EMCOMM III Portable Antenna Operator's Manual

Nevada - USA
WWW.CHAMELEONANTENNA.COM

VERSATILE – DEPENDABLE – STEALTH – BUILT TO LAST

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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.

Introduction

Thank you for purchasing and using the Chameleon Antenna™ EMCOMM III Portable antenna. The EMCOMM III Portable antenna, see plate (1), is a portable High Frequency (HF) antenna specially designed for short to long range portable and man-pack HF communications. The EMCOMM III Portable antenna is ideal for hiking, backpacking, and both tent and Recreational Vehicle (RV) camping. It is also highly 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 amateur radio operators (hams) involved in field communication and disaster preparedness.

The EMCOMM III Portable antenna is configurable to facilitate Near-Vertical Incident Sky wave (NVIS) communication and will support most Automatic Link Establishment (ALE), frequency-hopping, and spread-spectrum modes and operations. An antenna tuner or coupler may be required for in some instances. The EMCOMM III Portable antenna can be deployed by the operator in the field in less than 15 minutes, using almost any available support, with no masts or guying required.

The EMCOMM III Portable antenna is comprised of a matching transformer, a 73-foot antenna wire on a line winder, and a 25-foot counterpoise - making a highly portable and effective HF antenna system.

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 EMCOMM III Portable antenna.

Plate (1). EMCOMM III Portable 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 III Portable'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. The LUF is the frequency below which successful communications are lost due to ionospheric loses. 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 show 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 frequency selected must be below the critical frequency, so NVIS is 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 EMCOMM III Portable antenna is comprised of the following components, refer to plate (2):

a. Matching Transformer

The Matching Transformer provides impedance matching for the EMCOMM III Portable antenna. It is permanently affixed to the Line Winder (b).

b. Line Winder

The Line Winder is used to store the Antenna and Counterpoise Wires and enables rapid deployment and recovery of the EMCOMM III Portable antenna. The Matching Transformer (a) is permanently affixed to the Line Winder. The Line Winder is also used as the end support for the erected antenna.

c. Antenna Connection

The Antenna Connection is the wing nut on the left side of the Matching Transformer (a) marked "A". It is used to connect the Antenna Wire (g) to the Matching Transformer.

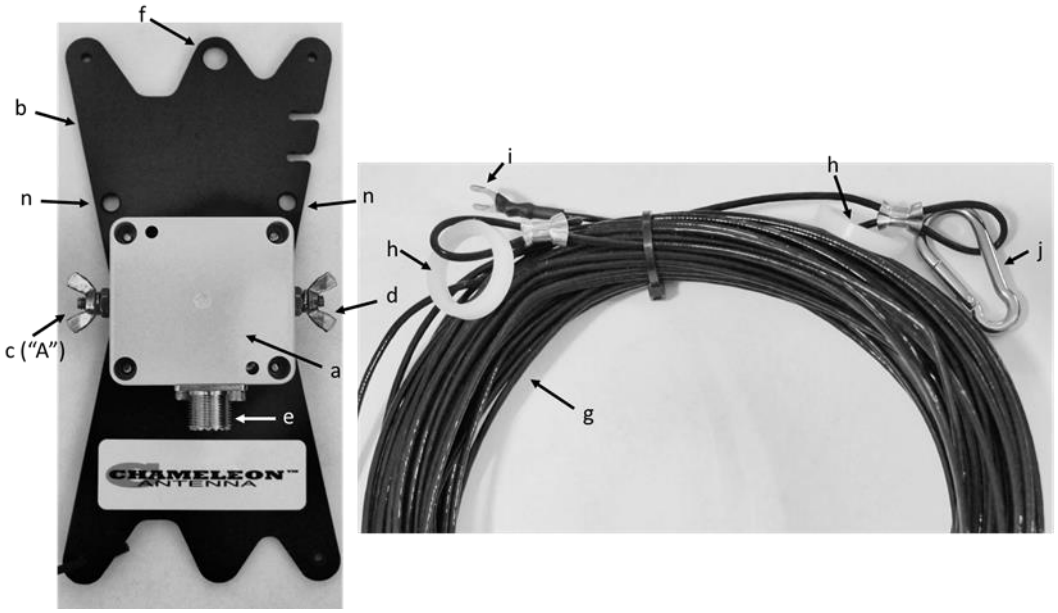

Plate 2. EMCOMM III Key Components.

d. Counterpoise Connection

The Counterpoise Connection is the other wing nut on the right side of the Matching Transformer. It is used to connect the Counterpoise Wire (m) to the Matching Transformer**.**

e. UHF Socket

The UHF Socket, SO-239, is located on the bottom of the Matching Transformer.

f. Suspension Attachment Point

The Suspension Attachment Point is a hole in the top of the Center Line Winder (b) used to allow attachment of Paracord (k) for suspension of the erected antenna.

g. Antenna Wire

The Antenna Wire consist of a 73-foot length of black insulated wire, wrapped around the Line Winder (b).

h. Isolation Loop

An Isolation Loop is permanently attached to end of the Antenna and Counterpoise Wires. There is also a floating Isolation Loop along the Antenna Wire. They are used to attach Paracord (k) for suspension of the erected antenna.

