Reveiw

The Comet CHA-250BX Broadband GP Antenna

The Comet CHA-250BX antenna, can be a useful antenna for those of us who have postage-stamp sized gardens as it doesn't need radials.

The CHA-250BX is described by the manufacturer as a ground-plane antenna. It's essentially a multi-band vertical covering 3.5-50MHz (80m-6m) working against ground. But it doesn't require any radials or earth connection. General advertising sources suggest it's the ideal antenna where there is restricted space. (More on this later).

The item was well packed for transit and arrived undamaged. The box contained all the pieces required for assembly, there were no deficiencies which always goes down well with me! There are five sections to be joined and at the base of section one is the black housing containing what is described as the 'Matching Section,' **Fig. 1**.

Instructions are in the form of a sheet folded (the wrong way) and describe, in quaint 'Jinglish', (Japanese English) the specification and assembly method. Great attention is also paid to safe practice. However, as I removed the various components I noticed a lack of de-burring (sharp edges) on the mounting bracket and swarf had not been removed from the clamping split, which is cut in the top end of the base section. Other than these items, the general engineering was of a good standard.

The lower section wall thickness is 2mm with the matching unit at its base terminating in an SO239 connector, the upper end accommodates the second section, which is locked into position with a substantial worm-drive (Jubilee) screw clip round the clamping split. The matching unit is mounted on a rectangular plate, which is pre-drilled to take two 'U' bolts for mast mounting, as can be seen in Fig. 1.

Section two has a wall thickness of 1.8 mm. The top end is inwardly reduced (swaged) to accommodate the third section.

Section three is likewise formed and has a wall thickness of 1.5 mm with what appears to be a *ptfe* insert at the lower end for strength. It's secured to the second section through pre-drilled holes with two hexagon headed bolts (M5x35) and wing-nuts.

Section four, wall thickness 1.5 mm, is secured to the third section with two hexagonal headed bolts (M4x30) and wing-nuts into pre-drilled holes.

Section five (also 1.5 mm) is adjustable within the fourth section. This is locked by two set-screws retained within two stainless steel collars at the

Dave Mason G3ZPR has been busy evaluating a vertical antenna and despite poor propagations conditions enjoyed himself very much!

Braving a below 0°C shack to get the propagation conditions to check out the antenna.

top of the fourth section.

The instructions for fixing each section were well illustrated, clear and specific and the holes for securing bolts are accurately drilled which make for easy assembly. Mounting to a mast is effected by the previously mentioned 'U' bolts into the mounting plate. These will accommodate mast diameters between 30 and 72mm (1.18 to 2.8in).

Note: The manufacturers state clearly that the antenna should be mounted **at least 10.5m (35ft)** above ground for optimum performance.

Assembly Space

As I worked, I soon discovered that a substantial space is needed to assemble the antenna, as the total length, fully assembled, is 7.13m (23.8 ft). Starting at the base, I slid the second section 200 mm (8in) into the first and secured it with the worm-drive clip around the clamping split. The instructions advised me that it should be tight but not so excessive as to strip the clamp!

Next, I slid out section three from within section two until the fixing holes were aligned and inserted the M5 x 35 stainless bolts. These were then secured with the wing-nuts. Then I slid out section four from within section three, aligned the holes, inserted the bolts (M4 x 30 this time) and secured the section with the wing-nuts.

The instructions then advised that I should slide out section five completely from section four and then slide it back 100mm (4in) before securing the section with the two set-screws. The antenna was then fully assembled!

Mounting Method

As with any antenna, I think that serious consideration should be made as to the mounting method appropriate for the location to be used. It was at this point I was reminded of advertising suggestions relating to what might be

Fig. 1: This is the feed-point of the antenna, showing the matching section and the clamp fitting onto a mast.

referred to as 'limited space' or, as a friend commented, 'postage stamp' UK gardens.

As I see it, there are three ways of mounting a vertical antenna 10.5 m (35ft) above ground.

a) Fix on the apex of the house gable with brackets and stub mast fixed to the wall.

b) Attach it to a tilt-over, crank up, mast.

c) Attach it to a pneumatic mast.

Method (a) requires at least

two people and a head for heights to fix brackets and a stub mast, while working from a double/ triple extension ladder or, preferably, a scaffold tower. The antenna then has to be hoisted into position and held steady for fixing – remember it's fixed at its base so needs to be held very steady by an assistant while the 'U' bolts are secured around the stub mast. Don't forget to fit the feeder before dismantling the tower!
Disadvantages: Includes risks of working at height (although you could use professional antenna erectors) and possibly poor **E**lectro **M**agnetic **C**ompatibility (EMC) due to proximity of house wiring in roof spaces and to neighbours' TV antennas.
Advantages: Occupies no garden space.

