A coaxial-fed multiband 'Windom' antenna

according to Gian Moda, I7SWX

This simple multiband antenna works on all bands from 3.5 to 28MHz, including WARC bands other than 10.1MHz; Fig 1a. It is in effect an adaptation of the twin-wire form of the 300Ω Windom antenna but fed with 75Ω coaxial cable by means of a 4:1 balun.

The antenna has been used for nearly 10 years with powers up to 200W RF, and the SWR at the transmitter is quite low, not more than 2:1 at the band edges.

The 4:1 transformer, Fig 1c, is made of PVC-insulated wire (eg black and red wire used for connecting loudspeakers to hi-fi amplifiers) connected as in Fig 1b.

RadCom, 'Technical Topics', March 1988

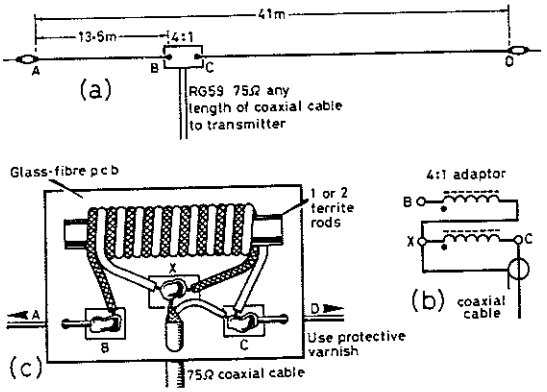

Fig 1. I7SWX's multiband antenna and 75/300Ω balun transformer

The G5RV multiband antenna

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The G5RV antenna, with its special feeder arrangement, is a multiband centre-fed antenna capable of very efficient operation on all HF bands from 3.5 to 28MHz, specifically designed with dimensions which allow it to be installed in gardens which can accommodate a reasonably-straight run of about 102ft (31.1m) for the 'flat-top'. However, because the most useful radiation from a horizontal or inverted-V resonant antenna takes place from the centre two-thirds of its total length, up to one-sixth of this total length at each end of the antenna may be dropped vertically, semi-vertically, or bent at some convenient angle to the main body of the antenna without significant loss of effective radiation efficiency. For installation in a very limited space, the dimensions of both the 'flat-top' and the matching section can be divided by a factor of two to make the half-size G5RV, which is a very efficient antenna from 7 to 28MHz. The full-size G5RV will also function on the 1.8MHz band if the station end of the feeder (either balanced or coaxial-type) is strapped and fed by a suitable ASTU using a good earth connection or a counterpoise wire. Similarly, the half-size version may be used thus on the 3.5 and 1.8MHz bands.

In contradistinction to multiband antennas in general, the full-size G5RV antenna was not designed as a λ/2 dipole on the lowest frequency of operation, but as a 3λ/2 centre-fed long-wire antenna on 14MHz, where the 34ft (10.36m) open-wire matching section functions as a 1:1 impedance transformer, enabling the 75Ω twinlead or 50/80Ω coaxial cable feeder to 'see' a close impedance match on that band with a consequently low VSWR on the feeder. However, on all the other HF bands the function of this section is to act as a 'make-up' section to accommodate that part of the standing-wave (current and voltage components) which, on certain of the operating frequencies, cannot be completely accommodated on the 'flat-top' (or inverted-V) radiating portion. The design centre frequency for the full-size version is 14,150kHz, and the dimension of 102ft (31.1m) is derived from the formula for long-wire antennas which is:

$$\text{Length (ft)} = \frac{492(n-0.05)}{f_{MHz}} = 492 \times 2.95/14.15 = 102.57\text{ft (31.27m)}$$

where n = number of half-wavelengths of the wire (flat-top).

In practice, since the whole system will be brought to resonance by the use of an ASTU, the antenna is cut to 102ft (31.1m).

As it does not make use of traps or ferrite beads, the 'dipole' portion becomes progressively longer in electrical length with increasing frequency. This effect confers certain advantages over a trap or ferrite-bead loaded dipole because, with increasing electrical length, the major lobes of the vertical component of the polar diagram tend to be lowered as the operating frequency is increased. Thus, from 14MHz up, most of the energy radiated in the vertical plane is at angles suitable for DX working. Furthermore, the polar diagram changes with increasing frequency from a typical λ/2 dipole pattern at 3.5MHz and a 2 × λ/2 in-phase pattern at 7 and 10MHz to that of a 'long-wire' antenna at 14, 18, 21, 24 and 28MHz.

Although the impedance match for 75Ω twinlead or