G5RV U-Shape Installation – G8ODE

RSARS

102 feet (31.1M)

Full-size G5RV

34feet (10.36M)

Choke BALUN
10 turns RG58
on 50mm Diam
Pipe

Mini-8 50 Ohm Coax
Back to Shack

The G5RV Multi-band HF antenna
Designed by RSARS member Louis Varney G5RV (SK)

5m Aluminium TV
mast

Stainless Steel
Poly Coated Wire

300 Ohm
Ladder Line

Mini-8 Coax

Bungee Rope
1m stretches to 1.7m

Bungee Rope
1m stretches to 1.7m

Coax Choke BALUN
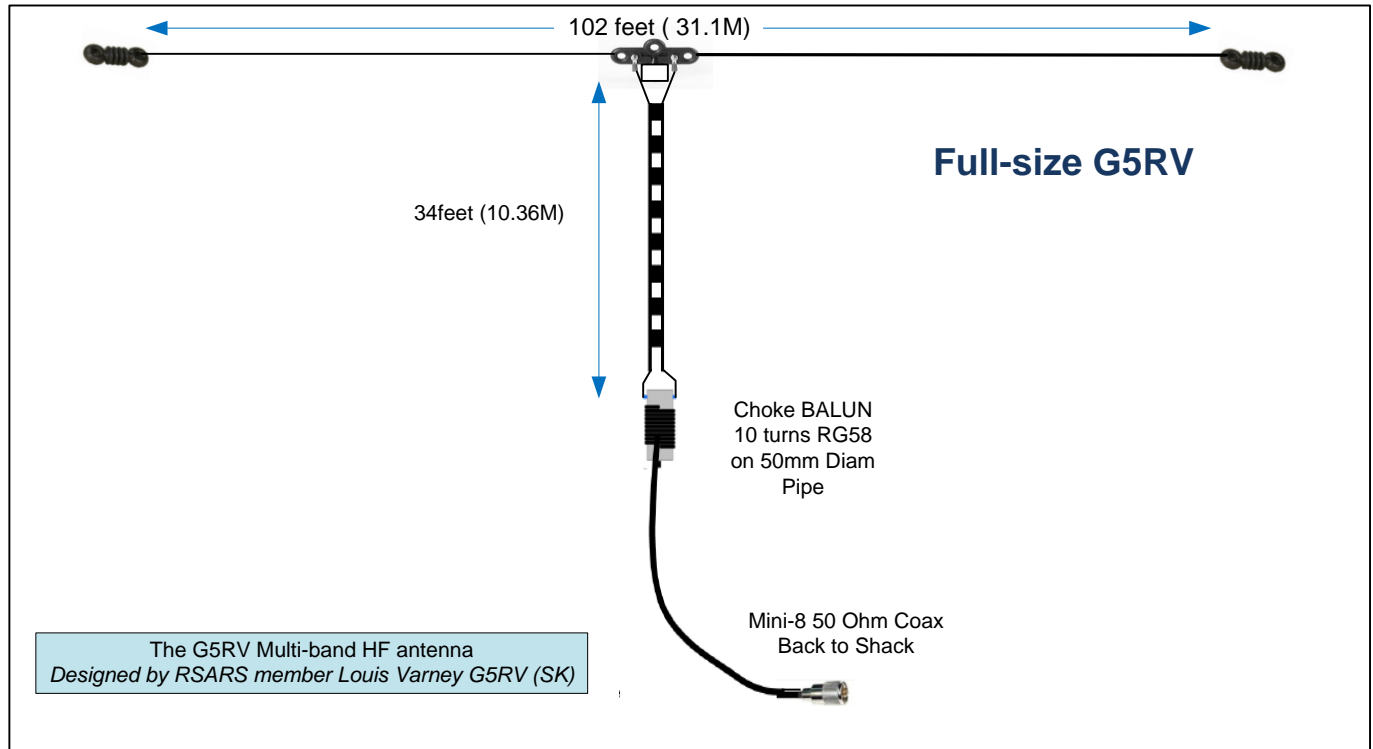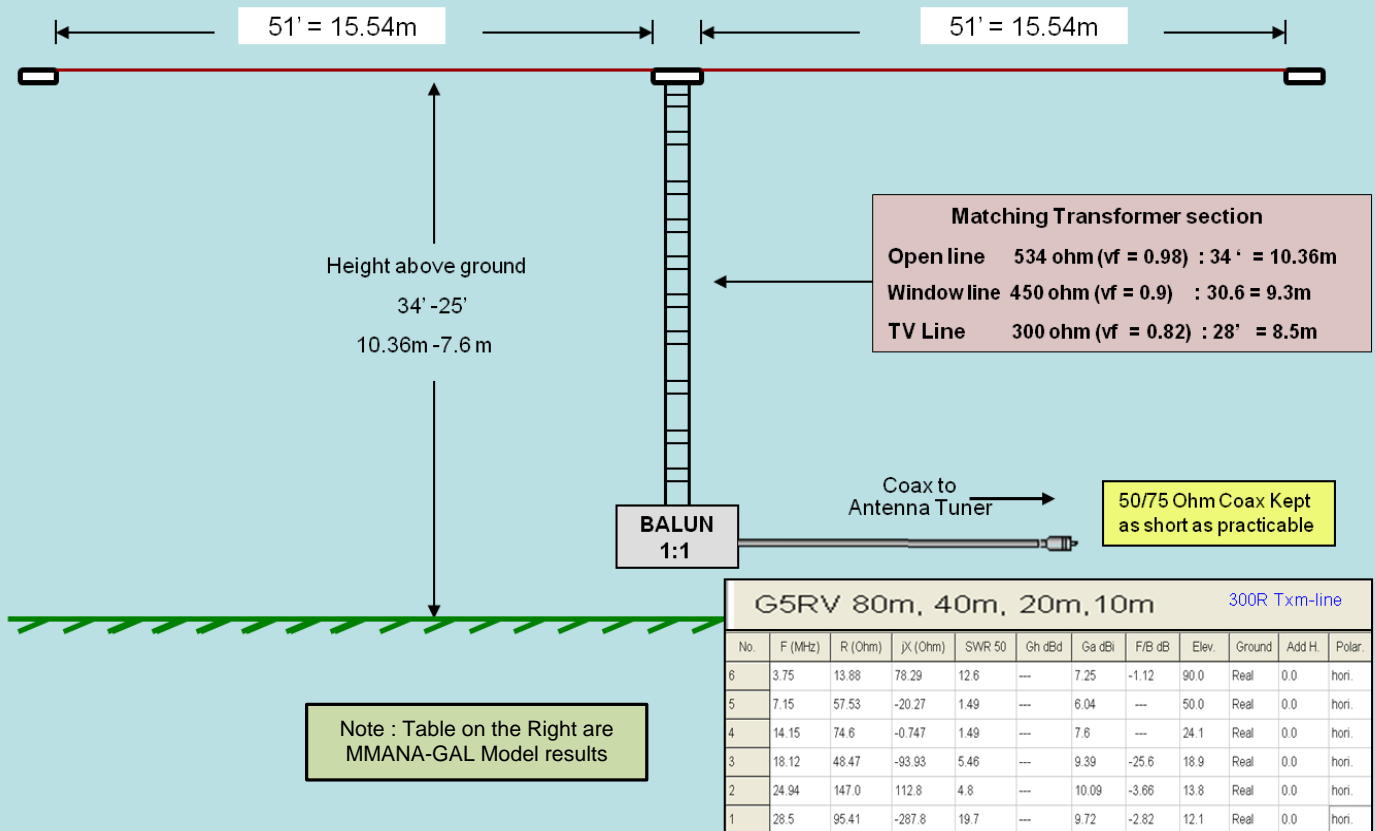
The Garden is fairly small, being 57ft wide, the LHS is 30Feet deep and the RHS is 35ft deep i.e. too short for an in-line full-sized G5RV. Hence it is erected as an open square. The average height is about 9 metres, but the part that slopes to the house gutter is 6.5 metres high. This arrangement affects the radiation pattern as one would expect , and I modelled the antenna using MMAN-GAL program (see pages 3&4). My kind neighbours allowed me to attach bungees to their trees branches using a " grappling" hooks with my 10m fishing pole, but the antenna wire is within my garden boundary. The choke balun improved the SWR that was presented to the ATU in the shack, see page 5 for measurements taken using an Autek VA1 Antenna Analyser
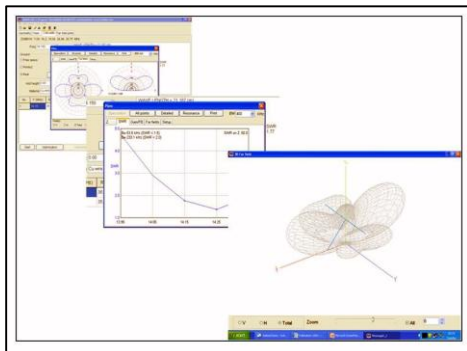
G5RV U-Shape Installation – G8ODE