Assembly hint: If your garden really is postage stamp sized, and you haven't got the room to assemble the antenna horizontally – it can the be assembled vertically starting with the top two sections (five and four) resting it against a wall corner, with the assembly continuing until the complete antenna is ready to hoist aloft.

Method (b) is much easier if you happen to have an existing tilt-over mast, but here enters the problem of garden length! The retracted mast tilted over will be something like 3.6m (12ft) long, add to that, the length of the antenna 7.3m (about 24ft) means the total length required from the mast base will be 10.9m (36ft) minimum. If you have that space, attach the feeder, tilt up, lock, and crank to full height – a one man job. Disadvantage – none, if you have one, use it. Advantages – permanent, with less chance of EMC problems.

Method (c) (pneumatic mast) is the only one which can be carried out in the smallest of spaces and the one chosen by me as the easiest, most effective and practical method. I'm lucky enough to have the use of such a mast but they are very expensive if purchased new, **Fig. 2**.

The antenna can be fixed to the mast at ground level if about 8.8 m (29ft) is available and then the whole assembly can be lifted to its fixing points by two people. Alternatively, it can be lifted on to the lowered mast using a cunning slide over stub (Described below). The advantages are – it requires only the space around the mast base. Less chance of EMC problems. This method has the added advantage of ease of lowering when not in use but, when fully erected, the mast **must** be guyed, or the base must be anchored down sufficiently well, **Fig. 3**.

Disadvantages of the pump-up mast method of mounting – none. But it's less permanent than the tilt-over option. Remember, a vertical is best sited well away from other antennas and house wiring – and keep it high!

Fig. 2: Dave G3ZPR, suitably dressed, for the cold weather setting to – starts to raise the pump-up mast in his back garden.

Fig. 3: Each leg at the base of the pump-up mast must be securely held in place, in this case with a 700mm long ground-spike.

The Inevitable VSWR

The manufacturers of the antenna specify a voltage standing wave ratio (v.s.w.r.) of less than 1.5:1 typical, and make a point of stating that *"...before transmitting, please check that the VSWR is less than 1.5 at the operating frequency."* Initially, I found it difficult to reconcile the actual values with those stated.

The addition of an LDG Z-100 antenna tuner unit (a.t.u.) to the system, (only for the purposes of double checking) made a considerable difference, bringing values closer to the those suggested. The stated values were however, achieved (without the a.t.u.) when I upgraded the feeder to H100 – a better quality and lower-loss cable. There's a moral in there somewhere. Don't skimp on feeder, it's really part of the antenna !

On The Air

It was then time to see how the antenna performed on the air because, of course, what's really important for an antenna is, it's ability to perform, bringing in the signals and sending them out to good use. However, my tests were restricted by the limitations inflicted by propagation conditions. Clearly, there's little point in trying to use a band when it is effectively closed.

Despite the propagation problems, I made every effort to seek out the smallest opportunity of a contact by going on air at some ridiculous hour which paid off. This proved to be between 0001 and 0300 hours on 7MHz, even if it was -1^{0}C in the outdoor shack! I had QSOs to Aruba Island and Martinique in the Caribbean – decidedly warmer than my location!

