40 Meter Horizontal Full-Wave Loop Antenna (CHA SKYLOOP 40) Operator's Manual

Nevada - USA
WWW.CHAMELEONANTENNA.COM

VERSATILE – DEPENDABLE – STEALTH – BUILT TO LAST

Rev. 7/16/2026

Table of Contents

WARNING! Never mount this, or any other antenna near power lines or utility wires! Any materials: ladders, ropes, or feedlines that contact power lines can conduct voltages that kill. Never trust insulation to protect you. Stay away from all power lines.

WARNING! Never operate this antenna where people could be subjected to high levels of RF exposure, especially above 10 watts or above 14 MHz. Never use this antenna near RF sensitive medical devices, such as pacemakers.

- Photographs and diagrams in this manual may vary slightly from current production units due to manufacturing changes that do not affect the form, fit, or function of the product.

- All information on this product and the product itself is the property of and is proprietary to Chameleon Antenna™. Specifications are subject to change without prior notice.

Introduction

Thank you for purchasing and using the Chameleon Antenna™ 40 Meter Horizontal Full-Wave Loop Antenna (CHA SKYLOOP 40). The CHA SKYLOOP 40, shown in plate (1), is an extreme performance horizontal full-wave loop antenna. The main advantages of a horizontal loop antenna are reduced background noise and a better gain over a dipole—which means signals will be stronger. In fact, most operators can't believe the increase in performance over their old dipole antenna. The horizontal loop antenna also has strong Near-Vertical Incidence Skywave (NVIS) propagation characteristics.

The CHA SKYLOOP is comprised of 141 feet of wire and a matching transformer unit. The integral broadband impedance matching network transformer allows broadband antenna tuning. The antenna will operate on the 40 and 20 meter Amateur Radio Service band without a tuner. It also covers 17 through 10 meters with an antenna tuner. The CHA SKYLOOP 40 is suitable for military, government agencies, non-governmental organizations (NGOs), Military Affiliate Radio System (MARS), Civil Air Patrol (CAP), Amateur Radio Emergency Service (ARES) / Radio Amateur Civil Emergency Service (RACES), Salvation Army Team Emergency Radio Network (SATERN), and hams looking for a high-performance wire antenna for HF base stations and base camps. Its' low observable characteristics and short legs make it a good choice for hams living in developments with Homeowners Associations (HOAs), deed restrictions, or Covenants, Conditions & Restrictions (CCRs). It is also an outstanding shortwave listening (SWL) antenna. When mounted low, the CHA SKYLOOP 40 will provide good Near-Vertical Incident Sky wave (NVIS) communication. The CHA SKYLOOP 40 antenna requires an antenna tuner on most frequencies.

Plate 1. CHA SKYLOOP 40 Antenna.

Antennas built by Chameleon Antenna™ are versatile, dependable, stealthy, and built to last. Please read this operator's manual so that you may maximize the utility you obtain from your CHA SKYLOOP 40 antenna.

HF Propagation

HF radio provides relatively inexpensive and reliable local, regional, national, and international voice and data communication capability. It is especially suitable for undeveloped areas where normal telecommunications are not available, too costly or scarce, or where the commercial telecommunications infrastructure has been damaged by a natural disaster or military conflict.

Although HF radio is a reasonably reliable method of communication, HF radio waves propagate through a complex and constantly changing environment and are affected by weather, terrain, latitude, time of day, season, and the 11-year solar cycle. A detailed explanation of the theory of HF radio wave propagation is beyond the scope of this operator's manual, but an understanding of the basic principles will help the operator decide what frequency and which of the EMCOMM II V3's configurations will support their communication requirements.

HF radio waves propagate from the transmitting antenna to the receiving antenna using two methods: ground waves and sky waves.

Ground waves are composed of direct waves and surface waves. Direct waves travel directly from the transmitting antenna to the receiving antenna when they are within the radio line-of-sight. Typically, this distance is 8 to 14 miles for field stations. Surface waves follow the curvature of the Earth beyond the radio horizon. They are usable during the day and under optimal conditions, up to around 90 miles, see table (1).

Low power, horizontal antenna polarization, rugged or urban terrain, dense foliage, or dry soil conditions can reduce the range very significantly. The U.S. Army found that in the dense jungles of Vietnam, the range for ground waves was sometimes less than one mile.

Sky waves are the primary method of HF radio wave propagation. HF radio waves on a frequency below the critical frequency (found by an ionosonde) are reflected off one of the layers of the ionosphere and back to Earth between 300 and 2,500 miles, depending upon the frequency and ionospheric conditions.

Frequency	Distance	Frequency	Distance
2 MHz	88 miles	**14 MHz**	33 miles
4 MHz	62 miles	**18MHz**	29 miles
7 MHz	47 miles	**24 MHz**	25 miles
10 MHz	39 miles	**30 MHz**	23 miles

Table 1. Maximum Surface Wave Range by Frequency.

HF radio waves can then be reflected from the Earth to the ionosphere again during multi-hop propagation for longer range communication. The most important thing for the operator to understand about HF radio wave propagation is the concept of Maximum Usable Frequency (MUF), Lowest Usable Frequency (LUF), and Optimal Working Frequency (OWF). The MUF is the frequency for which successful communications between two points is predicted on 50% of the days of in a month. LUF is the frequency below which successful communications are lost due to ionospheric losses. The OWF, which is somewhere between the LUF and around 80% of the MUF, is the range of frequencies which can be used for reliable communication. If the LUF is above the MUF, HF sky wave propagation is unlikely to occur.

The HF part of the Radio Frequency (RF) spectrum is usually filled with communications activity and an experienced operator can often determine where the MUF is, and with less certainty, the LUF by listening to where activity ends. The operator can then pick a frequency in the OWF and attempt to establish contact. Another method is using HF propagation prediction software, such as the *Voice of America Coverage Analysis Program (VOACAP)*, which is available at no cost to download or use online at www.voacap.com. The operator enters the location of the two stations and the program shows a wheel with the predicted percentage of success based on frequency and time. ALE, which is the standard for interoperable HF communications, is an automated method of finding a frequency in the OWF and establishing and maintaining a communications link.

Even under optimal conditions, there is a gap between where ground waves end (around 40 to 90 miles) and the sky wave returns to Earth on the first hop (around 300 miles). NVIS propagation can be used to fill this gap. The selected frequency must be below the critical frequency, so NVIS can normally only be used on frequencies from around 2 to 10 MHz. Frequencies of 2 – 4 MHz are typical at night and 4 – 8 MHz during the day.

Parts of the Antenna

The CHA SKYLOOP 40 is comprised of the following components, shown in figure (1).

A. **Matching Transformer Unit.** The Matching Transformer Unit is at one corner of the loop and contains the 2.5:1 matching transformer.
B. **Line Winder**. The Line Winder *(not shown)* is used store the Antenna Wire (C) when the antenna is not in use.
C. **Loop Wire.** The Loop Wire is 141 feet of 16-gauge wire
D. **Carabiner.** The Carabiners are stainless steel gate hook devices used to secure the ends of the Loop Wire (C) to the Eyebolt (E) to provide strain relief.
E. **Eyebolt.** The Eyebolt is located on top the Matching Transformer (A) and is used to suspend the corner of the loop and attach the Carabiners (D) at the ends of the Loop Wire for strain relief.
F. **Isolation Ring.** Isolation Rings are attached to one end of the Loop Wire and floating along the length of the Loop Wire. They are used to electrically isolate the Loop Wire, provide strain relief, and form the corners of the loop.

