POTA Antennas

A practical field guide

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Contents

Introduction

The POTA programme (Parks On The Air) has brought portable radio back into fashion: the activator sets up a complete station in a park, often in under thirty minutes, operates for a few hours, then packs up[1]. Under these conditions, the antenna is the deciding factor: it must be light, quick to deploy, efficient enough to make the ten contacts required by the rules, and suited to the available terrain — with or without trees, with or without ground space.

This article reviews the antenna families most often encountered among activators, each with a schematic diagram, its strengths, its limitations and links to field reports.

Note that to our knowledge, no official POTA statistic ranks activations by antenna type. The ranking below is based on activators' reports, field guides, practical tests, discussions between radio amateurs and the catalogues of manufacturers specialising in portable equipment.

A practical ranking of the antennas most commonly seen in POTA

Rank	Antenna family	Why it is popular	Main limitation
1	EFHW 40–10 m	Very light, multiband, quick to deploy with trees or a fibreglass mast.	Depends on a support; RF feedback possible with a poorly thought-out setup.
2	Telescopic vertical + radials	Very quick setup, no tree needed.	Efficiency highly dependent on the radials and the ground.
3	EFRW (random wire) + 9:1 + ATU	Very compact and inexpensive; works with a variety of lengths.	Usually requires an ATU; the counterpoise is essential.
4	Coil-loaded vertical (Wolf River Coil)	Self-supporting, rugged, handles 100 W, ideal for a car park, table or park.	Retuning needed on every band change; heavier.
5	Linked dipole	Very good efficiency, balanced antenna, low losses if well trimmed.	Takes longer to set up and to change bands.
6	Commercial kits (Chameleon, Buddipole, PackTenna, K6ARK)	Clean, modular, field-ready solutions.	Sometimes expensive; sometimes outperformed by a well-erected wire.
7	Magnetic loop	Very compact, useful in confined spaces.	Narrow bandwidth, fine tuning, power limited depending on the model.

[1] See the article on POTA by Yves ON8ON on the website on4rsx.be

1. The EFHW 40–10 m: the queen of activator antennas

The 40–10 m End Fed Half Wave comes up again and again in activators' reports. It is a wire of about 20.1 m — a half-wave on 40 m — fed at its end through a 49:1 or 64:1 impedance transformer. Thanks to operation on the harmonics of the half-wave, it generally covers 40, 20, 15 and 10 m without a tuner.

It can be set up as a sloper, an inverted V or horizontally. Its great advantage is speed: one high point, one wire, a short coax at the feed point, and the station is on the air — without having to bring the coax to the centre of the antenna as with a conventional dipole.

For an activation in Europe, this is probably the best compromise as soon as trees or a 7 to 10 m fibreglass mast are available. Two points to watch: the quality of the transformer (heating at 100 W in digital modes) and possible RF feedback if the setup is poorly thought out — at least 5 m of coax at the feed point usefully serves as a counterpoise.

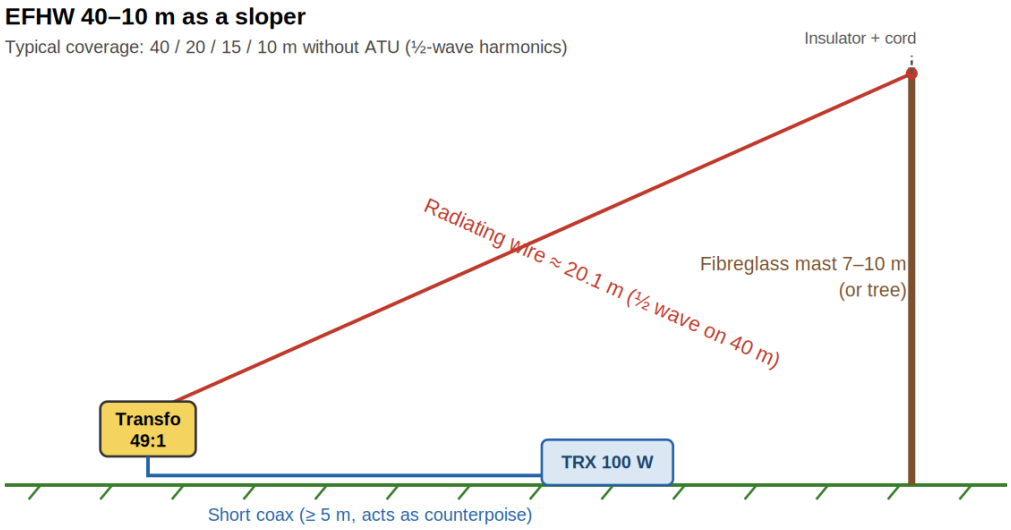

Figure 1 — EFHW 40–10 m as a sloper on a fibreglass mast, 49:1 transformer at the low end.

2. Telescopic quarter-wave vertical with radials

This is the antenna for quick activations without trees: a 5.2 m (17 ft) or 7 m telescopic whip, a base on a ground spike or small tripod, and radials laid on the ground. Deployment takes a few minutes.

A 5.2 m vertical is a natural quarter-wave on 20 m and remains very efficient on 20, 17, 15, 12 and 10 m. On 40 m it works but becomes a shortened antenna: the radials and any loading coil then become decisive for efficiency. Field rule: the lower the frequency, the more the radial system matters.

For an activation from a car park, a bench, a table or a clear area with no support, this is often the quickest solution.

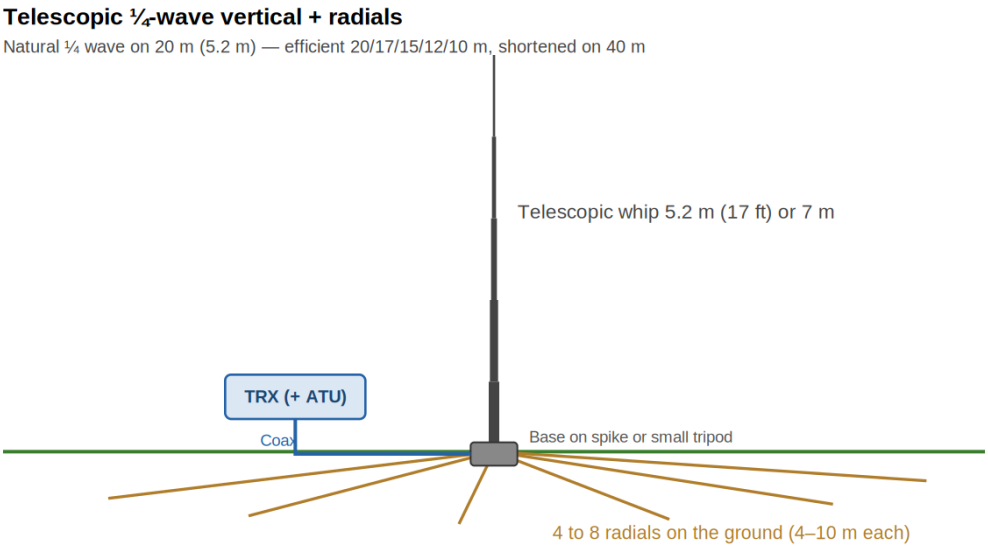

Figure 2 — Telescopic vertical on a ground spike with radials laid on the ground.

3. EFRW: random wire + 9:1 UNUN + ATU

The random wire (End Fed Random Wire) with a 9:1 UNUN and a tuner is the other great classic of lightweight portable operating. Typical configuration: 8 to 12 m of wire at a non-resonant length, a counterpoise on the ground, a small fibreglass mast or a tree, then the transceiver's internal or external ATU.

This formula is very attractive for QRP: it is the most compact and cheapest antenna there is. However, one must accept that the whole system — wire, counterpoise, coax and sometimes the operator themselves — takes part in the RF operation. It is less “clean” than a well-tuned EFHW, but it is an excellent back-up antenna, tolerant of whatever lengths are available on site.

