

# **INDEX**

SAFETY AND USAGE .....	3
INTRODUCTION .....	4
COMMAND DESCRIPTION .....	5
REFLECTION / TRANSMISSION AND CONNECTION METHOD .....	6
CONNECTION WITH PC/TABLET .....	7
INPUT SETTINGS AND FREQUENCIES .....	8
MAIN MENU .....	9
EASY MENU.....	10
METER MENU .....	11
AUTOSWR MENU .....	12
BAND METER MENU .....	13
RF METER MENU .....	14
GRAPHIC MENU .....	15
TX GRAPHIC MENU .....	16
SWR METER MENU .....	17
GENERATOR MENU .....	18
CALIBRATION MENU .....	19
INFO MENU .....	20
WATTMETER MENU .....	21
RF METER MEN .....	22
CAB METER MENU .....	23
DATA ACQUISITION MENU .....	24
GRID DIP METER MENU .....	25
ANTFIX MENU .....	26
CALIBRATION MENU .....	27
FIRMWARE UPDATE .....	28
MULTIBAND DIPOLE / 2mtVERTICAL TEST .....	29/30/31
EXPORT to PDF .....	32
VNA/J SOFTWARE.....	33/34
TROUBLESHOOTING.....	35/36
DECLARATION OF CONFORMITY.....	37
TECHNICAL and FUNCTIONAL SPECIFICATIONS .....	38

# SAFETY AND USAGE



Handle your Metrovna with care. It is made of metal, glass or plastic and contains sensitive electronic components. It may be damaged if dropped, burnt, punctured or broken, or if it comes into contact with liquids. Do not use Metrovna if it has been damaged, for example, if the screen is broken, as this may cause injury.



**Repairs.** Do not open Metrovna and try to repair by yourself. Disassembly may damage the device or cause you injury.



**Battery.** Do not try to replace the Metrovna battery yourself because you may damage it, or could cause overheating and damage. The lithium-ion batteries must be re- cycled or disposed of separately from household waste. Do not incinerate the battery or exceed the recharge time of 6 hours.



Do not charge the battery in areas in the presence of flammable gases. Disconnect the Metrovna from the electrical outlet after charging and do not leave unattended while charging



Avoid prolonged exposure to heat for long periods of time. in case of malfunction – turn it off immediately.



## Crossed-out Wheeled Bin Symbol

Equipment marked with the Crossed-out Wheeled Bin Symbol complies with council directive 2002/96/EC (the “WEEE Directive”) in European Union. For Products placed on the EU market after August 13, 2005, please contact your local representative at the end of the product's useful life to arrange disposal in accordance with your initial contract and the local law.

**IMPORTANT INFORMATION** Read all the operating instructions, safety tips and warnings in the instruction manual. Identifying potential hazardous situations and observing the appropriate safety rules will avoid accidents.

Dangerous situations to avoid in order to prevent all risks that are shown above. Never use the Metrovna inappropriately, but only as described in the user manual. The Manufacturer reserves the date the technical information contained in this manual without notice.

---

## **Introduction**

The Metrovna is a useful tool for the amateur radio environment for the development of antennas, filters and measurement of transmission lines. This instrument is technologically very advanced and aims to surpass the best features of a commercial VNA without neglecting the simplicity and flexibility of use. Due to its small size, low weight and use of a rechargeable battery pack, it is perfectly compatible with all the requirements of a modern Radio Amateur, both in the workshop, shack and outside. The VNA can also be interfaced:

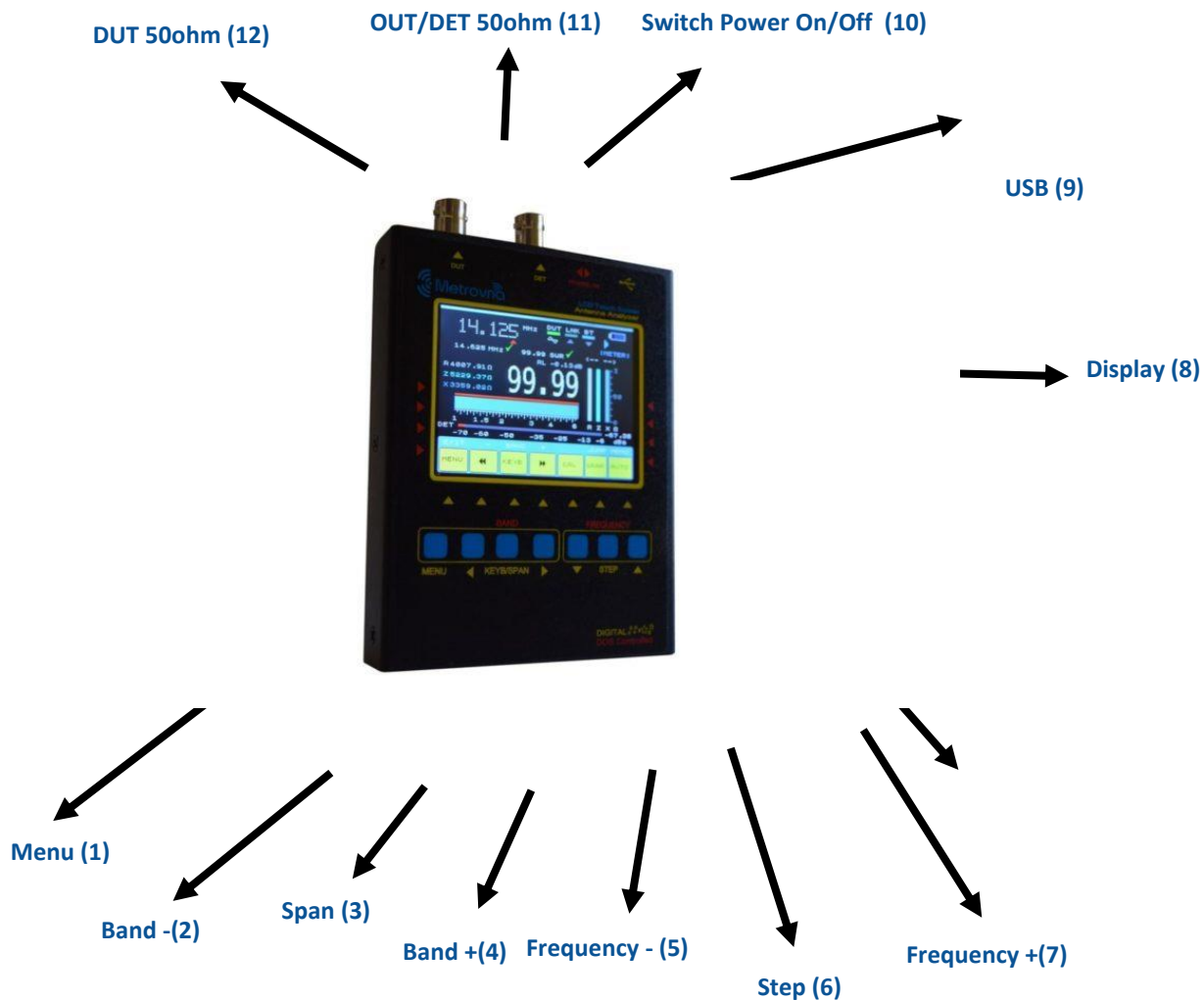
- PCs - Windows, Mac, Linux
- Tablets and Android Smartphones
- Additionally, all graphs and measurements can be stored externally. Later they can be exported for each type of simulation or easily printed. Integrated tools allow you to measure : ...
- SWR
- Best SWR
- Impedance Z
- Resistance R
- Reactance X
- Phase
- Return Loss
- Transmission Loss
- RF level in db
- Power Measurement (Deluxe version)

All settings are displayed simultaneously and can be shown graphically on the display.

Using convenient menus you can choose measurements of multiband antennas, crystals, filters or traps - all with extreme simplicity.

Below, the operation of all the internal menus are explained.

# Command Descriptions

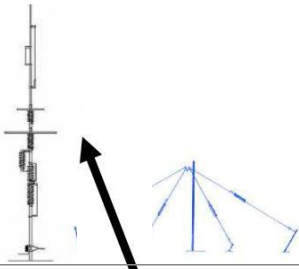


## Function Switches and Ports

1. Menu : Internal Menus
2. Band - : Band Change - DOWN
3. Span : Double Function - Span / Virtual Keyboard on/off
4. Band + : Band Change - UP
5. Frequency - : Move Frequency DOWN
6. Step : Set Step
7. Frequency + : Move Frequency UP
8. Touch Screen Display
9. USB : USB Port for connection to PC and for charging battery
10. Power On/Off : Power Switch
11. OUT/DET : BNC 50 ohm OUT DET (DEtector)
12. IN / DUT : BNC 50 ohm IN ( connect antenna or Device Under Test )

# Metrovna Connection Mode

The Metrovna can operate in two modes

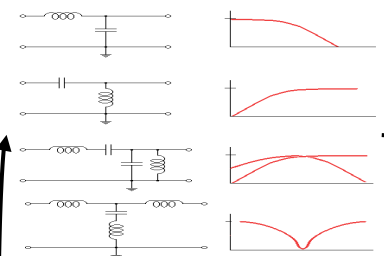


**REFLECTION MODE** In this mode, the signal produced by the DDS goes to the antenna and is analyzed by the Metrovna through the DUT connector. The other BNC connector is not used. Use this configuration to measure antennas.

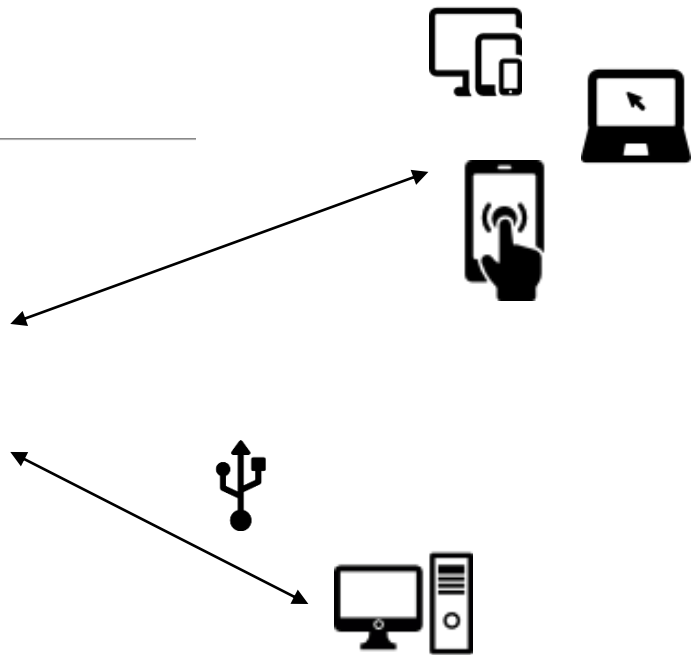
## **TRANSMISSION MODE**

In this mode, both the DUT and DET connection are used.

The signal from the DDS goes from the DUT connection, through the circuit / network under test and reaches the DET connector, where it is analyzed by the VNA. In this way you can measure, for example, filters, traps and crystal



# Connection - PC



The Metrovna works well with its graphical display, but can also be interfaced to a PC,

**TABLET or SMARTPHONE.**

The VNA has a USB port and an internal module so can be positioned up to 10m away. It can also be connected directly to an antenna, and can perform all measurements easily.

Through the USB port you can connect it to a PC or laptop and simultaneously charge the battery. In mode you can bind the Metrovna like a normal device through these simple steps:

- ☐ Set your PC or Smartphone to 'Search' mode
- ☐ Select "METROVNA PRO"
- ☐ Input "1234"
- ☐ Save and Exit.

In a few seconds the VNA should be ' recognized and installed. When connected the data transfer icon flashes on the display. The green LED on the display indicates the LINK and blinks to indicate that the VNA is ready to connect. The VNA can also be powered through the USB port and simultaneously charge the internal battery, but only when the charging device is capable of delivering a minimum of 500mA.

When connected to the PC via USB you will need to install correct drivers on your PC along with the relevant software.



# Input Settings and Frequencies



Virtual keyboard

The Metrovna has a large color touch screen, all settings can be entered easily by touching the display, or via the membrane keyboard just below.

Using the KEYB key you can activate the virtual keyboard and set:

- ☐ Operating frequency ( setting the value in kHz or MHz )
- ☐ HF / VHF / ALL
- ☐ SPAN , BAND ( to quickly scroll through all the preset frequency bands )

Press 'Enter' to confirm the settings you've input or simply exit the menu.

There is also a traditional keyboard with 7 membrane keys for convenience when you are wearing gloves or in difficult situations.



