

**WAM-X25**  
**Wireless Activity Monitor**  
**Cellular 2G/3G/4G/5G - 2.4GHz/5GHz Wi-Fi/Bluetooth Wideband**  
**0-14 GHz – Wi-Fi Network & Bluetooth Analyser Instruction**  
**Manual**



## INTRODUCTION

The WAM-X25 Wireless Activity Monitor is a compact tablet-style, multi-band Radio Frequency (RF) signal detector for handheld or desktop use. It is designed for detection and logging transmissions from all types of radio frequency devices. The WAM-X25 provides complete coverage and logging of all activity in the surrounding area.

Features:

- 0-14 GHz Wideband Channel for maximum detection capability of all types of RF devices – detected frequency displayed (up to 6 GHz)
- Up to 10 separate user programmable cellular bands, for worldwide detection of the latest generation of super-fast 5G devices (as well as existing 2G, 3G & 4G) such as Phones and GPS Vehicle/Asset Trackers.
- Separate 2.4 & 5 GHz channels for detection of signals from Wi-Fi, Bluetooth and other band sharing devices such as covert video cameras.
- Independent Wi-Fi Network (2.4 & 5GHz) & Bluetooth Analysers to provide detailed activity information about WLAN networks in the surrounding area such as Hotspots, Wi-Fi cameras and Bluetooth devices.
- Direction Find function for pin-pointing RF signal sources using supplied directional antenna.
- 7-inch TFT Screen to provide detailed information and enable the user to view both live signals and logged signals simultaneously.



## CHARGING THE BATTERY

The WAM-X25 has an internal Lithium Polymer battery pack. Before use connect the supplied 5V charger (Micro USB) to the socket marked '5V DC' on the side of the unit. If possible, charge the WAM-X25 whilst the power is off as this will result in a faster charge. When charging the red charge LED will illuminate. When the charge is complete the green LED will illuminate. Depending on the condition of the battery the charge will take up to 4 hours. Use only the specified charger and cable provided with the unit.

## RETRACTABLE LEGS

The WAM-X25 features two retractable legs that can be extended to provide a better viewing angle for desktop use. For handheld use the legs can be stowed flush within the unit.

## ANTENNA CONNECTION

Connect the supplied black hinged antennas to the gold 'ANT WIDE' & 'ANT CELL' connectors at the top of WAM-X25. These are omni-directional wideband antennas for general use and are fitted by screwing the antenna base/nut clockwise onto the antenna socket until finger tight. Once fitted the antennas are designed to freely rotate to allow movement or angle adjustment when in use.



## OPERATING THE WAM-X25

### POWER ON/OFF

To switch on the WAM-X25 press and hold the Power Symbol button for 1 second and then release. The display will momentarily show the start-up screen and then the main live monitoring screen. To switch off the unit press the Power Symbol button for more than 2 seconds.

### SETTING TIME & DATE

Before first use set the Time & Date by pressing the SETTINGS button. Then scroll to the Time & Date option and press OK. Use the UP/DOWN buttons to select the correct date and time values pressing OK after each parameter is set. Use the date format DD / MM / YY and time in 24 Hour format HH / MM. When complete confirm by pressing the SETTINGS button.

### REGION SELECTION

The WAM-X25 can be used worldwide. Before use select the region of use. Press SETTINGS and scroll down to Location. Then keep pressing OK until the required Location region is selected. Once selected press SETTINGS to confirm. The unit will then shut down and restart with the selected region settings.

### MAIN/SPLIT SCREEN

The main WAM-X25 screen shows displays any live detected signals. There are up to 13 separate RF channels operating simultaneously to provide maximum detection capability: 1 Wideband (0-14Ghz), Up to 10 (depending on Region) Cellular (2G,3G,4G,5G) and 2 Wi-Fi/Bluetooth etc. (2.4 and 5Ghz). Each band has a 20-element bar graph running vertically. The stronger the detected signal the more bars illuminate. This will help locate the precise source of any detected signal. At the top left of the screen the Time, Date Location and Region are displayed. To the top right of the screen the battery level indicator is shown.



