

# A 42' Portable Endfed Multiband HF Antenna with no Wire on the Ground: the "W3EDP Jr."

Posted on August 15, 2016 by Jose VA3PCJ

The "senior" (full-length) W3EDP, as originally described (QST March 1936, pp. 32-33), is likely the best option for a portable, HF multiband (6m – 160m), tuned antenna not requiring wires on the ground. However, it is 85 Ft. long, often too long for vertical deployment with telescopic poles and not too practical in highly constrained environments (i.e., a small balcony or a small boat). In these instances a half-sized "junior" version might prove more practical. However, the W3EDP Jr. does not seem to have received as much attention or to be as popular as its "senior" relative, which is rather surprising considering its potential characteristics:

- can be hoisted vertically with a 43 ft. telescopic mast
- can be tuned to all HF bands down to 80m
- does not require any wire on the ground

Similar to its bigger relative, it does, however, require a tuner and a 4:1 unun.

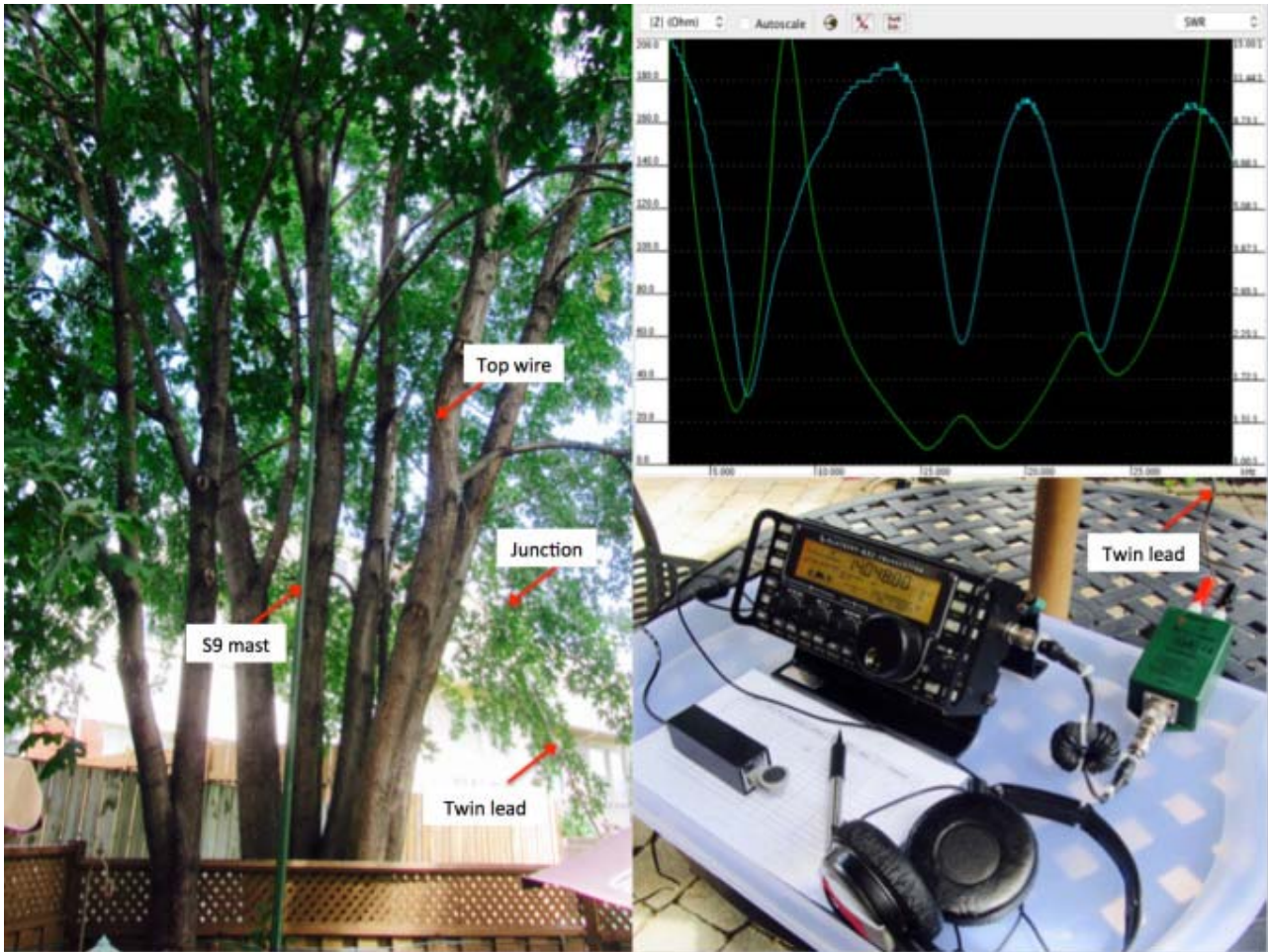
It can be viewed as an amputated version of the better known G5RV Jr. and is the same length as the popular S9v43', itself designed for use from 80m to 6m. In fact, when hoisted vertical the W3EDP Jr. could be consider as an S9v43' antenna with a single juxtaposed counterpoise cable 1/5th its length (actually, it can be easily converted into a portable version of the S9v43' by disconnecting the coax shield from its shorter branch and connecting it instead to one or more counterpoise ground cables).

Since the full-length W3EDP can readily tune 6m – 160m, its half-size version would likely tune up to 80m. Dropping the ability to tune in 160m seems an acceptable trade-off for the advantage of having a shorter multiband end-fed antenna with no counterpoise cables on the ground.