# MAIN MENU

When you switch on the Metrovna, and after booting, the Main Menu appears, allowing you to manage all the internal menus. The first two virtual keypads cover the 10 user menus, with the third row and the service menu for power measurements.



Main Menu ( Metrovna PRO )

Main Menu ( Metrovna DELUXE )

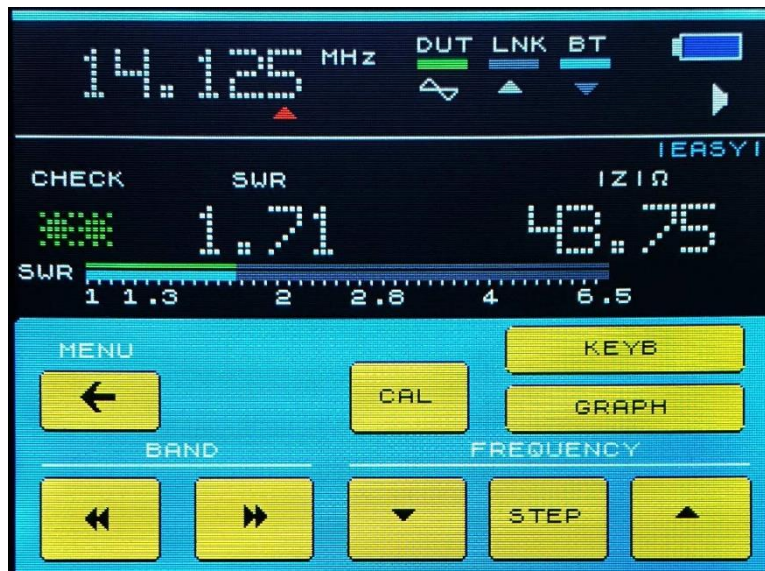


Using this menu, you can easily select all the 'submenus'.

There are 20 submenus for the Deluxe version and 15 for the LT / PRO version

Also, on the top bar you can monitor the status of data transfer via USB through a bar that glows yellow or red.

# EASY MENU



## 'EASY' MENU

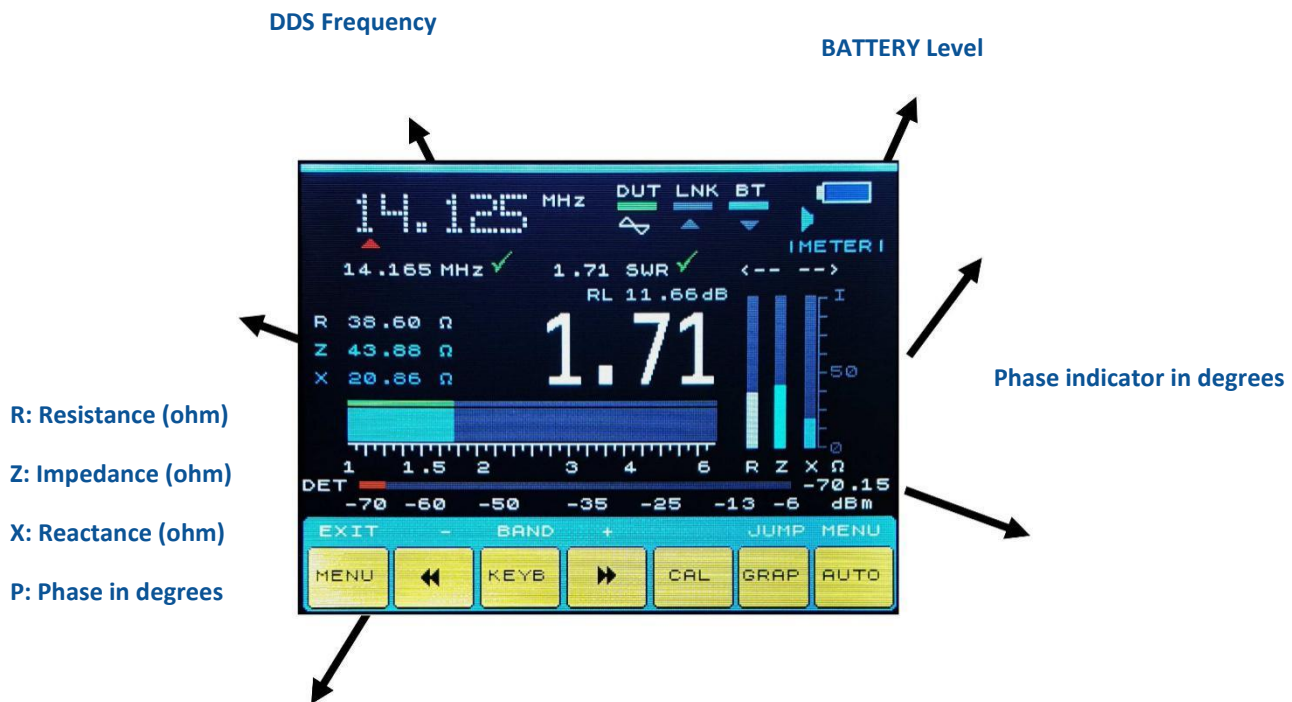
The Metrovna has been designed to be fast and simple in use.

Using the BAND keys, you can change the operating band and with the FREQUENCY keys, the frequency and the step.

You can also activate the virtual keyboard to directly set frequency and all other settings easily. The graphics are useful to get to the desired commands quickly.

You can also calibrate the Metrovna using the 'CAL' key, disconnecting any antennas on the DUT.

# METER MENU



## Meter Menu

Via this menu, you can do measurements of SWR, IMPEDANCE, REACTANCE, RESISTANCE and POWER of an antenna connected to the DUT via the DET or power connector.

Just change the tuning frequency using the FREQUENCY + - keys and using 'STEP' you can set any frequency in the operating range.

Settable steps are highlighted with a triangle below the corresponding figure that moves each time the STEP button is pressed. The easy to read real time logarithmic display shows the SWR value, while the R, Z, X MULTI METER simultaneously measures all the fundamental values of an antenna and represents them with a vertical meter. (The central value is 50ohms) For adjustment of the antenna under test the values of R and Z must be close to 50 ohms, the reactance value X must be close to 0 ohms, and the SWR value should be close to 1: 1.

The X value represents the antenna reactive component and the tool indicates the absolute value without the sign. This value depends on many factors such as elevation above ground, distance away from obstacles as well as antenna loss and should be close to 0 ohms.

Measurements on the 'Ham Bands' can quickly be selected using the BAND + - keys to reach the desired band, since the VNA has all bands pre-set from 160m to 2m.

In addition, on the Deluxe version, there is also a power meter (in dBm) available via the DET connector, **BUT - be careful not to exceed a level of + 5dBm on the connector to avoid damaging the Metrovna.**

# AUTO SWR METER MENU



## “AUTO SWR METER” Menu

Using this menu you can measure the SWR in AUTOMATIC MODE.

Simply by pressing BAND + - , you can select the operating band from 160m to 2m.

On the left side of the screen, two values appear automatically, showing BEST FREQ and

BEST SWR. With the Frequency key you can input the precise frequencies that you want to measure. Moving the white triangular indicator also changes the chart and the SWR measurement through the range indicating real SWR on the right hand side.

If the antenna has a very narrow bandwidth, you can also select a SPAN sweep using the keys. In this mode the DDS does not generate a fixed frequency performs a SWEEP between the values of F-start and F-stop with a bandwidth represented in SPAN.

Here's an example of the above:

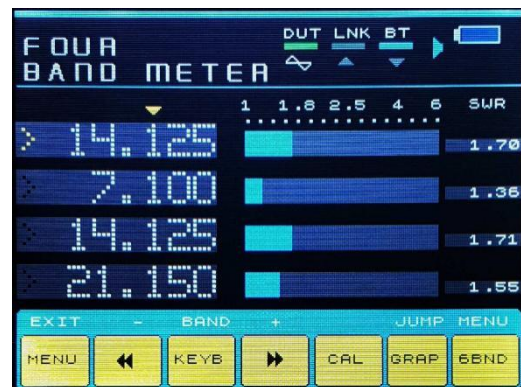
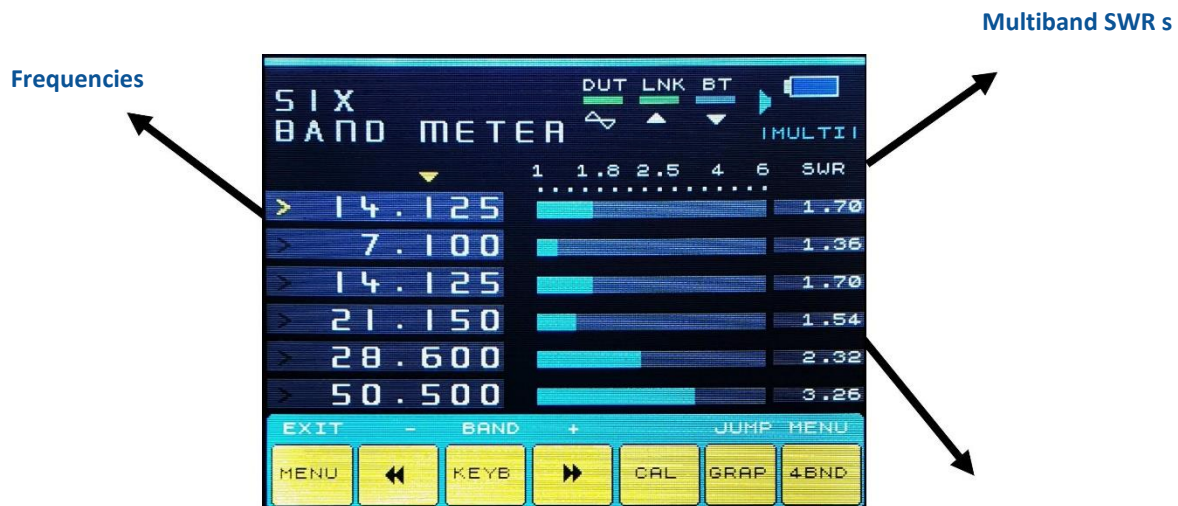
e.g. F-start 9,000 F-stop 19,000 Span 10 MHz

This means that the DDS generates a sweep from 9.000 to 19.000 MHz and analyses the total bandwidth of the 10 MHz SPAN.

The processor identifies the lowest SWR in this RANGE and shows the Best Frequency and SWR as a numerical value which is shown on the left hand side of the display. The SWR of the indicated span point is shown as the larger numeric value at the bottom right

This feature is useful during calibration of an antenna since any changes of element lengthening or shortening are automatically detected at the point of BEST SWR with split - second speed.

# SWR BAND METER MENU



## SWR BAND METER MENU

In this mode you can test multiband antennas.

Using the + - FREQ keys enter the frequency and with the SPAN key you go to the next line.

After setting all 4 preferred frequencies, the Metrovna indicates their SWR.

The VNA tunes band by band and the microprocessor calculates their SWR indicating the figure next to each frequency.

This menu is very useful for calibrating multiband antennas such as multiband dipoles and beams.

This is practical in helping us to visualize the influence of the calibration incorporating the other bands of the antenna.

It's well known that in the case of multiband dipoles the variation in length of one element also influences the calibration of the other bands. The speed of processing by the processor is very high and in a few milliseconds all the data on the display is updated.

This allows real time measurements with absolute precision.



# RF METER MENU

RF value expressed in dBm  
at 50ohm



Graduated Scale

## RF METER MENU

In this mode you can measure an RF signal connected to the DET Connector.

Connecting a small antenna at DET you can turn this into a FIELD ANALYZER with an operating range of -70dB to + 5 dB with a maximum error of + /- 2dB.

Meanwhile, if we insert an RF signal coming from a generator to the DET input, the instrument can detect dBm through the virtual indicator arrow.

You can also set 0db via the BAND + and BAND - to calibrate the VNA compensating for cable attenuation. In this mode, the accuracy of the VNA is not very high but still allows good measurements in a range between 1 MHz and 500 MHz. Measurement beyond 500 MHz is possible but with increasing error.