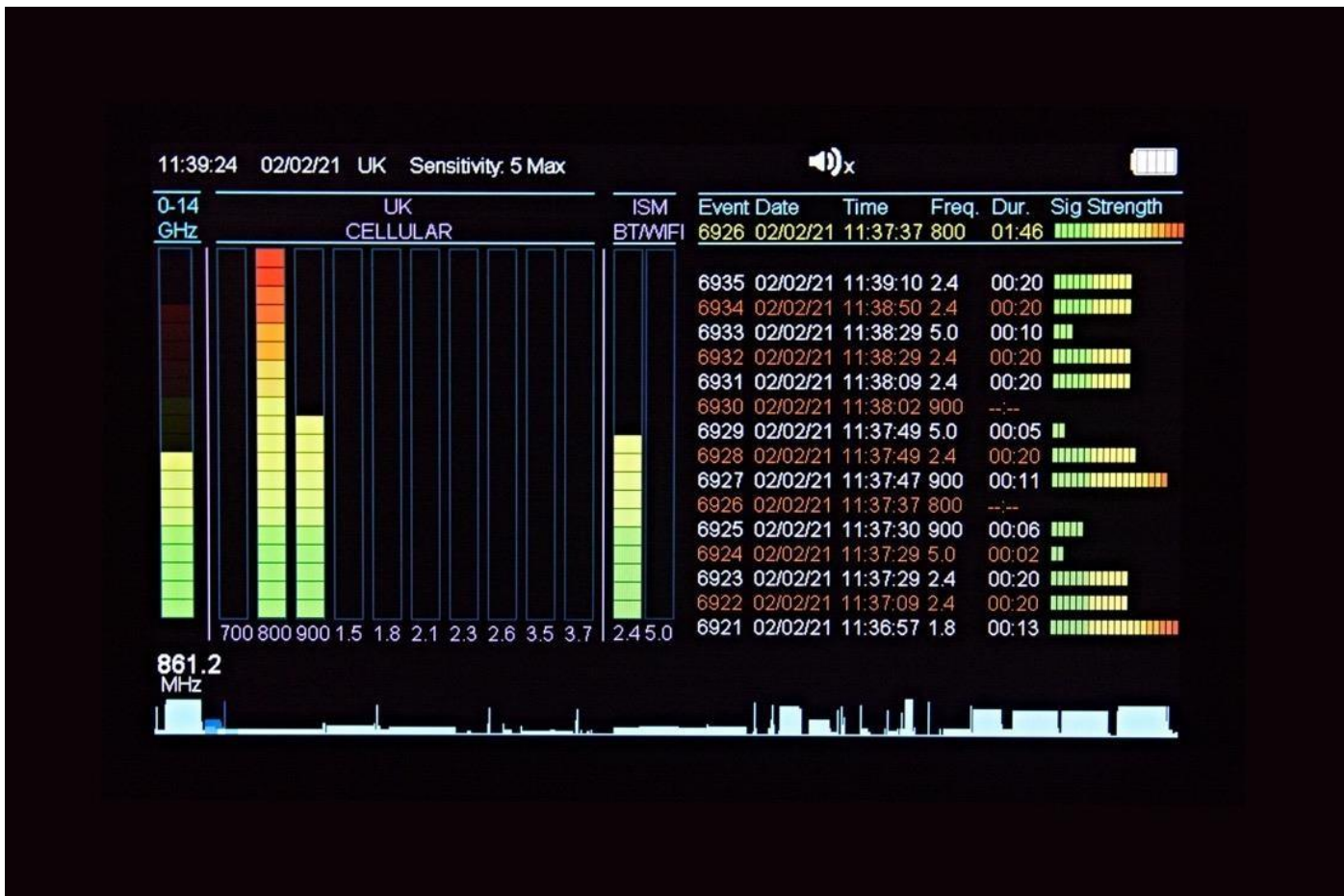
Main screen of the WAM-X25 showing live detected signals

## SPLIT SCREEN

To select Split Screen Mode, press the MAIN-SPLIT button. The screen will now split into two halves, left showing all the live detected signals and right showing the detected events log list.

The WAM-X25 has a built in 10,000 Event memory for all detected bands. This is particularly useful if the user wishes to leave the unit in situ and return later to monitor detected signals or in busy RF environments where multiple simultaneous detected signals can occur.

Events are numbered from 0000 to 9999 with the most recent event displayed at the top of the list. By pressing the UP/DOWN buttons the user can manually scroll through logged events. The Event number, Time, Frequency, Duration, and Maximum Signal Strength are displayed. To scroll quickly press and hold the UP/DOWN buttons.



Split screen of the WAM-X25 showing live detected signals (left) and Event Log of detected signals (right)

### 'LIVESCAN'

To help analyse the type of signal being detected the WAM-X25 features 'Livescan', a fast-sweeping signal analysis of the WIDE channel (left) that is displayed along the bottom of the MAIN/SPLIT screen in blue. The Livescan trace runs along the bottom of the screen approximately once every 1-2 seconds and shows the amplitude of the detected signal. This can be useful when trying to determine the signal type, whether it be analogue, digital, or pulsing bursts from a tracking device etc. Gaps in the trace indicate a pulsing digital signal, large gaps potentially pointing towards a 'burst' type device such as a GPS tracker. A smooth flat trace with no gaps indicates an analogue constant carrier signal.

### SENSITIVITY ADJUSTMENT

The WAM-X25 has five sensitivity levels that can be adjusted to suit the range of detection required. From the main screen press the SENSITIVITY button. The sensitivity setting (displayed at the top of main screen) will momentarily change colour to red. Use the UP/DOWN buttons to adjust the sensitivity. Please note: at sensitivity 4 or 5 (Max)

in very close proximity to a strong detected signal it is possible co-channel interference may occur and a signal be shown on another adjacent band or harmonic.

