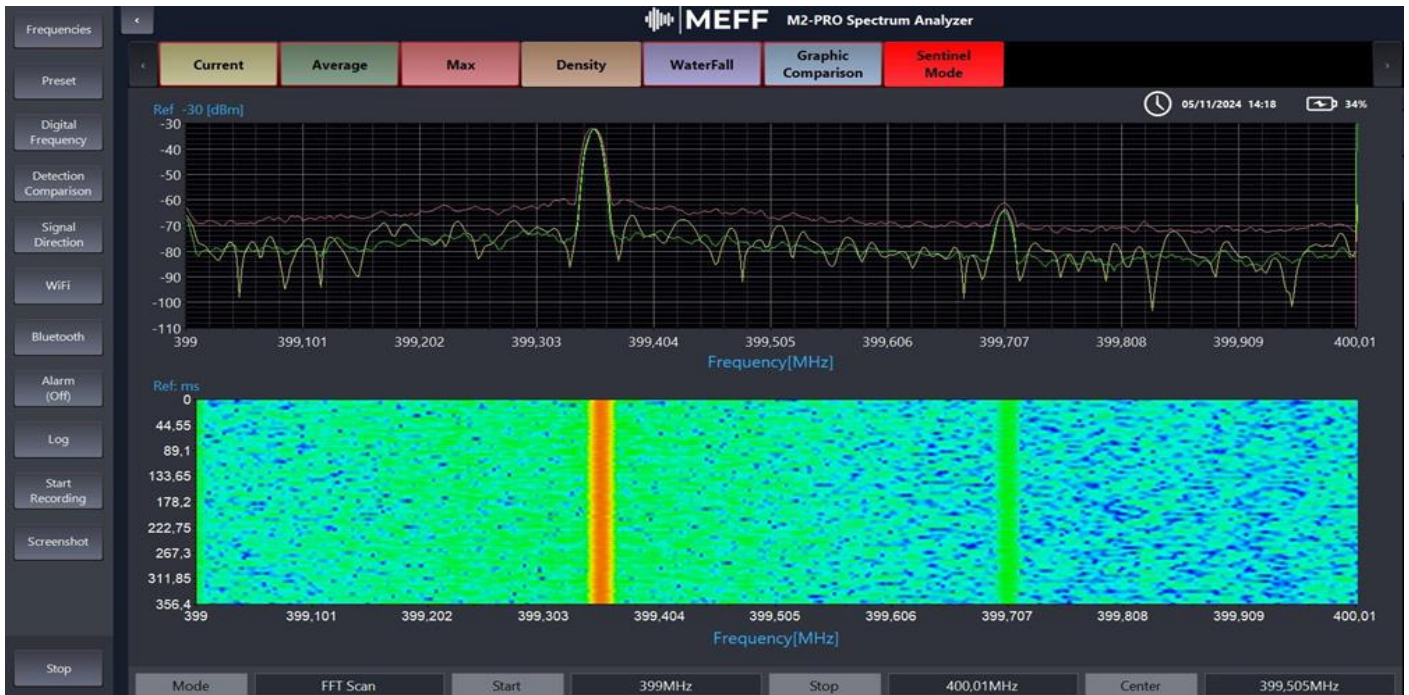
In summary, the Demod Setup function of a spectrum analyzer is critical to ensuring that the signal is analyzed correctly, by setting the key parameters that influence demodulation and allowing the correct extraction of information from complex signals.







## Controlling the M2-PRO device remotely



The remote control function in the M2-PRO device allows users to access and manage the instrument from a remote location over a network using third-party software. This feature is especially useful in environments where remote control can improve efficiency and facilitate operations.

### Main features of M2-PRO remote control function:

**Remote Access:** Users can control the device and view measurement results from a computer or mobile device, without having to be physically present at the instrument.

**Remote User Interface:** Using dedicated software or web interfaces, users can navigate configuration options, initiate measurements, and view real-time data.

**Configuration and Settings:** You can change instrument settings, such as center frequency, bandwidth, reference levels and demodulation settings, directly remotely.

**Data Acquisition:** Users can initiate data acquisition and recording procedures, monitoring results and analysis from a central location, which is useful for continuous signal monitoring or extended experiments.

Alarm	Date and time	Min threshold (dBm)	Max threshold (dBm)	Value (dBm)	Frequency
!	05/11/2024 01:32:20	-50	-40	-45.05	5180.66MHz
!	05/11/2024 01:32:21	-50	-40	-48.75	5168.67MHz
!	05/11/2024 01:32:22	-50	-40	-49.24	5168.67MHz
!	05/11/2024 01:32:23	-50	-40	-48.74	5168.67MHz
!	05/11/2024 01:32:24	-50	-40	-48.57	5168.67MHz
!	05/11/2024 01:32:26	-50	-40	-48.24	5168.67MHz
!	05/11/2024 01:32:27	-50	-40	-49.05	5172.66MHz
!	05/11/2024 01:32:28	-50	-40	-44.01	807.49MHz
!	05/11/2024 01:32:29	-50	-40	-42.97	267.83MHz
!	05/11/2024 01:32:29	-50	-40	-35.80	335.79MHz
!	05/11/2024 01:32:30	-50	-40	-42.70	267.83MHz
!	05/11/2024 01:32:30	-50	-40	-35.79	335.79MHz
!	05/11/2024 01:32:32	-50	-40	-41.96	267.83MHz
!	05/11/2024 01:32:32	-50	-40	-39.96	291.82MHz
!	05/11/2024 01:32:33	-50	-40	-41.41	267.83MHz
!	05/11/2024 01:32:33	-50	-40	-36.52	355.78MHz
!	05/11/2024 01:32:34	-50	-40	-41.40	267.83MHz
!	05/11/2024 01:32:34	-50	-40	-34.65	335.79MHz

**Technical Support:** Remote control also facilitates team collaboration and technical support, allowing MEFF technicians to troubleshoot issues or provide assistance on specific features without being physically present.