i. Wire Connector

The Wire Connectors are wing nuts used to connect the Antenna and Counterpoise Wires to the Antenna and Counterpoise Connections on the Matching Transformer.

j. Carabiner

The Carabiner is used to attach the Antenna Wire and Counterpoise Wires to the Strain Relief Holes (n) in the Line Winder.

k. Paracord, 550

Paracord *(not pictured, not supplied)* is used to suspend components of the EMCOMM III Portable antenna at the proper height or anchor it to the ground, depending upon the antenna configuration. *A 50-foot length of Paracord on a Line Winder is available for purchase from Chameleon Antenna™. At least one assembly is highly recommended for deployment of most antenna configurations.*

l. Coaxial Cable Assembly

The Coaxial Cable Assembly *(not pictured, not supplied)* connects to the UHF Socket (e) at one end and the Radio Set at the other. The use of an RF choke at the feed point of the antenna will improve the performance of the antenna. *A 50-foot coaxial cable assembly, with an integrated RF choke, is available purchase from Chameleon Antenna™.*

m. Counterpoise Wire

The Counterpoise Wire *(not pictured)* is a 25-foot length of black insulated wire used in most configurations of the EMCOMM III Portable antenna. *An optional Counterpoise Kit, which contains four 25-foot wire radials secured around Line Winders and four steel Tent Stakes is available from Chameleon Antenna™.*

n. Strain Relief Hole

The two Strain Relief Holes are used to provide mechanical strain relief for the Antenna and Counterpoise Wires.

Initial Assembly

Prior to first use, perform the following initial assembly procedure to prepare the EMCOMM III for field deployment. Refer to plates (2) and (3) during assembly.

1. Attach the Carabiner (j) which is fastened to the Antenna Wire (g) to the Strain Relief Hole (n) on the left side of the Line Winder (b). The Antenna Wire is the longer of the two coils of wire.
2. Connect the Wire Connector (i) at the end of the Antenna Wire to the Antenna

Connection (c) on the left side of the Matching Transformer (a). Tighten the wing nut finger tight. The Antenna Connection is marked with an "A".

3. Attach the Carabiner which is fastened to the Counterpoise Wire (m) to the Strain Relief Hole on the right side of the Line Winder. The Counterpoise Wire is the shorter of the two coils of wire.
4. Connect the Wire Connector at the end of the Counterpoise Wire to the Counterpoise Connection (d) on the right side of the Matching Transformer. Tighten the wing nut finger tight.
5. Wrap the Antenna Wire around the left side of the Line Winder using the grooves at the top and bottom of the Line Winder.
6. Wrap the Counterpoise Wire around the right side of the Line Winder using the groves at the top and bottom of the Line Winder.

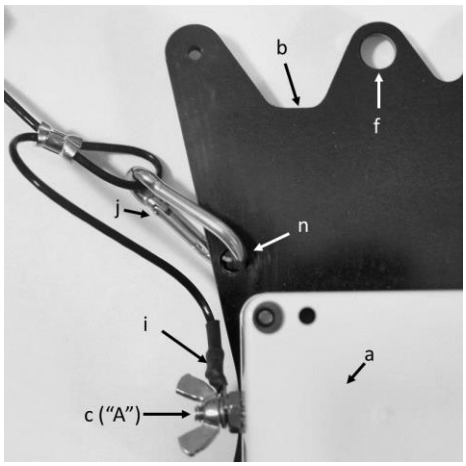

Plate (3). Antenna Wire Connection.

The completed assembly should look similar to that pictured in plate (1). Once assembled it is not necessary to completely disassemble the antenna after use.

Antenna Configurations

Using the supplied components, the EMCOMM III Portable antenna can be deployed into a number of useful configurations. Three basic configurations are described in this manual, each with unique performance characteristics. Table (2) shows the antenna configurations described in this manual. The table can assist the operator to quickly select the most appropriate antenna configuration to meet their operational requirements.

Configuration	Ground	Short	Medium	Long	Directionality	Deployment
Inverted "L" / Sloping Wire	↕		↕	↑	Omnidirectional	Deliberate / Hasty
End-Fed Inverted "V"	↕		↕		Bidirectional	Hasty
Horizontal End-Fed (NVIS)		↓	↑		Bidirectional	Deliberate

Table 2. Antenna Configuration Selection.

To use the table, decide which distance column (Ground = 0 to 90 miles, Short = 0 - 300 miles, Medium = 300 – 1500 miles, Long > 1500 miles) best matches the distance to the station with whom you need to communicate. Then, determine if the OWF is in the lower (↓ = 1.8 – 10 MHz) or upper (↑ = 10 – 30 MHz) frequency range. Finally, select the EMCOMM III Portable configuration with the corresponding symbol in the appropriate distance column. All EMCOMM III Portable configurations provide some capability in each distance category, so depending upon the complexity of your communications network, you may need to select the best overall configuration. The directionality column indicates the directionality characteristic of the antenna configuration. When using NVIS, all the configurations are omnidirectional. "Hasty" and "Deliberate" in the deployment column indicate the relative complexity of site selection and setup for each antenna configuration.