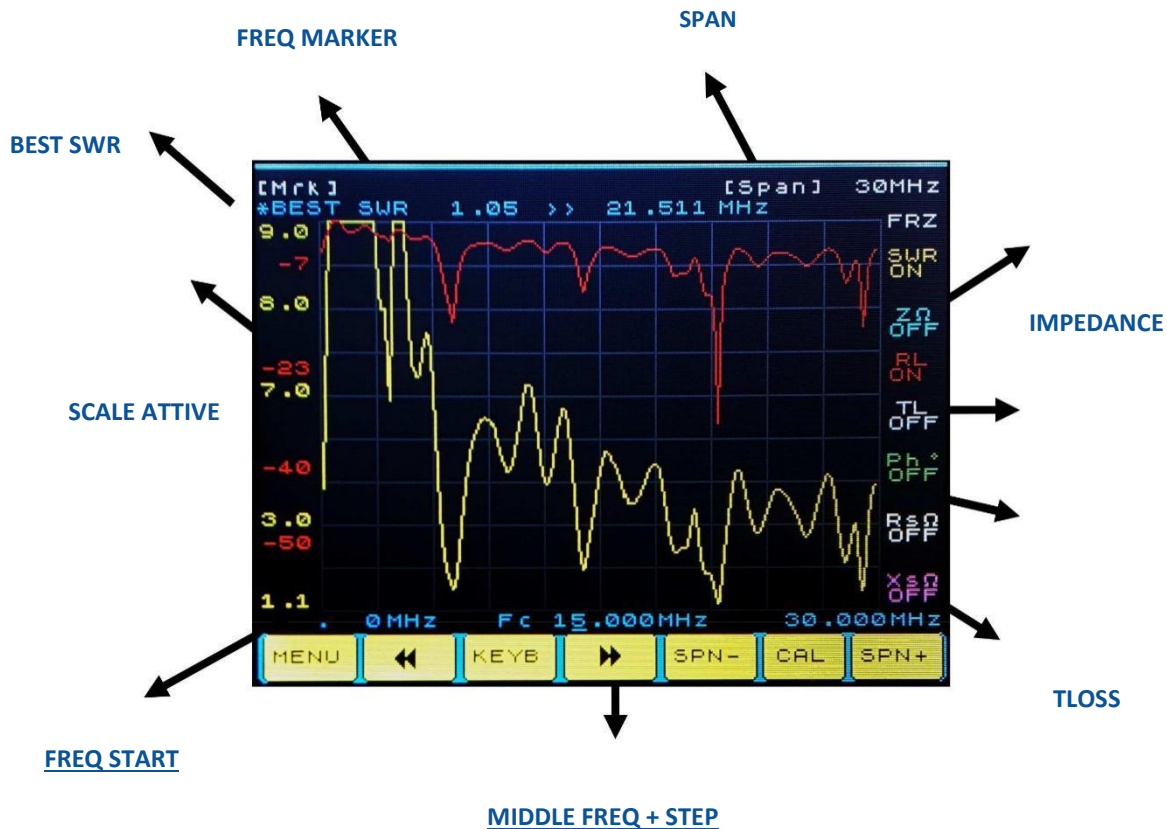
This feature is useful when you are looking for RF noise or the extent of gain of an antenna or just to test an RF stage. The impedance of the Metrovna is 50 ohms, so it is recommended in the case of measurement of critical stages to connect an active probe. The MAXIMUM SIGNAL measurable is + 5 dB



**Do not exceed this threshold to avoid damaging the Metrovna.**

Maximum signal on DET = +5dBm

# GRAPHIC MENU



## GRAPHIC MENU

Using this menu you can view the progress of axes SWR, RL, R, Z, X and antenna PHASE.

This can be set via FREQ + - Step for the central frequency, - the microprocessor automatically calculates on the selected SPAN and the F-START and F-STOP frequencies. This way the curve is always centered since the span is only the RANGE between the start and stop frequencies.

For example from 10.000 MHz and 11.000 MHz the SPAN is 1.000 MHz

Once the desired CENTRAL frequency is selected with the Frequency + - or BAND + - keys, the processor plots the curve on the display. You can turn on the marker by touching (MRK) so you can view all the settings relevant to a single point. Moving the FREQ + - keys will translate the curve to the right or left and the value MRK is the relative frequency of the marker.

It's important to keep in mind that tool always indicates the Best SWR automatically, calculating exactly the frequency at the point of best SWR. This function is extremely useful in understanding what the resonant frequency is. And at any time you can activate the virtual key-board (Keyb) to directly set all parameters for Band, Span and operating frequency.

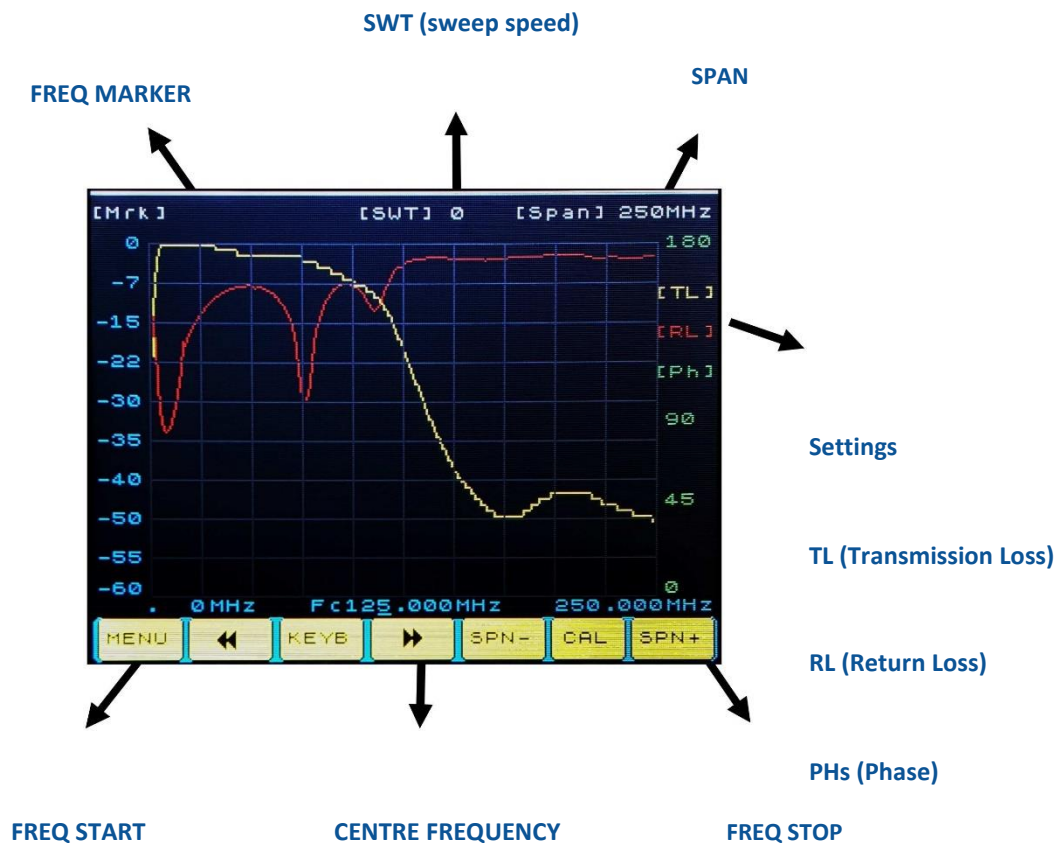
**Calibration.** The Metrovna has two types of calibration, the first mode is automatic during booting. When turned on, if the inputs DUT and DET are free, the instrument automatically calibrates and the display shows Calibrate otherwise Uncalibrated.

Calibration can be performed manually through the CALIB key on the virtual screen

**IMPORTANT:** If the SPAN is too high, according to the center frequency set on the display, an



# TX GRAPHIC MENU



## TX GRAPHIC MENU

Here the VNA works in TRANSMISSION MODE and the DUT and DET inputs are used. Imagine measuring a filter, this being connected in series between DUT and DET.

Through this menu you can view the 'TL' or TRANSMISSION LOSS of a filter or an attenuator on test. Just set the range through SWEEP FREQ + - STEP SPAN and the display shows the curve with an accuracy of +/- 2dB.

By increasing or decreasing the SPAN you can widen or tighten the curve.

You can turn on the Marker by touching (MRK) and the display will show the frequency at the relevant point.

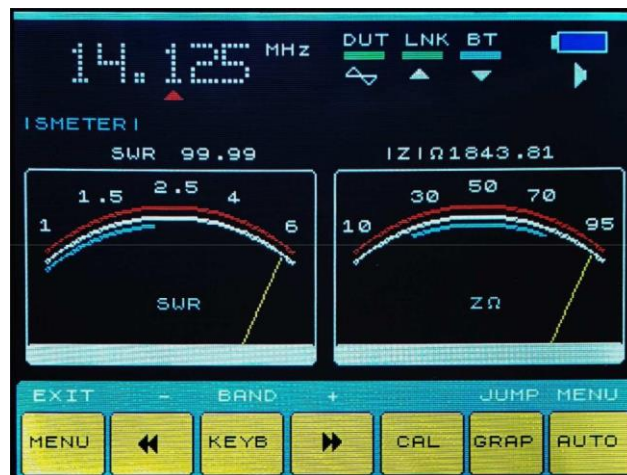
You can turn on the virtual (Keyb) to input settings and the center frequency.

**IMPORTANT:** If the SPAN is too high, according to the center frequency set on the display, an "OUTRNG" error may appear, indicating that the sweep is out of range. In this case, lower the value of SPAN to the correct operating range.



Max signal on DET =+5db

# SWR METER MENU



By activating these menus you can see a clear analogue S-meter with IMPEDANCE and SWR - very useful in seeing small SWR changes

Additionally - you can calibrate the Metrovna using the CAL key using the DUT port.

# GENERATOR MENU ( MetroVNA Pro )

## GENERATOR MENU

With this menu you can use your Metrovna as a precise RF generator.

Just set the operating frequency via the keyboard and DUT output will generate an RF signal. With the Metrovna DELUXE version you can extend the frequency beyond 250MHz up to 750MHz. In fact, if you set a higher frequency such as 430 MHz on the Metrovna it will generate both the fundamental signal in the range that the DDS harmonic frequency to 430MHz automatically .



Menu Tables - dBm / V / Po

Menu Tables RL / dB and SWR

TABLE	RL/dB	SWR	RL/dB	SWR
RL/SWR	32.255	1.05	7.894	2.35
	26.444	1.10	7.707	2.40
	23.127	1.15	7.529	2.45
	20.828	1.20	7.350	2.50
	19.085	1.25	6.021	3.00
	17.690	1.30	5.914	3.05
	16.540	1.35	5.811	3.10
	15.563	1.40	5.712	3.15
	14.719	1.45	5.617	3.20
	13.979	1.50	5.524	3.25
	13.324	1.55	5.435	3.30
	12.735	1.60	5.348	3.35
	10.881	1.80	5.265	3.40
	9.542	2.00	5.184	3.45
	9.485	2.01	5.105	3.50
	9.262	2.05	4.419	4.00
	8.999	2.10	3.946	4.50
	8.752	2.15	3.569	5.00
	8.519	2.20	2.614	7.00
	8.299	2.25	2.099	9.00
	8.091	2.30	1.432	15.0

TABLE	dBm	Vrms	Po	dBm	Vrms	Po
dBm/V/Po	+50	70.7	100W	+51	79.3	125W
50ohm	+49	64.0	80W	+52	89.0	158W
	+47	50.0	50W	+53	99.8	199W
	+43	32.0	20W	+54	112	251W
	+40	22.5	10W	+55	125	316W
	+39	20.0	8W	+56	141	398W
	+37	16.0	5W	+57	158	501W
	+23	3.20	200 mW	+61	250	1259W
	+20	2.25	100 mW	+62	281	1585W
	+17	1.60	50 mW	+65	397	3162W
	+13	1.00	20 mW	+70	707	10KW
	+10	.71	10 mW			
	+5	.400	3.2 mW			
	0	.225	1.0 mW			
	-5	.125	.32 mW			
	-10	.071	.10 mW			
	-20	22.5	mV .01 mW			
	-30	7.10	mV .001 mW			

# CALIBRATION MENU

## CAL FREQ MENU

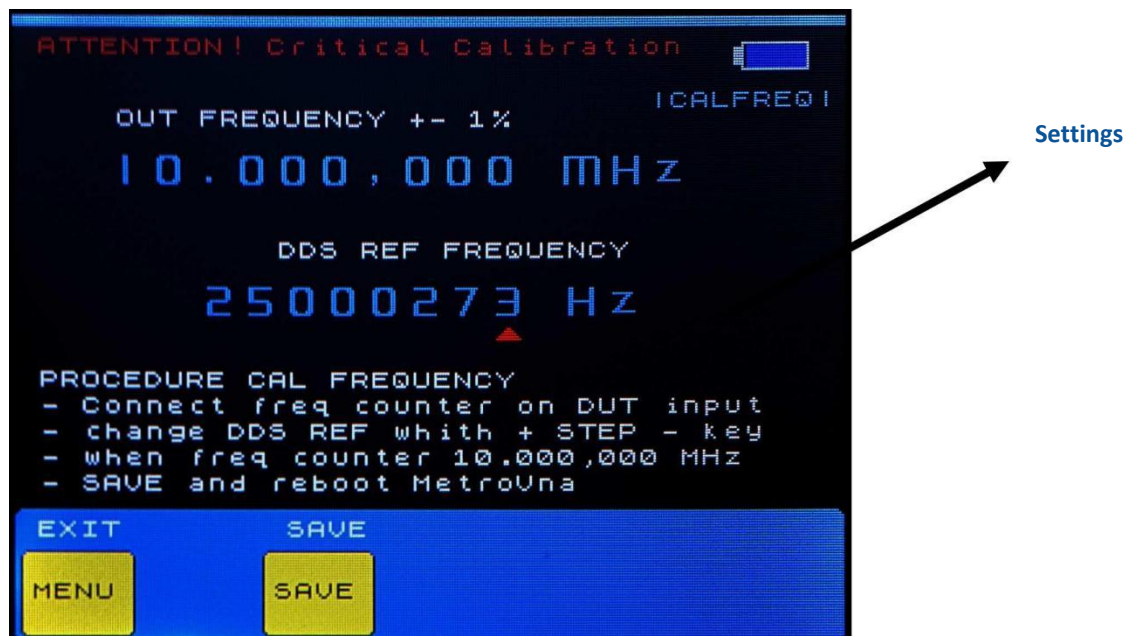
With this menu, you may accurately calibrate the DDS reference frequency.

