

1:6 VOLTAGE BALUN

1:6 Voltage balun. Install July 2016.

Requiring a balun to feed a balanced antenna from an un-balanced line with a impedance step up from 50ohms to 300ohms, a 1:6 Voltage balun design using a L15 ferrite toroid cores was selected.

Construction

The 1:6 voltage balun has 5 turns wound evenly spaced around the L15 ferrite toroid core with the five individual windings wound close together. The toroidal core was rapped in an overlapping layer pink heavy duty Teflon plumbers tape to protect the enamelled copper wire from insulation puncture from abrasion with the toroid core.

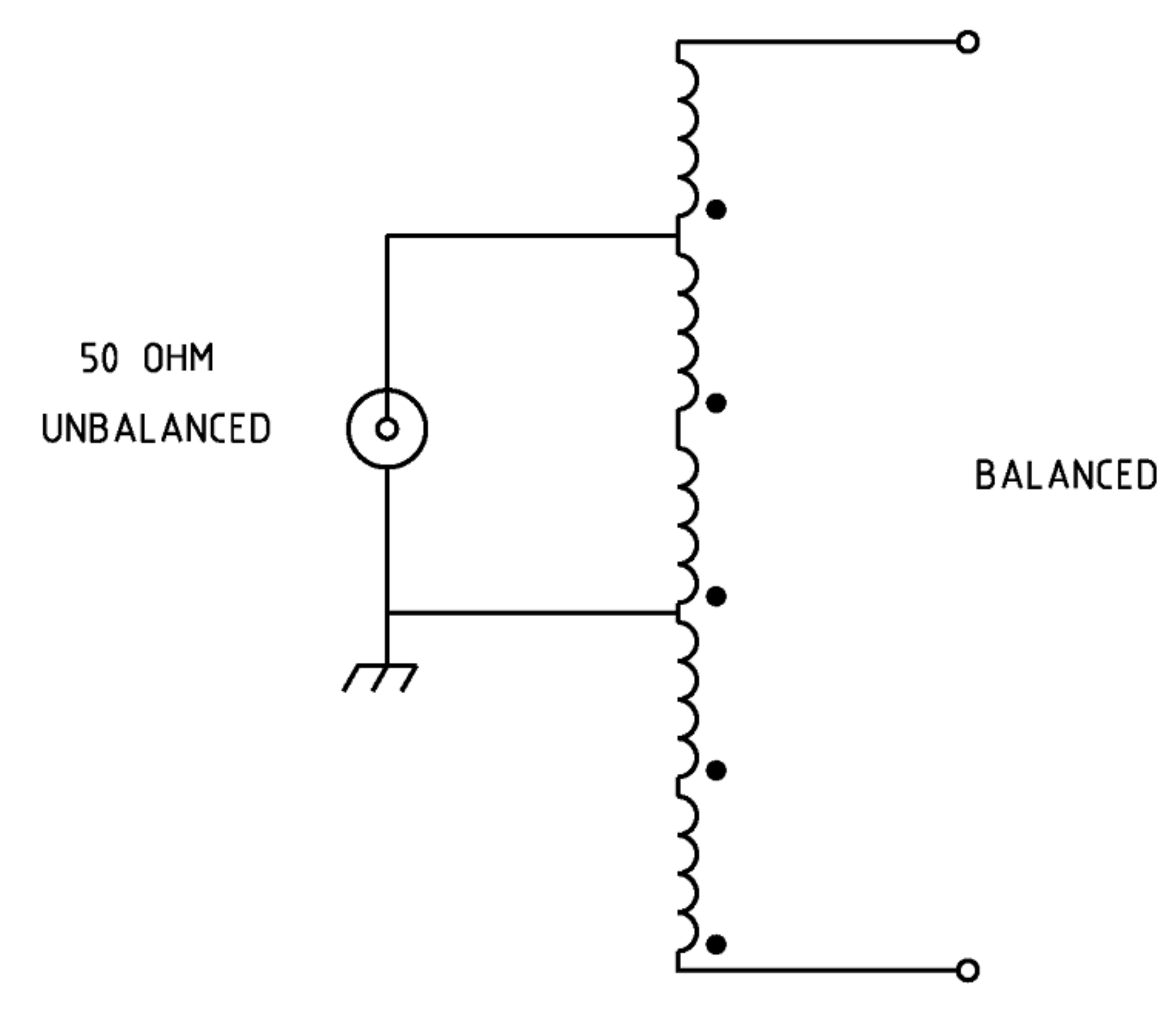


Figure 1 Schematic of the 1:6 Voltage balun

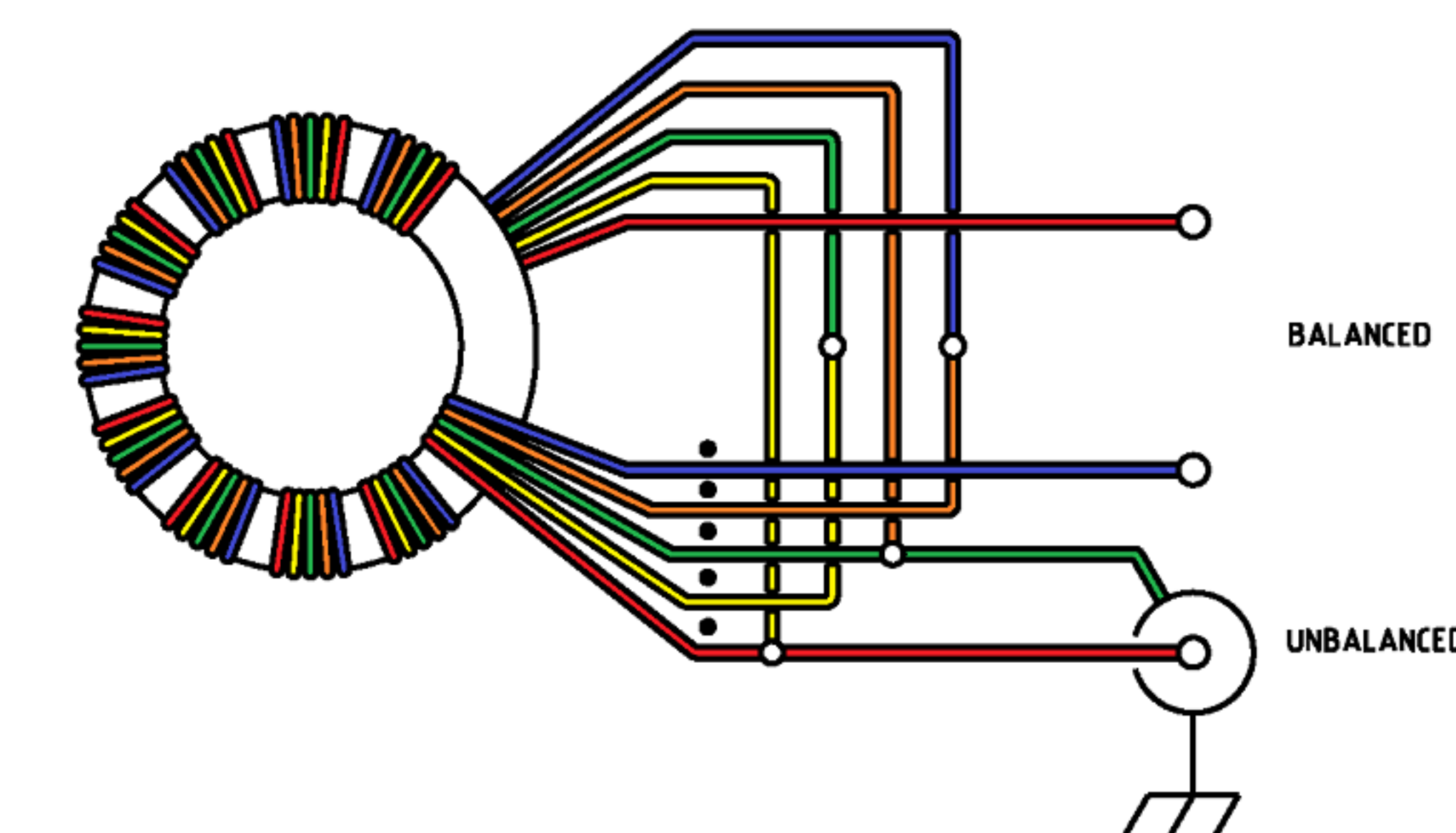


Figure 2 Winding of the 1:6 Voltage balun.
 Note this drawing shows winding connections and not the number of turns required. See article for details.