The measures used were exactly one half of those used for the W3EDP: 8.5 Ft. of twin-lead wire with one of its wires soldered to 33.5 Ft. single wire for a total length of 42 Ft.. The materials were the same as those used in the construction of the "Flimsy W3EDP"

(<https://thewakesileave.wordpress.com/2016/05/22/a-flimsy-w3edp-portable-antenna-la-manquita/>).

Here is an initial analysis of the antenna using the mini-VNA analyzer. The plot shows SWR (blue curve) and Z (green curve) values for the 3-30 MHz range of the HF spectrum. The W3EDP Jr. was hoisted to its full length (using the S9 telescopic mast resting on the top branches of a tree) and was being fed via a 4:1 unun.



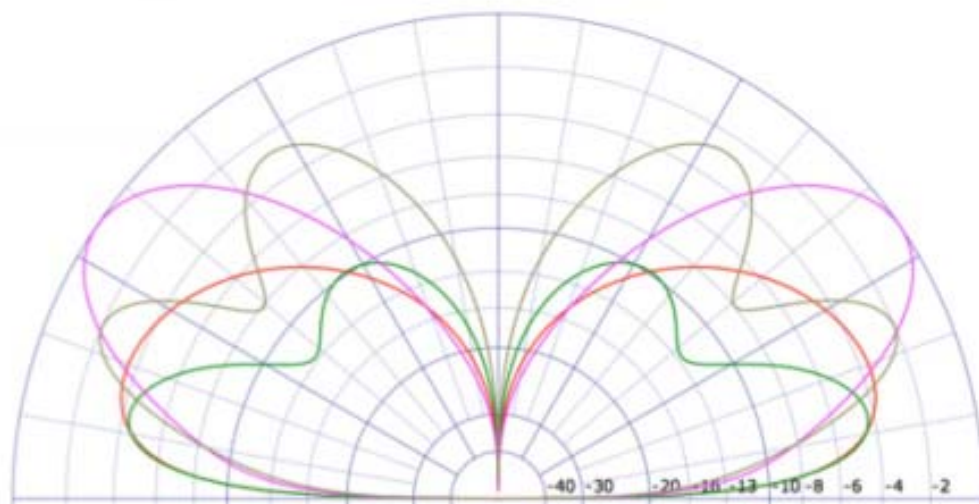
Similar to the S9v43', it resonates around 5.5 MHz. The SWR for the most part is below 10:1 and the impedance remains within tunable range, being highest for 40m (as expected for an end fed 1/2 HWL wire).

Here are some data taken with the Elecraft KX3 and its internal ATU (all measurements were made in the middle of the CW portion of each band using 1 Watt and the configuration of the antenna and the connection to its twin line portion were the same for each band):

Band	SWR			
	No Unun No ATU	No Unun w/ATU	w/Unun No ATU	w/Unun w/ATU
6m	5.8:1	1.0:1	3.1:1	1.0:1
10m	29.9:1	1.2:1	10.9:1	1.0:1
12m	9.9:1	1.0:1	7.7:1	1.0:1
15m	2.2:1	1.0:1	2.4:1	1.0:1
17m	2.0:1	1.0:1	5.5:1	1.0:1
20m	14.0:1	1.1:0	6.9:1	1.0:1
30m	8.9:1	1.0:1	2.7:1	1.0:1
40m	31.9:1	1.0:1	10.3:1	1.2:1
80m	10.4:1	1.0:1	6.9:1	1.0:1
160m	21.0:1	8.5:1	6.9:1	1.0:1

The antenna was also modeled using CocoaNEC-2:

- 7.080 MHz
- 14.080 MHz
- 21.080 MHz
- 28.080 MHz



The elevation angle in vertical configuration appears to be low with a single lobe for the low bands and increasing and becoming “hat-shaped” for the higher bands (this and the vagaries of propagation (and sprint participation) may account for the apparent predominance of relatively nearby 20m contacts in the initial trial below).

Field tests in every band will have to wait for better propagation conditions. However, initial results in 40m and 20m seem to confirm the above predictions: here are the initial CW QSOs (QRP) while operating portable during a recent SKCC WES (i.e., with realistic Rx RST reports):

CALL	Band	Rx RST	SPC
KK6L	40m	589	PA
K1LEE	40m	559	CT
W3DF	20m	579	MD
KA3OCS	20m	599	VA
NO8C	20m	559	OH
W4AFB	20m	589	FL
KC3DOF	20m	339	PA
K3WW	20m	559	PA
N8KR	20m	559	IN
W9DLN	20m	559	WI
F6HKA	20m	559	F

Although here it has been used in a vertical configuration, similar to the full-length W3EDP it could easily be used in other shapes and configurations,, something not readily evident for the S9v43’.

The W3EDP Jr. is being added to the backpack as another choice for a practical /QRP/P antenna, together with the Alexloop, the PAR EndFedZ's (mono and tribander) and its "senior" relative: the 85 Ft. W3EDP.

Note added Aug 17 2016: Operating /QRP/P under similar conditions as above, 4 more CW contacts were made, adding two new bands to the list of QRP QSOs credited to the W3EDP Jr.: 15m and 30m:

- OH6NVC Mika, Finland (CW, 20m)
- K6RB Rob, CA (CW, 15m)
- K6DGW Skip, NV (CW, 15m)
- DL1NKS Stefan, Germany (CW, 30m)

<https://thewakesileave.wordpress.com/2016/08/15/a-42-portable-multiband-hf-antenna-with-no-wire-on-the-ground-the-w3edp-jr/>