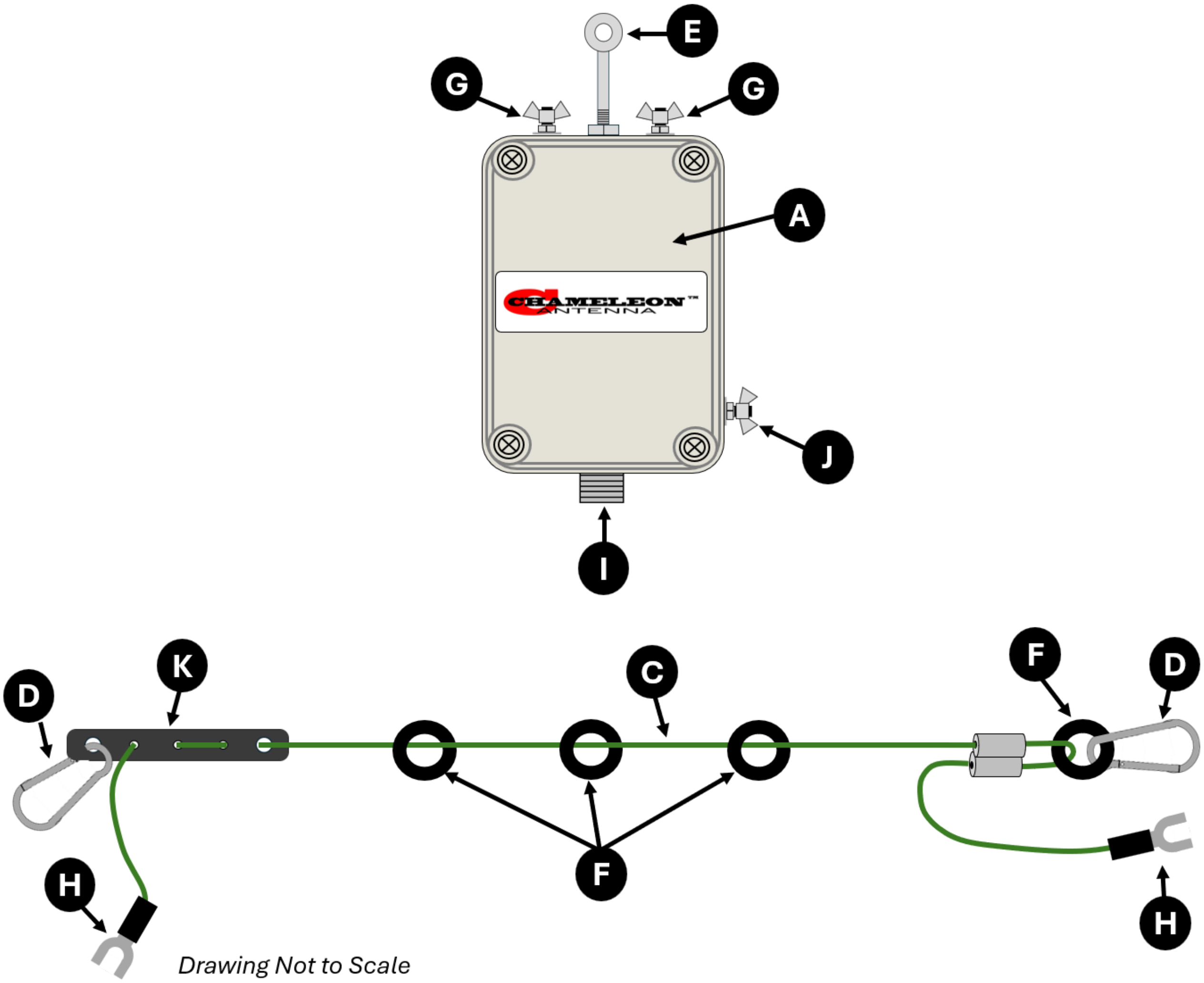


Figure 1. CHA SKYLOOP 40 Components.

G. Loop Wire Connection. The Loop Wire Connections are wing nut connectors on top of the Matching Transformer used to electrically connect the Spade Lugs (H) at ends of the Loop Wire.

H. Spade Lugs. The Spade Lugs are located at the ends of the Loop Wire and are used to electrically connect the wires to the Matching Transformer.

I. Coaxial Connector. The Coaxial Connector is a UHF Connector (SO-239) r used to attach the coaxial feedline to the Matching Transformer Unit.

J. Ground Connection. The Ground Connection is used to connect an earth ground to the Matching Transformer for lightning protection. A ground is not required.

K. End Insulator Strip. The End Insulator Strip is the end of one side of the Loop Wire and is used to attach that end of the Loop Wire to the Matching Transformer and enable the operator to field tune the antenna.

Installation Example

Figure (2) shows an ideal CHA SKYLOOP 40 installation with perfectly located mast and tree supports and the loop in a square. However, it is not usually possible to have a "perfect" installation. A more practical example of a small lot installation is shown in figure (3). This installation is discreet, using only one pole mast. The remaining supports are the top of the back fence and a convenient tree. Of course, it is better to have the loop up higher and in a perfect square, but the point of the example is to show that the loop will work -- even if it is lower, not perfectly square, and not perfectly horizontal. Our advice is that you do the best you can with your situation.

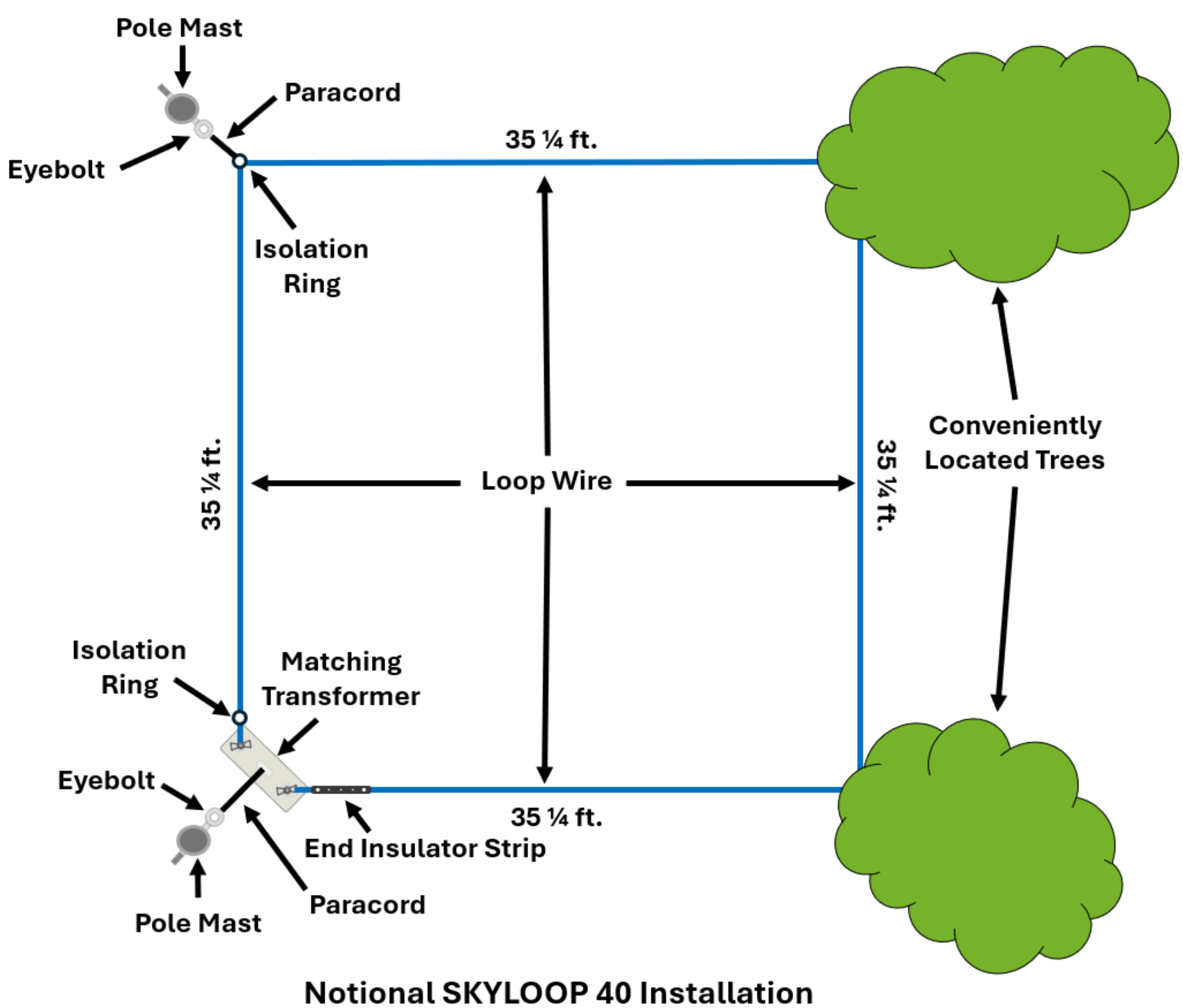


Figure 2. Ideal SKYLOOP 40 Installation.

Installation details are shown in figure (4). The left diagram shows connection details and the right diagrams shows how the three corners can be installed. Varying the length of the paracord in the corners will help shape and tension the loop.

The corners can be attached to many types of supports, such as the top of a fence post (as shown), a pole mast, the eaves of a building, or conveniently placed trees – depending on your lot layout.

Lowest optimal installation height is around 30-feet, but the antenna will still provide excellent results if installed lower.