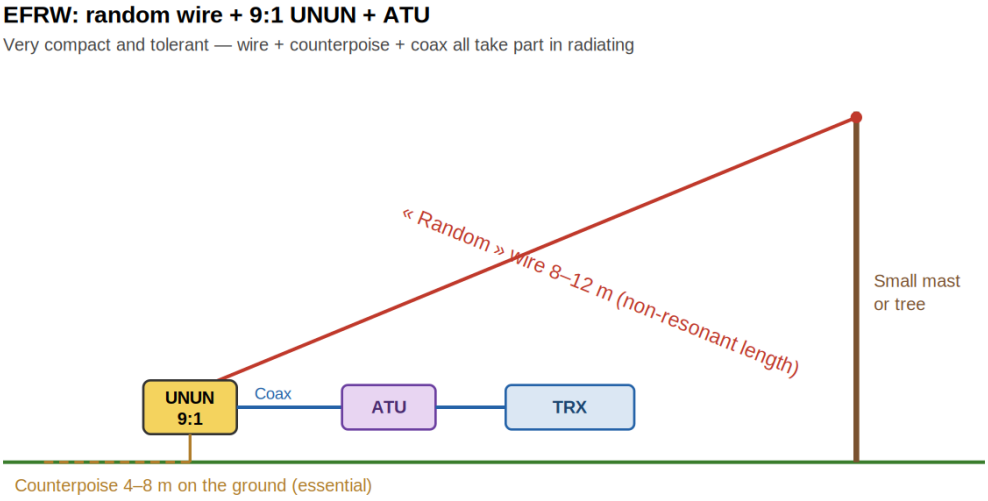

Figure 3 — EFRW: non-resonant wire, 9:1 UNUN, counterpoise on the ground and ATU.

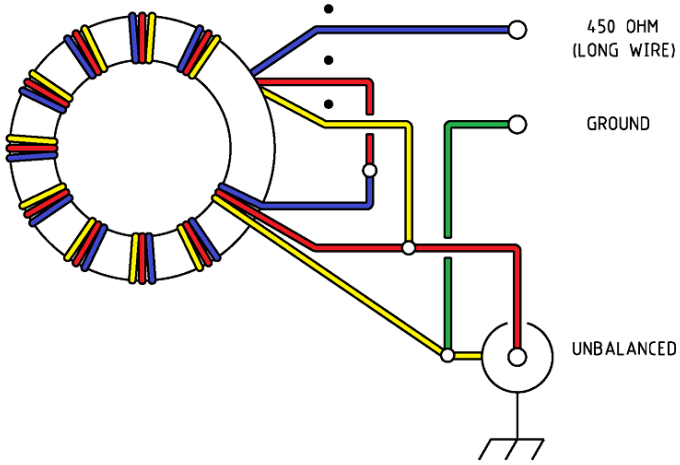

Figure 4 — 9:1 UNUN schematic – VK6YSF
T100-2 toroid, 9 turns, maximum power 400 W

4. Coil-loaded verticals: Wolf River Coil and friends

Coil-loaded verticals, including the famous Wolf River Coil, are very popular with American activators. The principle: a shortened vertical radiator, a coil with a sliding tap near the base to tune the system band by band, and a set of radials. Together they form a self-contained station, with no tree needed, covering 40 to 10 m — sometimes 80 m depending on the version.

They handle 100 W portable, which makes them a coherent family for an FT-991A or FT-891, provided one accepts the bulk, the weight and the mechanical retuning at every band change. Here again, the radial system accounts for most of the efficiency.

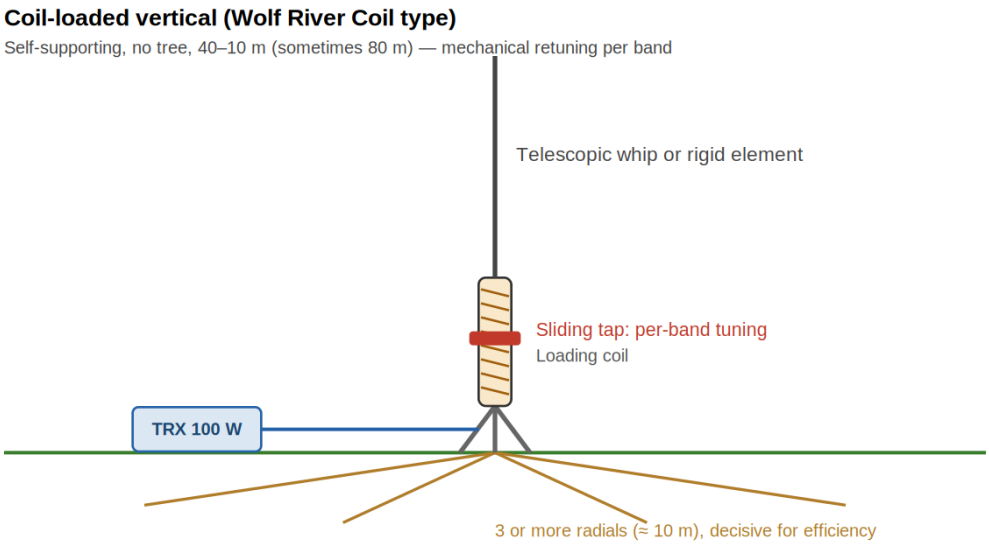

Figure 5 — Coil-loaded vertical: the sliding tap on the coil tunes the antenna band by band.

5. Linked dipole: efficiency first – ON8ON's antenna

The linked dipole is excellent in terms of efficiency: a 40/20 or 40/30/20 m dipole whose legs contain connections to open or close in order to change bands. Set up as an inverted V on a 7 to 10 m centre mast, it is balanced, often quieter than an end-fed, and needs no ATU if the lengths are properly trimmed.

Its drawback is purely practical: you need room to lay out the two legs, a centre support, and the antenna sometimes has to be lowered to open or close the links when changing bands. It is the choice for long activations where efficiency takes priority over setup speed.

Figure 6 — Linked dipole in the field – Photos ON8ON.

Field report

The multiband dipole shown in this section's photos is made of 1.5 mm^2 wire, without a balun, and trimmed for 40, 20, 17, 15, 12 and 10 m; the last connector accepts an extension that additionally opens up 80 m. Mounted on a fibreglass mast carried by an aluminium tripod or a car-wheel support, it allows a band change in about two minutes: retract the mast, connect or disconnect the link for the desired band, redeploy.

Two field tricks complete the setup. When there are passers-by, the ends running down to the ground are made of thick fluorescent orange nylon, highly visible to walkers. And rather than driving an aluminium tent peg into the ground — not always welcome in a park — each end is simply weighed down by a small 500 g weight resting on the ground: nothing to hammer in, nothing to forget.

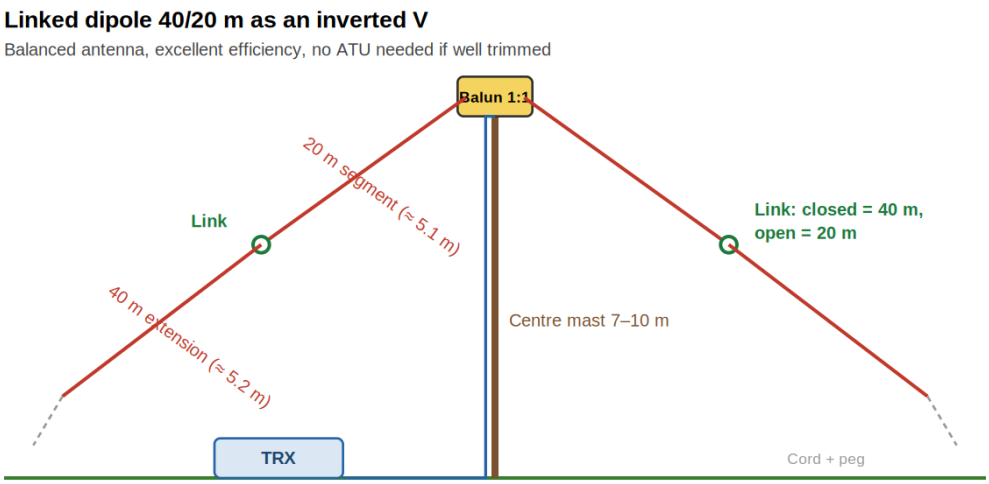

Figure 7 — Linked dipole 40/20 m as an inverted V: links closed for 40 m, open for 20 m.

For 10 m, Yves additionally uses a monoband vertical dipole of the T2LT type (Tuned Transmission Line Trap): a half-wave dipole made in the coax itself, with a few turns at the bottom of the line forming the choke that delimits the radiating section. Hoisted on a fibreglass mast of at least 10 m, its very low radiation angle makes it formidable for DX — excellent results from an antenna that costs no more than a few metres of coax.