RSARS

Classic G5RV -Louis Varney

51' = 15.54m

51' = 15.54m

Height above ground

34' -25'

10.36m -7.6 m

Matching Transformer section

Open line   534 ohm (vf = 0.98) : 34 ' = 10.36m

Window line 450 ohm (vf = 0.9)   : 30.6 = 9.3m

TV Line   300 ohm (vf = 0.82) : 28' = 8.5m

Coax to
Antenna Tuner

50/75 Ohm Coax Kept
as short as practicable

**BALUN
1:1**

Note : Table on the Right are
MMANA-GAL Model results

G5RV 80m, 40m, 20m,10m   300R Txm-line

No.	F (MHz)	R (Ohm)	jX (Ohm)	SWR 50	Gh dBd	Ga dBi	F/B dB	Elev.	Ground	Add H.	Polar.
6	3.75	13.88	78.29	12.6	---	7.25	-1.12	90.0	Real	0.0	hori.
5	7.15	57.53	-20.27	1.49	---	6.04	---	50.0	Real	0.0	hori.
4	14.15	74.6	-0.747	1.49	---	7.6	---	24.1	Real	0.0	hori.
3	18.12	48.47	-93.93	5.46	---	9.39	-25.6	18.9	Real	0.0	hori.
2	24.94	147.0	112.8	4.8	---	10.09	-3.66	13.8	Real	0.0	hori.
1	28.5	95.41	-287.8	19.7	---	9.72	-2.82	12.1	Real	0.0	hori.

Drawn by   G8ODE RSARS 1691

MMANA GAL - (MMANA)

The Multilingual Method of Moments ANtenna Analyzer)

By **JE3HHT** - **Makoto Mori** .

DL1PBD - Alex Schewelew & **DL2KQ** - Igor Gontcharenko

This is available free to be down loaded from the following web link.:-

http://mmhamsoft.amateur-radio.ca/

NOTES:-
The radiation patterns on the following pages were produced using this free program, but it is important to note a number of its limitations, two of which are that :-
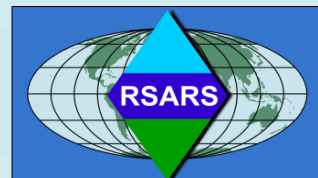
        a. It does not cope with very closely spaced conductors,
        b. It cannot model coaxial cable or dielectric other than air.