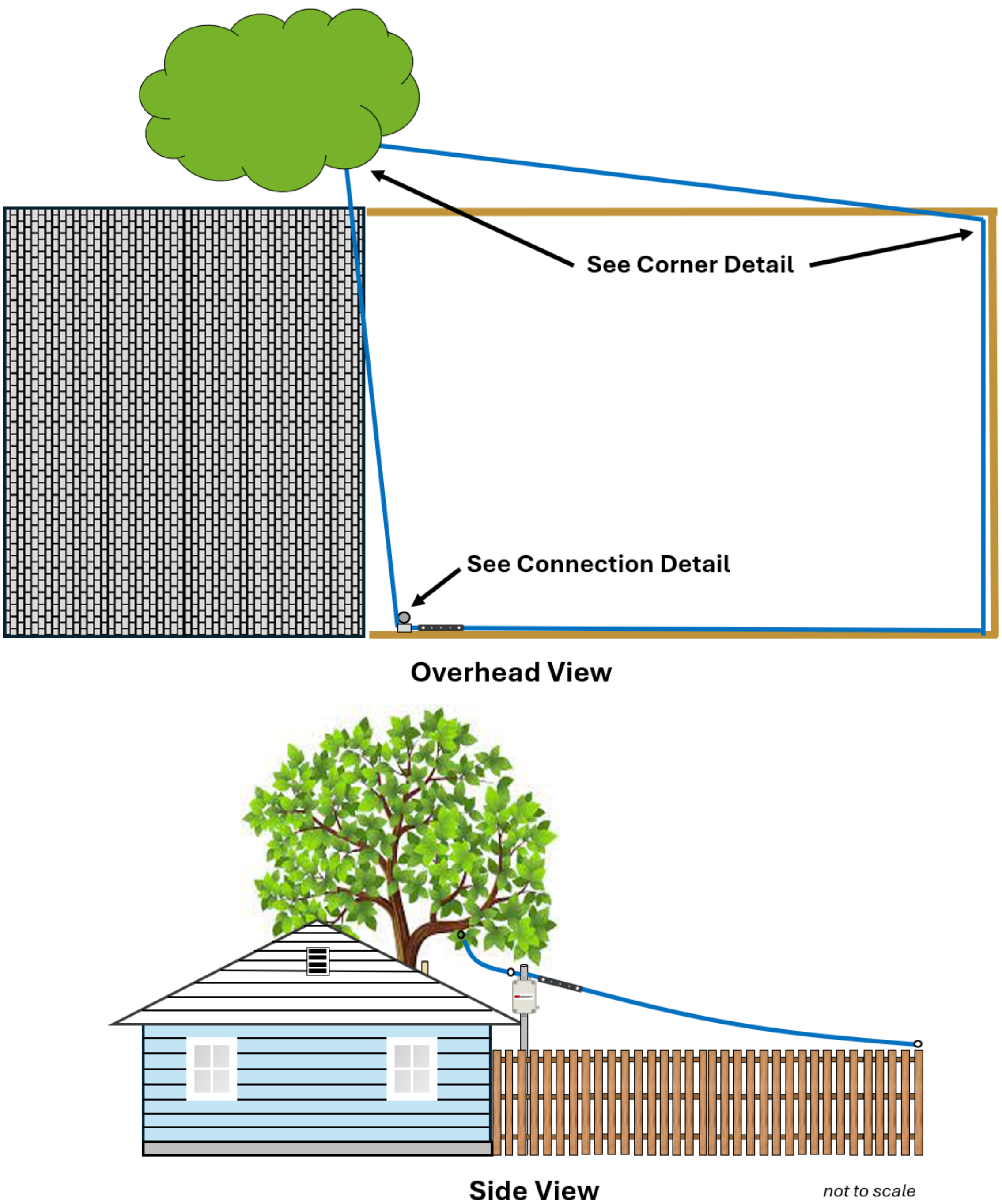


Figure 3. Small Lot SKYLOOP 40 Installation.

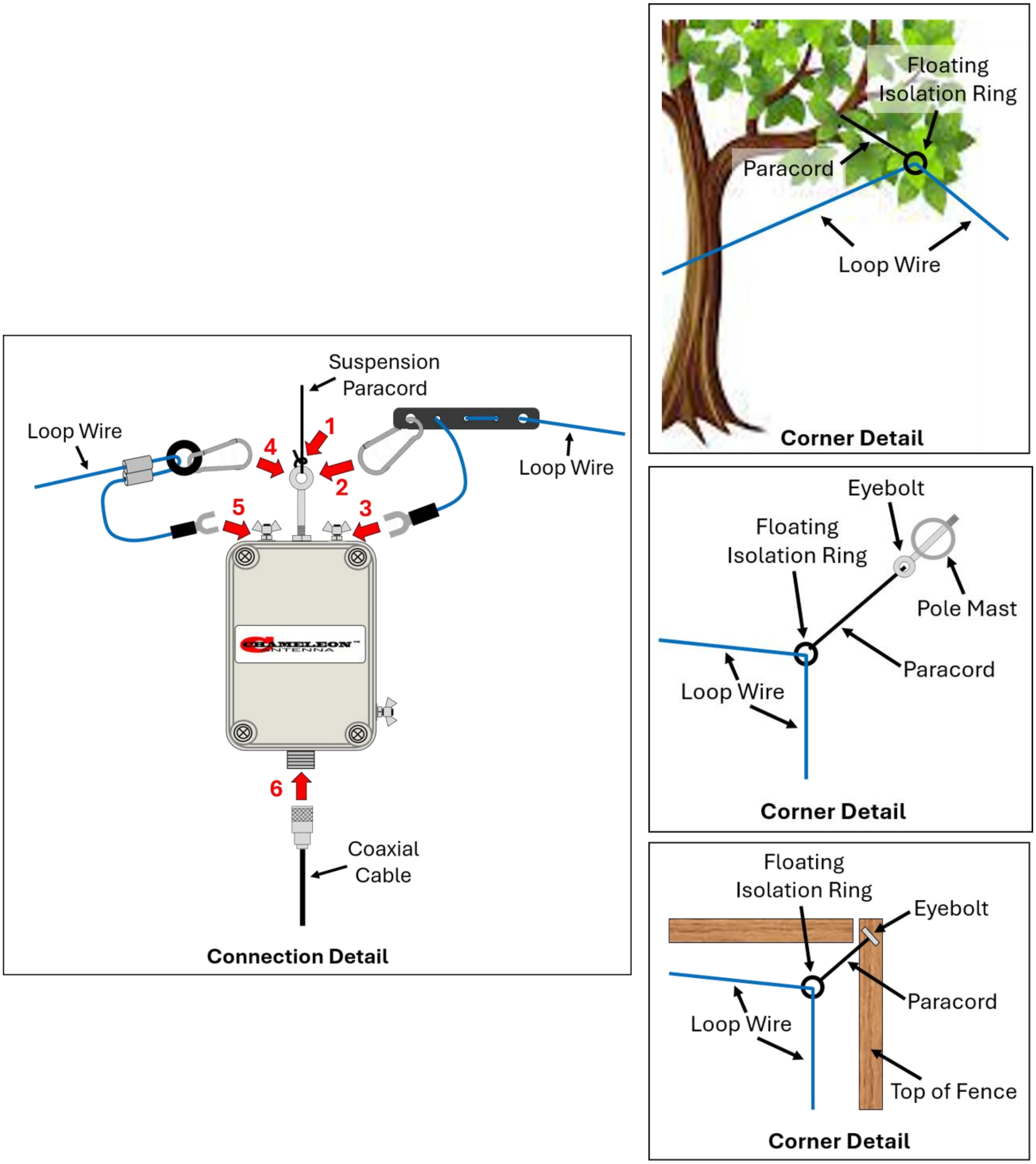


Figure 4. Installation Details.

Installation Procedure

Conduct site planning to determine where the four corners of the loop will be located. Optimally, each leg should be 35 ¼ feet long, but individual legs can be longer or shorter, depending on available supports and your lot situation. What can't be changed (other than for tuning) is the total length of the loop, which is 141 feet.

Use the following procedure to install the CHA SKYLOOP 40.

1. Using a Bowline Knot, tie a long length of paracord to the Eyebolt (E) on top of the Matching Transformer.
2. Attach the Carabiner (D) from one end of the Loop Wire (C) to the Eyebolt.
3. Connect the Spade Lug (H) from the same end of the Loop Wire from step (2) to one the Loop Wire Connections (G) on top of the Matching Transformer.
4. Attach the Carabiner from the other end of the Loop Wire to the Carabiner from step (2).
5. Connect the Spade Lug from the same end of the Loop Wire from step (4) to the other Loop Wire Connection on top of the Matching Transformer.
6. Connect the Coaxial Cable to the Coaxial Connector (I) on the bottom of the Matching Transformer. *Seal connection with "Coax-Seal" or other waterproof cable sealant.*
7. Raise the Matching Transformer to the desired height.
8. Proceed to the next corner of the loop and using Bowline Knot, tie a paracord to the next unattached floating Isolation Ring (F).
9. Raise the corner of the loop to the desired height.
10. Repeat steps (8) and (9) for the remaining two corners.
11. Check the shape and tension of the loop and adjust, as needed.
12. Perform an operational test.

Tuning

The CHA SKYLOOP 40 has been designed and cut to resonate at the lower (CW/digital) end of the 40-meter band. Installation height, ground conditions, surrounding objects, and many other factors can have a significant impact on the resonant frequency.

Figure (5) shows an example of the SWR sweep for the CHA SKYLOOP 40 during field testing. The red SWR sweep was the original length and the blue SWR sweep is after cutting 12 inches off the Loop Wire. After trimming, the resonant frequency increased from 6,988 KHz to 7,048 KHz, an increase of 60 KHz.