To operate efficiently, all EMCOMM III Portable antenna end-fed configurations need one or more counterpoise wires. The single non-resonant counterpoise with a length of 25 feet, which is supplied, will provide satisfactory performance on most frequencies. However, increasing the number of counterpoise wires will increase the efficiency of the antenna, with four being a good compromise between performance and practicality. Chameleon Antenna™ offers a counterpoise kit (CHA COUNTERPOISE KIT), which consists of four 25 ft radials and Tent Stakes. Contact Chameleon Antenna™ for availability and price.
An antenna tuner or coupler may be required with some configurations and frequencies to obtain a suitable transmitter match.

Inverted "L" / Sloping Wire Configurations

The EMCOMM III Portable antenna, Inverted "L" and Sloping Wire configurations, see figure (1), are medium to long range HF antennas. They should provide acceptable ground wave and sky wave propagation. The Inverted "L" and Sloping Wire configurations are excellent general-purpose antennas and are a good choice when two supports are available (for the Inverted "L") or one support (for the Sloping Wire) and there is sufficient time for site selection and installation. Installing the antenna at a height of around 25 feet or higher will provide good performance. These configurations are predominately omnidirectional on lower frequencies, slightly favoring the end of the antenna on upper frequencies.

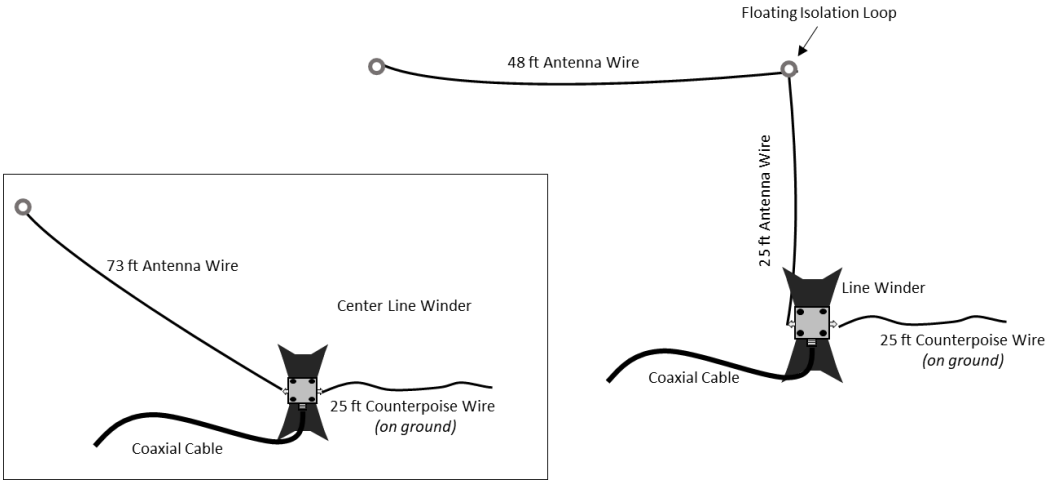

Figure 1. Inverted "L" and Sloping Wire (inset) Configurations.

Site Selection and Preparation.

1. Select a site to deploy the EMCOMM III Portable antenna Inverted "L" configuration, see figure (1). The best site should have two trees or other supports where the height of the supports and the distance between the supports equal the length of the of the Antenna Wire. In the example configuration shown in figure (4), the height is 25 feet and the distance between the supports is 48 feet for a total of 73 feet. The Sloping Wire configuration requires only one support and is the easiest configuration to install. If tall supports are unavailable, any convenient object, such as fence posts or the top of vehicles, may be used as a field expedient supports with reduced performance.
2. Unwind the Antenna Wire (g) from the Line Winder (b).
3. Unwind the Counterpoise Wire (m) from the Line Winder.
4. Using a Bowline or similar knot, tie one end of a short length of Paracord through the Suspension

Attachment Point (f). This will be used to anchor the bottom end of the antenna to the ground.

Extend the Antenna Wire.

5. Secure the Line Winder to the ground with the short length of Paracord and a Tent Stake *(not supplied)* or base of a small tree.
6. Extend the Antenna Wire to its full length to a position near the desired end point of the antenna.

Raise the antenna.

Inverted "L" only, perform steps 7 through 9. Sloping Wire, skip to step 10.

7. Using a Bowline or similar knot, tie a long length of Paracord to the floating Isolation Loop on the Antenna Wire.
8. Using a throw weight or some other method, loop the free end of the Paracord from the floating Isolation Loop on the Antenna Wire over the near end support.
9. Raise the floating Isolation Loop to the desired height and secure the free end of the Paracord to the support with a Round Turn and two Half Hitches or similar knot.
10. Tie a long length of Paracord to the Isolation Loop on the end of the Antenna Wire.
11. Using a throw weight or some other method, loop the free end of the Paracord from the end Isolation Loop over the far end support.
12. Pull the end Isolation Loop up to the desired height, such that the Antenna Wire is somewhat taut, but still has sufficient sag to allow for swaying. Secure the end of the Paracord to the end support using a Round Turn and two Half Hitches or similar knot.
13. Extend the Counterpoise Wire on the ground, in a mostly straight line, in any convenient direction. The end of the Counterpoise Wire may be left free or it can be secured to the ground using a Tent Stake *(not supplied)*.
14. Connect the Coaxial Cable Assembly (l) to the UHF Socket (e) on the Matching Transformer.
15. Perform operational test.