Calibration is very simple: just connect a frequency counter to the DUT and input via the keys on the display, moving DDS REF until it is exactly 10MHz.

Confirm with the SAVE button and calibration is done.

Settings are stored in the Metrovna's EEPROM.

### CALFREQ Menu



For calibration, connect the frequency meter to the DUT

---

# INFO MENU

Using this menu you can see the firmware version and other Metrovna settings.

After a Firmware update, you can check the version on your Metrovna





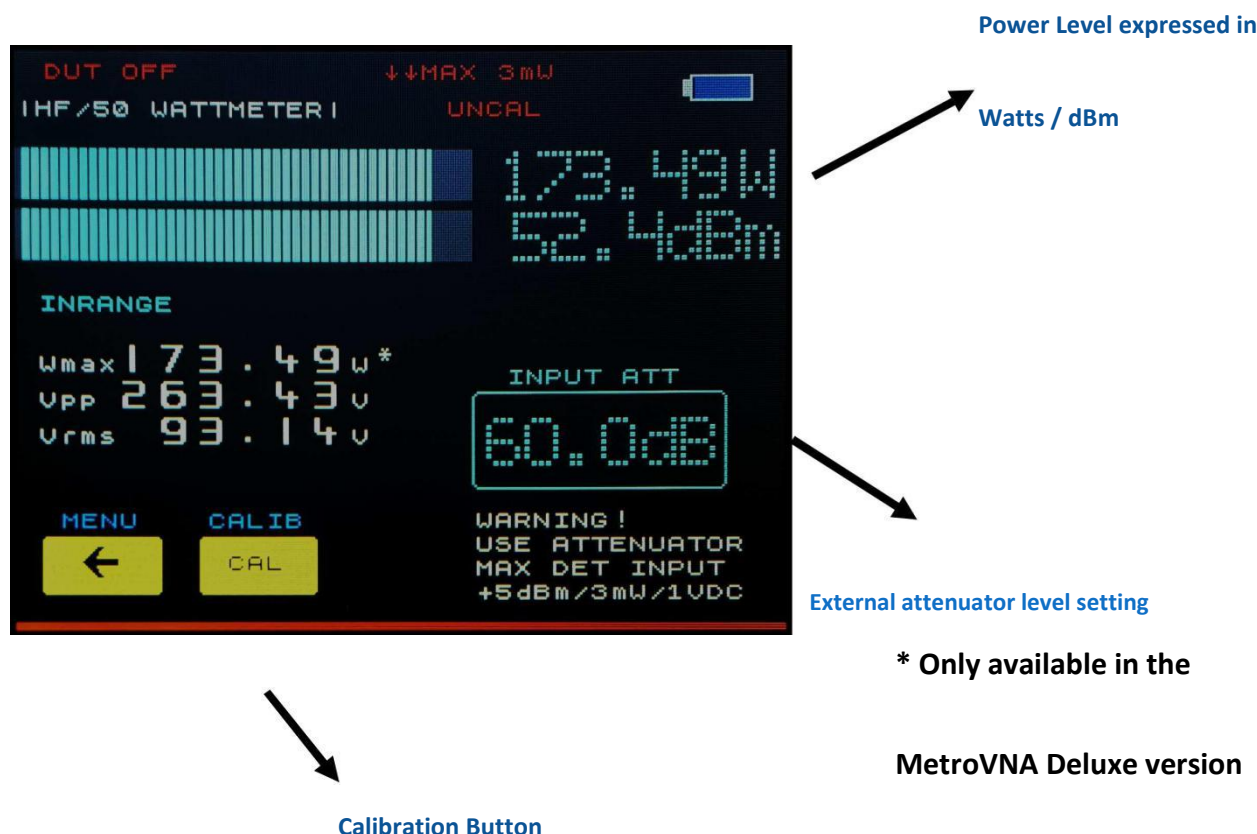
# Metrovna Deluxe WATTMETER MENU

The next menu is available only on the METROVNA DELUXE 250MHz version.

The first relates to the power level. Inserting an external attenuator to the DET, you can measure the power in WATTS and all values of Wmax, Vpp, and Vrms. The tool turns into a precise power meter from HF / 50 with two S-Meter bars.

**WARNING - MAXIMUM SIGNAL ON THE DET Connector = + 5dBm**, or maximum 1mW.

Do not connect a signal generator or transmitter to the DET that generates a power higher than 1mW or about + 5dBm.



You must not connect a transmitter directly to the DET connector.

Connect an attenuator in series and set the attenuation level in the INPUT ATT field and the VNA will automatically perform all calculations and display the relevant results.

You can calibrate the instrument by bridging the DUT CAL connector and DET and following the on- screen instructions.



**CAUTION** do not connect a signal generator or transmitter to the DET that generates a power higher than 1mW or about + 5dBm.

Always insert an attenuator in series.

# RFMETER MENU

- With this menu, you can measure signal strength on the DET.

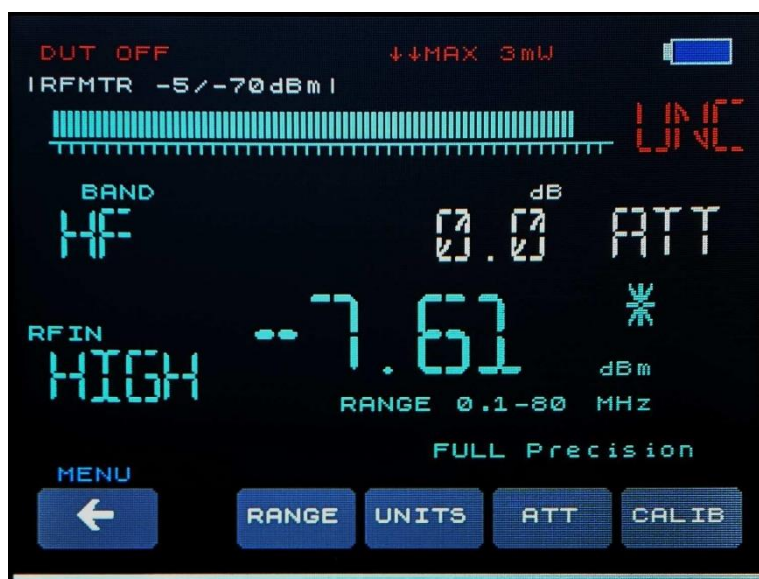
This menu looks like the previous one but it measures in a higher range.  
The VNA has an internal logarithmic detector that performs measurements up to 500MHz with decreasing accuracy with the increase of the measured frequency.

Set the measurement range and the corresponding accuracy

- 0.1-80MHz with HIGH precision
- 80-200MHz with HIGH/MID precision
- 200-300MHz with MID precision
- 300-500MHz with LOW precision

You can select the measurement in mW / W / dBm / Vrms or external attenuator level.

You can also calibrate the instrument by bridging the DUT and DET with a



Shows whether VNA is  
Calibrated or Un-Calibrated

External Attenuator level

Measurement Precision

Measurement Range

Measurement  
Units

Set External  
Attenuator

\* Menu available only on  
Metrovna Deluxe version



**CAUTION** do not connect a signal generator or transmitter to the DET that generates a power higher than 1mW or about + 5dBm.



# CABMETER MENU

With this menu you can measure the length of a coaxial cable.

Just select the cable speed factor, by reference to the displayed table, and select the START button.

In a few moments the instrument will give the cable length with an accuracy of 5/10%

Cable 'Speed Factor' table

ICABMTR I

Cable VF

0.66

Frequency

1.168

Best PHS

180.00

MENU

←

VF

COAXIAL TABLE

0.66 RG/8/58/174/213/214

0.81 Belden/H155/H500

0.83 Belden/H1000/H1500

0.83 Ecoflex 10/15std

0.83 Aircom Plus/Aircell7

0.82 Aircell5/Belden 9880

49.47

m

CABLE

START

Length Measurement

Select Cable type

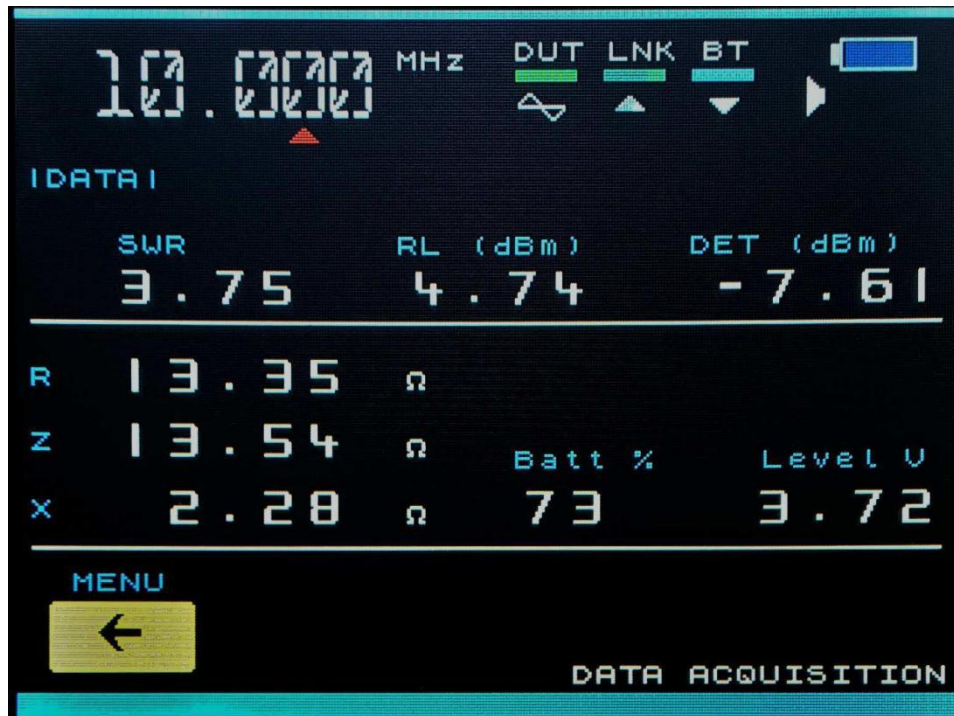
Start Measurement

\* Menu available only on  
Metrovna Deluxe version

# DATA ACQUISITION MENU

With this menu you can see all the signals present on the DUT and DET numerically. You can also set the measurement frequency both through the membrane keypad and via the virtual display.

In addition you can also see the charge level and the percentage charge of the battery.



Numerical settings for  
DUT and DET

\* Menu available only on  
Metrovna Deluxe version

The three virtual LEDs for DUT, LNK and BT monitor the signals generated on the ports as well as module activity.

# DIPMTR MENU

With this menu you have a modern digital Grid Dip Meter.

You can set the operating frequency and check the DIP or resonance peak with the Signal meter. Connect a small probe or a loop on the DUT connector and approach the coil or trap to be measured. Moving the tuning frequency or resonance point you can detect a deviation of the 'needle' to the maximum.

At this point just read the relative frequency and that will be 'the resonant frequency of the coil or trap being tested.