Parts list.

- L15 ferrite toroid core.
- About 500mm of 1.25mm Enamelled copper wire.
- SO-239 UHF chassis mount connector
- 1.25mm Enamelled copper wire.

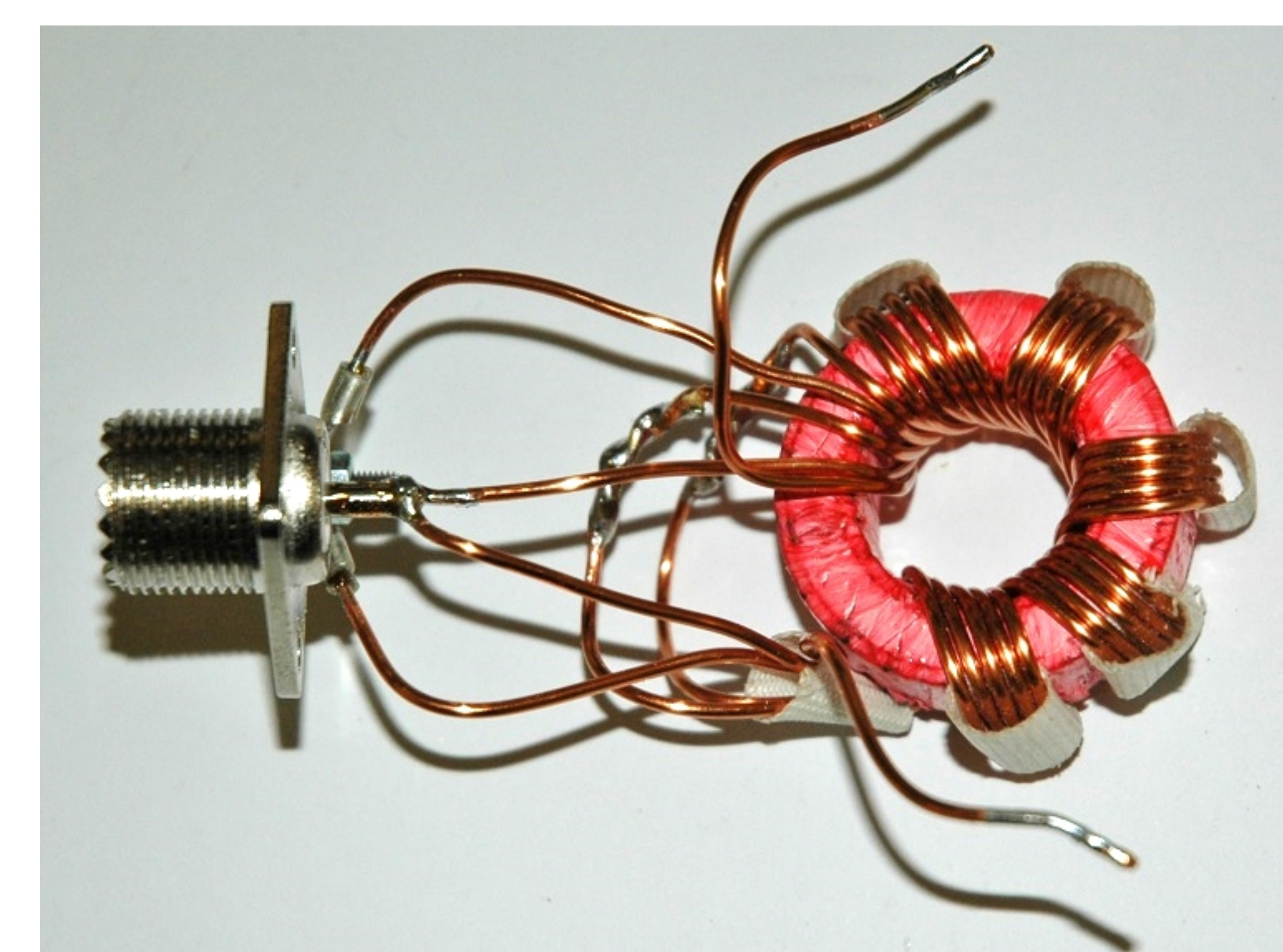


Photo 1 1:6 Voltage balun assembled.