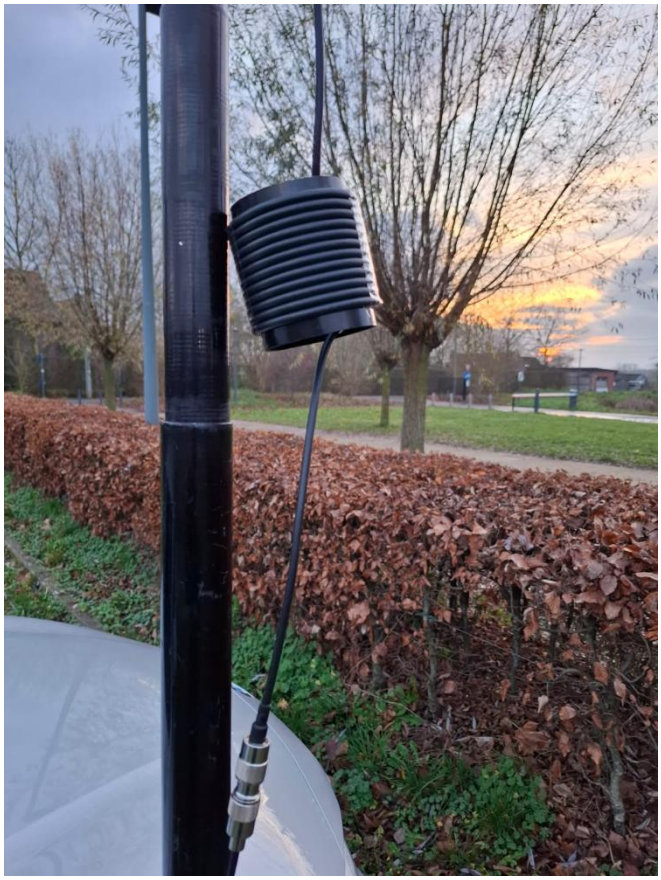

Figure 8 — choke of the T2LT – Photo ON8ON

6. Magnetic loops: for very confined spaces

Magnetic loops are rarer in the field, but precious when space is very limited: urban park, balcony, campsite, picnic table. A main loop of about one metre in diameter, a high-isolation variable capacitor and a small coupling loop are all that is needed.

They are compact and often good on receive, but the bandwidth is very narrow — retuning is needed at every frequency change —, tuning is delicate and the permissible power depends heavily on the model. Also beware of the very high voltages present on the capacitor while transmitting. For “fast” SSB POTA this is generally not the first choice; for QRP, CW or digital modes it can work very well.

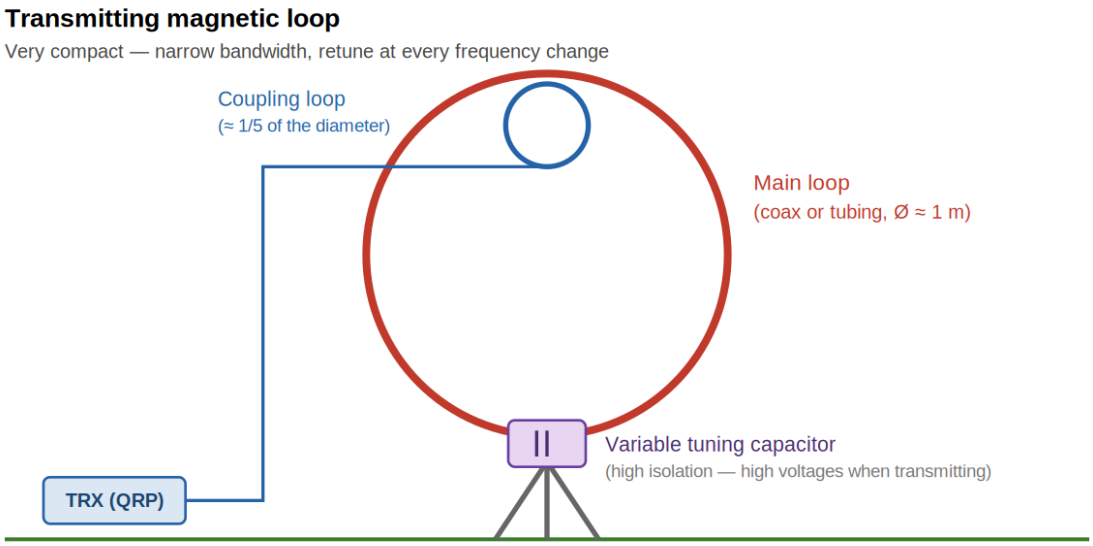

Figure 9 — Transmitting magnetic loop: main loop, tuning capacitor and coupling loop.

7. Commercial antennas

Chameleon MPAS, Buddipole and Buddistick, PackTenna, Radioddity, K6ARK… All these antennas regularly turn up in POTA and SOTA bags. Each manufacturer has its philosophy: Chameleon aims for ruggedness and modularity, PackTenna for compact wire antennas, K6ARK for ultralight QRP. There is something for everyone.

These solutions are neat, well finished and ready to use. However, one should bear in mind that a well-built home-made EFHW costs far less and is not necessarily any less effective than a commercial kit.

7.1 Chameleon antennas

Chameleon Antenna (United States) targets the rugged top end of the market, with a military flavour. The flagship product for POTA is the MPAS 2.0 (Modular Portable Antenna System): a "Lego-block" modular system built around a wideband matching base (Hybrid-Micro), a 2.85 m folding military whip, an extension bringing the whole to 5.53 m, about 22 m of antenna wire and 7.6 m of counterpoise. The same bag can deploy a man-pack vertical, a sloper, an inverted L, an NVIS or a horizontal wire antenna.

The downside of this wideband matching (1.8 to 54 MHz): every configuration requires a wide-range tuner, and part of the power is dissipated in the hybrid base — that is the price of versatility. The MPAS Lite takes the same concept in a lighter version (Hybrid-Micro base and whip only).

Model	Advertised coverage	Advertised power	POTA relevance and practical assessment
CHA MPAS 2.0	1.8–54 MHz (160–6 m), wide-range ATU required	100 W SSB / 50 W CW	The Swiss army knife: man-pack vertical, sloper, inverted L, NVIS with the same kit. Very rugged, ideal for EmComm and rough terrain; heavy (≈ 3 kg and more depending on configuration) and expensive.
CHA MPAS Lite	1.8–54 MHz, wide-range ATU required	100 W SSB / 50 W CW	Lighter version (base + whip only) of the same concept, for the activator who puts the backpack first. Same efficiency limits on the low bands (short whip).

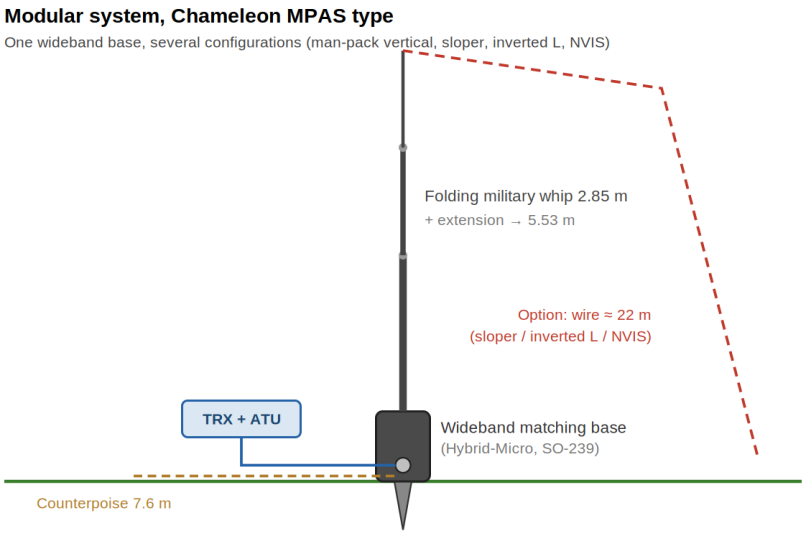

Figure 10 — Modular system, Chameleon MPAS type: one wideband base, several deployments (concept drawing).

Figure 11 — Chameleon MPAS 2.0: modular commercial kit (manufacturer photo).