After installing your CHA SKYLOOP 40, If the SWR is 2.0:1 or less on both 7,000 and 7,300 KHz, we recommend you don't adjust it. However, if it is higher than 2.0:1 at the top (phone) end of 40 meters (and lower at the lower end), it indicates the antenna is too long. You can trim the antenna to resonate on a higher frequency using the End Insulator Strip and by crimping and soldering one of the extra Spade Lugs and Heat Shrink provided with the antenna. Leave around 7 inches coming out of the End Insulator Strip to allow for strain relief and connection to the Matching Transformer. Each foot removed from the Loop Wire increases the resonant frequency by roughly 60 KHz.

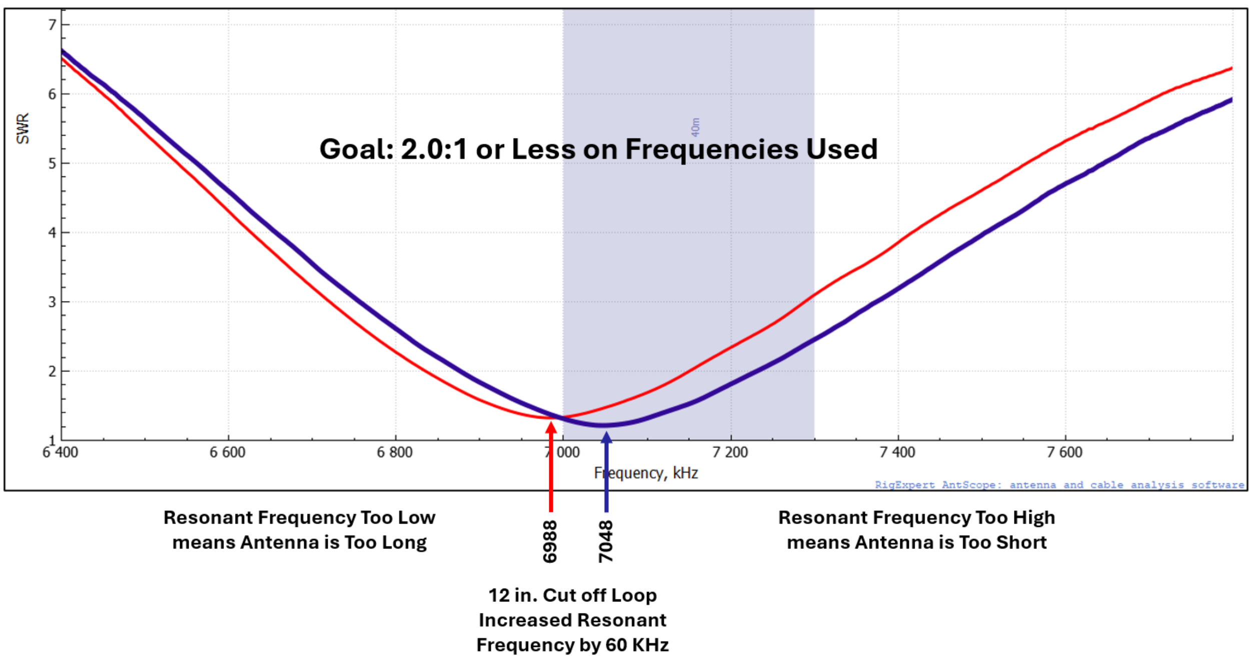


Figure 5. Loop Wire Tuning.

We recommend using an antenna analyzer (or using a series of measurements and graphing them) to visually verify the SWR curve. <u>Trim carefully – it's hard to put wire back on once cut.</u> This is not a Swiss watch, the SWR doesn't have to be perfect – the goal is an SWR of 2.0:1 or less on the frequencies you actually use.

Troubleshooting

1. Ensure the Loop Wire is connected correctly, per installation instructions and diagrams.
2. Ensure Loop Wire Connections are tight.
3. Check that the Coaxial Cable is securely connected to the Matching Transformer.
4. Inspect the Coaxial Cable for cuts in insulation or exposed shielding.
5. Inspect antenna components for signs of breakage, strain, or wear.
6. Inspect Coaxial Connectors Adapters, if used.
7. If it is still not operational, replace Coaxial Cable. *Most problems with antenna systems are caused by the coaxial cables and connectors.*
8. If still not operational (SWR > 3:1 on 40 meters), contact Chameleon Antenna™ at support@chameleonantenna.com for technical support, be sure to include details on the antenna configuration, symptoms of the problem, and what steps you have taken.

Accessories

The following accessories are recommended for use with your antenna. They are available from www.chameleonantenna.com or your great dealer.

- **CHA COAX CABLE.** Premium quality RG-58/U coaxial cable with an integrated RFI Choke. Available in 12, 50, 75, and 100 foot lengths.
- **CHA PORTA-MAST.** The PORTA-MAST is a heavy-duty telescoping mast made with industrial strength, aircraft grade (6005T6) anodized aluminum. It is designed for semi-permanent installation at home with no guy wires required. When installed at your home, it is HOA friendly because it can be lowered, so it is less than eight feet tall, or removed from the mount completely, and laid on the ground. It can even be camouflaged by adding a flag! Available in 25, 20, 15 and 15HD foot lengths.

Specifications

- Frequency:
  - 7.0 – 7.3 MHz (40m Amateur Radio Service Band) and 14.0 – 14.35 MHz (20m Amateur Radia Service Band) without an antenna tuner.
  - 18.068 – 18.168 MHz (17m) , 21.0 – 21.45 (15m), 24.89 – 24.99 (12m), and 28.0-29.0 MHz (10m) with an antenna tuner.
- 2:1 Bandwidth: 350 KHz (minimum).
- Power: 500W SSB, 250W CW and 100W Digital Modes.
- RF Connection: UHF Connector (SO-239).
- SWR: Less than 2.0:1 at resonance. See figures (6) and (7) for measured SWR graphs.
- Length: 141 ft. Loop.

- Weight: 2 lbs. 8 oz.
- Color: Gray, Black, and Green.

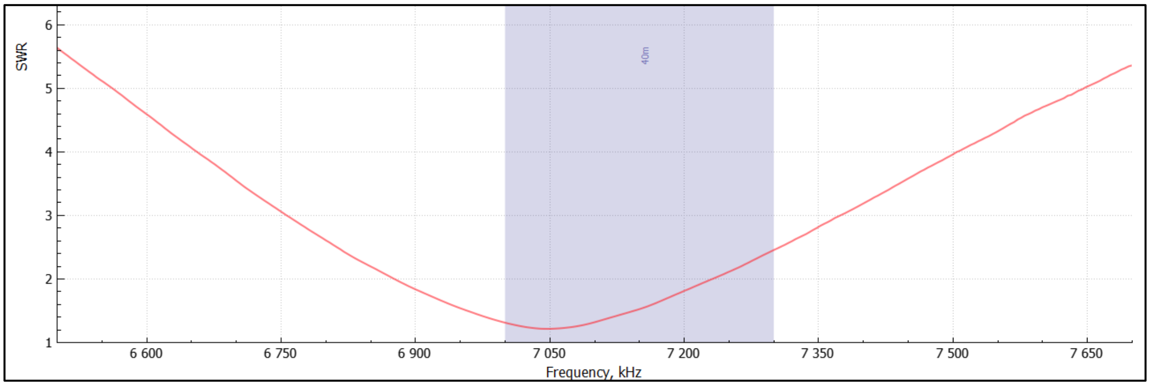


Figure 6. Measured SWR Graph (40m).

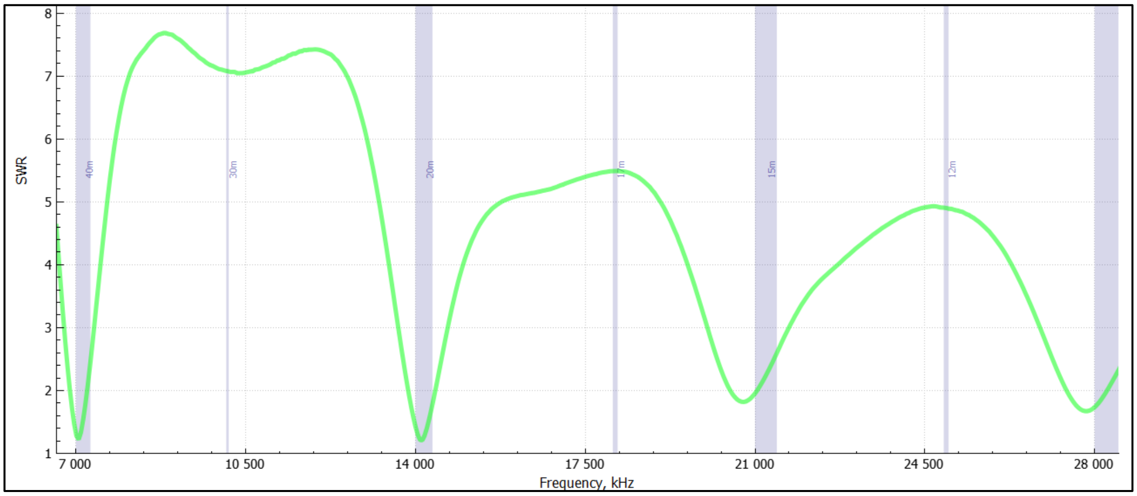


Figure 7. Measured SWR Graph (6.5 – 29.0 MHz).