End-Fed Inverted "V"

The EMCOMM III Portable antenna End-Fed Inverted "V" configuration, see figure (2), is a medium range HF antenna. The End-Fed Inverted "V" is a good compromise between performance and ease of installation since it requires only one center support, has a reasonably small foot-print, and provides good sky wave propagation. The center should be mounted at a height of around 25 feet and when mounted at this height, the antenna will be omnidirectional at lower frequencies and predominately bidirectional broadside to the antenna on upper frequencies.

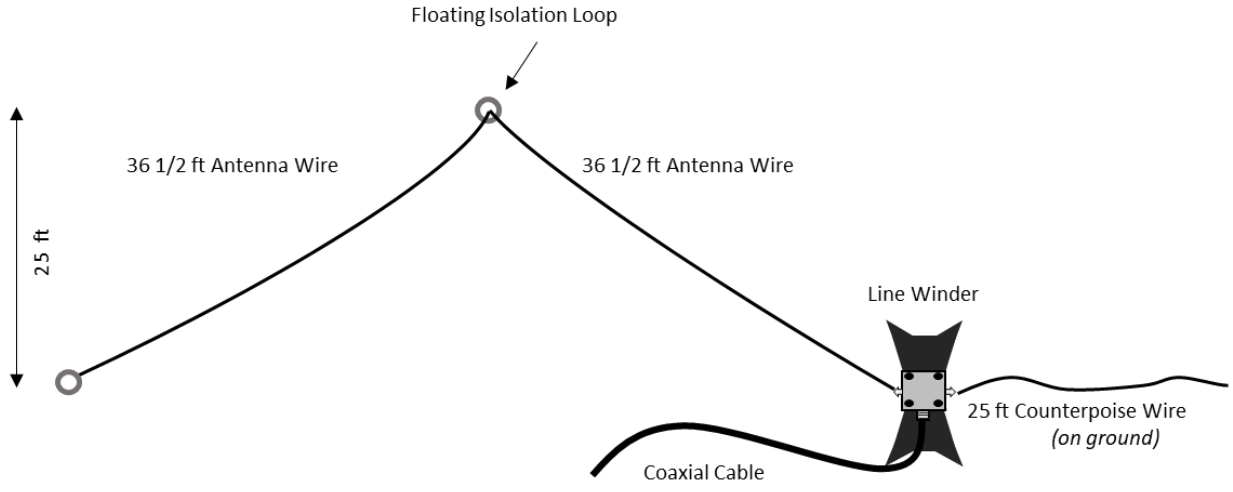

Figure 2. End-Fed Inverted "V" Configuration.

Site Selection and Preparation.

1. Select a site to deploy the EMCOMM III Portable antenna End-Fed Inverted "V" configuration, see figure (2). The best site should have a tree or other support that would enable the center of the Antenna Wire to be raised to a height of around 25 feet. If tall supports are unavailable, any convenient object, such as a fence post or the top of a vehicle, may be used as field expedient supports with reduced performance.
2. Unwind the Antenna Wire (g) from the Line Winder (b).
3. Unwind the Counterpoise Wire (m) from the Line Winder.
4. Using a Bowline or similar knot, tie one end of a short length of Paracord through the Suspension Attachment Point (f). This will be used to anchor the bottom end of the antenna to the ground.

Extend the Antenna Wire.

5. Secure the Line Winder to the ground with the short length of Paracord and a Tent Stake *(not supplied) or the base of a small tree.*
6. Extend the Antenna Wire to its full length to a position near the desired end point of the antenna.

Raise the antenna.

7. Using a Bowline or similar knot, tie a long length of Paracord to the floating Isolation Loop on the Antenna Wire.
8. Using a throw weight or some other method, loop the free end of the Paracord from the floating Isolation Loop on the Antenna Wire over the center support.
9. Raise the floating Isolation Loop to the desired height and secure the free end of the Paracord to the support with a Round Turn and two Half Hitches or similar knot.
10. Tie a short length of Paracord to the Isolation Loop on the end of the Antenna Wire.
11. Pull the end Isolation Loop, such that the Antenna Wire is somewhat taut, but still has sufficient sag to allow for swaying. Secure the end of the Paracord to the ground using a Tent Stake *(not supplied)* or the base of a small tree.
12. Extend the Counterpoise Wire on the ground, in a mostly straight line, in any convenient direction. The end of the Counterpoise Wire may be left free or it can be secured to the ground using a Tent Stake *(not supplied)*.
13. Connect the Coaxial Cable Assembly (l) to the UHF Socket (e) on the Matching Transformer
14. Perform operational test.

Horizontal End-Fed (NVIS)

The EMCOMM III Portable antenna Horizontal End-Fed (NVIS) configuration, see figure (3), is a short to medium range HF antenna. The Horizontal End-Fed configuration will provide good NVIS propagation on lower frequencies and medium range sky wave propagation on upper frequencies. It requires two supports and should be mounted at a height of 25 feet for good overall results. When mounted at this height, the antenna is omni-directional on the lower frequencies and predominantly bidirectional towards the ends of the antenna on the upper frequencies.