7.2 Buddipole and Buddistick

Buddipole Inc. (United States) offers two complementary families. The Buddipole is a reconfigurable rigid dipole: two aluminium arms on a centre piece (VersaTee), tapped coils and telescopic whips allow switching from horizontal dipole to vertical or V, from 40 to 6 m plus 2 m. The Buddistick PRO is the compact vertical version designed for POTA: a 2.44 m whip on a Versahub base (BNC connector, 1/4" camera thread), a tapped coil and a 9.5 m colour-coded elevated radial, band by band — a simple idea that speeds up band changes considerably.

Model	**Advertised coverage**	**Advertised power**	**POTA relevance and practical assessment**
Buddipole (modular dipole)	7–54 MHz continuous + 144–148 MHz	QRP to 250 W	Complete reconfigurable dipole with no tree needed; very versatile but heavier (1.5 kg antenna alone, 4.3 kg as the Deluxe pack with tripod) and longer to adjust.
Buddistick PRO	40–6 m	250 W PEP	Compact vertical (33 cm folded, 1.2 kg) with an elevated radial colour-coded by band: fast, repeatable band changes. Very well suited to a picnic table or camera tripod.

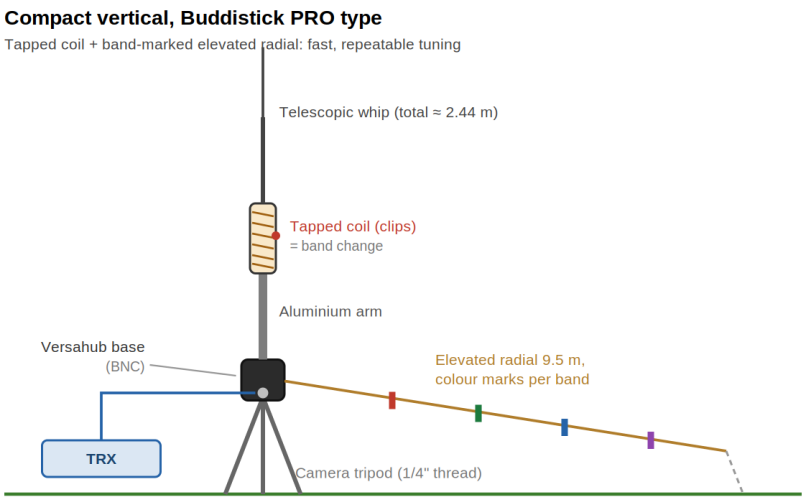

Figure 12 — Compact vertical, Buddistick PRO type: tapped coil and elevated band-marked radial (concept drawing).

Figure 13 — Buddistick PRO: field deployment as a portable vertical (distributor photo).

7.3 PackTenna

PackTenna (United States) specialises in ultra-compact wire antennas of the Mini series: a miniature transformer, an integrated winder and fine “silky” 26 AWG copper-clad steel wire that hardly ever tangles. Two main versions: the Mini EFHW (49:1 transformer, half-wave wire, usable without an ATU on its design band and harmonics) and the Mini Random Wire (9:1 UNUN, 8.8 m non-resonant wire supplied, to be used with a wide-range ATU such as the KX2/KX3 or an external ATU).

Model	Advertised coverage	Advertised power	POTA relevance and practical assessment
Mini EFHW (49:1)	Design band + harmonics (e.g. 40/20/15/10 m)	See data sheet depending on version	The “clean” EFHW in pocket format: no ATU needed if the wire is properly trimmed. Perfect for a light bag and pedestrian SOTA/POTA.
Mini Random Wire (9:1)	Multiband with wide-range ATU	100 W SSB/CW, 50 W digital	8.8 m wire supplied, can be shortened; impedance brought down from 500–1500 Ω into the ATU's range. In-line choke recommended above 50 W. Very tolerant of the terrain.

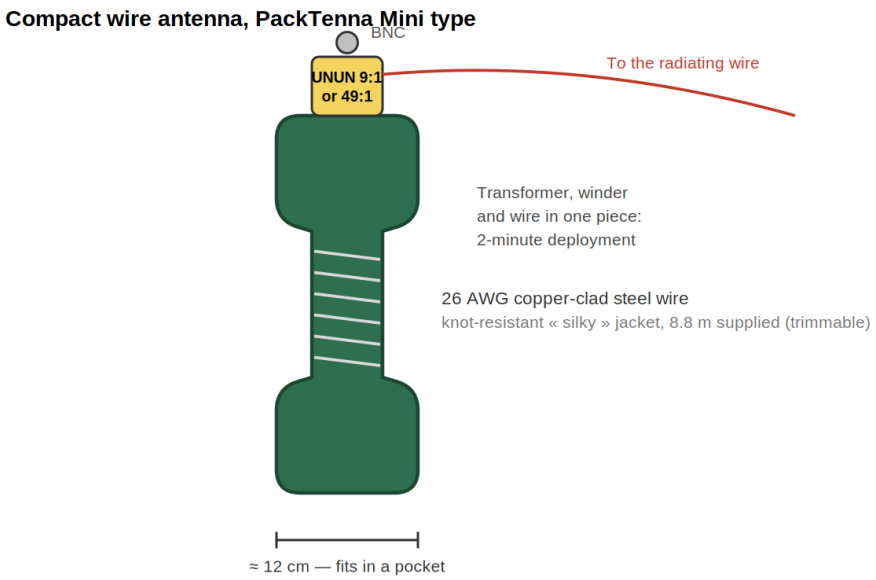

Figure 14 — Compact wire antenna, PackTenna Mini type: transformer, winder and wire in one piece (concept drawing).

Figure 15 — PackTenna Mini: example of an ultra-compact wire system in portable use (manufacturer photo).

7.4 The Digitenna

The Digitenna, designed by Digirig, takes the logic of compactness to its conclusion: a complete EFHW — spool, 49:1 transformer on an FT-82-43 toroid and wire — fitting in the palm of the hand (Ø 78 mm). The wire unwinds and rewinds in seconds without knots, the male BNC connector plugs into a short coax whose shield serves as the counterpoise, and fine tuning is done by moving the sliding knot at the end of the wire.

A pleasant detail: the design is open source — 3D print files, bill of materials and build instructions are published. Like the K6ARK kits, it therefore also makes an excellent group build project for a radio club.

Version	Advertised coverage	Advertised power	POTA relevance and practical assessment
Digitenna 20 m	≈ 10 m of 22 AWG wire: resonant on 20 and 10 m (17/15 m possible with ATU)	≈ 50 W SSB / 20–30 W digital modes	Ultra-fast deployment in confined spaces: ideal for daytime activations on 20 m with a single high point.
Digitenna 40 m	≈ 20 m of 24 AWG wire: resonant on 40/20/15/10 m	≈ 50 W SSB / 20–30 W digital modes	Maximum multiband coverage; the longer wire requires deployment as a sloper or horizontally from a high point.

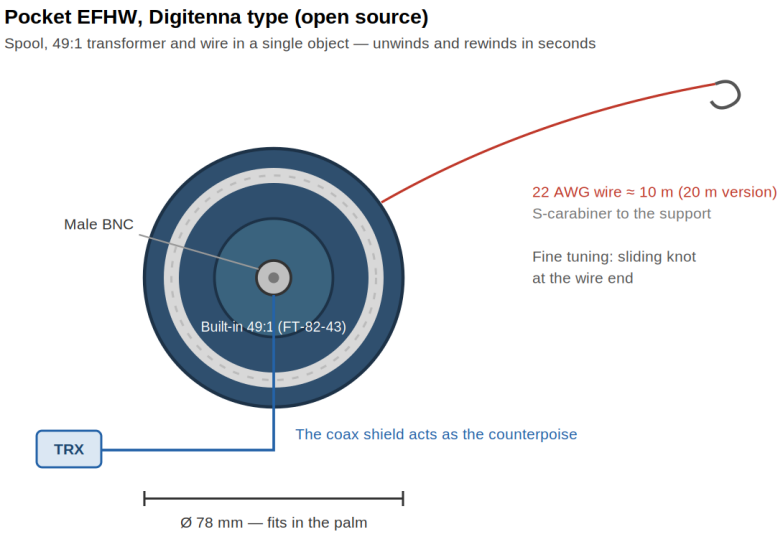

Figure 16 — Pocket EFHW, Digitenna type: spool, 49:1 transformer and wire in a single object (concept drawing).