Sensitivity Selection Tool

Sensitivity

\* Menu available only on

Metrovna Deluxe version

You can also change the sensitivity of the VNA with the SENS '+' and '-' buttons. You can also read the related setting and SWR level on the DET.

A tip - having found resonance you can visualize it by selecting the GRAPHIC menu. This way - trace its exact curve....

# Metrovna Deluxe ANTFIX MENU

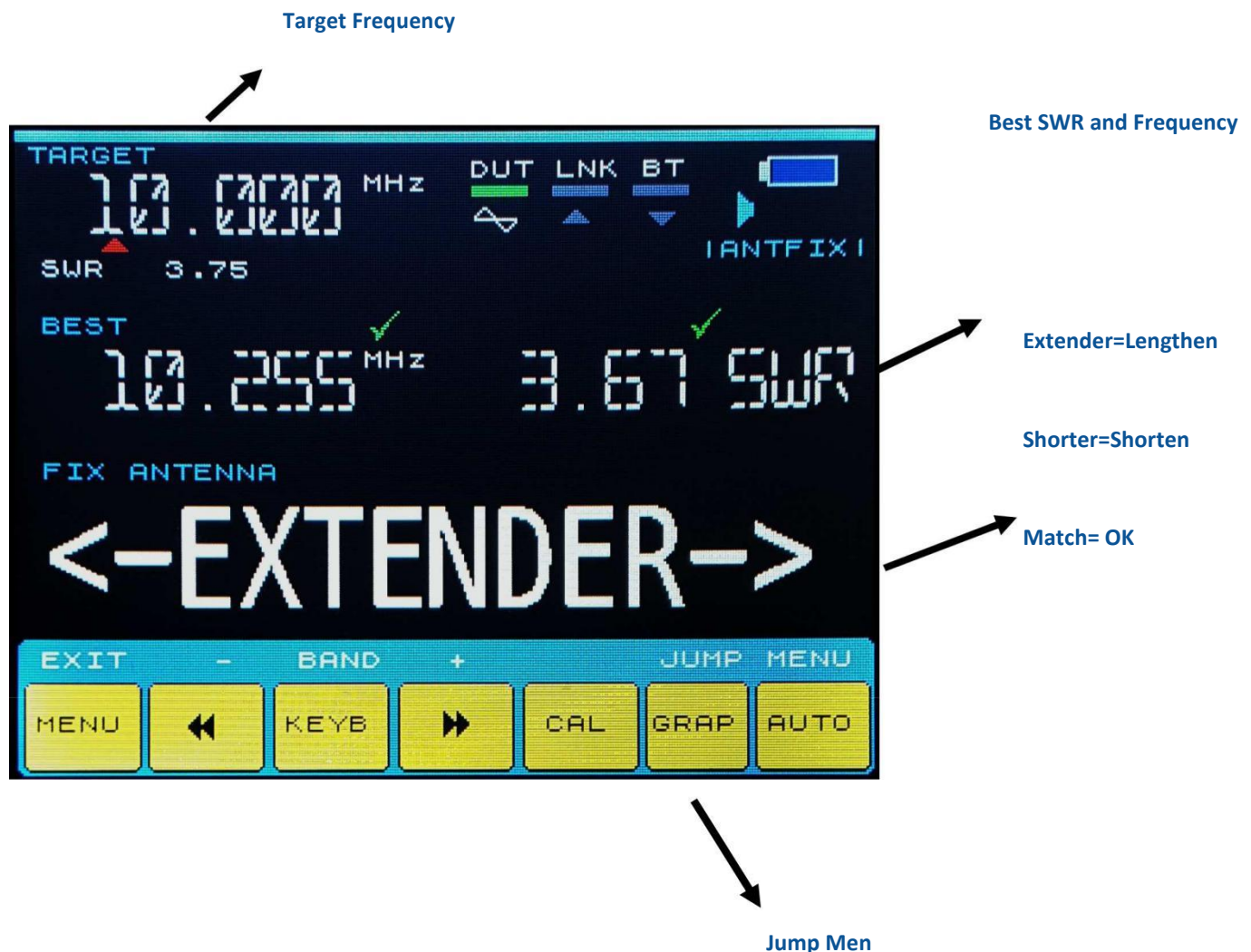
Using this menu, you can quickly tune an antenna.

E.G. - a single band dipole. This needs to be tuned to an exact TARGET frequency of 10.000 MHz. It will tell you in real time whether to lengthen or shorten the elements to achieve the lowest SWR.

It will also display the best SWR and the relevant frequency.

The Metrovna will show one of three suggestions:

- ☐ EXTENDER = Lengthen antenna
- ☐ SHORTER = Shorten antenna
- ☐ MATCH = Achieved best SWR



\* Menu available only on

Metrovna Deluxe version

# CALIBRATION MENU

The Metrovna is a very complex tool and allows you to perform a CALIBRATION procedure before each measurement.

Using this procedure all measurements are optimized depending on the type of cables used and the relevant losses are compensated for.

For ease of use there are only two types of calibration:

OPEN (open DUT)

LOOP (DUT and DET bridged)

- Each menu has its own simple calibration routine as in the pictures below.



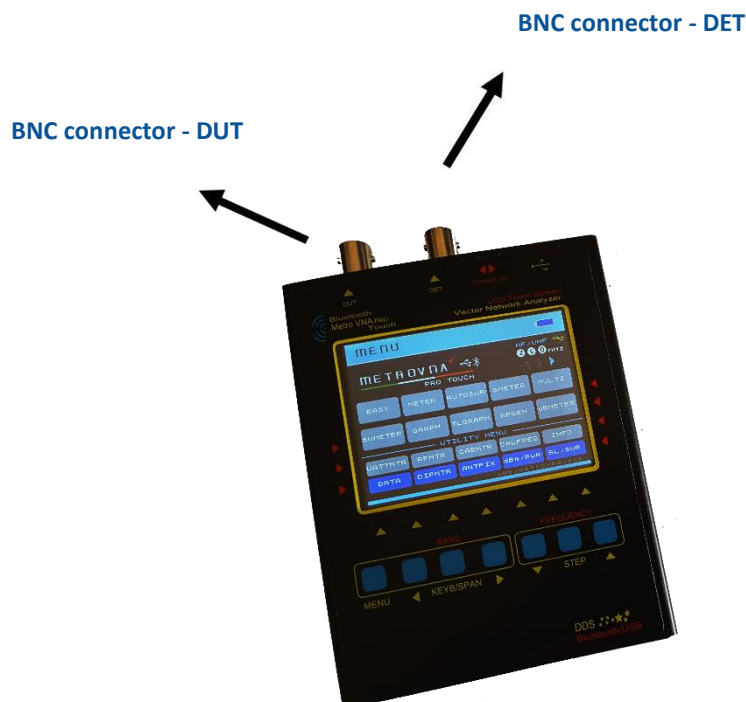
Calibration in 'Reflection' mode

(holding DUT open)



Calibration in 'Transmission' mode

(bridging DUT and DET)





# MetroVNA Firmware Update

Metrovna is upgradeable through a firmware upgrade.

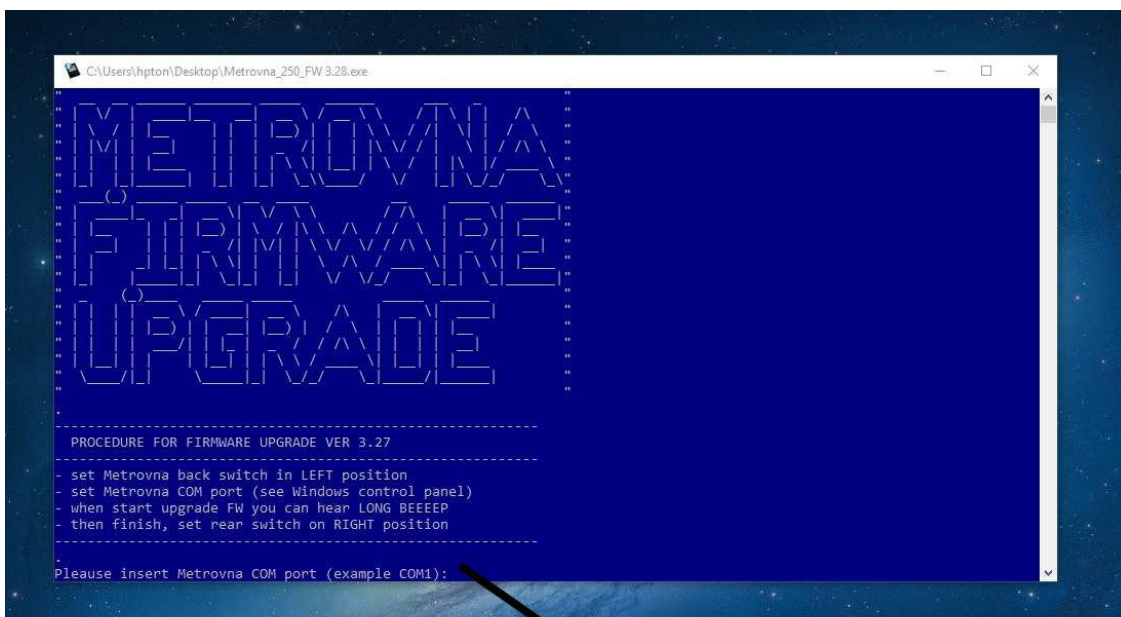
The update is very simple. The first step is to position the rear switch that can just be seen through the ventilation holes to the left 'ON' position.

Then simply connect the VNA to the PC tool to install its driver, it should be detected through the windows control panel a serial port

- COM10 for example. Launch the utility on the PC and select COM10 at the prompt and press enter. Within 1 minute the Metrovna will be updated.

Then, return the rear switch to the right 'OFF' position.

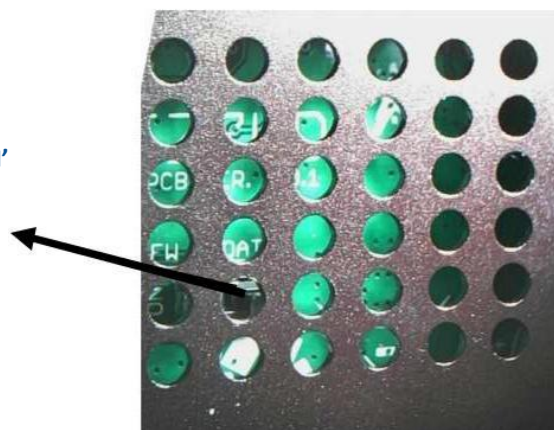
It's very important to disable any antivirus on the PC before copying the upgrade file.



Select the serial port,

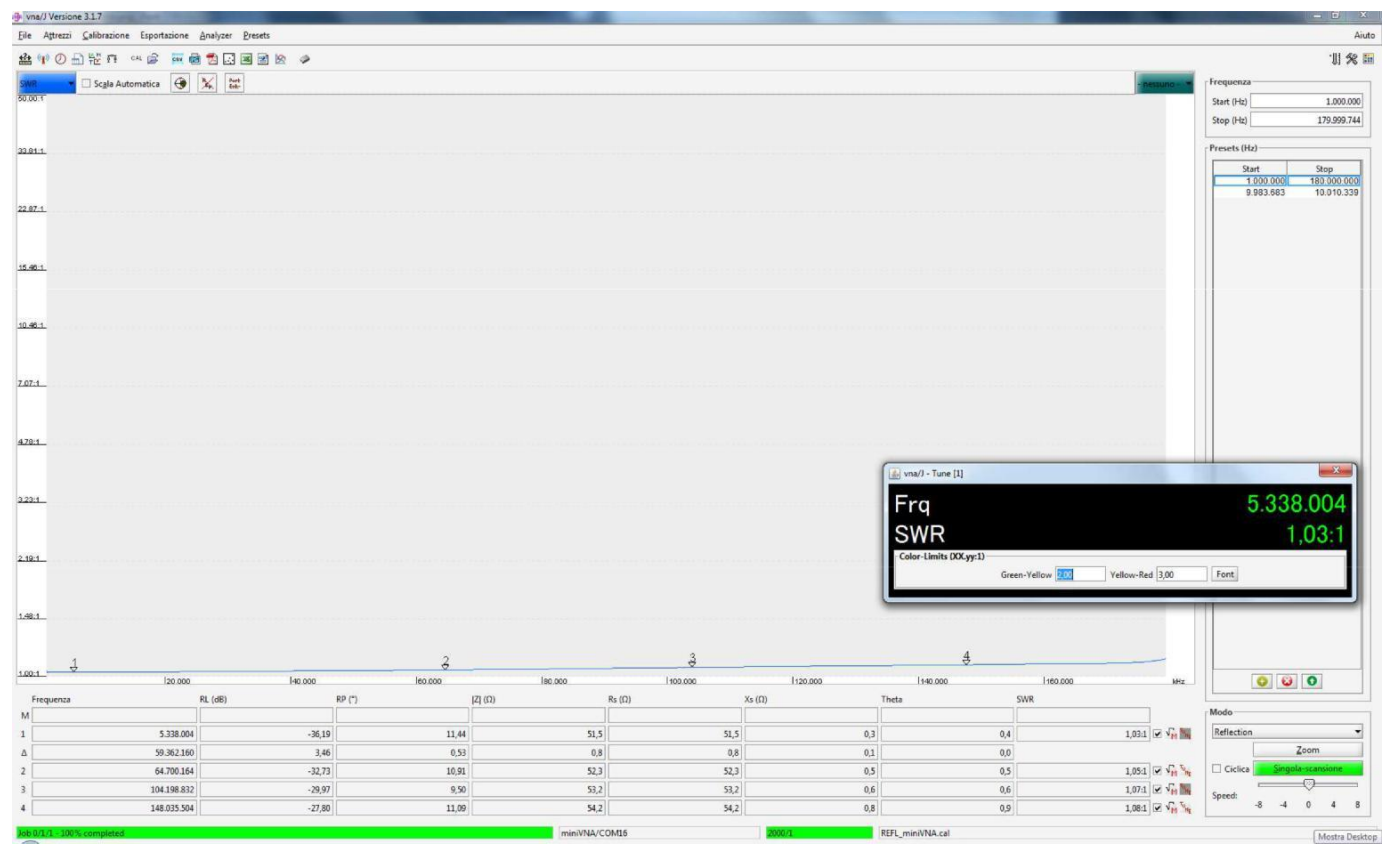
e.g. - COM10

Move this switch to the left - 'ON'