It can however model 300 ohm open wire ladder line, and this was used to produce the following G5RV diagrams. There is also a feature to add extra height to the antenna, and this was used to elevate the end of the ladder line by 1 metre in so that the models ground did not affect the results.
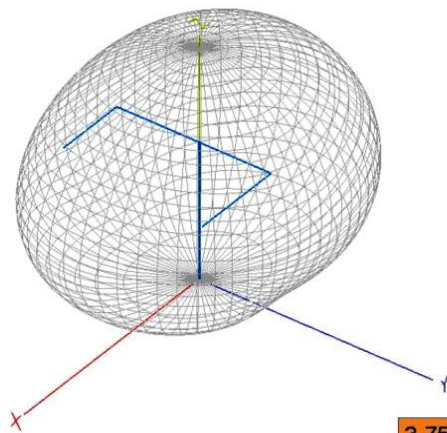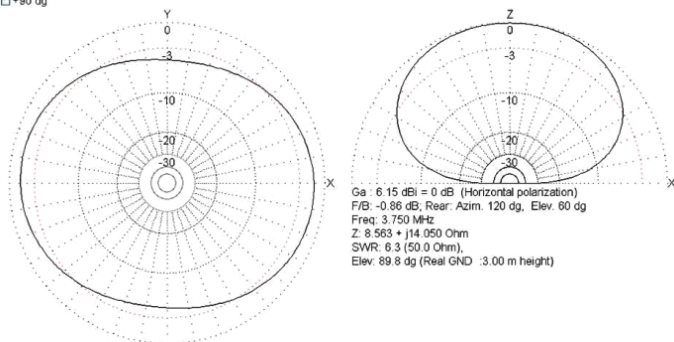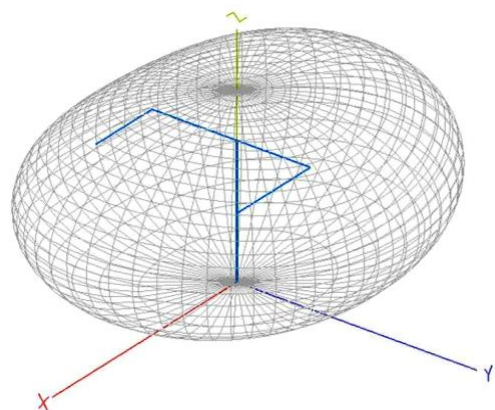
G5RV U-Shape Radiation Patterns – G8ODE

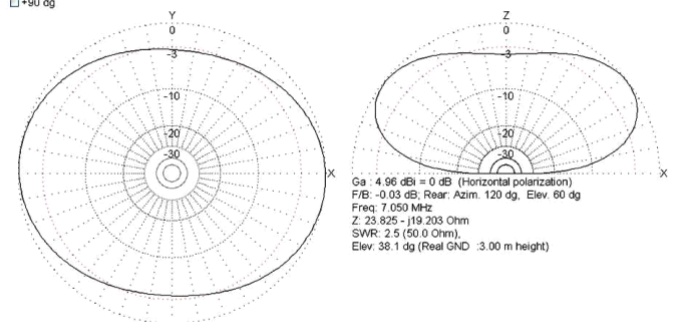http://www.rsars.org.uk/ELIBRARY/docsants.htm

RSARS

FAR FIELD-   Total Radiation

□ +90 dg

Ga : 6.15 dBi = 0 dB (Horizontal polarization)
F/B: -0.86 dB; Rear: Azim. 120 dg, Elev. 60 dg
Freq: 3.750 MHz
Z: 8.563 + j14.050 Ohm
SWR: 6.3 (50.0 Ohm),
Elev: 89.8 dg (Real GND :3.00 m height)

3.75 MHz

□ +90 dg

Ga : 4.96 dBi = 0 dB (Horizontal polarization)
F/B: -0.03 dB; Rear: Azim. 120 dg, Elev. 60 dg
Freq: 7.050 MHz
Z: 23.825 - j19.203 Ohm
SWR: 2.5 (50.0 Ohm),
Elev: 38.1 dg (Real GND :3.00 m height)