Figure 17 — Digitenna: pocket EFHW spool with BNC connector (distributor photo).

7.5 Radioddity portable verticals

Radioddity offers several recent portable HF verticals explicitly aimed at POTA, SOTA and portable use. They belong to the family of compact coil- or slide-tuned verticals with radials — so to be compared with the Wolf River Coil, Buddistick, JPC/JNCRadio or GRA-7350TC.

Model	**Advertised coverage**	**Advertised power**	**POTA relevance and practical assessment**
HF-008	3.5–50 MHz (80–6 m)	To be checked on the seller's data sheet	Detachable telescopic antenna, light, presented as suitable for POTA. An interesting entry-level model; mechanical sturdiness and wind resistance to be checked.
HF-009	5–50 MHz (60–6 m)	100 W CW (data sheet and videos)	Compact vertical with a slide-tuning system; quick setup with no tree needed. Good "grab-and-go" solution; less natural on 80 m; mechanical tuning to be expected.
HF-010	3.5–50 MHz (80–6 m)	100 W CW / 150 W PEP SSB	More complete and rugged version, tripod included, dedicated coils, POTA/SOTA use explicitly targeted. The most serious of the three for a 100 W transceiver; more expensive and bulkier.

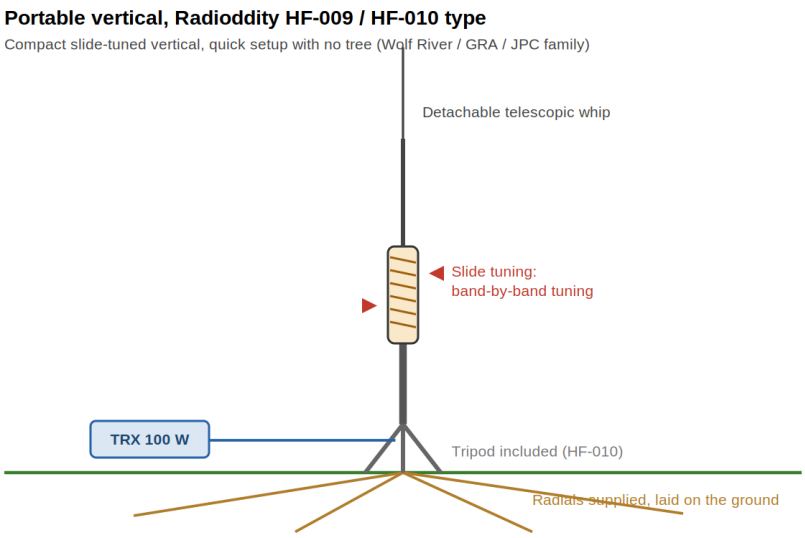

Figure 18 — Portable vertical, Radioddity HF-009/HF-010 type: slide tuning and tripod (concept drawing).

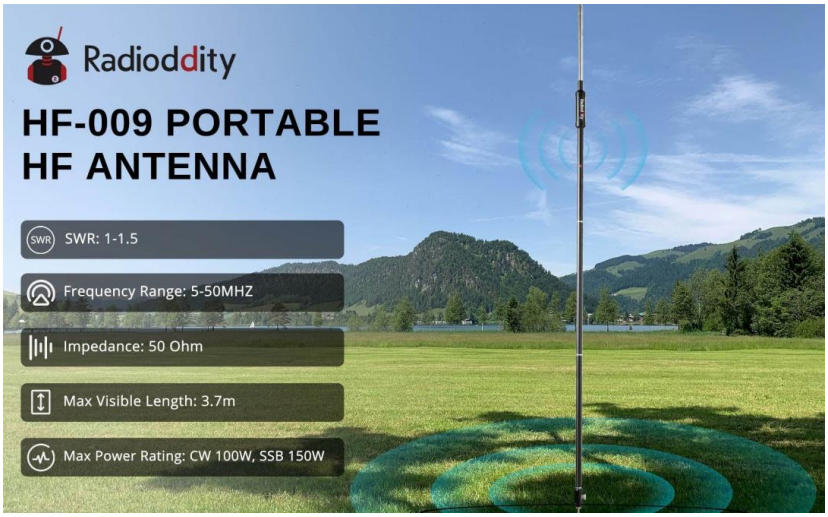

Figure 19 — Radioddity HF-009: compact portable vertical for field activations (manufacturer photo).

Figure 20 — Radioddity HF-010: portable multiband version with tripod and carrying bag (manufacturer photo).

7.6 The antennas of K6ARK

Adam K6ARK has become a reference in ultralight QRP: his solder-it-yourself kits reduce the feed point to a mini-transformer on a toroid moulded directly behind a BNC connector — a few tens of grams, wire included. The same circuit can be wired as a 49:1 (EFHW), 9:1 (EFRW) or 1:1 balun; assembly requires a fine soldering iron and soldering one SMD capacitor. It is the choice of pedestrian SOTA/POTA operators who count every gram — and an excellent little build project for a radio club.

Model	Advertised coverage	Advertised power	POTA relevance and practical assessment
EFHW 49:1 QRP kit	Depending on wire length (160–10 m possible)	≈ 10 W (QRP version) / 20 W (20 W version)	The lightest feed point on the market; can be used without a counterpoise for SOTA. Strictly QRP: reserve it for the KX2, MTR, QCX and other small transceivers.
Configurable 49:1 / 9:1 / 1:1 kit	Multiband depending on wiring and wire	QRP	One kit, three possible antennas (EFHW, EFRW or dipole with 1:1 balun): ideal for experimenting on a budget.

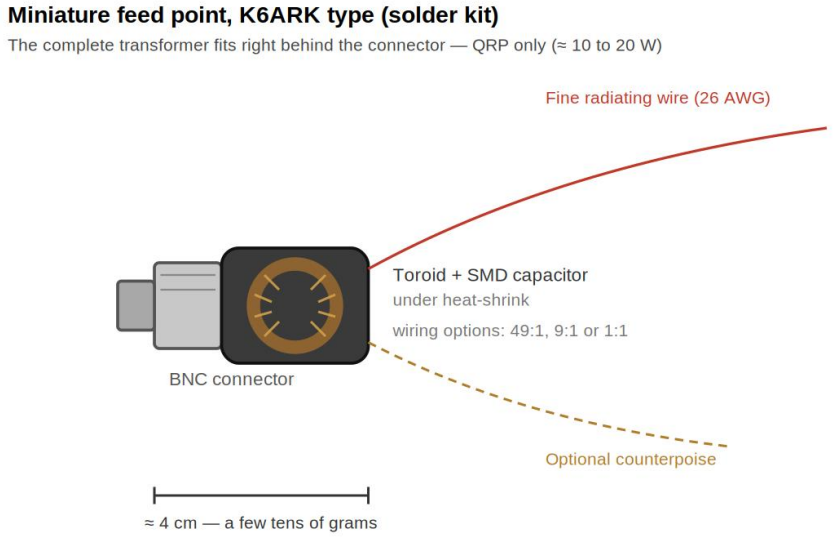

Figure 21 — Miniature feed point, K6ARK type: the transformer fits behind the BNC connector (concept drawing).

7.7 Sotabeams antennas

SOTAbeams (United Kingdom) is the European reference for the ready-to-use linked dipole. The Band Hopper range offers the linked dipole in 2, 3 or 4-band versions: full-size dipole on every band (no coil compromise), band selection via clip links, integrated current balun, 10 m of RG174 terminated in BNC, winders and aluminium pegs supplied. Delivered pre-tuned: it works “straight out of the bag”.

The trick that made the system's reputation: the centre piece slips over the top of a tapered fibreglass mast (the famous “SOTA pole”), and the two dipole legs plus one 10 m rear guy are

enough to guy the mast — no additional guying. The complete set weighs less than 400 to 475 g depending on the version.

Model	Advertised coverage	Advertised power	POTA relevance and practical assessment
Band Hopper II	40/20 m (variants 60/40/20, 20/17/15…)	125 W all modes	The European activator's classic two-bander: simple, rugged, ≈ 28 m total span including cords.
Band Hopper III	40/30/20 m (or 20/17/15 m)	125 W all modes	Three full-size bands for 390 g, the right POTA compromise; pre-tuned, nothing to trim.
Band Hopper IV	80/40/30/20 m	125 W all modes	The added 80 m coverage (3.5–3.7 MHz width at 1.5:1 SWR) for under 475 g: ideal for evenings and NVIS.