## BEEP MODE

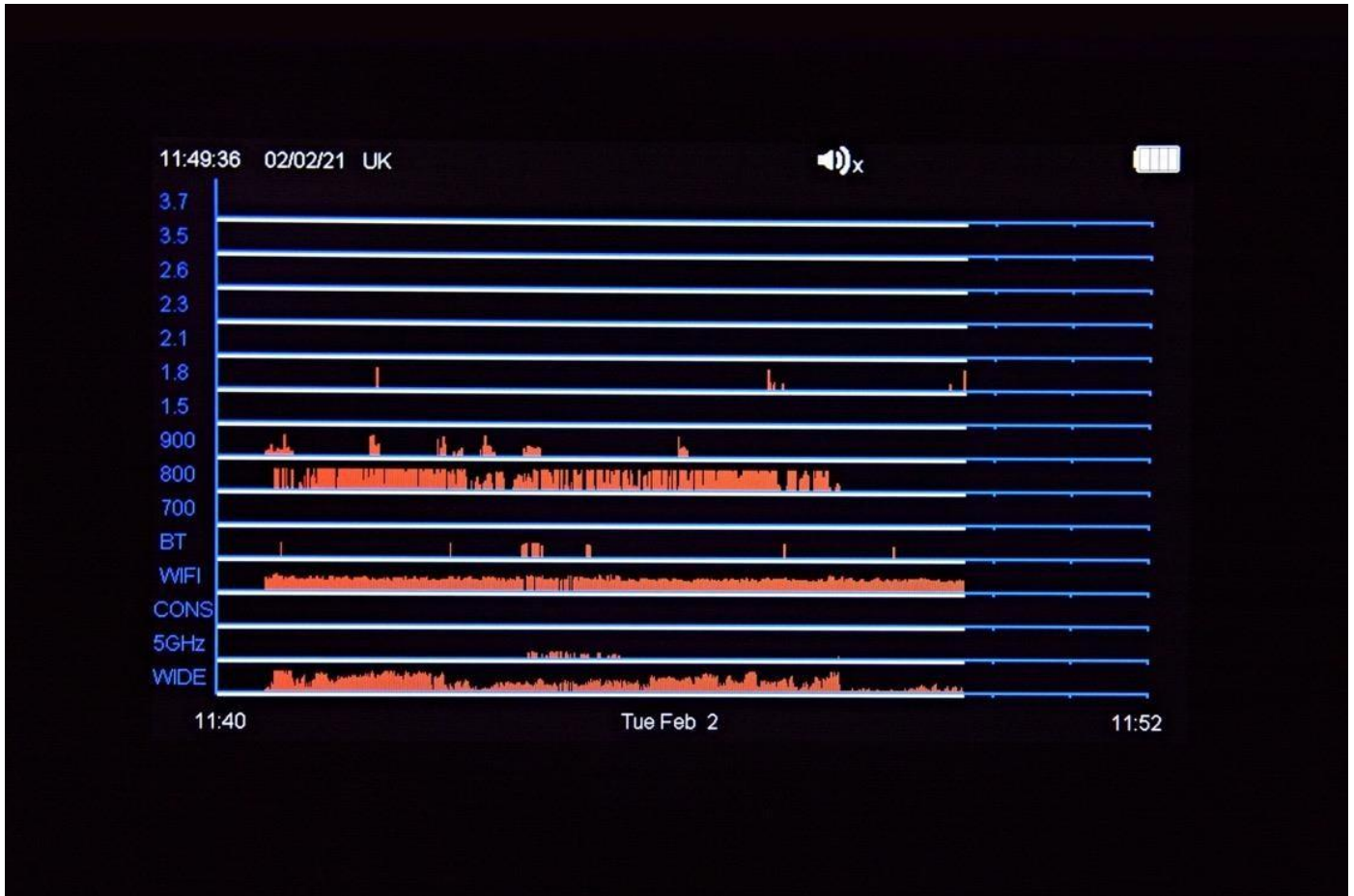
The WAM-X25 features an audible Beep tone that audibly represents the signal strength of any received signal to allow the user to monitor without looking at the display. The rate of the beep will increase with the detected signal strength. To switch the audible Beep Tone on or off press the BEEP button. The bell icon will be shown at the top of the main screen when Beep tone on is selected.

## AUDIO CONFIRMATION/ VOLUME

The WAM-X25 has an audio demodulation facility to allow the user to listen to any detected signals on the 0-14 GHz Wideband channel. To switch on the audio or adjust the volume, press the VOLUME button which will highlight the volume level bar at the top of the screen. Any detected signals will now be demodulated and heard through the internal speaker (or earphones if connected). Digital signals may be heard as clicks or buzzing sounds. Some analogue audio bugging devices can also be demodulated. If you speak closely to the suspect device or tap the enclosure you may hear your own voice or tapping. This confirms that the device you have found contains a microphone and is possibly some form of bugging device.