7.05 MHz

□ +90 dg

Ga : 7.96 dBi = 0 dB (Horizontal polarization)
F/B: -7.60 dB; Rear: Azim. 120 dg, Elev. 60 dg
Freq: 14.150 MHz
Z: 108.358 + j0.441 Ohm
SWR: 2.2 (50.0 Ohm),
Elev: 18.9 dg (Real GND :3.00 m height)

14.15 MHz

Notes:-
1. The antenna was modelled using freeware MMANA-GAL v1.2.0.20
2. The antenna wire is 2mm diameter, with a 11.8 metres of 300 Ω open wire transmission line. Plastic coated line will be shorter
3. The ground was modelled as "Real" 6mS/m and Conductivity of 13 .. The overall height was 12.8m

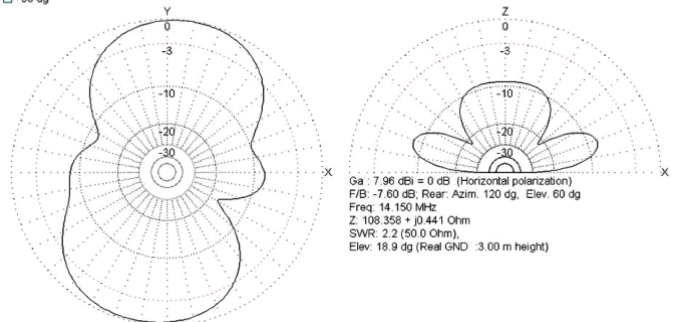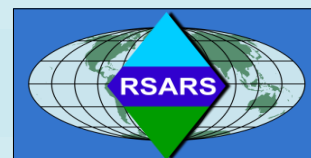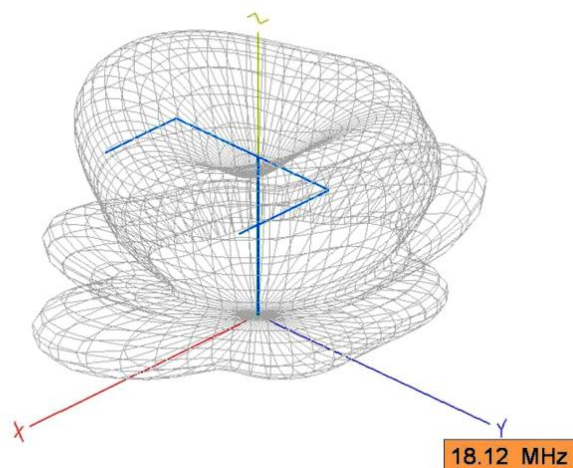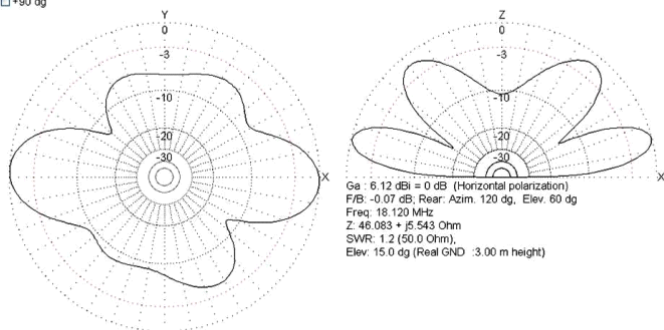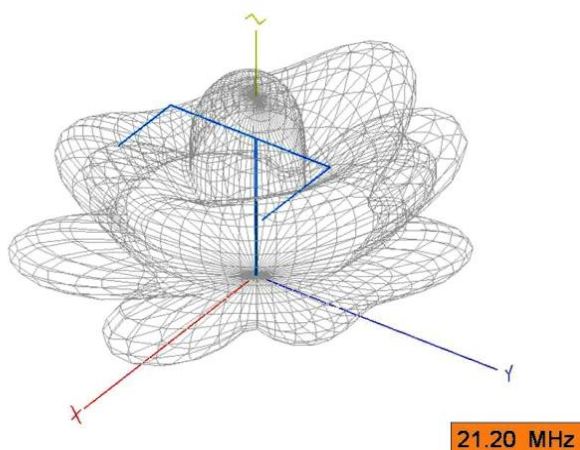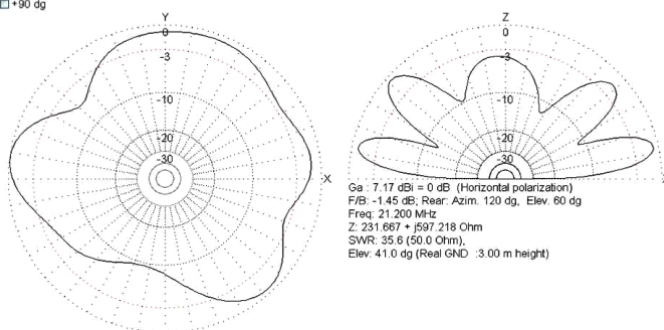# G5RV U-Shape Radiation Patterns – G8ODE