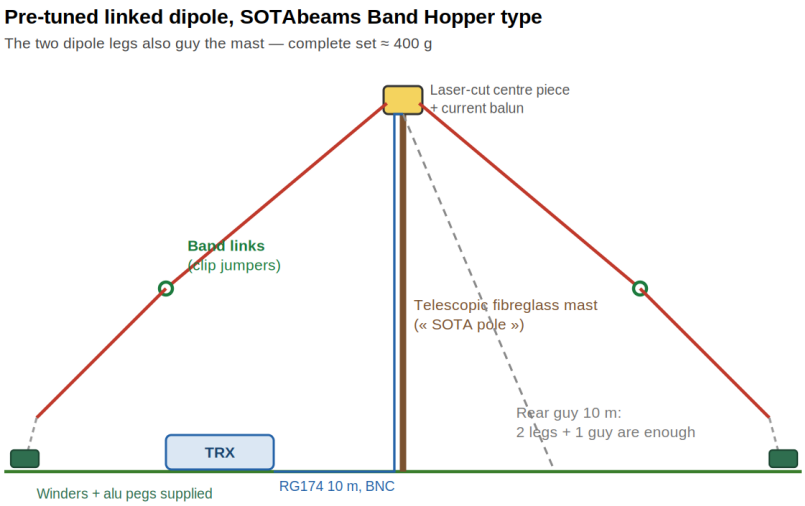

Figure 22 — Pre-tuned linked dipole, SOTAbeams Band Hopper type: the dipole legs guy the mast (concept drawing).

7.8 Alex Loop antennas

The AlexLoop is the reference portable magnetic loop, designed and hand-built since 2007 by Alexandre Grimberg, PY1AHD. Main loop in thick coax about 90 cm in diameter, coupling loop soldered directly to the BNC connector to limit losses, geared variable capacitor sweeping 7 to 30 MHz in a few seconds: the whole thing sets up in 90 seconds and fits in a shoulder bag.

This is the QRP antenna for confined spaces par excellence: balcony, window, park table, hotel when travelling. It fully accepts the family's limitations (very narrow bandwidth, retuning at every frequency change, strictly QRP power) in exchange for minimal bulk and total discretion.

Model	Advertised coverage	Advertised power	POTA relevance and practical assessment
AlexLoop Walkham / Premier	7–30 MHz continuous (40–10 m)	20 W PEP SSB / 10 W CW-FM-digital	The reference portable loop: ≈ 1 kg, 90-second setup, gold-plated connectors to limit ohmic losses. For the FT-817/818, KX2/KX3 and other QRP rigs.
AlexLoop HamPack	40–10 m	25 W SSB / 10 W CW-digital	Current version with an integrated backpack (radio pocket + antenna pocket), printed frequency scale and AlexTune tuning indicator: the "all-in-one" kit for pedestrian QRP POTA.

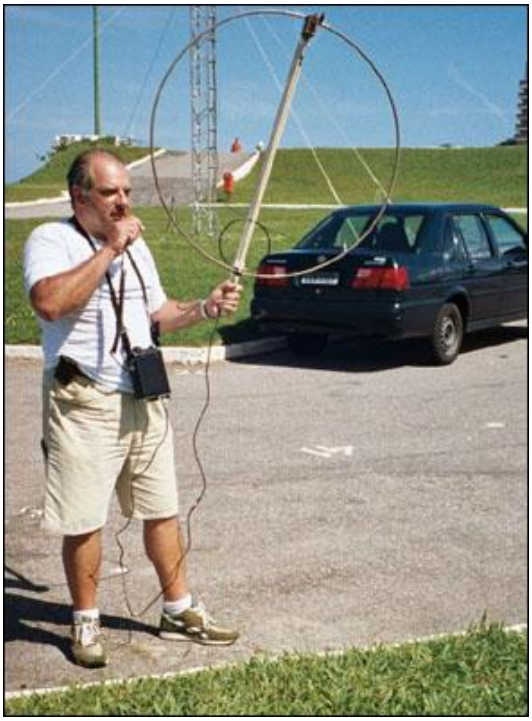

Figure 23 — Alex Loop – PY1AHD (manufacturer photo)

7.9 Elecraft AX1 and AX2 antennas

It is impossible to talk about POTA without mentioning Elecraft's AX1, probably the most photographed of all American activation antennas. The principle is radical: a 15 cm base containing a high-Q coil with a band selector, a 114 cm telescopic whip, a 4 m counterpoise — all for 90 grams, plugged directly into the transceiver's BNC. No mast, no wire to throw: you are on the air in seconds, standing for pedestrian mobile or seated at a table with the bipod.

Of course, such a short antenna is a compromise: efficiency is far below that of a full-size wire, and the transceiver's internal ATU (typically KX2/KX3) is part of the system. But the thousands of successful activations at 5–10 W in CW and FT8 prove that "the antenna you have with you" beats the antenna left at home. The range has since expanded: AX3 (30–10 m, integrated tripod) and AX4 (40–10 m, 100 W).

Model	Advertised coverage	Advertised power	POTA relevance and practical assessment
AX1	20/17 m via selector (15 m and up with ATU); 40/30 m with AXE1 extension	30 W	90 g in your pocket, deployed in seconds: the reference for pedestrian QRP POTA. Requires a wide-range ATU (KX2/KX3).
AX2	20 m (user-modifiable 17–6 m)	15 W	Even more compact, anti-tip base for "HT" use; the coil is accessible for experimenters.
AX3 / AX4	30–10 m / 40–10 m	30 W / 100 W	Recent additions: integrated tripod (AX3), longer 100 W version (AX4) for conventional transceivers.

Figure 24 — Pocket mini-whip, Elecraft AX1 type (manufacturer photo)

7.10 DX Commander antennas

DX Commander (Callum McCormick, M0MCX, United Kingdom) has transposed the fan dipole into a vertical configuration: several resonant quarter-wave elements, one per band, mounted in parallel around a roughly 10 m telescopic fibreglass mast and held apart by spreader plates. The signal "picks" its own wire: full-size antennas on every band, with no coil, no lossy transformer and no ATU.

The flip side: an initial "build day" is needed to solder and trim the elements, and the system demands a proper field of radials. Once built and marked up, on-site setup takes about twenty minutes: it is the antenna for long activations at 100 W and more, very popular with European activators, halfway between commercial and home-made.

Model	Advertised coverage	Advertised power	POTA relevance and practical assessment
Classic	40–6 m (80 m as an optional inverted L)	QRO (1500 W CW/RTTY)	The all-rounder: full-size elements in parallel, no ATU. Setup ≈ 20 min after the initial build; plan for radials.
Lite Mk2	4 bands of your choice on a 7 m mast (6.5 m usable)	QRO	The lightweight portable version for POTA: 30 m and above directly, 40 m possible with linear loading.

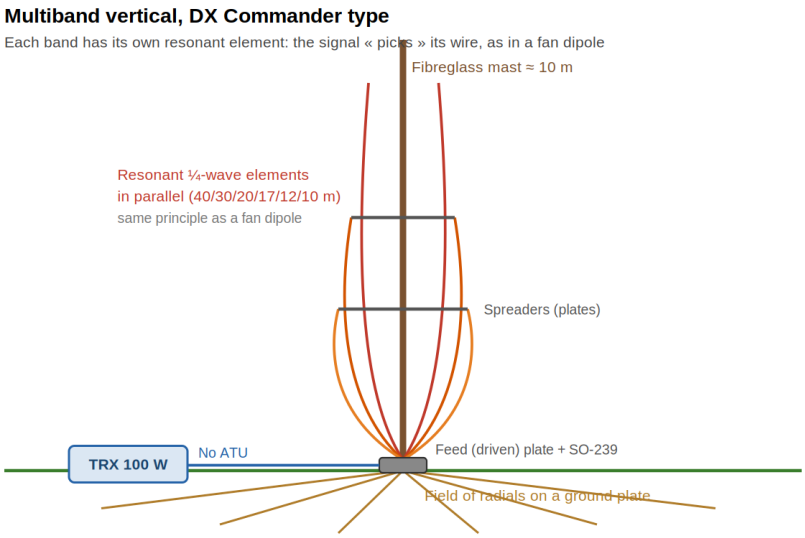

Figure 25 — Multiband vertical, DX Commander type: resonant quarter-wave elements in parallel around the mast (concept drawing).

