

Comet CAA-500 Mark II standing wave analyser



The CAA500 Mark II came in handy for adjusting the reviewer's 80m dipole. The lead image shows the readings in SSB part of the band, with SWR around 2:1, whilst the right image shows the antenna almost resonant on the CW part of the band.

What's the purpose of an antenna analyser and why would you need one?

Simply, it tells you the resonant frequency of a particular antenna, allowing you to trim the antenna to the frequency you want to use it. It'll give you the SWR and impedance of the antenna at that frequency and perhaps show you a SWR curve of the antenna, allowing you to see the SWR at different frequencies in the band.

Background

Antenna or Standing Wave Analysers are a comparatively new thing. As a young G4, they weren't about at all. We'd measure the SWR using a SWR bridge, first at the top

of the band, and then at the bottom of the band. If you were lucky, they were the same, meaning that the SWR was flat across the band. Otherwise, it was a case of measuring the SWR at various points in the band, deciding where you wanted the antenna to be resonant and trimming the antenna accordingly to achieve this. Did you need to bring the resonant frequency up a little, by shortening the antenna, or bring it down, by lengthening the antenna? Perfectly doable with a transmitter and an SWR bridge, but not the quickest of processes and one potentially involving a bit of shoe leather between the shack and the garden.

Then, I became aware of people turning up on contests or DXpeditions with these little boxes, with a display, generally two meters, showing SWR and impedance and a couple of controls – a band switch and

a 'tune' control with one or more antenna inputs. The great thing about these units was that they could be taken out into the field and the adjustments made without needing someone at the transmitter end, someone in the garden and all that back and forth!

Early antenna analysers were quite expensive and I did not have one! Over the years though, the price has come down and many amateurs find them invaluable in their station, especially if a lot of antenna experimentation and work is done.

That's a little bit about what an antenna analyser does and why you might want one. More specifically, what about the Comet CAA-500 Mark II? What does the manufacturer say about the unit?

The NEW CAA-500 MKII version SWR/ Impedance Analyser now adds a full colour TFT LCD display to the original model whilst

still featuring an analogue cross needles display for SWR and impedance.

Auto Sweep Mode: Automatically graphs the SWR on the LCD display. Choose any one of the pre-set amateur band frequency ranges and press the sweep button in for about 30 seconds the SWR graph is completed and displayed.

Manual Sweep Mode: Choose the band and manually set the band-width and manually sweep the chosen frequency range.

Multiple Manual Sweeps: Should you want to make an adjustment to the antenna length, to the position, height above ground, a gamma match adjustment, etc – you can overlay 5 manual sweep results in different colors! Instantly graph and see exactly what happened after each adjustment!

- Range: 1.8 - 500MHz
- RF output level: 0dBm 1mW
- Measured SWR Range: Analogue meter 1.0 6.0:1 , LCD display 1.0 9.9:1
- Impedance measurements: 12.5-300Ω
- Reactance range: 0 - 500Ω Oms (absolute value) 1.8 -190MHz
- Battery indicator and selectable Auto-Power-Off timer
- Operates up to 9 hours continuous using six AA Alkaline or NiMH cells (not included) or use an external 8-16VDC 200mA power source (DC cable included)
- Internal trickle charger option when using NiMH batteries
- Size: 3.5 x 7.75 x 2.65 inches (overall)
- Weight: 2lbs 2oz with alkaline batteries installed.

In the box

On opening up the box, the first impression is of a chunky, substantial unit. The analogue display, displaying SWR and impedance is nice and large and easy to read, especially when out in the field. There's a colour TFT display, two controls for 'Band' and 'Frequency' as well as On/Off, Sweep Centre, AP-Off Bandwidth and Graph On/Off switches.

The unit takes six AA alkaline or NiMH rechargeable cells, a source of some dismay initially to your reviewer who didn't have that many batteries in the house! Fortunately, a 12V power cable is supplied which, of course, is fine for using the analyser in the shack, but for work in the field, you'll want to use batteries. There's a trickle-charger built into the unit for use with NiMH cells (a Charge switch is located in the battery compartment to enable this function). There are two antenna inputs on the unit, an SO-239 socket for 1.8-300MHz and an N-socket covering 300-500MHz.