A special variation of this configuration is a high-gain long wire antenna for the 50 MHz (6 Meter) Amateur Radio Service band. In this configuration, the operator uses a 4 ft 8 in (56 in) wire and an insulator *(not supplied)* as the Antenna Wire and the supplied Antenna Wire as the counterpoise, as shown in the inset in figure (3).

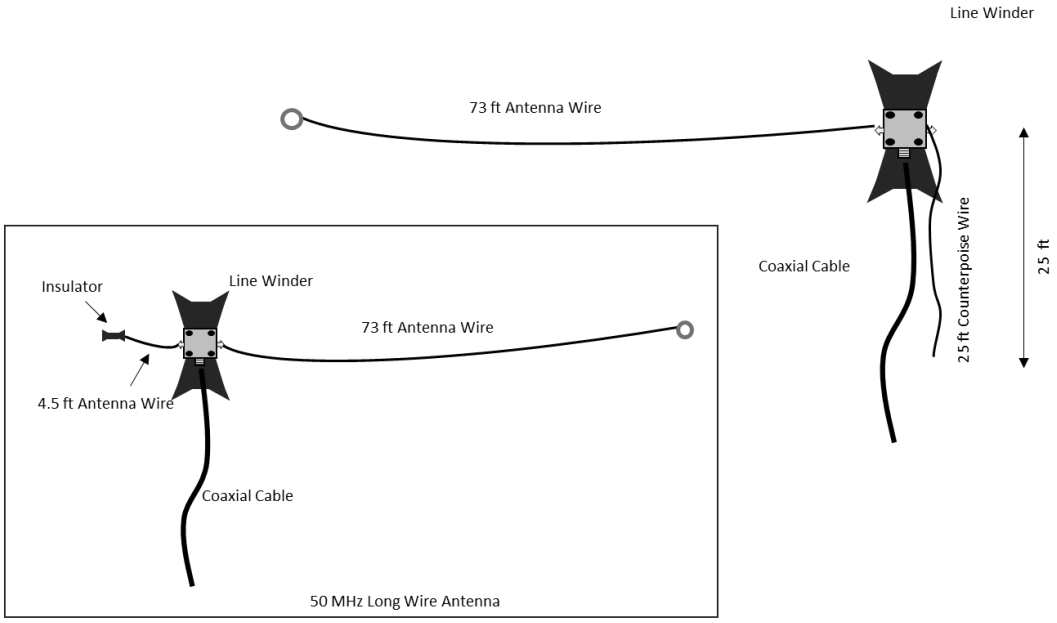

Figure 3. Horizontal NVIS Configuration.

Site Selection and Preparation.

1. Select a site to deploy the EMCOMM III Portable antenna End-Fed Horizontal (NVIS) configuration, see figure (3). The best site should have two trees or other supports where the distance between the supports is at least 73 feet. If sufficiently tall supports are unavailable, any convenient object, such as fence posts or the top of vehicles, may be used as a field expedient supports with reduced performance.
2. Unwind the Antenna Wire (g) from the Line Winder (b).
3. Unwind the Counterpoise Wire (m) from the Line Winder.
4. Using a Bowline or similar loop knot, tie the end of a long length of Paracord to the Line Winder through the Suspension Attachment Point (f). This will be used to suspend the end of the antenna.

Extend the Antenna Wire.

5. Extend the Antenna Wire to its full length to a position near the desired end point of the antenna.
6. Using a Bowline or similar knot, tie a long length of Paracord to the Isolation Loop on the end of the Antenna Wire.

Raise the antenna.

7. Using a throw weight or some other method, loop the free end of the Paracord from the Line Winder over the near end support.
8. Connect the Coaxial Cable Assembly (l) to the UHF Socket (e) on the Matching Transformer.
9. Raise the Line Winder to the desired height and secure the free end of the Paracord to the support with a Round Turn and two Half Hitches or similar knot.
10. Using a throw weight or some other method, loop the free end of the Paracord from the end Isolation Loop over the far end support.
11. Pull the end Isolation Loop up to the desired height, such that the Antenna Wire is somewhat taut, but still has sufficient sag to allow for swaying. Secure the end of the Paracord to the far end support using a Round Turn and two Half Hitches or similar knot.
12. Extend the Counterpoise Wire on the ground, in a mostly straight line, in any convenient direction. The end of the Counterpoise Wire may be left free or it can be secured to the ground using a Tent Stake *(not supplied)*.
13. Perform operational test.

Recovery Procedure

To recover the EMCOMM III Portable antenna, perform the following steps:

1. Disconnect the Coaxial Cable Assembly from the radio set.
2. Lower the antenna to the ground.
3. Disconnect the Coaxial Cable Assembly from the Matching Transformer.
4. Carefully roll (do not twist) the Coaxial Cable Assembly.
5. Wind the Antenna and Counterpoise Wires onto the Line Winder and secure with attached shock cord.
6. Remove dirt from antenna components and inspect them for signs of wear.