Figure 26 — DX Commander

7.11 HyEndFed antennas

HyEnd Company (Netherlands) hand-builds EFHWs renowned for their mechanical quality: IP67 polycarbonate enclosure, PTFE SO-239 connector, stainless-steel hardware, strain relief on an aluminium plate. The 8-band multiband covers 80/40/(30)/20/17/15/12/10 m with a single 40 m wire, without an ATU except on 30 m — a very widespread way in the Benelux of having "all bands on one wire", at home as well as on activations.

For POTA proper, the range includes a lighter field version ("Velddag" / field day) in an ABS enclosure with a BNC connector, rated for 100 W SSB. Right on our doorstep, with support in Dutch or English — a natural supplier for the OMs of the region.

Model	**Advertised coverage**	**Advertised power**	**POTA relevance and practical assessment**
HyEndFed 8-band	80/40/(30)/20/17/15/12/10 m, 40 m wire	200 W to 1.6 kW PEP SSB depending on the version (digital derated)	Eight bands without an ATU (except 30 m) on a single wire; very rugged construction, for the home station as well as for heavy-duty portable work.
Velddag / Portable Mini 8-band	80–10 m, 40 m wire	100 W PEP SSB / 15 W digital	The field version: light ABS enclosure, BNC; perfect for an FT-891 without an ATU. Allow room for 40 m of wire.
Short	40/20/10 m,	Depending on	For sites where 40 m of wire will not fit:

multibands (3–5 bands)	40/20/15/10 m, etc.	version	same enclosures, shorter wires.

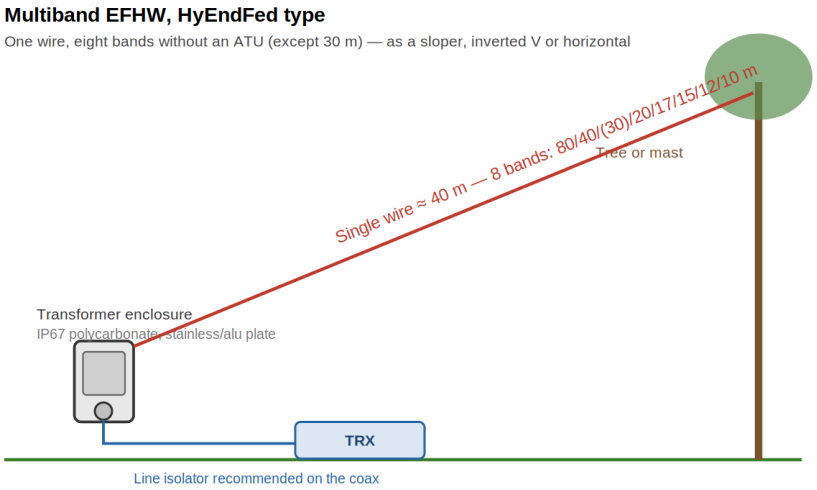

Figure 27 — Multiband EFHW, HyEndFed type: a single 40 m wire covering eight bands (concept drawing).

Figure 28 — Multiband EFHW, HyEndFed type

8. The role of radials and the counterpoise

Before choosing a portable antenna, the essential role of radials and counterpoises must be recalled. On a vertical, the radiating element is only half of the system: the other half consists of the radials, the ground, the coax and sometimes even the operator. A vertical without serious radials is often nothing more than a fine loss radiator. In practice, four to eight radials laid on the ground already make a good starting point for a quick activation; more radials generally improve efficiency, especially on 40 m and 80 m. With end-fed antennas, a short counterpoise or the coax shield also takes part in the operation. It is therefore useful to plan for a choke or a few ferrites near the transceiver to limit RF feedback into the station.

Why does this matter so much? Because any current going up the radiator must return somewhere. If that return path is poor ground, the loss resistance adds to the radiation resistance — and on a shortened vertical the latter is only a few ohms: every ohm lost in the ground goes off as heat instead of as radio waves. Two strategies exist. Radials laid on the ground are not resonant: their number matters more than their exact length, and 4 to 10 m wires laid out in a star pattern do the job very well. Elevated radials, on the other hand, are tuned: two to four wires cut to the right length are enough — exactly the principle of the colour-marked radial of the Buddistick PRO.

On the practical side: tape the ends of your radials together when packing up, and they will unroll knot-free in one motion at the next activation. With an end-fed, remember that the coax itself takes part: a coax of at least 5 m at the feed point serves as a natural counterpoise, and a choke (a few turns of coax or some ferrites) at the station end fixes the boundary of the radiating system. One simple test never lies: if the SWR changes when you touch the transceiver's case or move the coax, RF is coming back to the station — improve the counterpoise or add a choke.

9. ATU or not?

The tuner question comes up often. Some antennas are designed to work without an ATU when properly trimmed: this is the case for a well-tuned EFHW on its harmonic bands, a linked dipole or a vertical precisely adjusted band by band. Other antennas almost always demand a wide-range tuner: random wire with a 9:1 UNUN, very short systems, wideband antennas of the Chameleon type or improvised setups in the field. The ATU does not turn a bad antenna into a good one; above all it lets the transceiver work under acceptable conditions. Real efficiency always depends on the wire length, the losses in the transformers, the quality of the counterpoise and the ground.

One must also know where the losses hide. An ATU at the transceiver brings the SWR back to 1:1 as seen by the transmitter, but changes nothing about the SWR on the line between the ATU and the antenna: the coax losses, for their part, increase with that SWR — and all the more so when the cable is thin and long (RG174, long runs of RG58). In portable use, with 5 to 10 m of coax, the effect remains moderate; at home with 30 m of cable, it becomes significant. That is why an ATU at the base of the antenna is theoretically preferable — even if, in the field, the simplicity of a short coax largely puts the question into perspective.

Finally, watch the matching range: the internal ATUs of conventional transceivers (Icom, Yaesu, Kenwood) typically cover 25 to 150 ohms, about 3:1 — enough to catch a slightly off-resonance antenna, not enough for a random wire behind a 9:1 UNUN, which requires a wide-range ATU (internal KX2/KX3 type or external). To handle SWR above 3:1, you are better off turning to ATUs such as LDG or mAT. In summary: trimmed antenna = no ATU, simplicity and efficiency; ATU = freedom to explore every band and band edge, at the cost of one more link in the chain — and a possible illusion about real efficiency.

10. Antenna safety

Finally, a POTA activation must remain safe for the operator and for the public alike. Avoid stretching wires at head height over a path, make guys and radials visible if walkers pass nearby, and keep a comfortable distance from power lines, especially with fibreglass or carbon masts. Magnetic loops deserve particular attention: very high voltages can appear at the capacitor while transmitting. In a thunderstorm or strong wind, the right choice is simple: pack up. A portable antenna must remain light and efficient, but also discreet and harmless to the park's other visitors.

Exposure to electromagnetic fields also deserves thought: in POTA, the operator and the public are often within a few metres of the antenna. At 100 W, keep the feed point and the wires at a reasonable distance from people while transmitting, and be particularly careful with antennas very close to the ground and with magnetic loops, where the fields in the immediate vicinity are intense. The exposure standards in force in Belgium also apply to portable operation — in practice, a few metres of clearance and a power level matched to the actual need are enough to stay comfortably below them.

Finally, POTA is practised on other people's ground: in a park, we are guests. Protect the bark of trees if you run a cord over them (a piece of hose or foam is enough), throw your lines with a soft weight and never towards a busy path, mark guys and radials with coloured tape, and leave without a trace. A successful activation is also one after which the park manager will be happy to see radio amateurs again.

11. Which kit for a 100 W station?

For a 100 W portable transceiver such as the FT-991A or FT-891, the right instinct is to choose a simple, rugged combination rather than a single “miracle” antenna. The two tables below summarise an approach by use case: first the antennas to build yourself — the soul of amateur radio and the cheapest route —, then the commercial solutions, which buy setup time and repeatability.