## LIVE GRAPH MODE

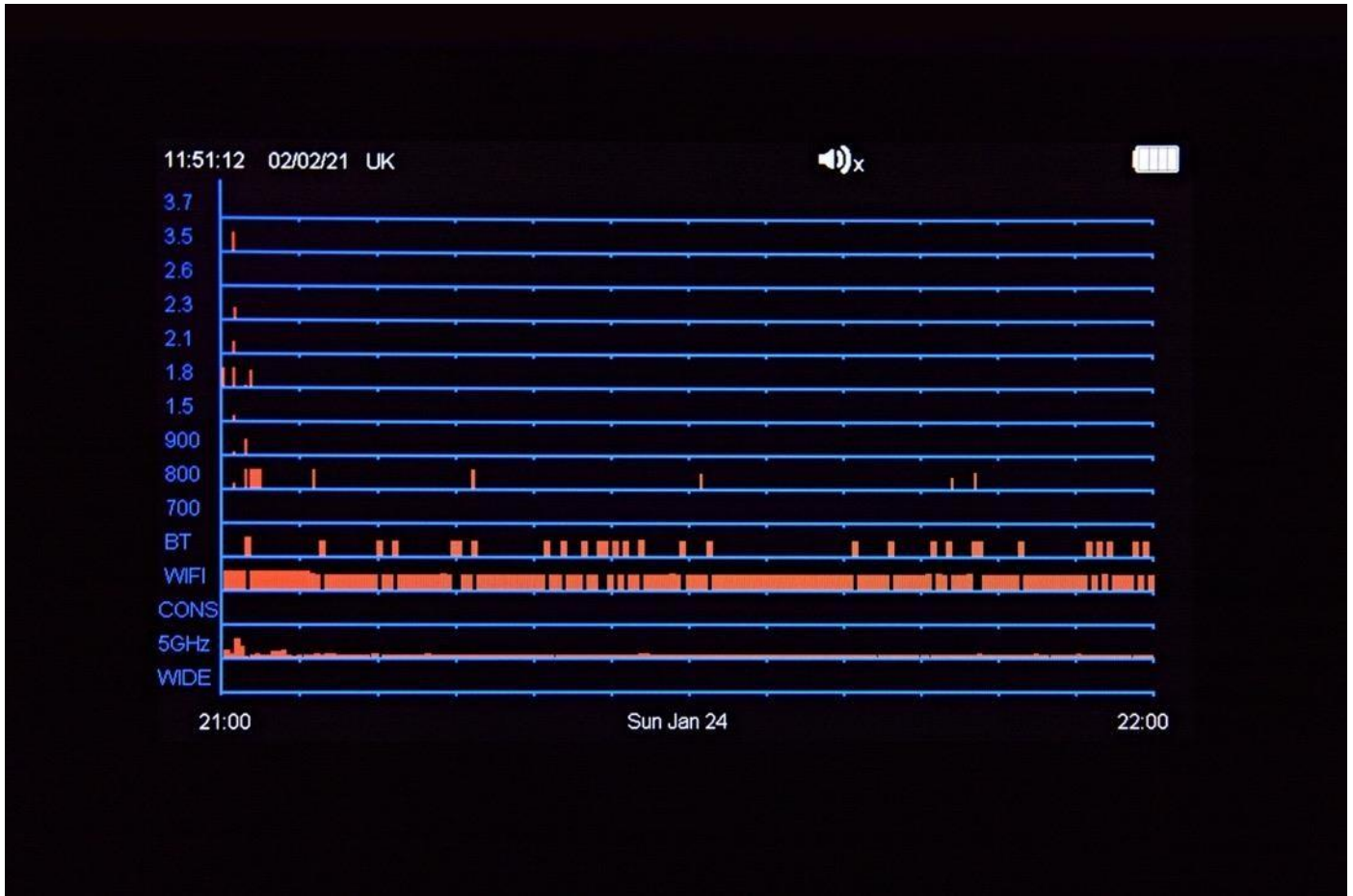
From the main screen press the LIVE GRAPH button to enter the live graph mode. The display will show a live graph of all detected events for each band over 12 minutes. Detected signals are shown as vertical red lines on the graph, the height representing the signal strength. The start time, end time and date of the graph are shown at the bottom of the display. As the time elapses a bold white line runs from left to right to show the time elapsed. This line will change colour to red as the 12 minutes is nearly elapsed to warn the user that the graph is nearly complete. The graph will stop plotting after 12 minutes. To repeat, press LIVE GRAPH to exit and LIVE GRAPH again to restart.



Live Graph Mode showing live detected signals over 12 minutes

#### LOG GRAPH MODE

From the main screen press the LOG GRAPH button to enter the log graph mode. The display will show a historical graph of all detected events for each band over 60 minutes. Detected signals are shown as vertical red lines on the graph, the height representing the signal strength. The start time, end time and date of the graph are shown at the bottom of the display. Use the LEFT/RIGHT buttons to scroll through each 60-minute historical graph. Please Note: If there is no detected event within a 60-minute period a Log Graph will not be stored.