Troubleshooting

1. Ensure Wire Connectors are securely connected.
2. Inspect the Antenna and Counterpoise Wires for breakage or signs of strain.
3. Ensure UHF Plug from the Coaxial Cable Assembly is securely connected to the UHF Socket.
4. Inspect Coaxial Cable Assembly for cuts in insulation or exposed shielding.
5. If still not operational, replace Coaxial Cable Assembly. *Most problems with antenna systems are caused by the coaxial cables and connectors.*
6. If still not operational, 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 available for purchase from Chameleon Antenna™. Please contact us at support@chameleonantenna.com for current prices and availability.

- **Counterpoise Kit.** The Counterpoise Kit is ideal for portable antenna deployment. The system will create the ground-plane needed for any EMCOMM III Portable end-fed antenna configuration. It contains four 25-foot wire radials secured around plastic wire winders and four steel Tent Stakes.
- **50' Paracord and Line Winder Assembly.** At lease one assembly is recommended to enable installation the EMCOMM III Portable configurations that require one support.
- **Coaxial Cable Assembly.** 50 feet of RG-58 with integrated RFI Choke. Used to connect the EMCOMM III Portable to the radio set. This is a highly recommended accessory if you are not using a CHA RFI CHOKE.

Specifications

- Frequency: 1.8 MHz through 55.0 MHz continuous (including all Amateur Radio Service bands 160m to 6m)
- Power: 50 W continuous duty cycle (CW, AM, FM, RTTY), 100 W intermittent duty cycle (SSB and SSB-based digital modes)
- RF Connection: UHF Plug (PL-259)
- SWR: Subject to frequency and configuration, as measured see table (4), but typically less than 2.0:1. An antenna tuner or coupler may be required.
- Length: 73 ft
- Weight: Approximately 1 lbs.

- Ingress Protection comparable to IP42 standard *(not tested)*. Ingress protection from most wires, screws or similar objects and from vertically dripping water when device is tilted at an angle up to 15 degrees
- Personnel Requirements and Setup Time: one trained operator, less than 15 minutes
- Far Field plots for the three basic and special EMCOMM III Portable antenna configurations are shown in figures (4) through (7)

FREQUENCY	SWR
1.9	1.9
3.6	1.9
5.4	1.6
7.1	1.4
10.1	1.9
14.1	2.0
18.1	1.6
21.1	1.5
24.9	1.5
28.5	1.3

Table 4. EMCOMM III Portable Antenna Measured SWR.

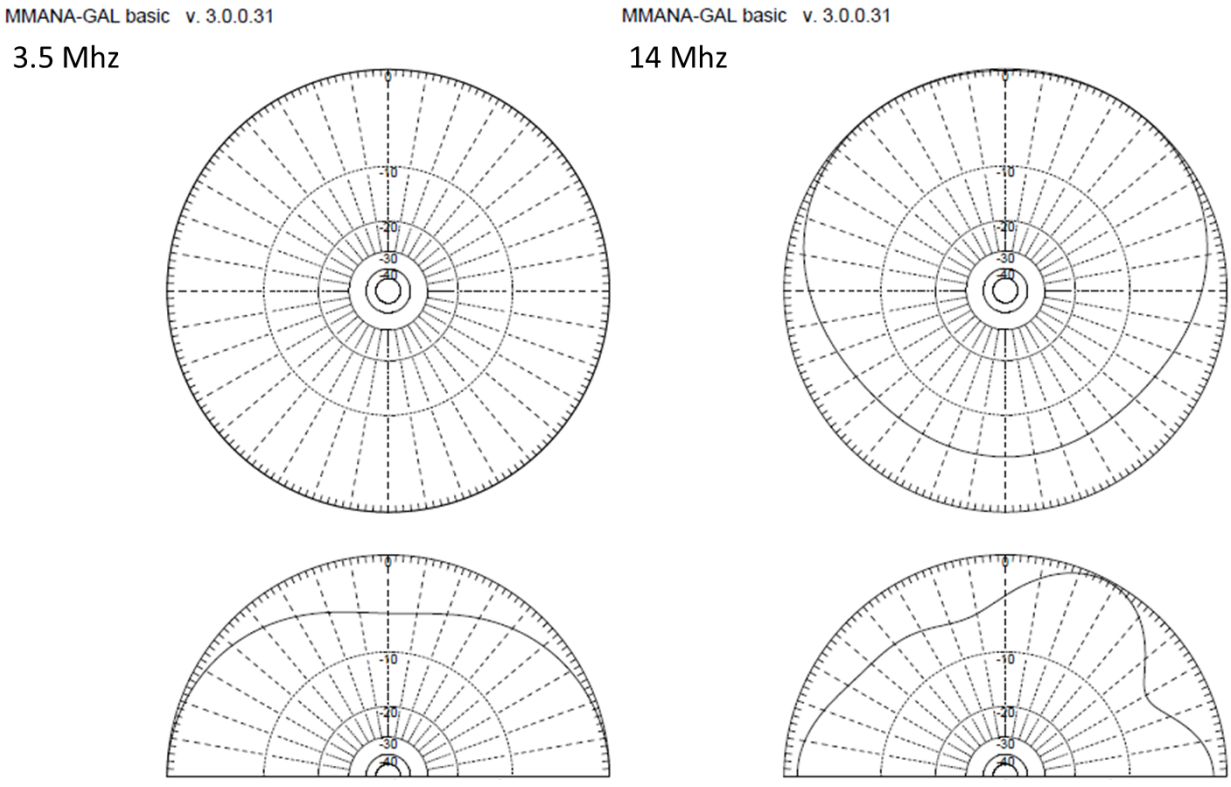

Figure 4. Inverted "L" Far Field Plot.