FAR FIELD-   Total Radiation

□ +90 dg

Ga : 6.12 dBi = 0 dB (Horizontal polarization)
F/B: -0.07 dB; Rear: Azim. 120 dg, Elev. 60 dg
Freq: 18.120 MHz
Z: 46.083 + j5.543 Ohm
SWR: 1.2 (50.0 Ohm),
Elev. 15.0 dg (Real GND :3.00 m height)

18.12 MHz

□ +90 dg

Ga : 7.17 dBi = 0 dB (Horizontal polarization)
F/B: -1.45 dB; Rear: Azim. 120 dg, Elev. 60 dg
Freq: 21.200 MHz
Z: 231.667 + j597.218 Ohm
SWR: 35.6 (50.0 Ohm),
Elev. 41.0 dg (Real GND :3.00 m height)

21.20 MHz

□ +90 dg

Ga : 9.53 dBi = 0 dB (Horizontal polarization)
F/B: -11.35 dB; Rear: Azim. 120 dg, Elev. 60 dg
Freq: 24.940 MHz
Z: 361.456 + j135.502 Ohm
SWR: 8.3 (50.0 Ohm),
Elev. 35.0 dg (Real GND :3.00 m height)

24.94 MHz
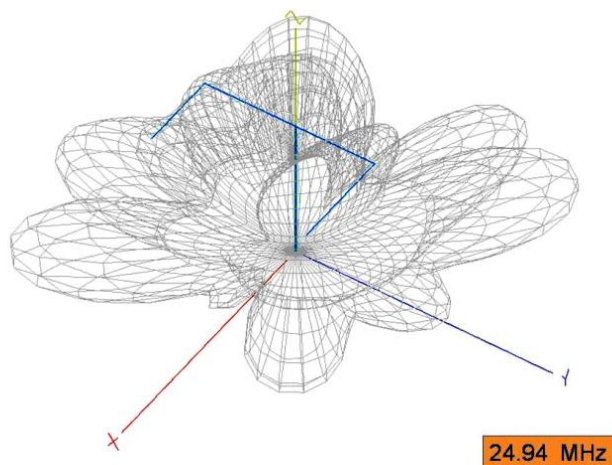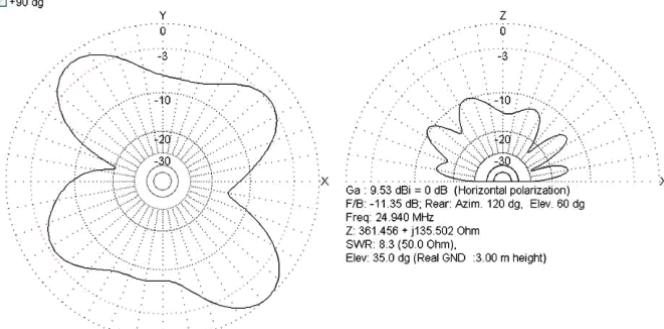
Notes:-
1. The antenna was modelled using freeware MMANA-GAL v1.2.0.20
2. The antenna wire is 2mm diameter, with a 11.8 metres of 300 Ω open wire transmission line. Plastic coated line will be shorter
3. The ground was modelled as "Real" 6mS/m and Conductivity of 13 .. The overall height was 12.8m