Log Graph Mode showing historic detected signals over one hour WIFI

## NETWORK MODE

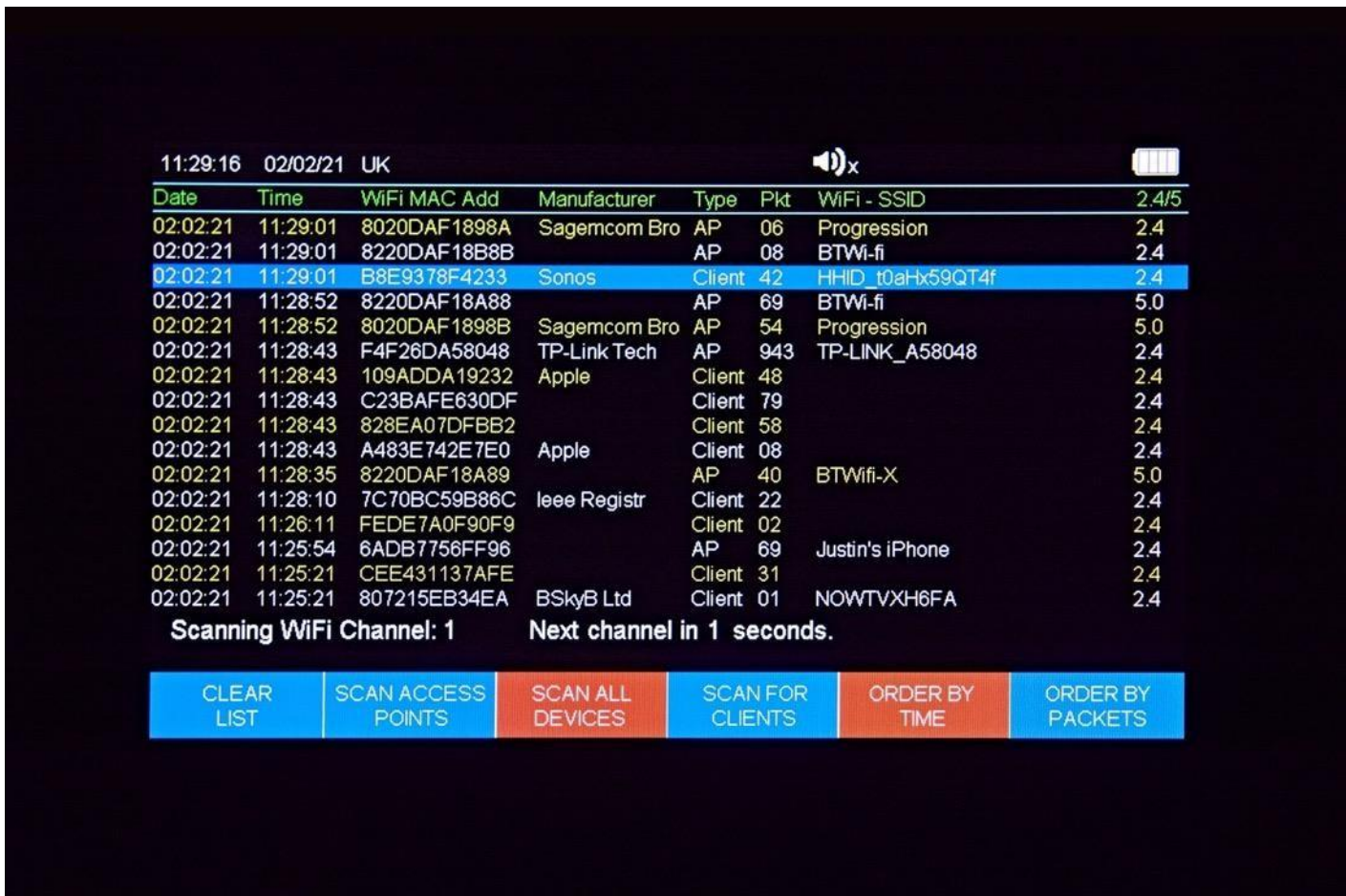
The WAM-X25 features an independent Wi-Fi network analyser to list local Wireless Access Points and Clients. The Wi-Fi network antenna is built-in to the left-hand side of the main unit.

From the main screen press the WIFI button to enter Wi-Fi mode. The WAM-X25 will start scanning through detected Wi-Fi Access Points/Clients and begin compiling a list.

From left to right the following information is listed:

Date & Time of Event, Wi-Fi MAC Address, Manufacturer (If available), Type (Access point or Client), Number of Data Packets detected, Wi-Fi SSID (If available) and band (2.4 or 5 GHz)

At the bottom of the main screen the 6 hot keys can be used to: Clear the list, Scan for Wi-Fi Access Points only (e.g. WLAN routers), Scan for all types of devices, Scan only for Clients (e.g. Phones, laptops, printers), Order networks by Time detected, order events by number of Packets detected, Order by Signal Strength (Access Points Only). To Reset Wi-Fi mode, select the CLEAR LIST hot key.



Wi-Fi screen showing a list of detected Wi-Fi Access Points & Clients BLUEOOTH

## DETECTION MODE

The WAM-X25 features a built-in Bluetooth analyser to list nearby Bluetooth devices. The Bluetooth antenna is built-in to the left-hand side of the main unit.

To enter Bluetooth mode, from the main screen, press BLUEOOTH. The WAM-X25 will start scanning for Bluetooth devices in the vicinity. Modern B.L.E (Bluetooth Low Energy Devices) such as Smartphones, Tablets, Bluetooth Earphones, Fitness trackers etc can be detected. Please note: Older generation 'Bluetooth Classic' devices may not be detected.

From left to right the following information is listed:

Date & Time of Event, Bluetooth MAC Address, Manufacturer (If available), Signal Strength in dBm and number of Data Packets detected,

At the bottom of the main screen the hot keys can be used to: Clear the list, Order devices by Time detected or order events by number of Packets detected. To reset Bluetooth network mode, select the CLEAR LIST hot key.