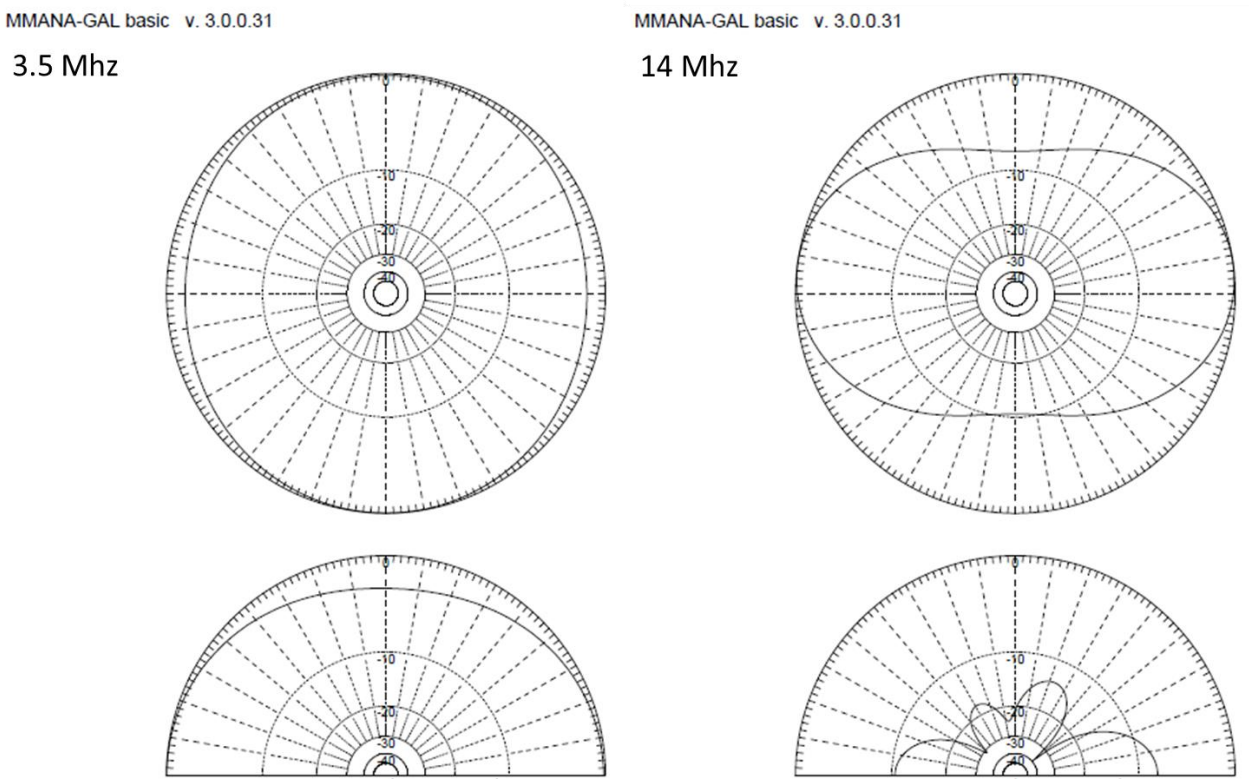

Figure 5. End-Fed Inverted "V" Far Field Plot.