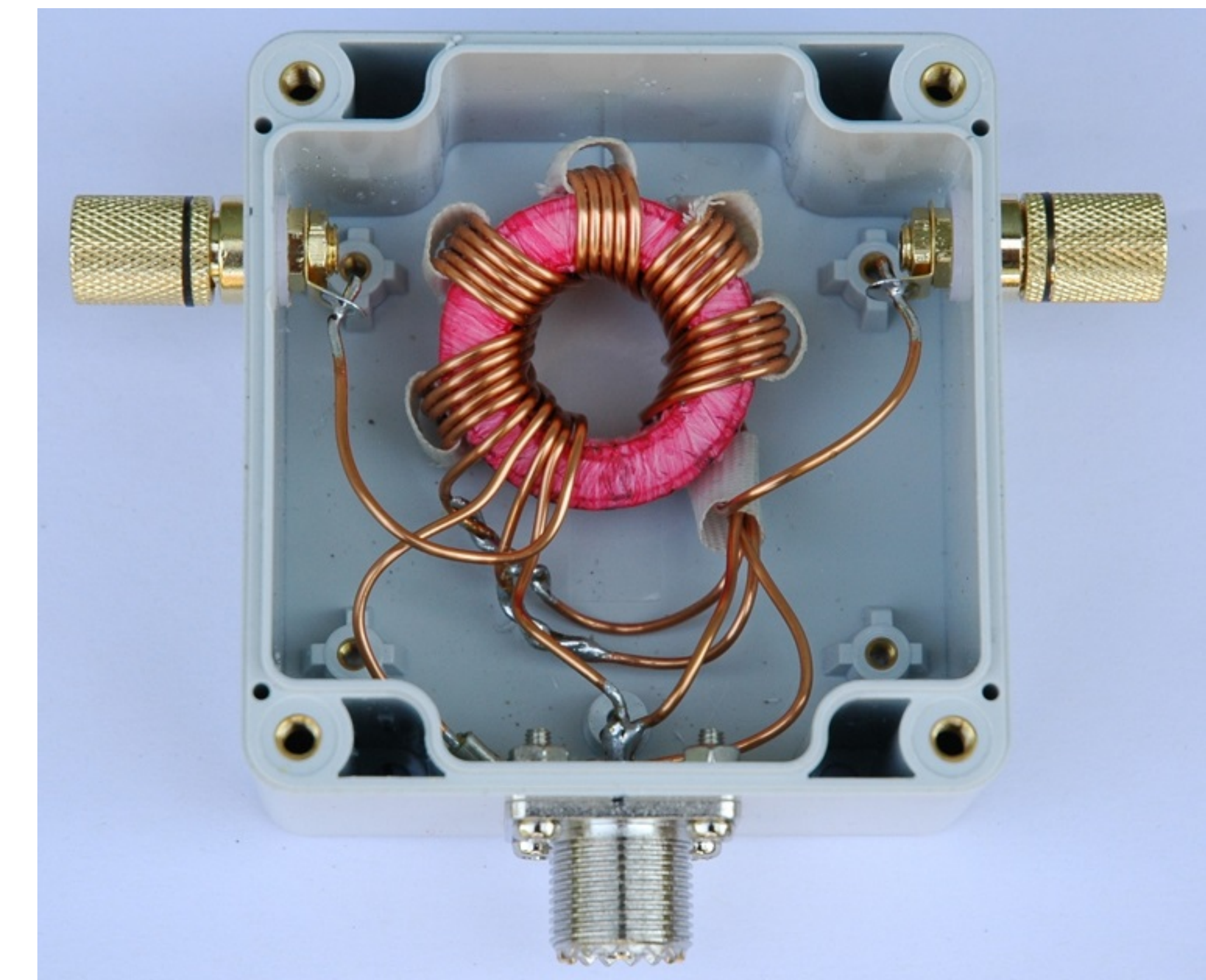


Photo 2 1:6 Voltage balun assembled in weatherproof enclosure.