Bluetooth screen showing a list of detected Bluetooth devices

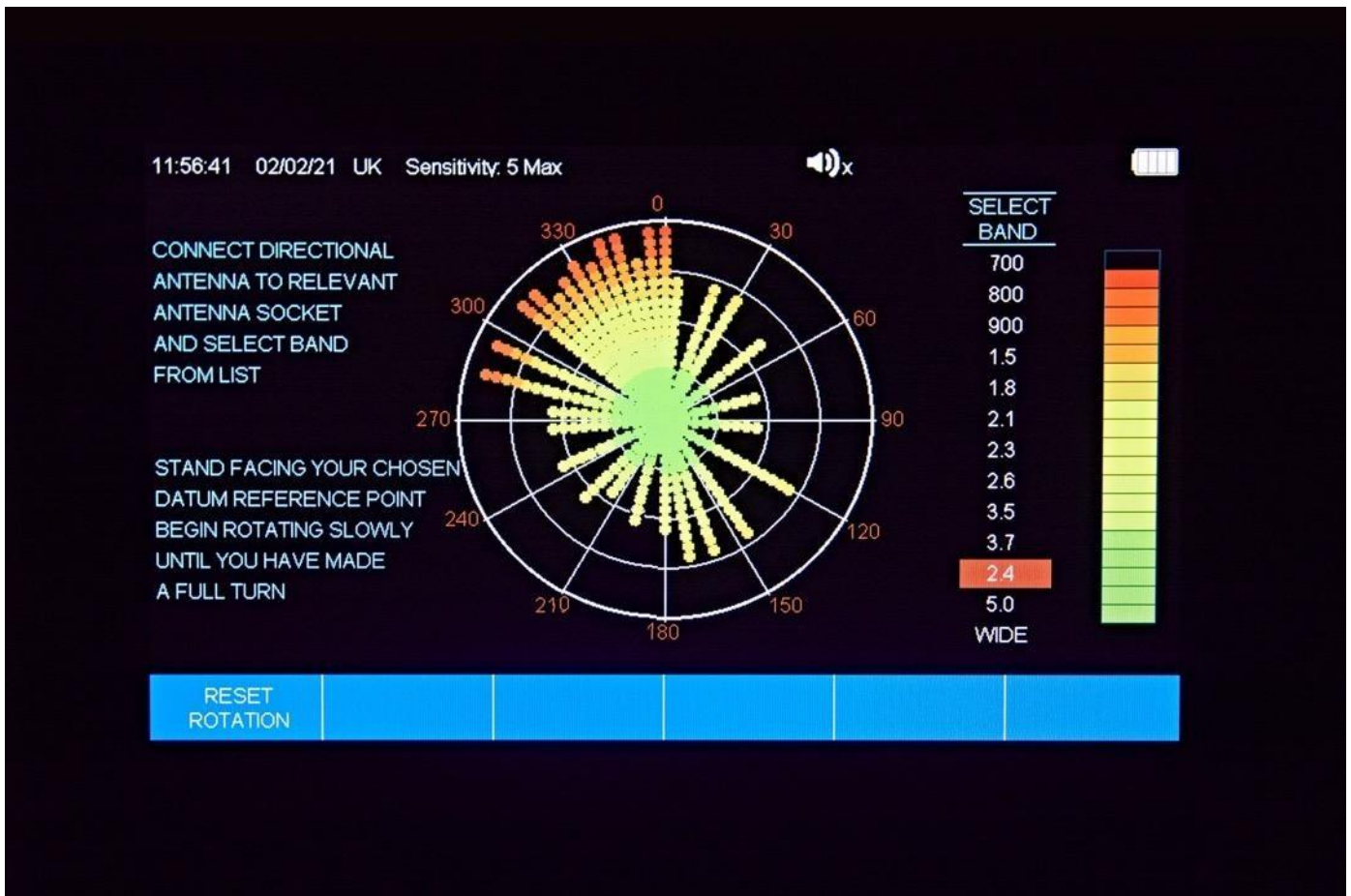
#### DIRECTION FIND MODE

Direction find mode enables the user to locate the source of a detected signal by rotating the WAM-X25 through 360 degrees.

Before use connect the LPA-14 (Blue) Directional Antenna to the required antenna socket: ANT WIDE if detecting on the Wideband Channel or ANT CELL/2.4/5 GHz for any other bands.

Hold the WAM-X25 in both hands so that it is positioned horizontally and stable. Press the DIRECTION FIND button. The message KEEP STABLE FOR DIRECTION CALIBRATION will be displayed.

Use the UP/DOWN buttons to select the band required to be detected from the list.



Direction Find screen showing 2.4 GHz signal detected, strongest at 270 to zero degrees bearing.

Stand facing your chosen datum reference point and begin to slowly rotate keeping the WAM-X25 as flat and stable as possible. The slower the rotation, the more signal information will be gathered. One 360 degree rotation should take around 10 seconds or longer. Each additional 360 degree rotation will gather more detected signal information and help provide a more accurate signal strength analysis. The stronger the signal at any given angle, the longer line will be from the centre point. Weakest signals start as green colours at the centre of the circle and then change to yellow, orange and red towards the outer circle for the strongest signals. Whilst rotating the live signal strength is shown on the vertical bar at the right hand side of the screen. To reset the rotation at any time press the hot key at the bottom of the screen RESET ROTATION.

#### DOWNLOADING LOG TO USB STICK

The Main Screen Event Log & Wi-Fi/Bluetooth Network logs can be downloaded to a USB stick for transfer to a computer for storage or viewing at a later date. To download the event log, enter the relevant screen that you wish to download the data from. eg. To download Wi-Fi Data, enter the WIFI screen. Connect the supplied USB stick into the 'USB Stick' socket on the side of the WAM-X25. The message 'USB DOWNLOAD – DO

NOT DISCONNECT!' will be displayed. The relevant log will then be downloaded to the USB Stick. Depending on the number of events in the log this may take several minutes. The Main Screen log will contain the Event number, Date, Time, Duration, Maximum Signal Strength, Band and Sensitivity setting. The Wi-Fi/Bluetooth Log will contain Date & Time of Event, WiFi/Bluetooth MAC Address, Wi-Fi SSID, Manufacturer (If available), Signal Strength in dBm and number of Data Packets detected. The filename will be made up of the date and time of the download. E.g. 31032042 would mean 31st March 2020 plus a random 2 digit number. The stored files can be viewed in Notepad, Word, Excel, Numbers etc. and displayed and sorted as required.

We recommend that the USB stick has no other data stored on it to ensure data is not corrupted. No responsibility will be accepted by the manufacturer for any technical problems/damage/loss of data caused by the connection/transfer of data from the WAM-X25 to any computer/storage device.

Please note: ONLY USB Sticks should be connected. Damage may result if other USB cables or devices are connected to the 'USB STICK' socket.