In use

As it turned out, the antenna analyser had arrived at a very useful time. A few weeks ago, I'd quickly

put up an 80m dipole, measured 'approximately!' Its SWR was a little high in the band, but a quick tune on the ATU and all was good. I decided though, I would take advantage on the presence of the analyser and do a proper job. I switched on the analyser, connected the dipole to the 1.8-300MHz port, switched the band control to 80m (just rotate the control until the TFT displays a frequency in the band you want to use). Then, using the Freq control, you can use the big analogue meter to see where the SWR dips at resonance. In my case, it was around 3.3MHz – rather low in frequency, so to bring the antenna to resonance around 3.5MHz, I needed to shorten the aerial a little bit. Wire cutters at the ready, I trimmed off an inch or two off either end and re-tested. This time, the frequency had come into the 80m amateur band, making the dipole easily usable in the CW segment without an ATU – perfect. Up at 3675kHz though, the frequency of my weekly SSB sked with GW5NF, the SWR is 2:1. As I'm happy to use an ATU for the sked, that's fine – but I could easily trim a little more off the dipole ends and try and get resonance somewhere in the middle so that I can work CW and SSB without an ATU. With the analyser, it's a simple process, as you can see.

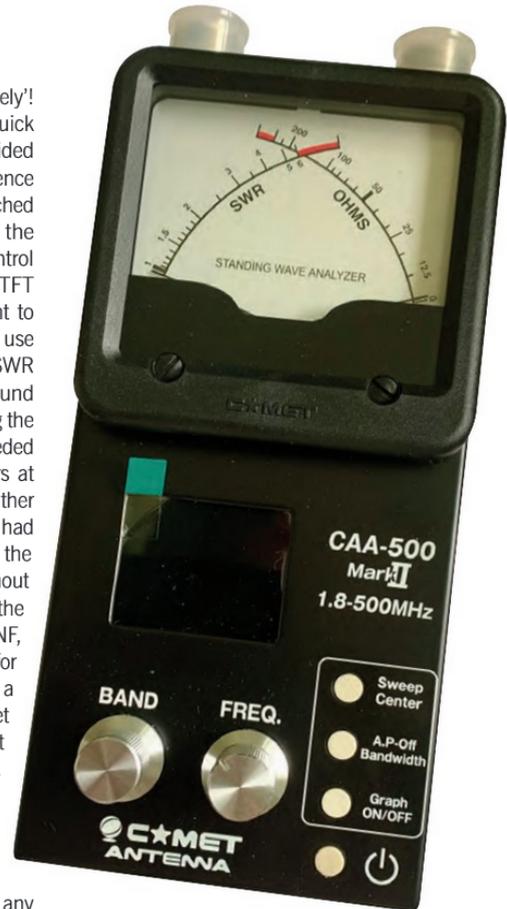
Something else that is quite fun and instructive to do is to run the analyser across some of the other bands and see if there are any useful looking resonance dips. For example, my 80m dipole shows an interesting resonance around 17m – I'll have to see if it works!

Functions

That's the basic use of the analyser covered, which the instruction leaflet (that is quite well written) terms as 'Normal mode', and the procedure I went through is termed as 'Manual Plot Mode'. Manual Plot mode allows you to set the centre frequency and the bandwidth of the plot. In this mode, if you press the AP-Off button, during the sweep, this changes the colour of the plot and allows you to have multiple sweep traces on the screen. Useful, as the instruction manual mentions, if you're trying to adjust a gamma match on a Yagi and are trying to gauge what effect you have made.

There's an 'Auto Sweep Mode', which allows you to display an SWR curve on the unit. The SWR curve is nicely displayed on the TFT screen. If you want to record it, you'll probably need to take a photo of it on your smartphone – as there's no means of transferring this data, or any other from the unit, onto a computer.

Up until now, I've only talked about using the unit on HF frequencies, but with a range up to 500MHz, it will be handy on the VHF/UHF bands too. I tried it on some of the VHF/UHF aerials here where it worked well and correlated well with other measurements I had made using my VHF/UHF equipment. I



The CAA-500 is simple to use and both the analogue meter and the TFT colour display are nice and easy to read quickly.

had wondered how accurate the frequency would be on the higher bands, but did not see any problems.

Conclusion

Overall, I was impressed with the CAA-500 Mark II. It's not cheap at £499.95 but performance is very good and the unit is very portable, which will be ideal if you want to use it out in the field (or in the garden). Cheaper units such as a nanoVNA can yield the same sort of information, albeit presented in a different way, work well but do not necessarily lend themselves to being used in the field, especially if they are connected to a computer, whereas the CAA-500 Mark II is entirely standalone.

I hope you have enjoyed this look at the Comet CAA-500 Mark II as well as a slightly more general discussion as to why you might find an antenna analyser useful. My thanks to Nevada Radio (www.nevadaradio.co.uk) for the loan of the CAA-500 Mark II.

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