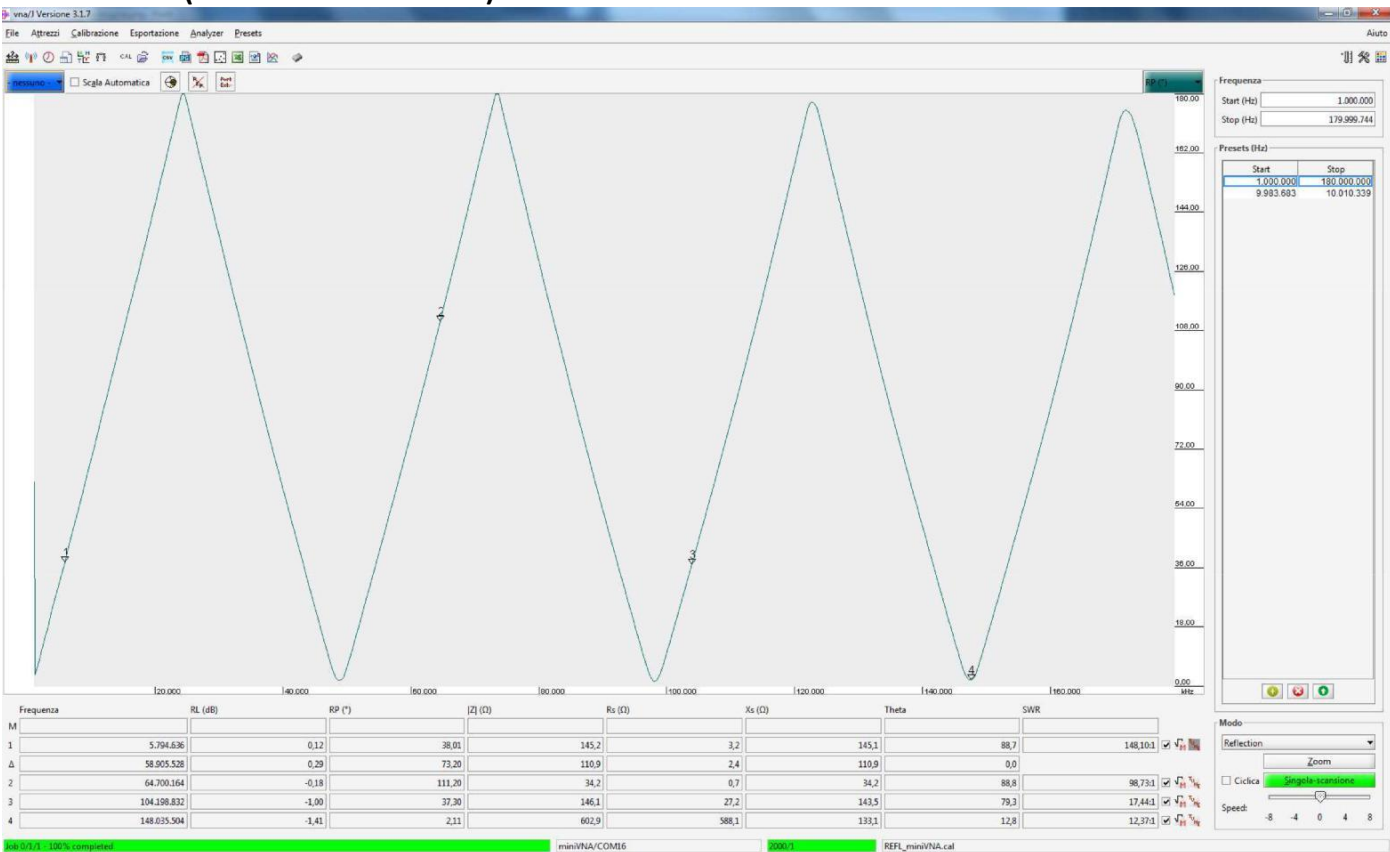


# PHASE and LINEARITY Test

Test 50ohm dummy load.



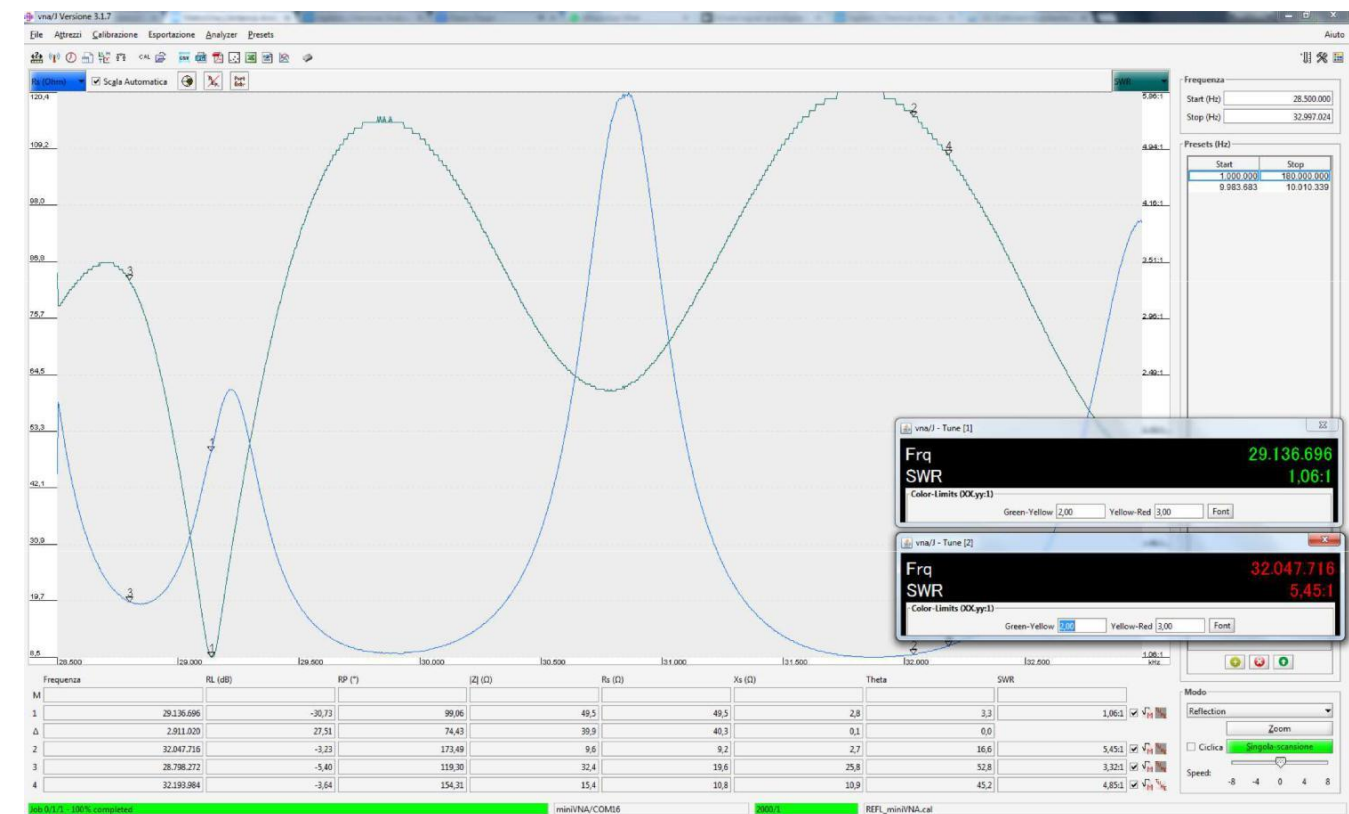
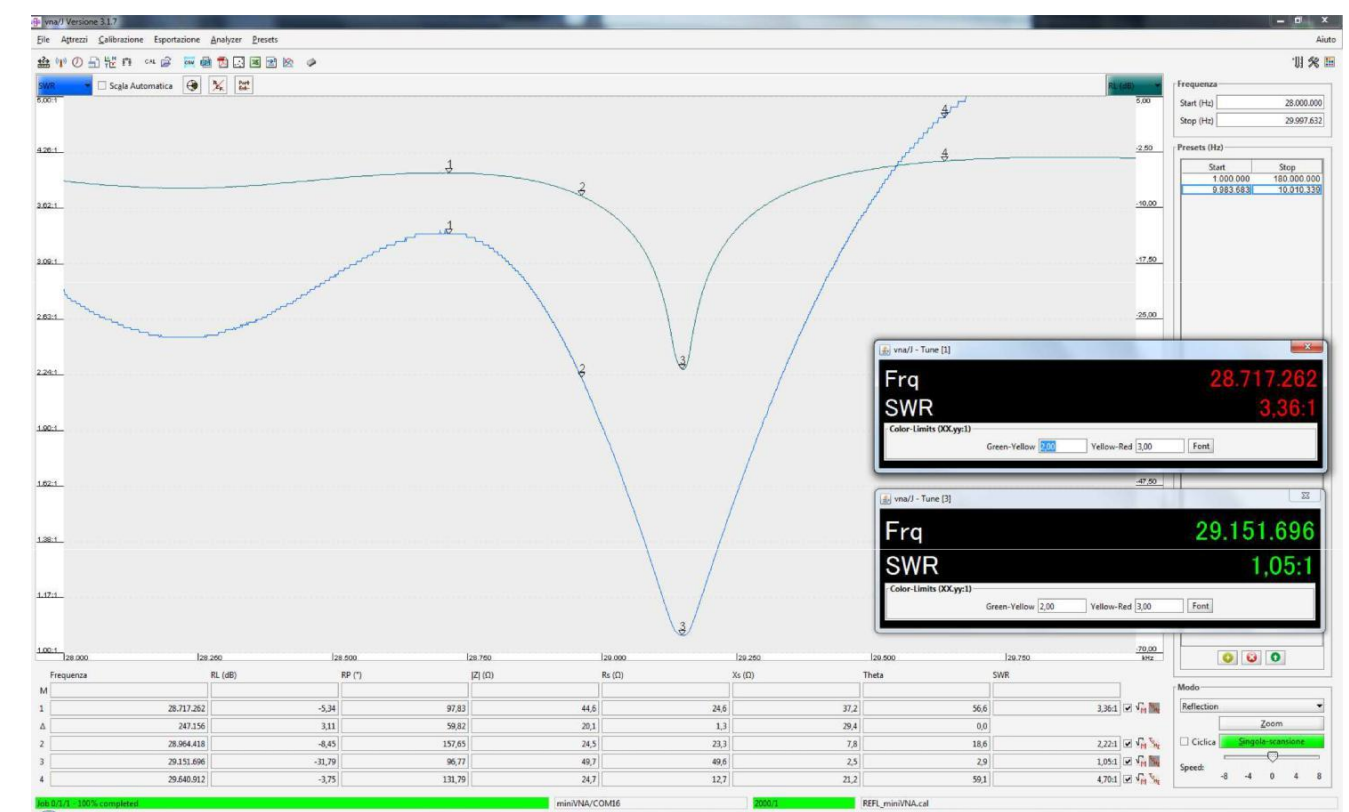
## Phase Test (RG316 screened cable)