## SETTINGS

To enter the SETTINGS screen, press the SETTINGS button. Use the UP/DOWN arrow keys to scroll through the list:



Settings Screen

TIME & DATE SETTING: See SETTING TIME & DATE – Above

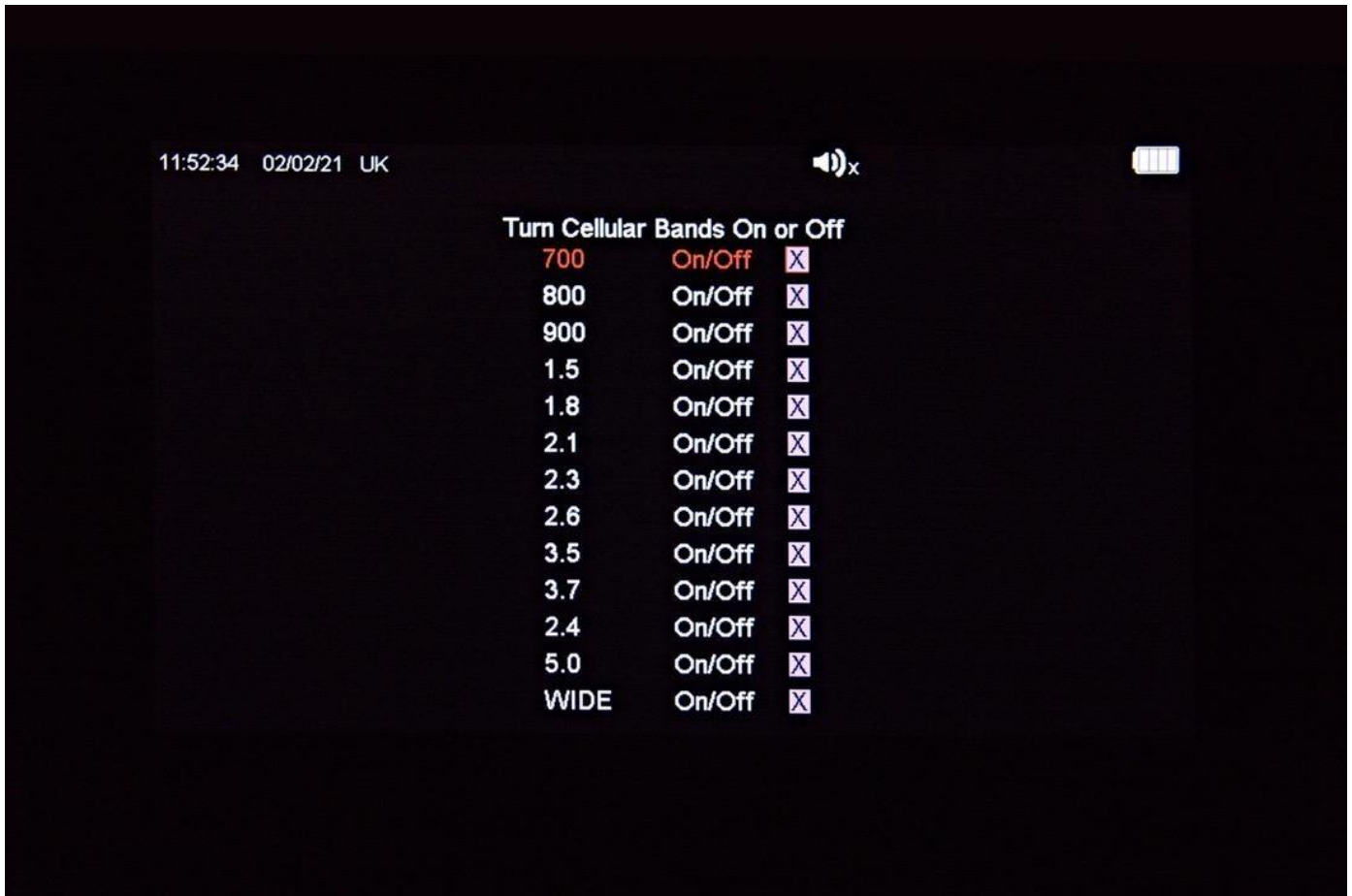
LOCATION: see REGION SELECTION – Above BAND

## SELECTION

If required, the user can select which bands that they wish to be detected and ignore those that they are not interested in. For example: it may not be necessary to look for devices on 3.4GHz so that band can be ignored.

To switch On/Off the required bands press the SETTINGS button, scroll down the list to select 'Select Bands' and confirm with the OK button. Use the UP/DOWN buttons to select the bands that you wish to switch On/Off and press OK to select/deselect the band. A 'X' in the box means the band is selected and will be detected. When finished use the

SETTINGS button to confirm. From the main screen you will now see any bands that have been deselected with the word 'OFF' below the relevant signal bar.  
To exit the Settings screen at any time press SETTINGS.



Band Selection Screen

## ERASE LOG

The Log memory will be full once 9999 events are recorded. The WAM-X25 will warn that the log is full but will still monitor live events. If you wish to delete the event log, select Erase Log in the SETTINGS Menu. The message TO ERASE THE LOG PRESS THE ERASE BUTTON will be displayed. To confirm press the ERASE LOG hot key button on the bottom on the screen. Once erased these events cannot be recovered. It is advised that events are downloaded to a USB Stick before being deleted from the WAM-X25 Log.