Photo 3 1:6 Voltage balun assembled in weatherproof enclosure.

The evaluation of the efficiency of the balun over the desired bandwidth (0.5 - 60MHz) was carried out by testing the impedance that could be seen from unbalanced side to a resistive load applied to the balanced side using an antenna analyser. The below antenna analyser plot views a 300ohm resistive load attached to the balanced side of the balun and measured at a nominal impedance of 50ohms presented as anticipated an approximate 50ohm load to the analyser and produced about a 1:1 SWR

The performance of the balun from 0.5MHz to about 30MHz is good and shows little reactance, however there is a gradual rise in reactance above 30MHz along with a gradual rise in the SWR. Despite this rise in reactance and SWR the balun should still perform well within the 50 - 54MHz amateur band.

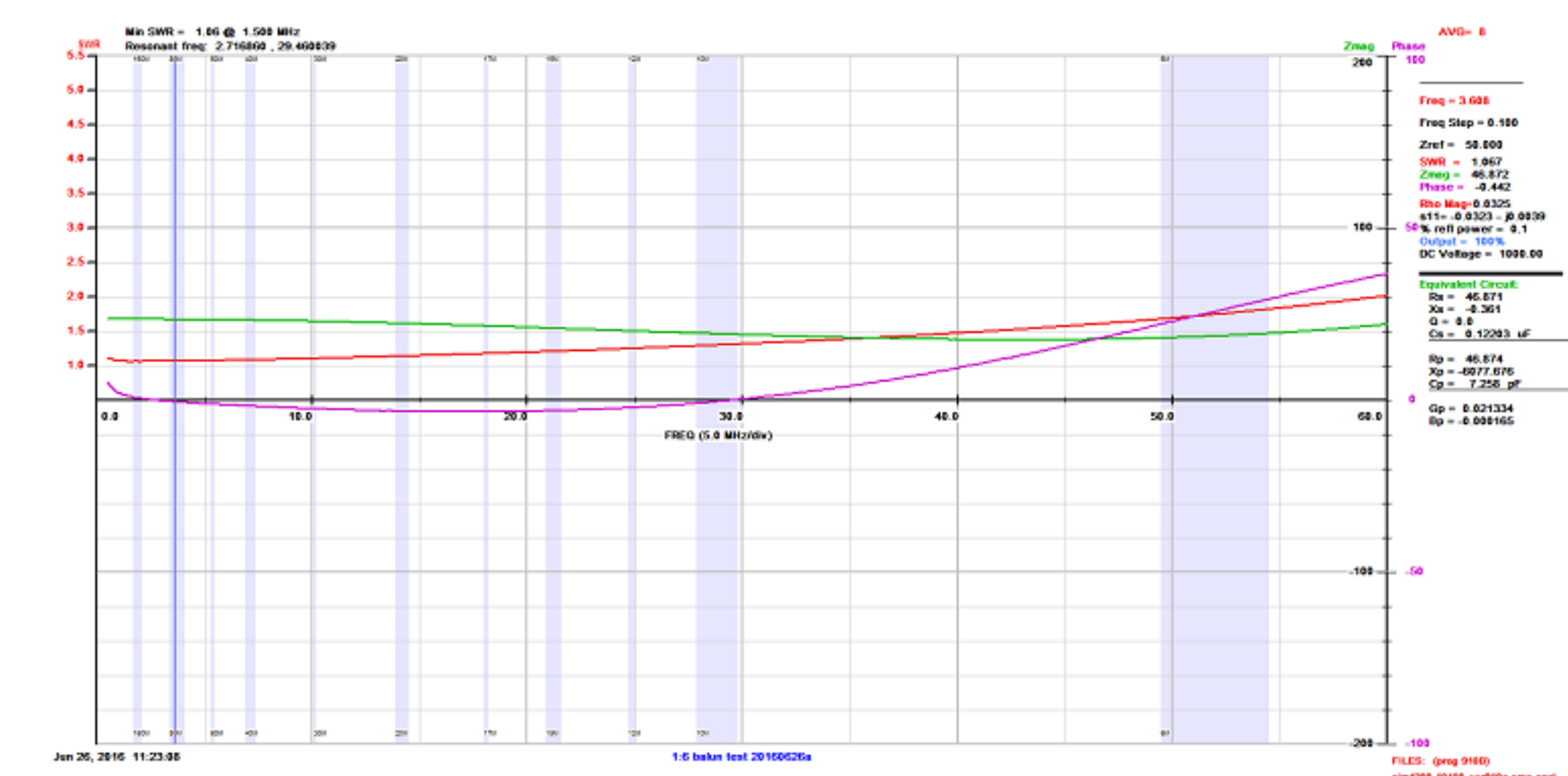


Figure 3 AIM 4170C antenna analyser plot viewing a 300ohm resistive load through the voltage balun. Note the 300ohm resistor appears as 50ohms due to the 6:1 balun ratio resulting in an ideal SWR of 1:1.

AIM 4170C antenna analyser explanation;

SWR	Standing Wave Ratio.
Zmag	Total impedance.
Theta	Phase angle between voltage and current.

Also see other baluns and ununs:

- [BALUN 1:1 CHOKE & 1:4 BALUN](#) HF ladder feed-line to coaxial cable combination choke and 1:4 balun. (0.1MHz - 30MHz).
- [BALUN 1:1 CHOKING](#) Choking balun for lower HF and MF bands. (200kHz - 10MHz).
- [CHOKING 1:1 BALUN - HF BANDS](#) Reinsert choking balun. (1.0MHz - 30MHz). FT240-43 Ferrite Toroid Core.