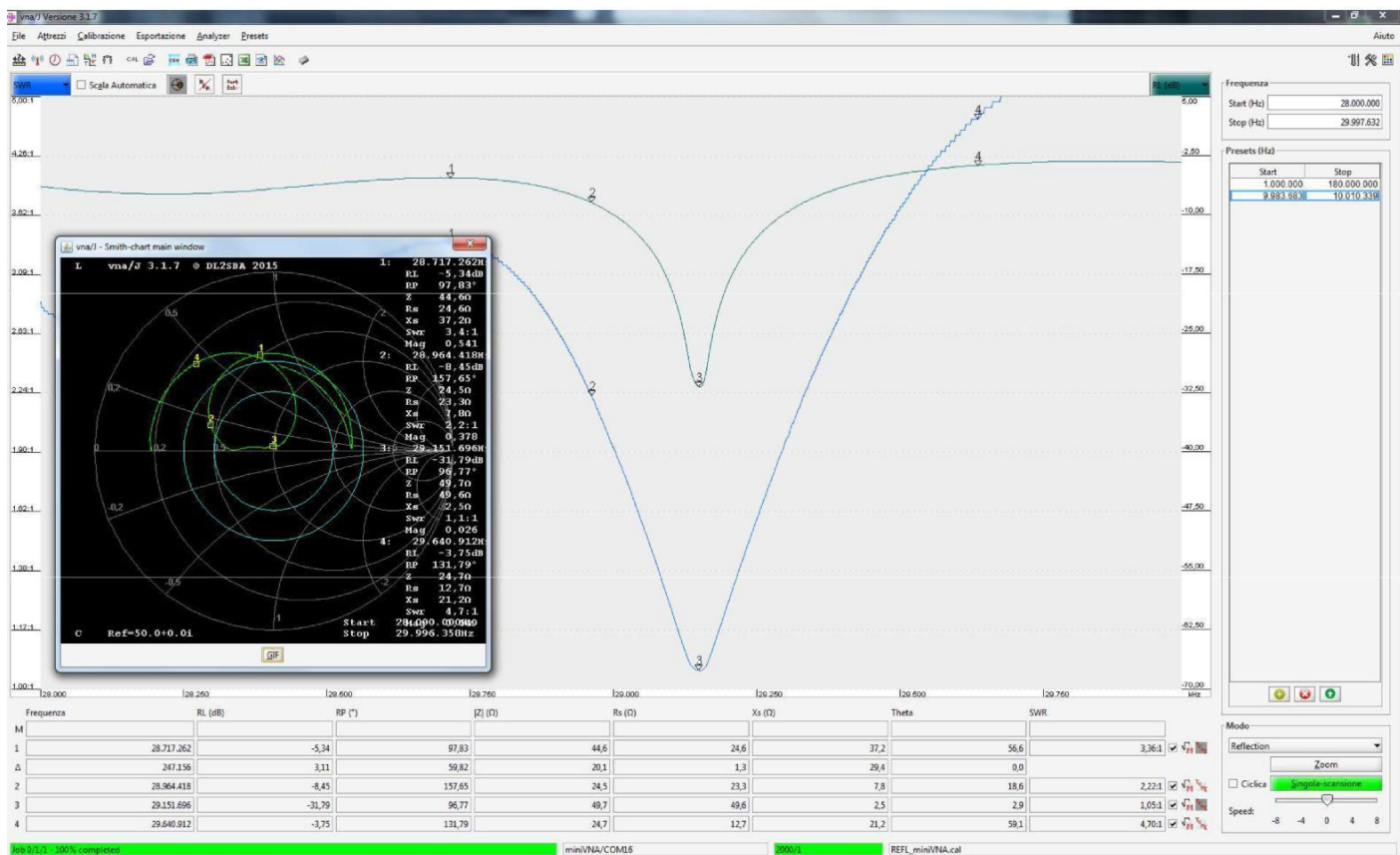
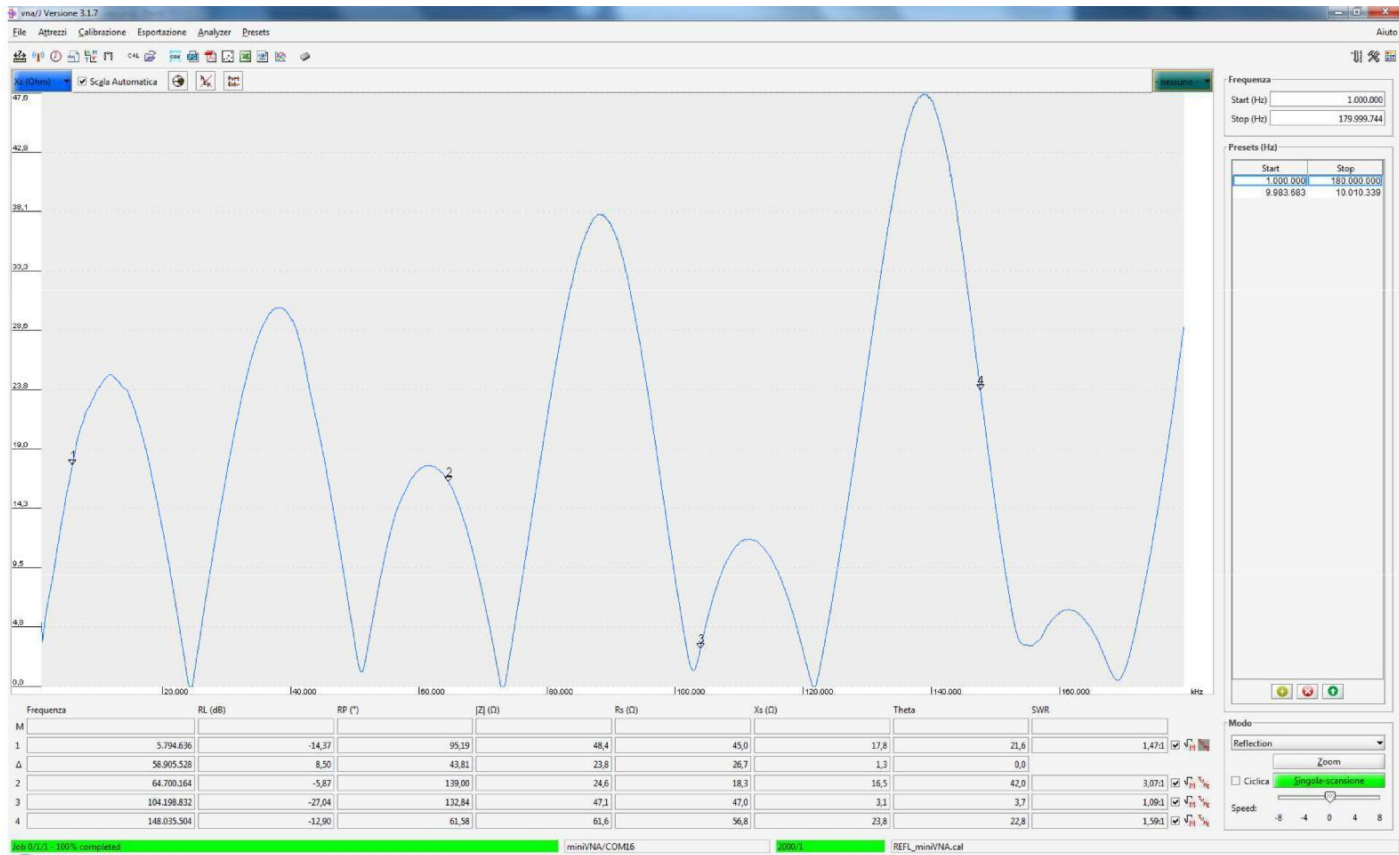
# Multiband Dipole Test

Reflection Test - The graphs below show the resonance curves of a multiband dipole.



# Reactance and Resonance Test of an Antenna

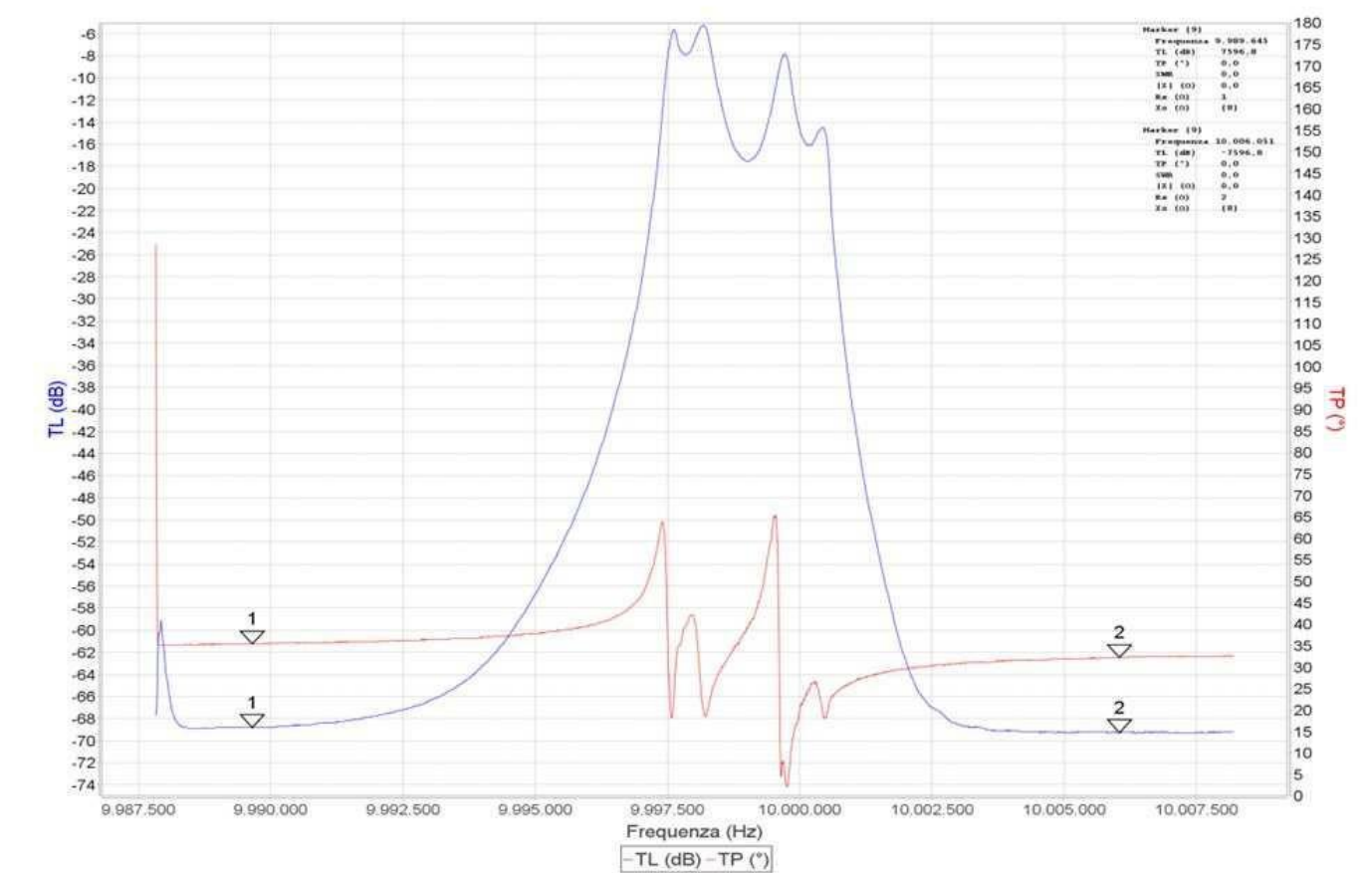
Test measures Reactance X and Resonance of a vertical antenna



# Export Data in PDF Format

The Metrovna permits the exportation of data and measurements in various formats to print graphics and export them to PDF software.

In the figure below is an example of a COWN LADDER filter.