References

1. Silver, H. Ward (editor), 2013, *2014 ARRL Handbook for Radio Communications*, 91st Edition, American Radio Relay League, Newington, CT.
2. 1987*, Tactical Single-Channel Radio Communications Techniques (FM 24-18)*, Department of the Army, Washington, DC.
3. Turkes, Gurkan, 1990, *Tactical HF Field Expedient Antenna Performance Volume I Thesis*, U.S. Naval Post Graduate School, Monterey, CA

Chameleon Antenna™ Products

Go to http://chameleonantenna.com for information about quality antenna products available for purchase from Chameleon Antenna™ – The Portable Antenna Pioneer.

Warranty information is available at http://chameleonantenna.com.

THE PORTABLE ANTENNA PIONEER BECAUSE GREAT RADIOS DESERVE GREAT ANTENNAS

Chameleon Antenna™ products are available from these great dealers:

HRO
DX ENGINEERING
GIGAPARTS
WIMO
MOONRAKER
RADIOWORLD UK
R&L ELECTRONICS
ML&S MARTIN LYNCH
PILEUPDX
LUTZ-ELECTRONICS
RADIOWORLD CANADA
GPS CENTRAL
PASSION-RADIO.COM
LIMMARED
RADIO MADE EASY
CHATT RADIO

CHAMELEON ANTENNA ENGINEERING

CHA SKYLOOP 40 Engineering Performance Brief

Seven-band EZNEC far-field interpretation
30 ft above Real Ground

11.4 dBi

Highest modeled maximum gain in the supplied set - 10 meters

Broad regional coverage on the lower bands. Concentrated, multi-direction upper-band DX performance.

Version 1.0.0 - 21 July 2026

Engineering boundary: this document interprets supplied model outputs. It does not certify measured realized gain, contact range, or superiority over another antenna.

What the model establishes

The supplied EZNEC far-field plots show a coherent and technically expected transition. At 7 and 10.1 MHz, the loop provides broad azimuth coverage and strong high-angle radiation. At 14 MHz the elevation pattern begins moving energy away from the zenith. From 18.1 through 28 MHz, the electrically larger loop forms increasingly concentrated azimuth and elevation lobes, with modeled maximum gain rising into the 9.4 to 11.4 dBi range.

This is a powerful product story because the same installed antenna changes operating character with frequency: regional and NVIS-oriented coverage on 40 meters, broad general-purpose coverage on 30 and 20 meters, and directional upper-HF DX performance in favored headings.

Approved central statement

At 30 ft over Real Ground, the modeled CHA SKYLOOP 40 transitions from broad, high-angle lower-band coverage to concentrated, lower-angle upper-band lobes, reaching 11.4 dBi modeled maximum gain on 10 meters in favored directions.

Important claim limit

- The plots support a model-specific gain statement, not a universal installed-performance guarantee.

- The results do not yet prove that this is Chameleon Antenna's highest-gain antenna because other products have not been compared under identical model assumptions.

- No communication distance can be guaranteed from an antenna pattern alone.

METHODOLOGY

Model assumptions and missing controls

Known from the supplied materials

- Antenna: CHA SKYLOOP 40, nominal 141 ft horizontal loop.

- Height: 30 ft above ground.

- Ground selection: Real Ground.

- Frequencies: 7.0, 10.1, 14.0, 18.1, 21.0, 24.9, and 28.0 MHz.

- Outputs: total-field azimuth and elevation patterns plus the reported maximum gain and available F/B or F/S ratio.

Not exposed in the supplied screenshots or PowerPoint

- Original EZNEC model geometry, segment count, wire conductivity and loss settings.

- Ground conductivity and dielectric constant used by the Real Ground selection.

- Source position, transformer representation, feed-line model, and any common-mode current controls.

- Whether the gain values include transformer and feed-line insertion losses.

- Absolute azimuth heading of the physical loop sides and major lobes.

- Exact elevation angle of maximum radiation as a numerical output.

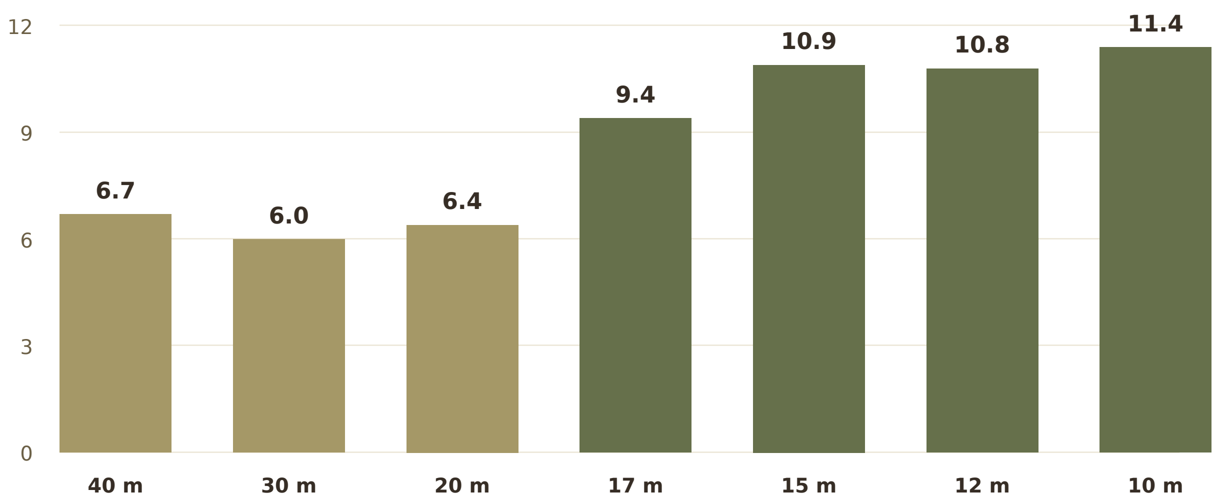
Until the original .EZ file or complete model report is archived, this brief preserves the supplied outputs faithfully but does not claim full reproducibility.

PERFORMANCE OVERVIEW

Modeled gain across seven HF bands

Band	Frequency	Modeled max gain	Pattern ratio	Polarization
40 m	7.0 MHz	6.7 dBi	F/S 0.0 dB	Mixed
30 m	10.1 MHz	6.0 dBi	F/B 0.1 dB	Horizontal
20 m	14.0 MHz	6.4 dBi	F/S 0.0 dB	Horizontal
17 m	18.1 MHz	9.4 dBi	F/S 2.1 dB	Not stated in supplied slide
15 m	21.0 MHz	10.9 dBi	F/S 1.5 dB	Horizontal
12 m	24.9 MHz	10.8 dBi	F/B 1.4 dB	Not stated in supplied slide
10 m	28.0 MHz	11.4 dBi	F/B 3.2 dB	Not stated in supplied slide

Modeled maximum gain by band (dBi)



All values are model outputs for the supplied 30 ft / Real Ground case; not measured field guarantees.

The gain trend is not a smooth broadband efficiency curve. It reflects how the loop's electrical circumference, current distribution, ground interaction, and pattern directivity change with frequency. Higher maximum gain on the upper bands is accompanied by narrower favored directions and deeper modeled nulls.

How to read the radiation plots

Azimuth plot

The circular plan-view plot shows relative signal strength around the antenna at the model's selected elevation cut. A nearly circular outline indicates broad heading coverage. Petal-like lobes show directions of concentrated energy; spaces between lobes are relative nulls.

Elevation plot

The half-circle side-view plot shows energy versus launch angle above the horizon. High-angle energy supports shorter regional sky-wave paths and NVIS when ionospheric conditions permit. Lower-angle energy generally supports longer single-hop distances and DX, but propagation remains dependent on the ionosphere, terrain, time, season, solar conditions, and noise.