**Updates:** Thanks to the remote function, the M2-PRO device will be able to receive updates automatically

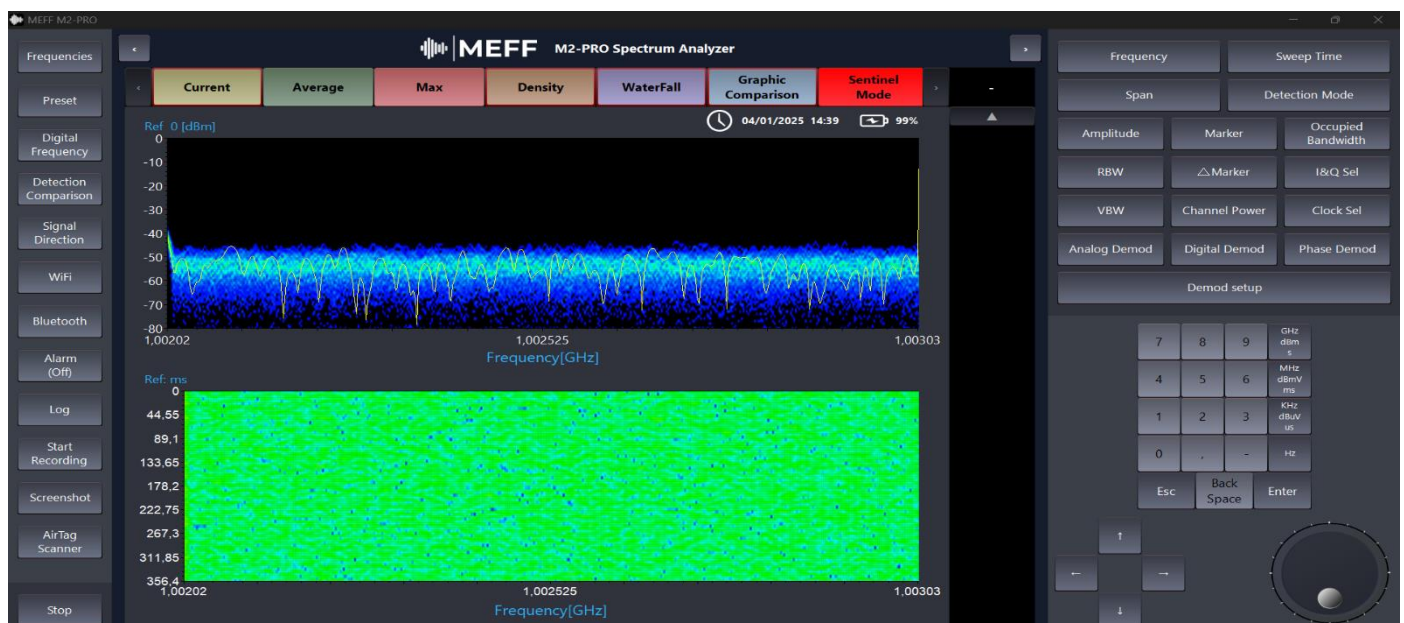
**Safety:** Remote connections are protected by security measures, such as data encryption and user authentication, to ensure the integrity and confidentiality of measurements.

## Using the Remote Control Function

To use remote control of the M2-PRO device via AnyDesk Professional, follow these instructions:

- Any Desk Professional is already installed on the M2-PRO device
- Download AnyDesk on the PC you want to use for remote control: <https://anydesk.com/it/downloads/windows>
- Launch AnyDesk on your computer. Once opened, you will see an AnyDesk ID on the main application panel.
- To connect to the device, enter the AnyDesk ID shown on the remote device of the M2-PRO into the "Enter AnyDesk address" field on your PC and click "Connect".
- Accepting Connection: Once the connection request has been made, the user on the M2-PRO device will need to accept the request. From this point on, the M2-PRO is programmed to automatically accept the request every time it is requested.
- Remote Control: Once the connection is accepted, you will have full access to the M2-PRO device and will be able to control the device as if you were physically present in front of it. You will be able to take measurements, change settings and view the results in real time.

This configuration enables efficient support and remote management of the MEFF M2-PRO device, facilitating service and optimization of operations.



**Dimensions and weight:**

- 14.37 inches (Length)  $\approx$  36.5 cm
- 9.45 inches (width)  $\approx$  24 cm
- 1.50 inch (height)  $\approx$  3.8 cm
- 8.38 lbs



**Included in the custom military-grade carrying case:**

- M2-PRO Device
- Shoulder strap
- 3 antennas
- Charger
- Probe 220v
- Probe 12v-3.7
- LAN Splitter
- 2 LAN and telephone cables