Antennas to build yourself

Use case	Antenna to build	Why
Classic activation with trees or a mast	Home-made EFHW 40–10 m (wire ≈ 20.1 m + 49:1 transformer on a type 43 toroid)	The best weight / efficiency / multiband ratio in this whole article, for a few euros of wire and a toroid. Covers 40/20/15/10 m without an ATU.
Quick activation without trees	Telescopic vertical 5.2–7 m + 4 to 8 radials	Commercial whip but a “home-made” system: it is your radials, trimmed and proven, that deliver the efficiency.
Long activation, maximum efficiency	Self-trimmed linked dipole 40/20 or 40/30/20 m	Full-size, balanced dipole, no ATU; the links are made with automotive connectors or snap hooks.

Back-up antenna (bottom of the pocket)	EFRW 8–12 m + 9:1 UNUN + counterpoise	Tolerant of any length and any terrain; requires a wide-range ATU.
Club project, minimal budget	K6ARK or Digitenna open-source kits (to solder)	Plans, bills of materials and 3D files published: one shared workshop evening for a commercial-grade antenna. QRP.

Commercial antennas

Use case	Possible commercial choices	Why
Quick activation without trees, 100 W	Radioddity HF-009 / HF-010, Buddistick PRO, Wolf River Coil	Self-supporting verticals on a tripod or spike, per-band tuning, radials supplied; setup in a few minutes in a car park.
Ready-to-use multiband efficiency	SOTAbeams Band Hopper II / III / IV	Pre-tuned full-size dipoles, 125 W, under 475 g; the legs guy the mast.
Rugged versatility, EmComm, rough terrain	Chameleon MPAS 2.0 / MPAS Lite	One bag for man-pack vertical, sloper, inverted L or NVIS; military-grade construction. Wide-range ATU required.
Ultra-compact wire antenna, light bag	PackTenna Mini (49:1 or 9:1), Digitenna	Transformer, winder and wire in one piece; deployment in two minutes.
QRP in very confined spaces	AlexLoop Walkham / HamPack	The reference magnetic loop: ≈ 1 kg, up in 90 s, usable on a balcony or a table.
Pedestrian QRP, deployed in seconds	Elecraft AX1 / AX2	Pocket whip (90 g) plugged into the transceiver's BNC; the QRP walker's deliberate efficiency compromise.
Full-size multiband vertical, 100 W and up	DX Commander Classic / Lite Mk2	Resonant quarter-wave elements in parallel: full size on every band, no ATU; setup ≈ 20 min.
Ready-to-use multiband EFHW	HyEndFed 8-band (Velddag version for the field)	Eight bands on one 40 m wire without an ATU (except 30 m); careful workmanship, supplier in the Benelux.

Conclusions

At the end of this overview, one observation stands out: there is no universal POTA antenna, but there is a simple decision logic built around three questions. What support does the terrain offer — trees, room for a mast, or nothing at all? What power — QRP or 100 W? And what matters most that day: setup speed or efficiency? Three answers, and the choice almost always narrows down to one or two families from the ranking.

For the majority of activations, the most balanced kit remains the combination of a 40–10 m EFHW and a small portable vertical. The EFHW serves whenever there is a high point: it offers the best weight/efficiency ratio in multiband, without an ATU. The vertical takes over when there is no support at all or when speed is essential, from a car park or a table. With these two antennas in the bag — and a back-up EFRW wire at the bottom of a pocket — practically any terrain becomes workable with an FT-891 or an FT-991A.

It is worth paying attention to these three technical lessons that run through all the families studied:

- First the ground plane: on any vertical, it is the radials or the counterpoise that deliver the efficiency, far more than the brand of the radiator — looking after your radials pays more than changing antennas.
- Then resonance: a trimmed antenna (EFHW, linked dipole) needs no ATU and avoids the losses it masks, whereas a wideband or non-resonant antenna buys its versatility at the price of a tuner.
- Finally clearance: the height of the feed point and the immediate surroundings often matter more than the antenna model itself.

Build or buy? The market sells time and repeatability more than performance: a well-built home-made EFHW rivals the best kits for a fraction of the price, but a pre-tuned Band Hopper, a coil-loaded vertical adjusted in two minutes or an AlexLoop assembled in 90 seconds turn an hour of tinkering into an hour of operating — and a HyEndFed ready to hang or a DX Commander raised in twenty minutes are further examples, from the AX1 pocket whip to the all-band vertical. The open-source kits — K6ARK, Digitenna — offer a third way, particularly suited to club life: building together, for a few euros, a commercial-grade antenna, and learning while building it.

Let us not lose sight of the essential: a successful activation means ten contacts in the log, and the best POTA antenna is neither the most expensive nor the most sophisticated — it is the one that is deployed, tuned and on the air while the hunters are calling. Pick two, learn them by heart in the field, note what works in your logbook… and happy activating!

Disclaimer: The commercial photos shown in this article are used for illustration purposes, with the manufacturer or distributor credited where the image comes from a product sheet.

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Links

- My Ideal POTA Antennas (huyettm.net)
- QRPer — Low cost EFRW POTA system
- Reddit HamRadio — Portable antenna discussion
- J-Pole Antenna — POTA PERformer HF Vertical
- Wolf River Coils
- OnAllBands — Linked Dipole for POTA
- Chameleon MPAS 2
- PackTenna
- K6ARK
- QRPer — POTA with magnetic loop
- Radioddity
- QRPer — Radioddity HF-009 field test
- Radioddity — HF-009 review
- Radioddity — HF-010: WSPR data
- J-Pole Antenna — HF-010 review

- Buddistick PRO (manufacturer)
- Buddipole (manufacturer)
- Buddistick PRO field tests (QRPer)
- Example of a low-cost EFRW system for POTA (QRPer)
- A linked dipole for POTA activations (OnAllBands)
- SOTAbeams antenna range
- https://www.alexloop.com
- Digitenna (Digirig, data sheet and open-source files)
- Elecraft AX1 (manufacturer)
- DX Commander (manufacturer)
- HyEndFed / HyEnd Company (manufacturer)
- Digitenna at Passion Radio (European distributor)

Glossary

ATU (Antenna Tuning Unit) — matches the impedance presented by the antenna to the one expected by the transmitter (50 Ω). Does not improve the antenna's efficiency, only the transceiver's working conditions.

Balun (BALanced-UNbalanced) — transition transformer between an unbalanced line (coax) and a balanced antenna (dipole). A current balun also limits shield currents.

Choke — RF block (turns of coax or ferrites) that stops return currents on the cable shield and fixes the boundary of the radiating system.

Counterpoise — wire (or coax shield) providing the current return path for an end-fed antenna or a vertical.

CW (Continuous Wave) — Morse telegraphy.

EFHW (End Fed Half Wave) — half-wave wire fed at its end via a 49:1 or 64:1 transformer; works without an ATU on its design band and harmonics.

EFRW (End Fed Random Wire) — non-resonant wire fed at its end via a 9:1 UNUN; requires a wide-range ATU and a counterpoise.

Linked dipole — dipole whose legs contain connections (links) to open or close in order to change bands, full size on each one.

NVIS (Near Vertical Incidence Skywave) — near-vertical-incidence propagation: a low antenna radiating towards the zenith, for regional links (0–400 km) on 80/40 m.

PEP (Peak Envelope Power) — peak power of the signal envelope, the usual reference for SSB.

QRO / QRP — Q codes: high power / low power (by convention, QRP ≤ 5 W in CW and ≤ 10 W in SSB).

Radial — wire laid on the ground (non-resonant, quantity matters most) or elevated (tuned, 2 to 4 suffice) forming the ground plane of a vertical.

SWR (Standing Wave Ratio) — measure of the mismatch between line and antenna; 1:1 = perfect match.

Loading coil — coil inserted into a too-short radiator to bring it back to resonance, at the cost of reduced bandwidth and losses.

Sloper — wire stretched at an angle between a high point and a low point.

Toroid — ring-shaped magnetic core (ferrite, e.g. FT-140-43) on which antenna transformers are wound; its size determines the permissible power.

49:1 transformer / 9:1 UNUN — impedance transformers bringing the ≈ 2,500 Ω of an EFHW and the 500–1,500 Ω of a random wire down to the 50 Ω of the coax, respectively. UNUN: UNbalanced-UNbalanced.

Inverted V — dipole whose centre sits at the top of a mast with the legs sloping down on either side; a single support suffices.

Whip — telescopic or rigid vertical radiator.