Normalized 0 dB pattern versus reported dBi

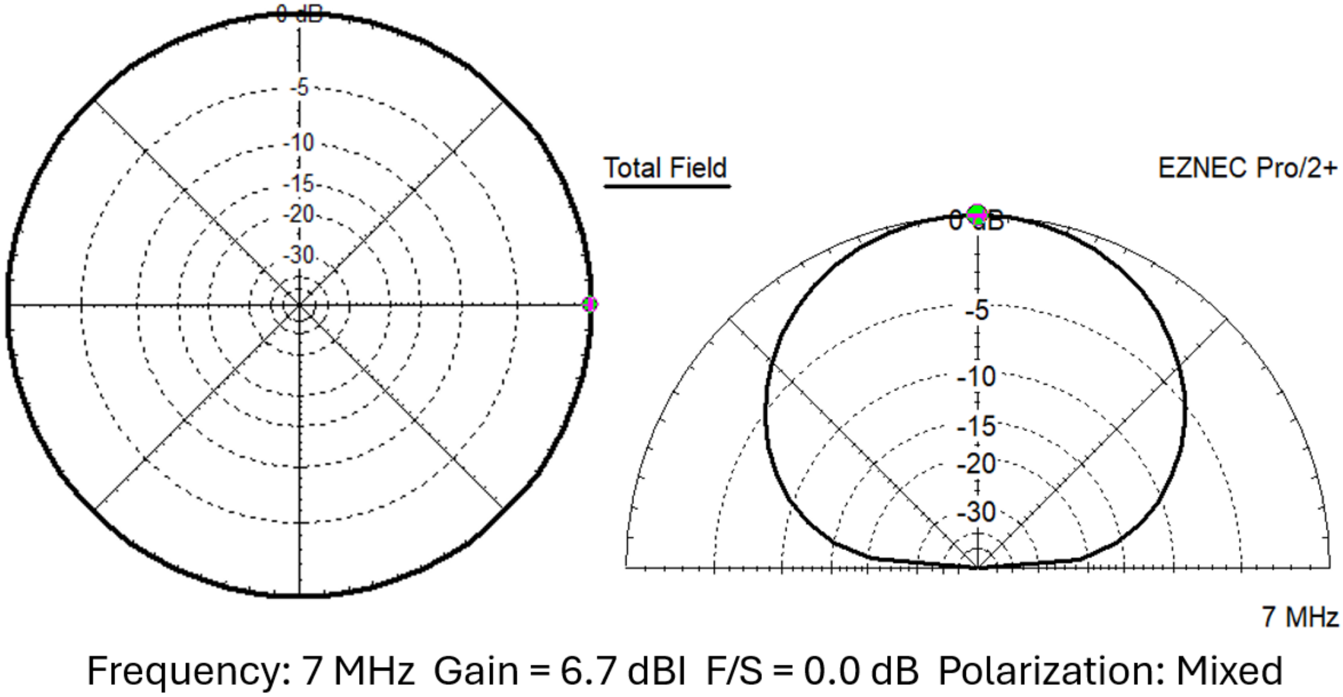
The outer 0 dB reference on each pattern is normalized to the strongest direction in that plot. It describes shape. The separate gain readout supplies the model's absolute maximum gain value. A normalized 0 dB label must never be mistaken for 0 dBi antenna gain.

Ground and installation

A horizontal antenna's elevation pattern is strongly affected by height and ground reflection. Real terrain, nearby conductors, unequal corner heights, irregular geometry, feed-line current, and losses can rotate, broaden, weaken, or partly fill the modeled lobes and nulls.

7.0 MHZ

40 m modeled performance



6.7 dBi	F/S 0.0 dB	Mixed
Modeled maximum gain	Reported pattern ratio	Reported polarization

Pattern character

Almost circular azimuth coverage with maximum radiation at very high elevation angles.

Best operating interpretation

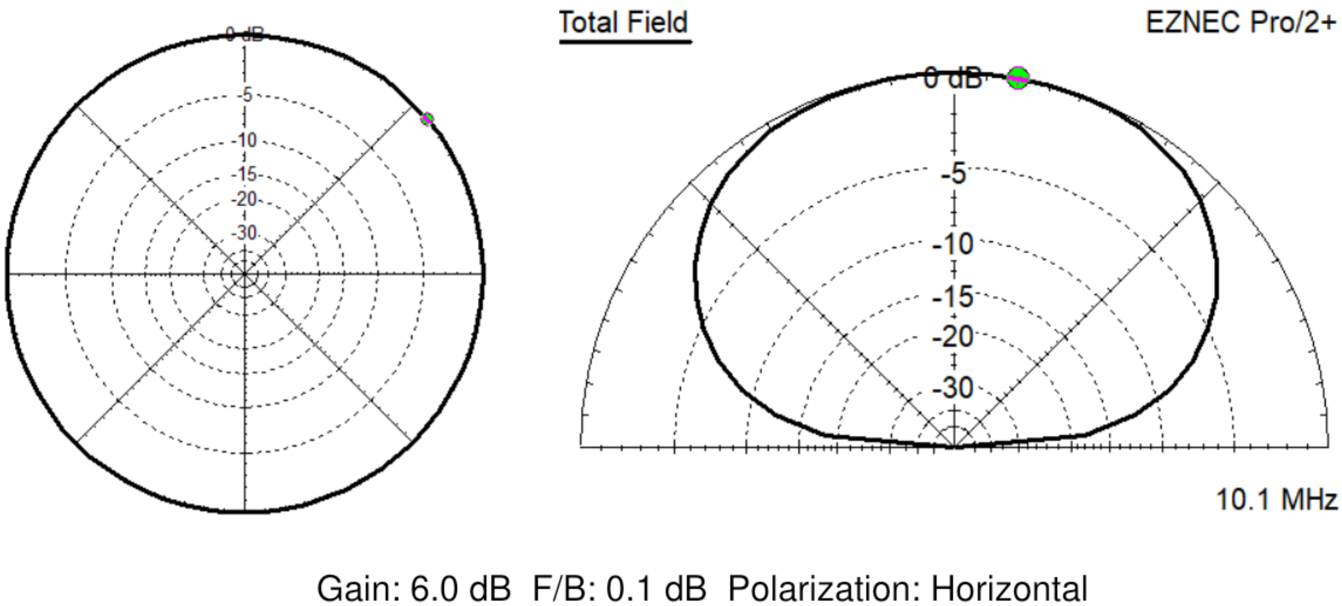
Regional and NVIS-oriented coverage. This is the lower-band coverage mode of the antenna, not its directional DX mode.

Claim and deployment caution

The model reports mixed polarization. Do not describe the 40 meter result as purely horizontal.

10.1 MHZ

30 m modeled performance



6.0 dBi	F/B 0.1 dB	Horizontal
Modeled maximum gain	Reported pattern ratio	Reported polarization

Pattern character

Nearly omnidirectional azimuth coverage with a broad high-angle elevation lobe.

Best operating interpretation

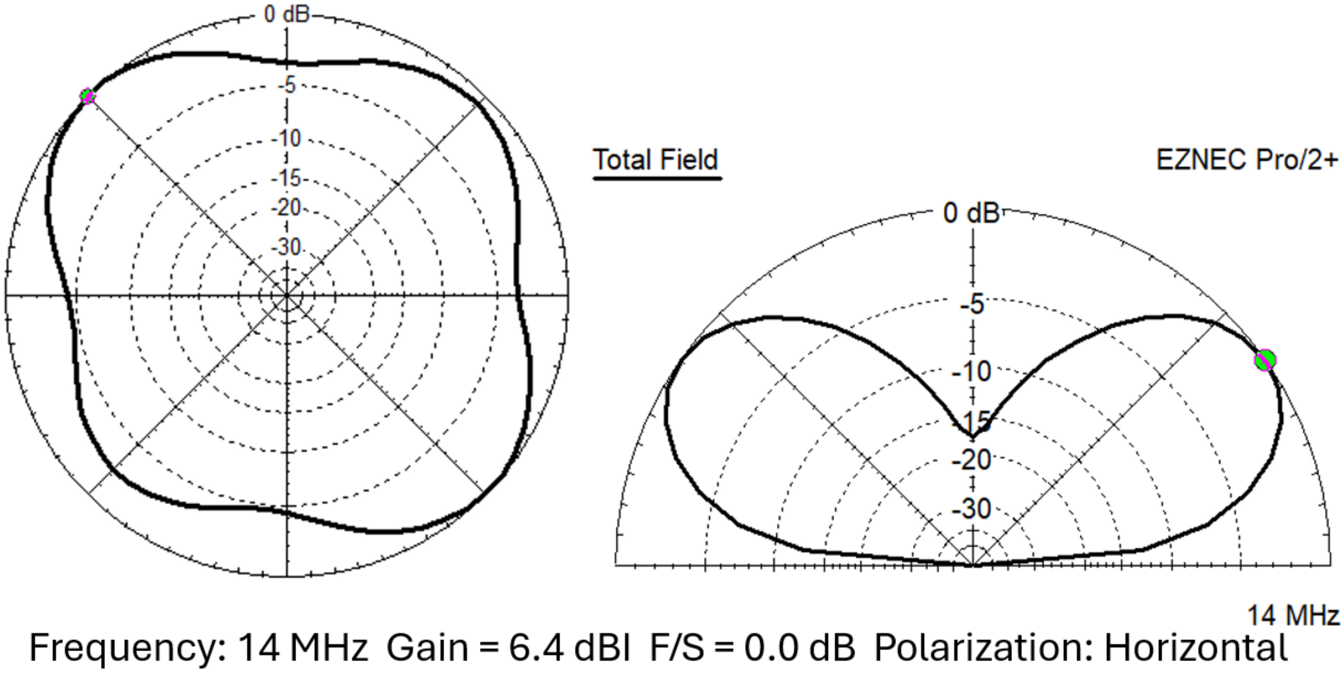
Broad regional and intermediate-distance coverage when propagation supports 30 meters.

Claim and deployment caution

30 meters is not listed as a documented transmit band in the current product manual. Treat this plot as engineering characterization unless product authorization is revised.