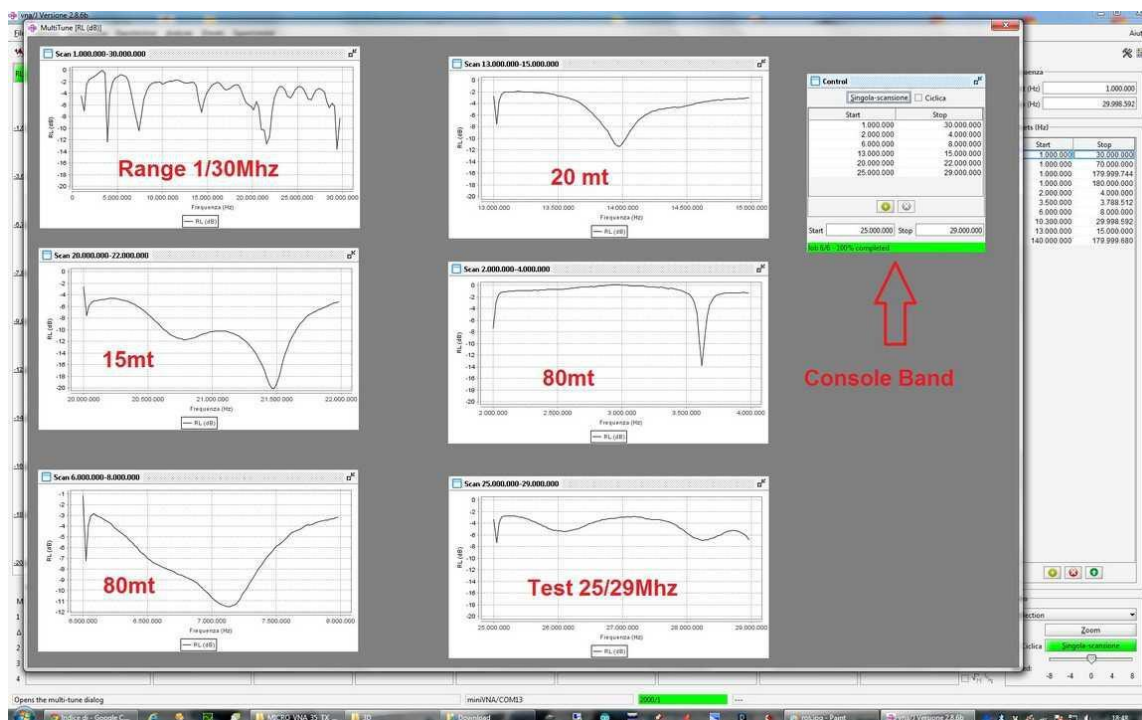
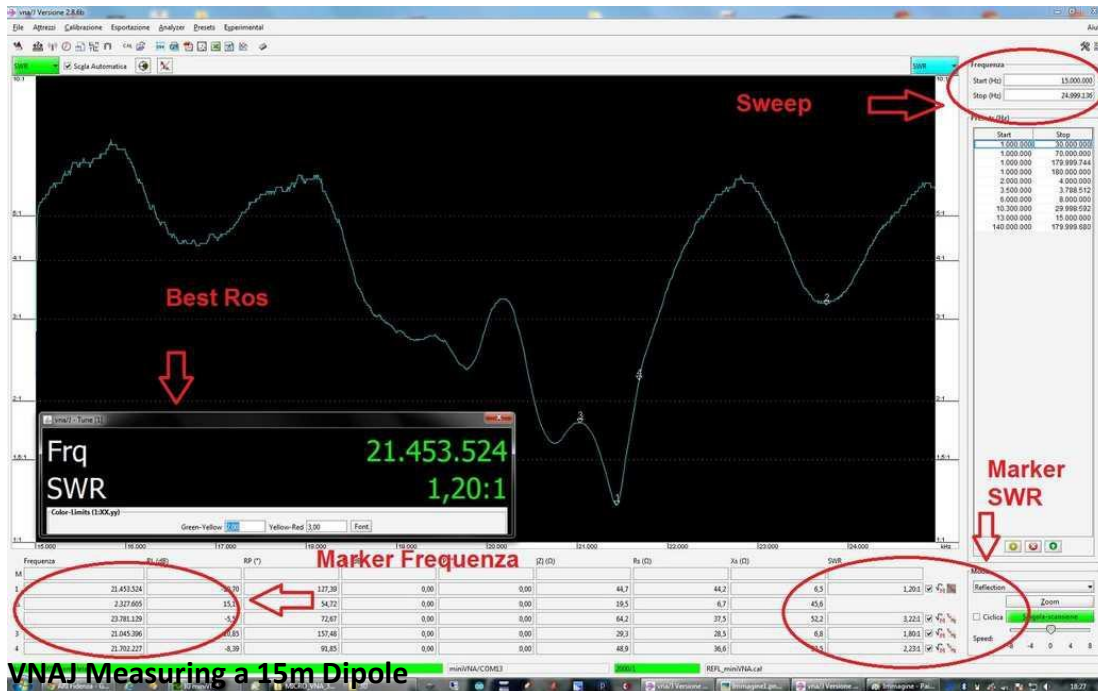


Marker	Frequenza	TL (dB)	TP (°)	Z  (Ω)	Rs (Ω)	Xs (Ω)	Theta	gr (ns)
1	9.989.645	-68,82	35,37	0,0	0,0	0,0	0,0	7596,8
2	10.006.051	-69,29	32,20	0,0	0,0	0,0	0,0	-7596,8
1-2	16.406	0,47	3,17	0,0	0,0	0,0	0,0	---

# Vnaj TEST Software

Metrovna is compatible with a lot of software including VNAJ, DL2SBA. This sophisticated software allows you to do filter and antenna measurements directly from the PC and works on Windows / Mac / Linux platforms.

For operation and manuals refer to the author's site



VNAJ Measuring a Multiband Dipole

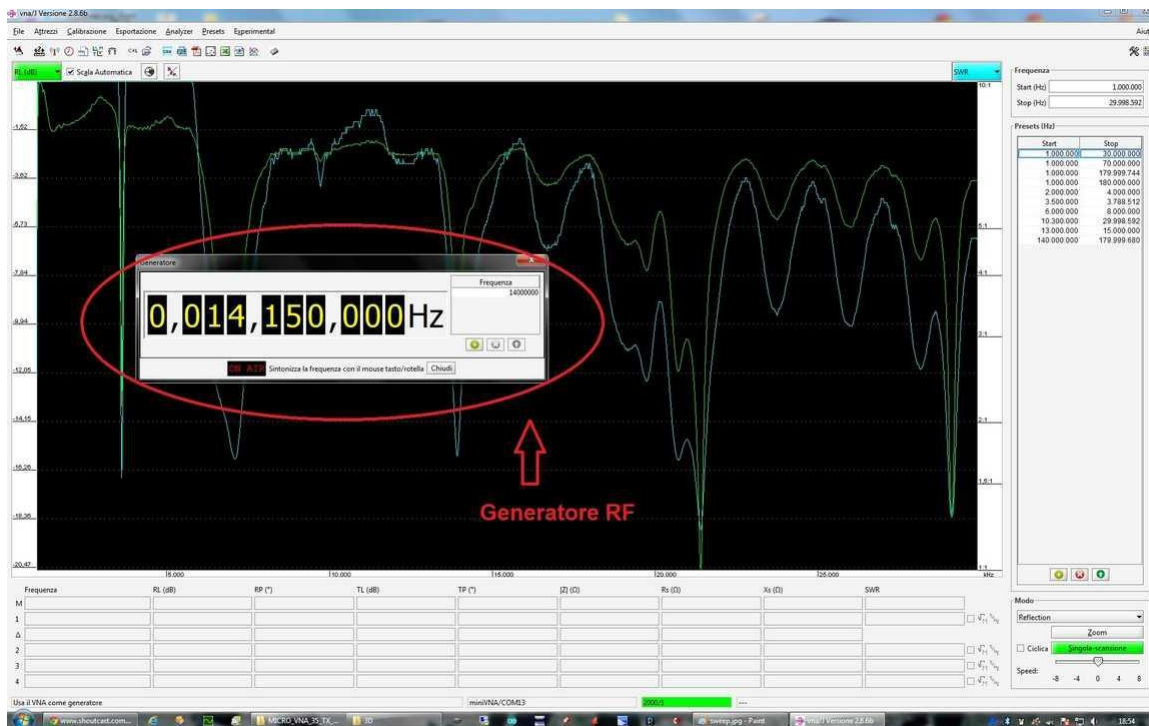


# VnaJ Test Software

Measuring an 80m dipole in with associated Smith diagram.



Another useful function makes the Metrovna an accurate RF Generator



---

# Troubleshooting

- ☐ ***What is the maximum level applicable in RF METER mode?***

***Answer*** The VNA measures from -65db to maximum +5db (not exceeding that threshold)  
-up to 500 MHz with an accuracy of +/- 2db

- ☐ ***What is the precision of the instrument and range of functions?***

***Answer*** The precision is from +- 5 ohm for the measurement of R,Z,X whilst in the frequency range of 1 MHz to 180 MHz

- ☐ ***Does the METROVNA need to be calibrated?***

***Answer*** In stand-alone mode the microprocessor sets to automatic calibration.

When connected to the PC you can calibrate with the relevant software.

- ☐ ***Does reference 0db correspond to the actual signal produced by the DDS?***

***Answer*** No - The 0db reference is only numeric, - in reality the instrument gives an RF signal of -6dbm.

- ☐ ***Under what conditions will the VNA give erroneous values?***

***Answer*** It can vary either from high RF signals present in the vicinity of cables, cables exceeding 100 metres, or defective connectors

---

# **Troubleshooting**

- ☐ ***From what distance it is possible to remote the METROVNA?***

***Answer*** IT depends on obstructions in the vicinity.

***'In the clear', its' about 10metres.***

**ATTENTION - do not obstruct the antenna!**

- ☐ ***Is it possible to charge the battery by inserting the power cable?***

***Answer*** The battery charges through the USB port, if the PC can supply at least

**500mA. If not, the Metrovna can be charged by other means.**

- ☐ ***Why is the VNA is not being identified by my PC?***

***Answer*** Make sure that the correct COM port of the PC has been selected.

- ☐ ***When the VNA is connected the display does not update the data***

***Answer*** When the VNA is connected to the PC or TABLET all the data is directed to the external device to save the resources of the microprocessor, making the display go to Standby and so non-updating.

- ☐ ***Is it possible to upgrade the Firmware?***

***Answer*** Yes, just slide the switch under the Metrovna to the RIGHT, and insert the latest updated Firmware via the relevant software. (See page 28)







# Declaration of Conformity

Certificate Ref. No. DC217

Manufacturer's Name	METROPWR di Ferrulli Antonio & C.
Address	Via Cap.Locorriere 32 70025 Grumo Appula (BA) Italy
PRODUCT	Antenna Analyzer
MODEL	METROVNA LT 55MHz, METROVNA PRO 180MHz, METROVNA DELUXE 250 MHz
SPECIFICATIONS	3.7Volt 500mA

*is in conformity with the following EC directive(s) (including all applicable amendments)*

*(EMC) Directive 2004/108/EC and carries the CE marking*

REFERENCE NO.	TITLE	EDITION DATE
EN 61326.1:2006	Radio disturbance characteristics - Limits	2006
EN55011 class B	measurement test	January 2017
EN61000-4-2	Electrostatic discharge immunity test	April 2011
EN61000-4-3	Radiated, radio-frequency electromagnetic field immunity test	April 2007

## Supplementary Information:

Last tests were conducted at the following accredited test facilities:

Test Report N.013.17

ITEL Telecomunicazioni S.r.l.  
Via Antonio Labriola 39, Z.I.  
70037 Ruvo di Puglia (BA) IT

DATE

21/07/2016

SIGNATURE

---

# **Technical Characteristics**

## **Technical Characteristics - Metrovna LT/Pro/DELUXE**

- Coverage 1/55MHz 1/180MHz 1/250MHz, 160/1.2mt continuously (depending on model)
- Measures R,Z,|X|(no sign), SWR, Transmission Loss, Phase, Return Loss, Power ( Deluxe version))
- DUT output -4 dBm at 50ohm
- Dynamic RF Meter -60 dBm
- Maximum Signal Input - 70/+5db
- Accuracy +-2db
- Operating Voltage 3.3V
- Size 125mm x 95mm x 20mm
- Weight 200gr

## **Functional Characteristics**

- Display TFT 3.1" 16K colour touch screen
- 15/20 internal menus (15 LT/PRO 20 DELUXE)
- Powered at 3.3 Volts
- Internal Li-ion Battery - 2600mAh
- Battery Charging via USB
- Firmware Update via USB
- Compatible with IG/VNA, VNA/J , BluVNA and others
- Compatible with Android Tablets and Smartphones
- Software platforms— WINDOWS, LINUX, ANDROID, MAC



[www.metrovna.com](http://www.metrovna.com)