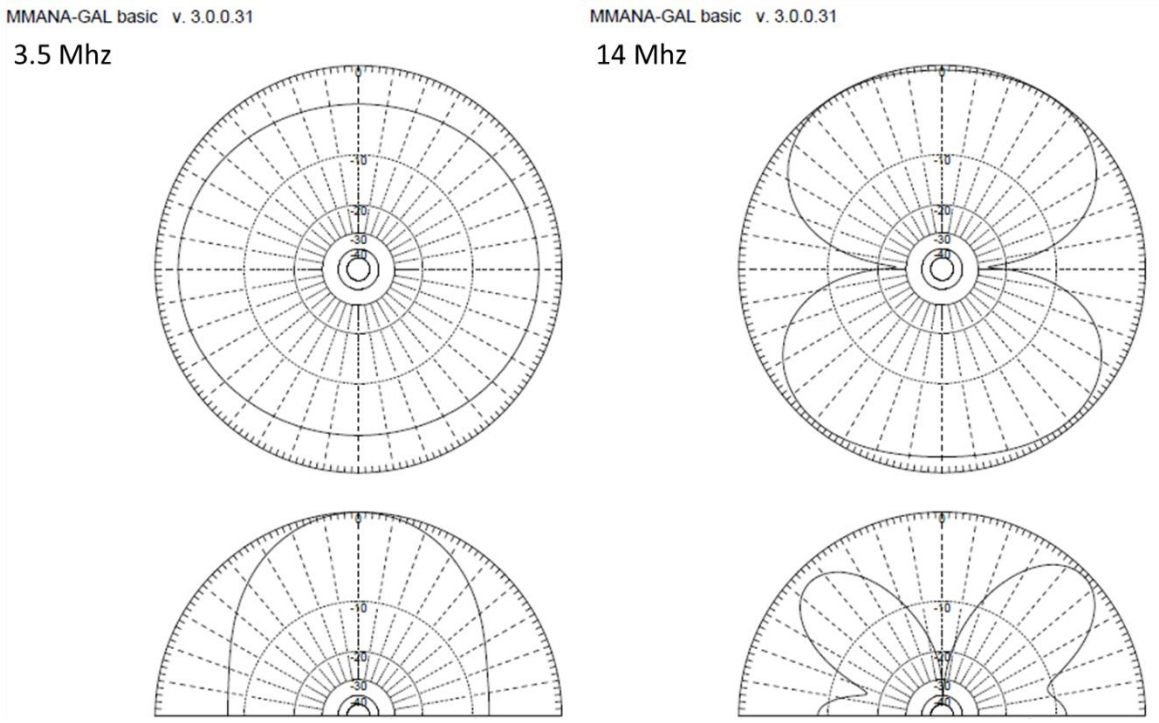

Figure 6. Horizontal End-Fed Far Field Plot.

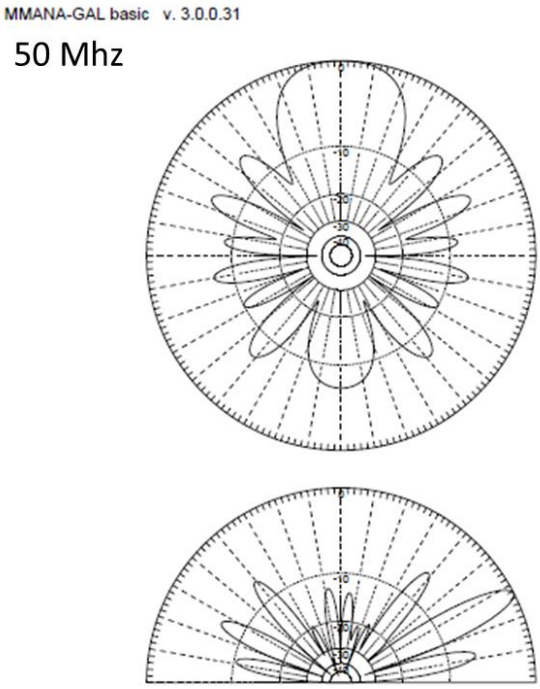

Figure 7. Six Meter Long Wire Far Field Plot.

Chameleon Antenna™ Products

The following products are available for purchase at Chameleon Antenna™.
Go to http://chameleonantenna.com *for ordering and more information.*

CHA P-LOOP 2.0 - The CHA P-LOOP 2.0 was designed with portability, ease of use simplicity, ruggedness and high performance in mind. Unlike any other similar antennas on the market, the CHA P-LOOP 2.0 is made with premium materials that are precisely manufactured and assembled in the USA! This is an exciting new product from Chameleon Antenna. Easily deployable HF magnetic loop antennas, also called small transmitting loops, have been routinely used for many years in military, diplomatic, and shipboard HF communication links, where robust and reliable general coverage radio communication is a necessity. Covers 7.0-29.7 MHz.

CHA F-LOOP 2.0 – The CHA F-LOOP 2.0 was designed with portability, ease of use simplicity, ruggedness and high performance in mind. Unlike any other similar antennas on the market, the CHA F-LOOP 2.0 is made with premium materials that are precisely manufactured and assembled in the USA! Easily deployable HF magnetic loop antennas, also called small transmitting loops, have been routinely used for many years in military, diplomatic, and shipboard HF communication links, where robust and reliable general coverage radio communication is a necessity. Covers 3.5-29.7 MHz.

CHA EMCOMM III – The EMCOMM III Portable antenna is a portable High Frequency (HF) antenna specially designed for short to long range portable and man-pack HF communications. The EMCOMM III Portable antenna is ideal for hiking, backpacking, and both tent and Recreational Vehicle (RV) camping. It would also be ideal as a backup emergency HF antenna.

CHA MPAS 2.0 – The Modular Portable Antenna System (MPAS 2.0) is a concept allowing the radio

operator to configure and deploy the antenna system in a variety of configurations. It covers 1.8 to 54.0 MHz and comes in a military-style backpack.

CHA TD Tactical Dipole - The CHA TD (Tactical Dipole) Antenna is a HF broadband antenna specially designed for portable HF communication where rapid deployment and simplicity of operation is essential. The antenna will operate at all frequencies from 1.8-30.0 MHz without any adjustment with most modern internal antenna tuners. It is ideal for use in conjunction with modern, digitally configured, HF communication transceivers where features such as ALE and frequency hopping require true broadband capability. The antenna will work successfully supported by trees, masts, the tops of vehicles or any convenient object or structure. The CHA TD comes in a military-style backpack.

CHA FT-817 BRACKETS 2.0 – CHA FT-817 Brackets are built exclusively by the skilled machinists of Chameleon Antenna™. It is a military-style pair of precision fabricated brackets and high-quality carrying strap for the popular Yaesu FT-817 series portable QRP transceiver. The CHA FT-817 Brackets will ruggedize and help protect your FT-817 from the many hazards of field operations.

References

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