14.0 MHZ

20 m modeled performance



6.4 dBi	F/S 0.0 dB	Horizontal
Modeled maximum gain	Reported pattern ratio	Reported polarization

Pattern character

Broad rounded-square azimuth coverage with strong medium-angle elevation lobes and a reduced zenith response.

Best operating interpretation

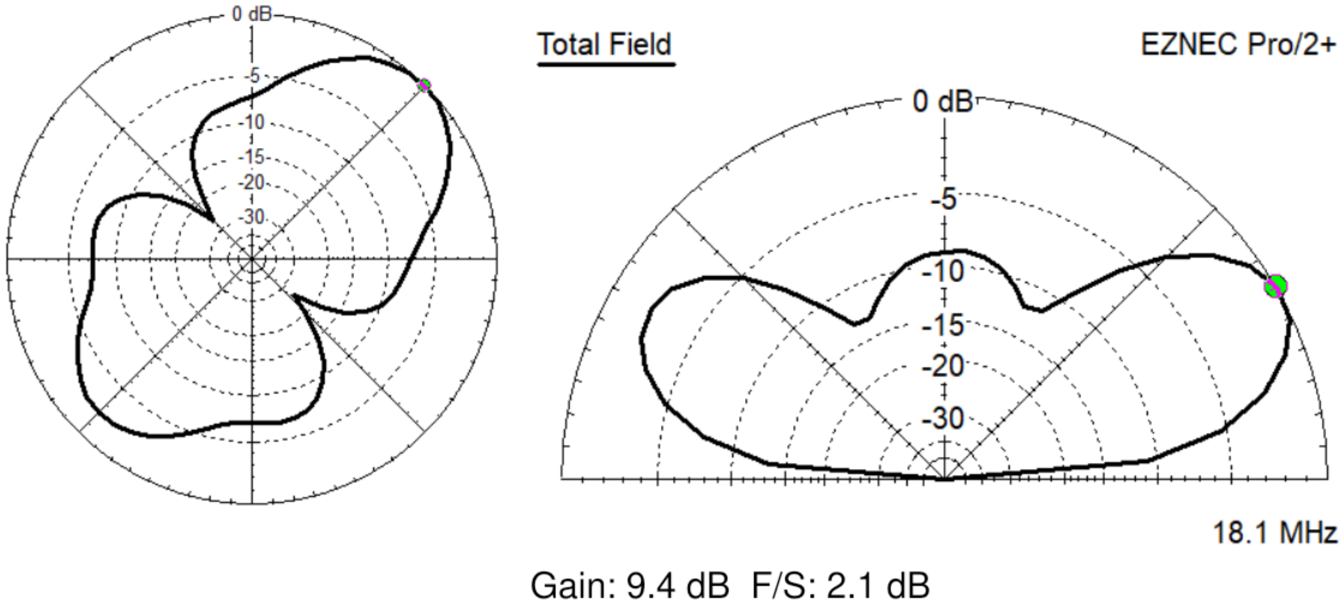
General-purpose regional and long-distance coverage with broad directional tolerance.

Claim and deployment caution

The deep modeled elevation notch will be changed by terrain, ground, geometry, losses, and local scattering.

18.1 MHZ

17 m modeled performance



9.4 dBi	F/S 2.1 dB	Not stated in supplied slide
Modeled maximum gain	Reported pattern ratio	Reported polarization

Pattern character

Three dominant azimuth lobes and pronounced lower-angle elevation energy.

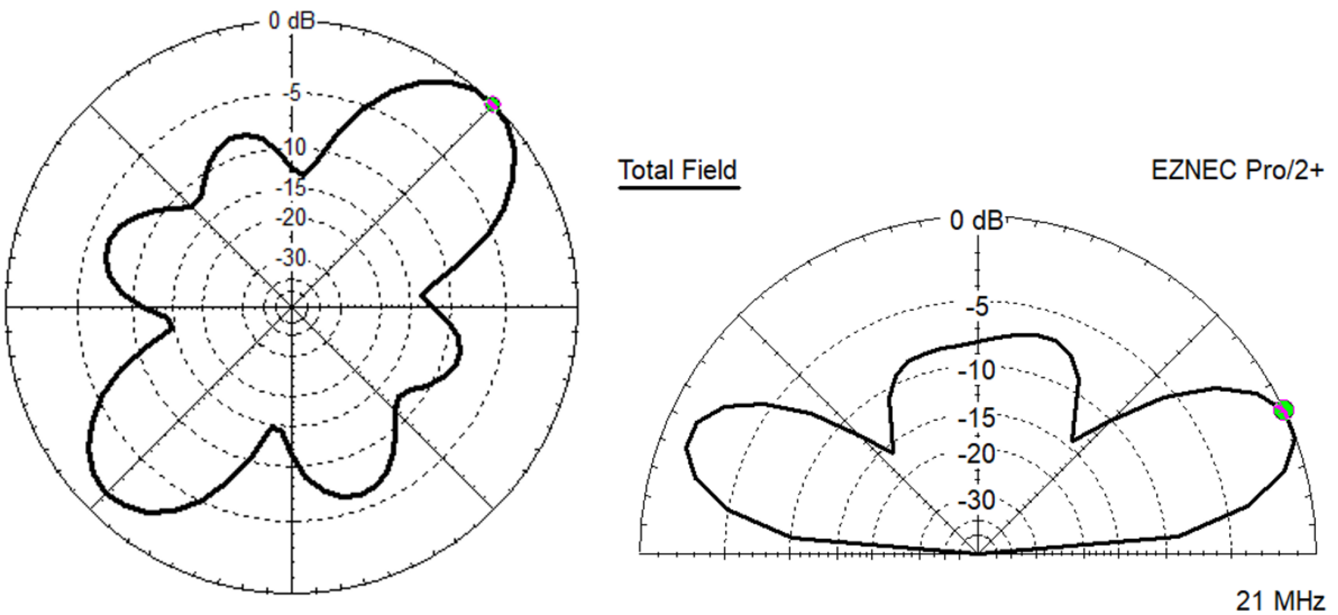
Best operating interpretation

Directional DX performance in favored headings, with gain created by concentrating energy rather than increasing transmitter power.

Claim and deployment caution

Operators should map the physical loop orientation because upper-band lobe headings rotate with the installation.

15 m modeled performance



Frequency: 21 MHz Gain = 10.9 dBI F/S = 1.5 dB Polarization: Horizontal

10.9 dBi	F/S 1.5 dB	Horizontal
Modeled maximum gain	Reported pattern ratio	Reported polarization

Pattern character

Multiple azimuth lobes with strong low-angle elevation energy and additional higher-angle structure.

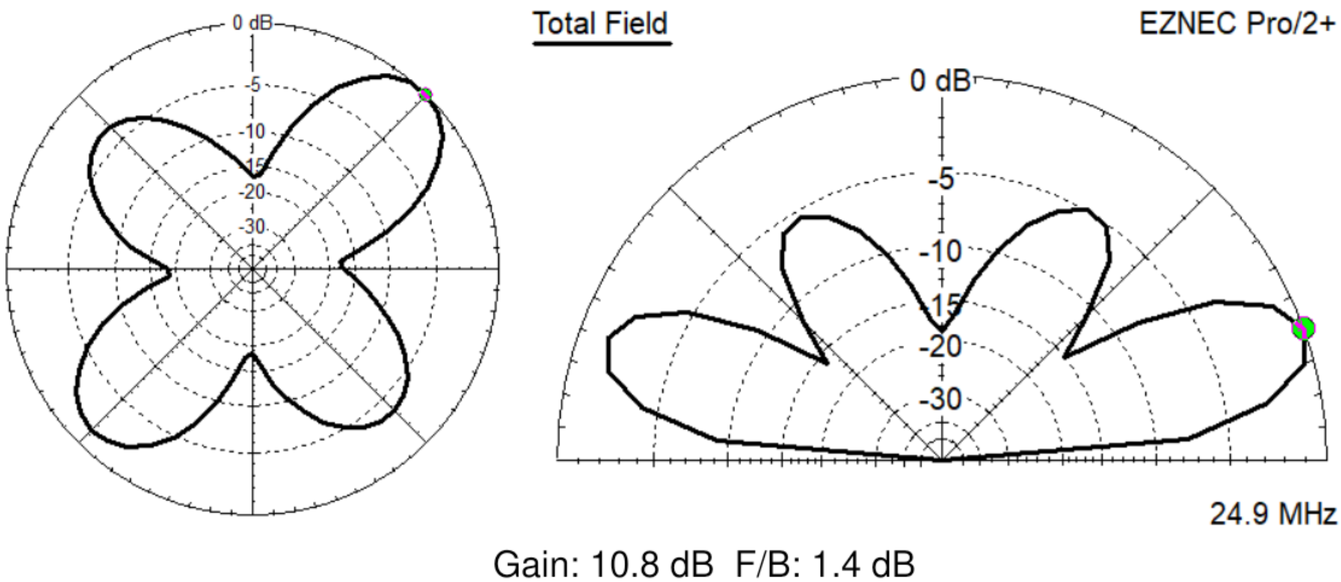
Best operating interpretation

High modeled gain in several favored DX directions when 15 meters is open.