## DISPLAY BRIGHTNESS

The WAM-X25 features a high contrast 7-inch TFT display. The brightness can be increased or decreased to increase clarity in difficult lighting conditions or to preserve operating battery life.

To adjust the display brightness, press the SETTINGS button and scroll down to Display Brightness and press OK. Use the OK button to select the required brightness from 1 (Min) to 5 (Max). Once selected press SETTINGS to set the brightness.

PLEASE NOTE: Operating battery life will be considerably reduced on the higher the brightness levels.

## VIBRATE ON/OFF

The Vibrate Mode enables the user to check for signals without alerting others. To switch vibrate mode on or off, press the SETTINGS button, scroll down the list to select 'Vibrate' and press the OK button to switch between ON or OFF. The vibrate symbol will be shown at the top of the main screen when Vibrate On is selected. Press SETTINGS to return to the main screen.

## MASTER RESET

**In the unlikely event of a firmware failure the WAM-X25 can be reset by pressing the 'OK' Button and 'Power Symbol' Button simultaneously. This will force the unit to shut down and restart.**

## DATA VIEWING SOFTWARE APPLICATION

The WAM-X25 is supplied with software to enable the user to view events graphically on a Windows based computer. The software required is supplied on the USB Memory Stick provided in the WAM-X25 package.

PLEASE NOTE: You will require a modern Windows based PC running Windows XP or later to use this software. No responsibility will be accepted by the manufacturer for any technical problems/damage/loss of data caused by the installation of this software to any computer/storage device.

To install the software on your computer:

1. Create a New Folder on your computer with a suitable name such as 'WAM-X25 Data Viewer'.
2. From the USB stick, copy the file 'WAMX25 Data Viewer.zip' to your new folder.
3. Unzip the file and you will see several files appear in the folder.
4. Once the files are all unzipped open the file 'setup.exe'. A 'Destination Directory' window will open showing you where the data viewer files will be

stored.

5. Click 'Next'. Then a 'Start Installation' window will open.
6. Click 'Next' and the installation will take place followed by 'Installation Complete'.
7. Click 'Finish'. The WAM-X25 Data Viewer is now installed.

To use the installed WAM-X25 Data Viewer Software, firstly ensure you have downloaded the Log from your WAM-X25 onto the USB memory stick as instructed above in 'DOWNLOADING LOG TO USB STICK'.

1. Ensure your USB memory stick is connected to the computer.
2. Go to your 'Start' Menu and click on 'WAMX25 Data Viewer'. If the program can't be seen there, select 'All Programs' and look for 'WAM-X25' there.
3. The JJN Digital Data Viewer will open in a new Window.
4. On the top left of the screen, click on 'Import Data from File'.
5. A folder should open showing the files in the USB stick. If not select the file location.
6. Double click on the data file you wish to view to open it. E.g. 15050728.xls
7. The data from the file should now be displayed on the JJN Digital Data Viewer.

Using the WAM-X25 Data Viewer application:

The WAM-X25 Data Viewer allows simple viewing of all stored data in an easy to read colour graphic format.

1. To set the Time Span on the bottom right click on the 'Span (hours)' Button. You can select 'All Data', '1 Hour View', or '24 Hour View'. The date and time is shown along the bottom of the graph. You can then use the left and right arrow buttons to scroll through the stored data.
2. To the right of the graph each band has an 'Open Log' button. Click on this to view the detected events of that band only in a useful list format showing their Date, Time, Band, Signal Strength and Duration.
3. To the top right of the screen the 'Wideband Frequency Display and Time Locator' button allows the user to select any event on the Wideband Channel (top) and view its frequency and event time. Click on the 'Wideband Frequency Display and Time Locator' button and to the left of it you will see a window showing 'Time' and another showing 'Frequency'. Using your mouse, drag the thin black vertical dashed line over an event (any red line) in the Wideband graph to see its exact event time and the frequency that was detected.

## SUPPLIED IN PACKAGE

WAM-X25 - Main Unit

Adjustable hinged antenna x 2 Directional

Antenna LPA-14-SMA (Blue)

5V Micro USB Charger - 110V to 240V AC input (Auto Switching) with International Adaptors

Earphones

USB Memory Stick

High Protection Military Standard Carry Case



## TECHNICAL SPECIFICATION

Typical Performance Characteristics - at 20 degrees C

Wideband Frequency Range	10MHz – 14000MHz (14.0GHz)
Cellular Regions covered	UK, EUROPE, ASIA, AFRICA, NORTH AMERICA, SOUTH AMERICA, AUSTRALIA
Cellular Frequency Range	International bands - (300 MHz to 6 GHz) – Maximum 10 viewable bands - Sensitivity -70 dBm Max
2.4 & 5 GHz Frequency Range Fi Analyser Display	2400 to 2485 MHz & 5150 to 5850 MHz Wi- 802.11a/b/g/n: 2.4 GHz and 5 GHz TFT Colour 7.0" High Contrast Graphic Display
Battery	Internal Lithium-Polymer rechargeable  Operating duration – fully charged battery – up to 8 hours
Charging Temperature Range Dimensions Weight	Micro USB socket - Charge Time ~ 4 hours Operating -15 to +50 degrees C - Relative Humidity < 90% 230 mm x 150 mm x 28 mm Main Unit – 1.0 kg  Carry Case Complete – 2.7 Kg
Signal Processing and Control	RISC Based Microcontroller with real time clock
Event Logs	Maximum 10,000 RF Events – Separate Wi-Fi/Bluetooth Log
USB Socket	For USB Stick download only