- [CHOKING 1:1 BALUN - HF BANDS](#) Reinsert choking balun. (1.5MHz - 30MHz). FT140-43 Ferrite Toroid Core.
- [CHOKING 1:1 BALUN - LOW VHF BAND](#) Choking balun. (10MHz - 60MHz). FT140-43 Ferrite Toroid Core.
- [BALUN 1:1 CURRENT](#) 1:1 Guanella Current balun using a L15 ferrite core (1.8 - 30MHz).
- [BALUN 1:4 CURRENT](#) 1:4 Guanella Current balun using a L15 ferrite core (1.8 - 30MHz).
- [BALUN 1:4 SINGLE CORE CURRENT](#) 1:4 Guanella Current Balun, single FT240-43 ferrite toroid cores. (0.3MHz - 30MHz).
- [BALUN 1:1 VOLTAGE](#) 1:1 Ruthroff voltage balun using a T-200-2 powdered iron toroid core (1.8 - 30MHz).
- [BALUN 4:1 VOLTAGE](#) 4:1 Ruthroff voltage balun using a T-200-2 powdered iron toroid core (1.8 - 30MHz).
- [BALUN 6:1 VOLTAGE - VERSION 1](#) 6:1 Voltage balun using a FT140-43 Ferrite Toroid Core (1.8 - 30MHz).
- [BALUN 6:1 VOLTAGE - VERSION 2](#) 6:1 Voltage balun using a FT140-43 Ferrite Toroid Core (1.8 - 30MHz).
- [BALUN 9:1 VOLTAGE - VERSION 1](#) 9:1 Voltage balun using a L15 ferrite toroid core (1.8 - 30MHz).
- [BALUN 9:1 VOLTAGE - VERSION 2](#) 9:1 Voltage balun using a FT140-43 Ferrite Toroid Core (0.5 - 60MHz).
- [UNUN 9:1 VOLTAGE](#) 9:1 voltage unun using a T-200-2 powdered iron toroid core (1.8 - 30MHz).
- [UNUN 9:1 VOLTAGE VERSION 2](#) 9:1 voltage unun using a L15 ferrite core (1.8 - 30MHz).
- [UNUN 9:1 VOLTAGE VERSION 3](#) 9:1 voltage unun using a FT140-43 ferrite core (0.5 - 60MHz).

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