Claim and deployment caution

A null in a normalized plot is not a guaranteed dead zone. Terrain and scattering can fill modeled nulls.

12 m modeled performance



10.8 dBi	F/B 1.4 dB	Not stated in supplied slide
Modeled maximum gain	Reported pattern ratio	Reported polarization

Pattern character

Four principal azimuth lobes with low-angle primary elevation lobes and secondary higher-angle lobes.

Best operating interpretation

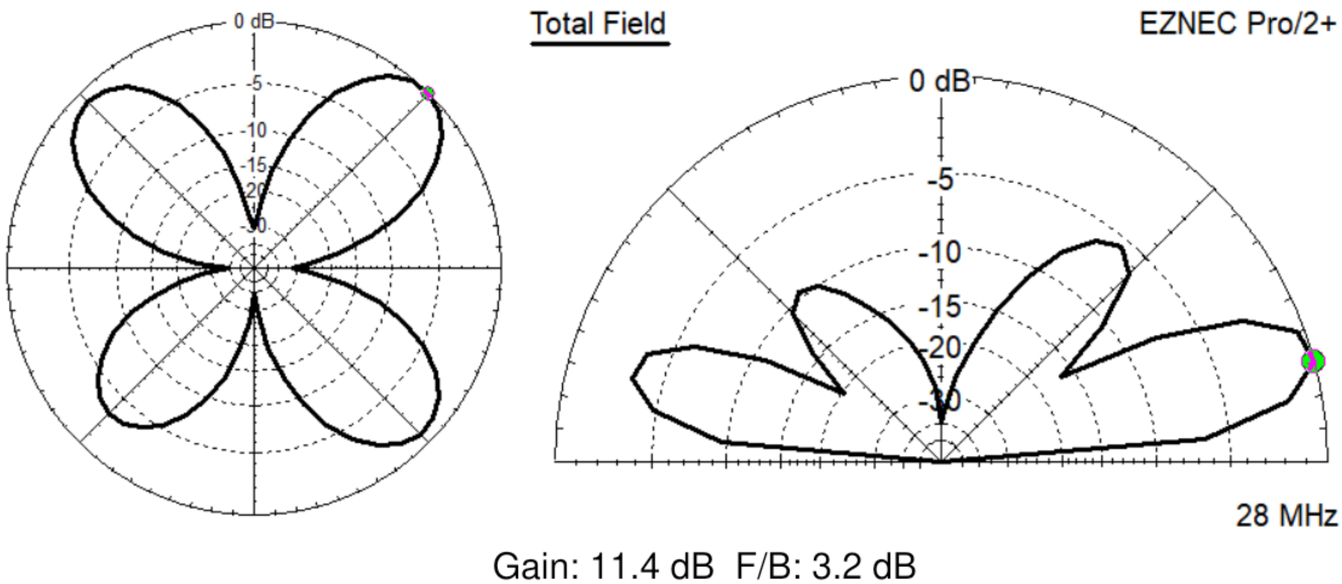
Concentrated multi-direction DX coverage on 12 meters with strong modeled maximum gain.

Claim and deployment caution

Tuner-supported operation does not make the feed system lossless. The tuner, coax, transformer, and installed SWR all remain part of the result.

28.0 MHZ

10 m modeled performance



11.4 dBi	F/B 3.2 dB	Not stated in supplied slide
Modeled maximum gain	Reported pattern ratio	Reported polarization

Pattern character

Four narrow principal azimuth lobes with strong low-angle elevation energy and secondary lobes.

Best operating interpretation

The highest modeled maximum gain in the supplied set: 11.4 dBi in favored directions.

Claim and deployment caution

The strong directivity also creates orientation sensitivity. Broadside assumptions from a dipole do not describe this multi-lobed pattern.

DEPLOYMENT STRATEGY

Orientation, siting, and real-world verification

On 40 and 30 meters, physical orientation has relatively little effect on azimuth coverage in the supplied model. By 17 through 10 meters, orientation becomes an operating control because the principal lobes and relative nulls are pronounced.

Recommended commissioning procedure

- Record the compass heading of each side and corner when the loop is installed.

- Save analyzer sweeps for every intended band before full-power operation.

- Use on-air reports, reverse-beacon data, WSPR, FT8 reception reports, or controlled field-strength measurements to map favored headings.

- Repeat measurements after changing height, geometry, feed-line routing, support points, or nearby structures.

- Treat a modeled null as a relative weakness, not a guaranteed absence of communication.

Antenna orientation does not change ionospheric availability. A strong modeled lobe cannot create a path on a closed band, and a modeled null can still support communication through scattering, terrain reflection, and multi-path propagation.

FIELD USE

Band-to-mission planning guide

Band group	Pattern character	Primary planning role	Operator action
40 m	Broad / very high angle	Regional and NVIS-oriented coverage	Select frequency below the critical frequency when NVIS is required; v
30 m	Broad / high angle	Regional and intermediate coverage	Engineering characterization only until the product's documented tran
20 m	Broad azimuth / medium-angle lobes	General regional and DX work	Use broad coverage when exact destination heading is uncertain.
17-15 m	Multiple directional lobes	Upper-HF DX in favored headings	Record loop orientation and compare target heading to observed on-a
12-10 m	Sharper low-angle lobes	High-gain directional DX	Use a suitable tuner where required and recognize stronger heading s

Documented operating scope

The current CHA SKYLOOP 40 manual documents no-tuner operation on 40 and 20 meters and tuner-supported operation on 17, 15, 12, and 10 meters. The 30-meter model is technically informative but does not override the published operating scope.

PUBLICATION CONTROL

Approved claims and claims to avoid

APPROVED

- The supplied model reports 6.0 to 11.4 dBi maximum gain across 30 through 10 meters, with 6.7 dBi on 40 meters.
- At 30 ft over Real Ground, the pattern transitions from broad high-angle coverage to concentrated upper-band directional lobes.
- The 10-meter case reports the highest maximum gain in the supplied model set: 11.4 dBi.
- The upper-band gain is directional; it is strongest in favored lobes and weaker between them.
- Actual installed results will vary with geometry, height, ground, terrain, nearby conductors, feed-line behavior, matching loss, and propagation.

AVOID

- Highest-gain antenna Chameleon makes - not proven without controlled comparison models.
- 11.4 dBi on every heading - false; the pattern is strongly directional.
- Guaranteed DX or a stated contact distance - propagation cannot be guaranteed.
- Measured gain - these are model outputs, not calibrated field measurements.
- Lossless matching or feed system - the supplied results do not document every modeled loss.

CONTROLLED COMPARISON

Next engineering validation step

To establish whether the CHA SKYLOOP 40 is the highest-gain Chameleon antenna, every candidate must be modeled under the same controlled conditions. That comparison should include the same frequency, height reference, ground constants, wire loss, feed-line treatment, matching loss, power normalization, and output definition.

Required model archive

- Original .EZ file for every SKYLOOP 40 frequency case.

- Complete geometry and segmentation report.

- Ground conductivity and dielectric constant.

- Wire and load loss settings.

- Source impedance, matching transformer representation, and feed-line model.

- Maximum gain, elevation angle, azimuth heading, efficiency, feedpoint impedance, and current distribution for each band.

Recommended comparison set

SKYLOOP 2.0, TDL, representative LEFS and OCF installations, BV, V-DIPOLE, and documented MPAS 2.0 configurations. Results should be presented as a model matrix, not as isolated best-case values.

Until that comparison is complete, the strongest accurate statement is: probably one of the highest modeled-gain antennas in the Chameleon lineup on the upper HF bands, with 11.4 dBi reported on 10 meters in the supplied model.

Sources and authority

Primary product sources

- CHA SKYLOOP 40 Operator's Manual, revision 2026-07-16.

- CHA SKYLOOP 40 Quick Start Guide and Flysheet, revision 2026-07-16.

- User-supplied EZNEC Pro/2+ far-field screenshots for 7, 14, and 21 MHz.

- User-supplied PowerPoint far-field plots for 10.1, 18.1, 24.9, and 28 MHz.

Engineering references consulted

- ARRL Antenna Book for Radio Communications, 24th edition: horizontal loops, ground effects, pattern interpretation, and elevation-angle behavior.

- ARRL Handbook for Radio Communications: multiband horizontal loops and the shift toward lower-angle radiation at higher frequencies.

- Jerry Sevick, Transmission Line Transformers: broadband transformer behavior and transformation ratios. Consulted for matching-network context only; the supplied model does not expose transformer implementation or loss.

This brief uses original Chameleon wording and original interpretation. It does not reproduce protected source passages. The official product manual remains the controlling source for assembly, power, tuning, and safety.

Revision control

Version 1.0.0 - 2026-07-21. Review after any change to the antenna geometry, matching transformer, wire assembly, documented bands, power ratings, model file, model assumptions, or field-validation data.