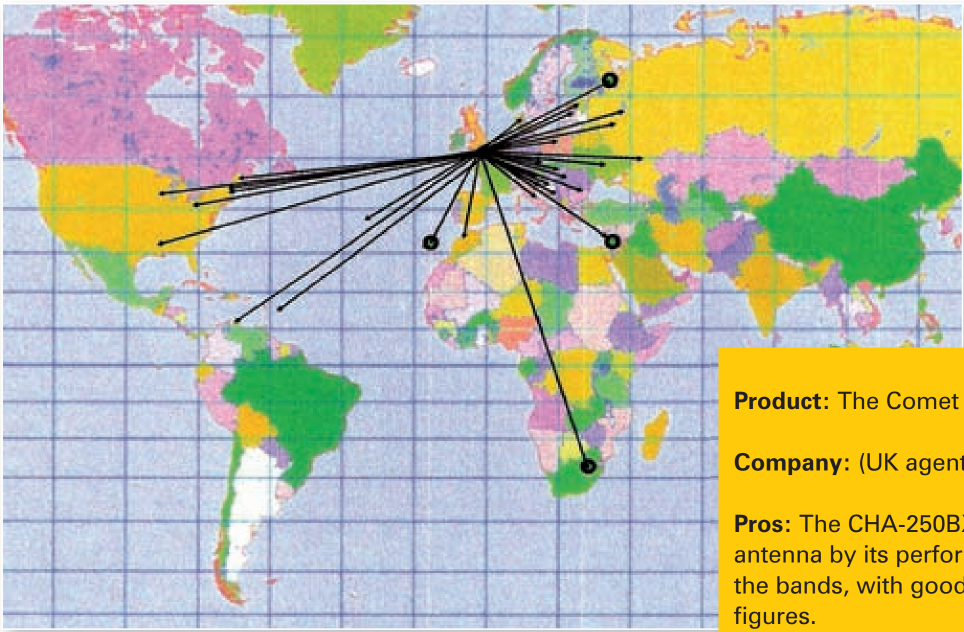

Fig. 4: This map shows the location of the stations worked, using the Comet CHA-250BX, when propagation conditions allowed. This meant in one case working after midnight in a freezing cold outdoor shack!

Product: The Comet CHA-250BX vertical antenna.

Company: (UK agents and distributors) Nevada.

Pros: The CHA-250BX has proved itself to be a good antenna by its performance, and its actual v.s.w.r. across the bands, with good quality feeder, meets the claimed figures.

Cons: Assembly really requires two people and plenty of space.

Price: The CHA-250BX antenna costs £299.95 plus £10 P&P.

Suppliers: My thanks for the loan of the review unit go to **Nevada Radio, Unit 1, Fitzherbert Spur, Farlington, Portsmouth, Hampshire PO6 1TT.**
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E-mail: **sales@nevada.co.uk**
Website: **http://www.nevadaradio.co.uk/**

Because of these problems I decided to carry out a beacon search (using the incredibly helpful **International Beacon Project's** 18 beacon, worldwide system, see **http://www.ncdxf.org/beacon/BeaconSchedule.html**) on the offending bands, 14 to 28MHz. And where I've heard any beacons, I've included them on the results map, **Fig. 4**. Please note that the lack of results can't be laid at the foot of the antenna and we all look forward to better times in the not too distant future. In general, when and where propagation has been good, so have the results!

Bands & Beacons Heard

14.100MHz – **4U1UN** (United Nations building) S2, **OH2B** (Finland) S1.

18.110MHz – **CS3B** (Madeira Island) S8.

21.150MHz – CS3B (Finland) S9.

24.930MHz – CS3B (Madeira Island) S 8, **ZS6DN** (South Africa) S1.

28.200MHz – Nothing heard.

Note: even though the 18, 21 and 24MHz beacons were of good strength, there were no contacts to be made on these bands. No contacts were made on 50MHz but an SWR of 1.5:1 was achieved.

A Good Antenna

The CHA-250BX has proved itself to be a good antenna by its performance, its actual v.s.w.r. across the bands, with good quality feeder, meets the claimed figures but variations can be expected if anything other than 'Low loss' feeder is used. Other reasons can reasonably be attributed to local conditions or the difference made by height.

I did some tests with the antenna lower than the height specified (easy when you can pump the mast to intermediate heights) and the difference was surprising. The matching unit at the base of the first section is certainly effective and there's no need of an a.t.u.

I agree with the suggestion that the antenna is suitable for small gardens but, of course, no location is identical to another and new owners will need to be resourceful during assembly. The device is comparatively light and mounting the antenna to its mast may appear easy enough – but a momentary loss of balance when it's being raised can occur leading to a variety of nasty results. So get help for the assembly and be safe.

Finally, I'm grateful to Nevada for the opportunity of reviewing the CHA-250BX, it has given me hours of fun doing what I like best of all – operating on the bands. The current difficulties with propagation conditions only spur me on to 'keep at it' and the rewards are making contacts despite those difficulties! ●

Mike Devereux G3SED replies: *"Hi Rob! The review looks fair and factual. My own experience with this antenna has found that it performed best for me on 20, 30 and 40 metres. When I tried this antenna against my 87ft Titanex Vertical (with 140 132ft radials) on 40 metres for example, I was truly amazed how close it came – only one S-point down. Clearly it's a winner on that band. I also had QSOs on 80 metres out to 200 miles during daylight, but my larger antenna outperformed the Comet by over 3 S-points as you might expect. However, it allowed me to make QSOs at distance on 80 metres with a virtual nil footprint when compared to a 132ft dipole or the Titanex vertical with all those radials.Thanks again for the review – a great job from Dave!*
Mike Devereux G3SED