



---

## Technical Note TN-565

### Tait Orca Antennas

17 March 1999

---

**Applicability:**

This Technical Note applies to all Tait Orca product.

---

**Introduction:**

The TOP range of antennas allow a choice in the size and performance of the resultant radio / antenna combination.

This Technical Note explains the differences between the antenna types, and the related effects of antenna choice upon resultant radio performance.

**Antenna Types:**

TOP series of antennas are constructed as either helically (spiraling internal conductor) wound, or straight conductor whip types.

The product codes and construction available are:

TOPA-AN-101 VHF 3" Helical (136-230Mhz)

TOPA-AN-102 UHF 3" Helical (336-530Mhz)

TOPA-AN-201 VHF 6" Helical (136-330Mhz)

TOPA-AN-202 UHF 6" 1/4 wave whip (400-530Mhz)

**Construction:**

The construction of a helical antenna allows an effective radiating element to be contained within a smaller physical length. The resultant power matching to the Transmitter is nominal, but the performance price paid for this size saving feature is reduced radiating efficiency compared to a conventional whip construction. The performance decrease will be proportional to the amount of length reduction gained in the helical design. This decrease in radiation efficiency translates directly to reduced coverage for the radio in question.

**Optimum Bandwidth:**

The range of antennas, due to their individual dimensions and constructions have different optimum bandwidths. These bandwidths specify the optimum frequency range over which the antenna will provide satisfactory performance.

The optimum bandwidth figures are approximately:

20MHz for 6" VHF helical.

10MHz for 3" VHF helical.

40MHz for 6" UHF whip.

20MHz for 3" UHF helical.

**Applications:**

At UHF, it is desirable to use the 6 inch whip antenna for medium to low signal strength areas, as the effective performance is better than the helical, providing superior coverage in marginal signal strength areas.

The UHF, the 3 inch antenna is only suitable for local high signal strength situations, as the helical radiation efficiency is approx 3.5dB lower than the equivalent 6" whip.

At VHF, preferred use of 6" helical will provide better radiation efficiency than the 3" version, due to its higher radiation efficiency.

**NOTE:**

**Due to the reduced bandwidth of the helical antennas, it is important (especially at VHF) to cut the antennas for half way through the desired TX freq range, to allow optimum matching of Transmitter to antenna, and therefore provide best radiation efficiency.**

**Customer  
Service  
Organisation:**

Please ensure that all internal sales/service staff are informed, and also dealers at your discretion.

---

**Issuing authority****Name and position  
of issuing officer**

Durham Sheriff  
MRD Customer Services Engineer.