One of the simplest baluns to make is the "Choke Balun" sometimes call the "dirty balun" made from a length of coax. The measurements made using an AUTEK VA1 Antenna analyser indicate that the simple balun reduces the SWR seen by a tuner, thus making less work for the tuner.

Not the prettiest BALUN, but just as effective and very easy to construct.

Using about 5-6m (15-18ft) of coax make a several coils 200mm diam (8ins) and tie tightly together using tie-wraps

The Coiled Coax BALUN

2008-01-15

G5RV Small Garden Installation

Choke Balun
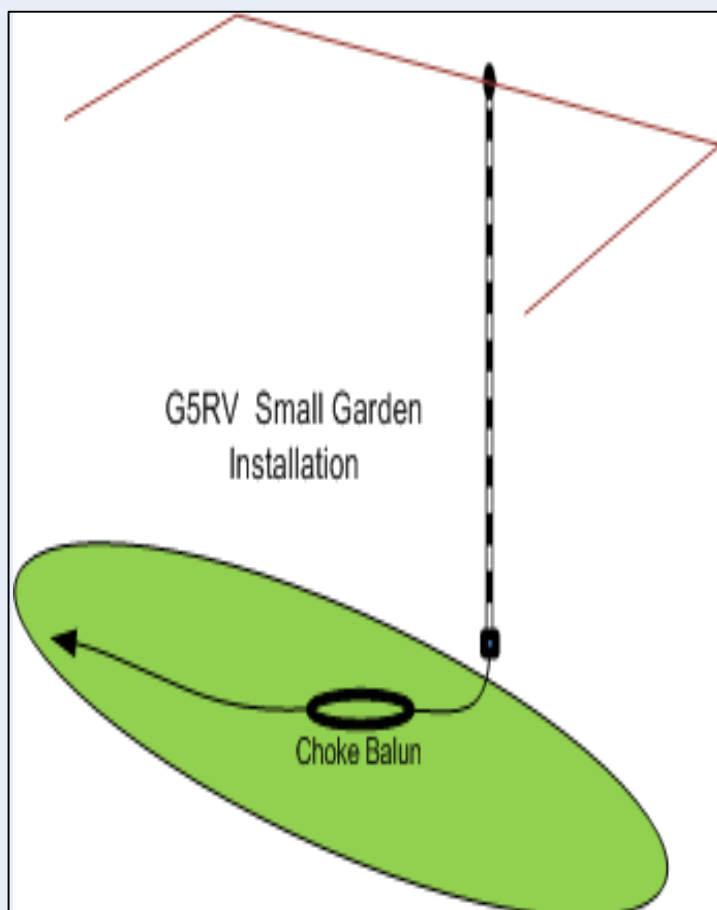
Test to show the effects of adding a balun in the feeder using a new roughly cut G5RV - i.e. still requires optimising for 20m.

Test Frequency MHz	Autek VA1 measuring SWR ref 50Ω connected direct to 300Ω line	Autek VA1 measuring SWR ref 50Ω connected via 8 turn balun to 300Ω line
3.75	3.33 : 1	2.24 :1
7.05	2.71 : 1	2.78 :1
10.12	**HIGH**	12.3 :1
14.15	8.4 :1	3.93 :1
18.12	7.8 : 1	2.49 :1
21.2	8.8 :1	5.2 :1

Note: Autek VA1 can only indicate "High" for SWR >15 :1