



Mission Critical Wi-Fi

HIGH PERFORMANCE TACTICAL MESH ANTENNA (HP-TMA) QUICK INSTALL GUIDE



Shown with optional NATO mount adapter

Congratulations on your purchase of the MMI High Performance Tactical Mesh Antenna! You are just minutes away from enjoying the benefits of a farther reaching, clearer wireless signal.

Products covered by this Guide

TMA-24A-302CT - 2.4GHz HP-TMA (33dBm), R HCP Omnidirectional

TMA-5XA-302CT - 5GHz HP-TMA (33dBm), VP Omnidirectional

TMA-5XA-304VT - 5GHz HP-TMA (35dBm), VP Omnidirectional

TMA-5XSA-307VT - 5GHz HP-TMA (37dBm), VP 180 Degree Sector

TMA-44A-305VT - 5GHz HP-TMA (35dBm), VP Omnidirectional



High Performance Tactical Mesh Antenna (HP-TMA)

WARRANTY

Mobile Mark, Inc. (Seller) warrants to Buyer that the products for a period of two years from the date of shipment will be free from defects of material and workmanship, and will be in accordance with specifications referred to herein. Seller's sole obligation under these warranties will be limited to either, at Seller's option and expense, repairing, or furnishing a replacement F.O.B. First point of shipment for the products or parts thereof which Seller reasonably determines do not conform with these warranties, and Buyer's exclusive remedy for breach of any of such warranties will be enforcement of such obligations of Seller. THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE AND OF ANY OTHER TYPE, WHETHER EXPRESS OF IMPLIED. IN NO EVENT SHALL SELLER BE LIABLE FOR CONSEQUENTIAL DAMAGES, nor shall Seller's liability on any claims for damages arising out of or connected with the sales contract for the manufacture, sale, delivery or use of the products exceed the purchase price of the products. Any action for breach of warranty must be commenced within one year after the cause of action accrues.

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Moving Wireless Forward™

This product may be covered by one or more U.S. and foreign patents.
Patents: 7,783,270, 7,379,717, 6,606,075, 6,373,448, other patents pending

Document Conventions

The following graphical alerts are used in this document to indicate notable situations:



NOTE: Tips, hints, or special requirements that you should take note of.



CAUTION: Care is required. Disregarding a caution can result in data loss or equipment malfunction.



WARNING! Indicates a condition or procedure that could result in personal injury or equipment damage.

QUICK INSTALL GUIDE

Product ships with:

- HP-TMA
- Quick Install Guide
- Smart Power Over Coax (SPOC) Injector
- Power cable for SPOC

Additional Items required:

- 802.11 a or b/g radio
- N-Male to Radio Antenna Port, Coax cable (See your radio manufacturer's set-up guide for more information on the required connector for your Radio) to connect your radio to the SPOC
- N-Male to N-Male, Coax cable to connect the SPOC to the HP-TMA

Required Tools:

- See the section, Mounting the HP-TMA, for necessary tools

Mounting the HP-TMA

The HP-TMA does not require a ground plane and can be mounted on any surface. We suggest the following guidelines be followed for installation for maximum performance.

1. The HP-TMA must be mounted vertically with the logo facing upward. It should not be mounted inverted or on an angle, (Figure 1).



NOTE: The HP-TMA cannot be mounted inverted outdoors because the vent on the base may become obstructed. However you may mount the HP-TMA inverted indoors.

2. There should be no obstructions on the same horizontal plane as the HP-TMA within a 12" (30.48cm) radius.
3. The HP-TMA should be mounted on a horizontal plane above any large metal objects that could act as obstructions, such as a turret, passenger compartment or door.

Antenna Deployment

The type of radiation pattern produced by the HP-TMA varies for the different models. Figure 2 shows where the HP-TMA should be mounted in the desired coverage area.

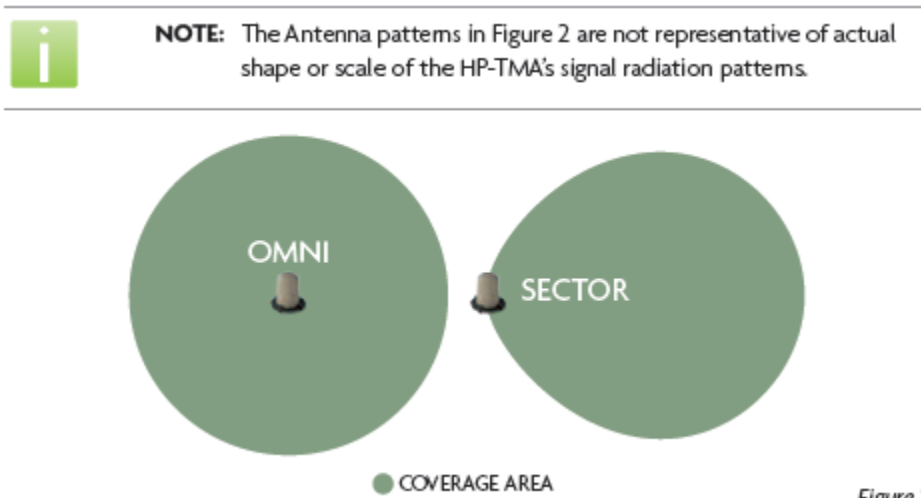


Figure 2

Mounting Direction for the HP-TMA Sector Antenna

The HP-TMA Sector, TMA-5XSA-308T, is a directional antenna. You will need to be aware of the direction it is pointing when deployed. The antenna signal radiates from the front of the antenna. The back of the HP-TMA sector indicated by the word "BACK" near the bottom edge of the antenna, Figure 3

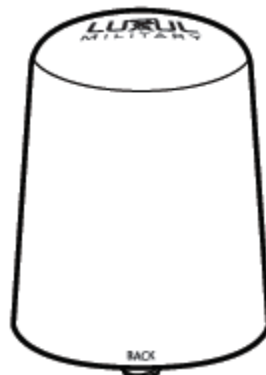


Figure 3

QUICK INSTALL GUIDE

Mounting the HP-TMA

(Optional) NATO Mount (HDW-TMA-45NATO) *Figure 4*

The Tactical Mesh Antenna (HP-TMA) can be mounted directly to a vehicle using a standard 4.5" NATO mount hole pattern.

1. Use the two 1/4-20 by 1/2" screws to connect the NATO mounting plate to the HP-TMA
2. Use the four 3/8-16 by 1" bolts to connect the NATO mounting plate to the HP-TMA's intended mounting location or other hardware as required.

Required Tools

- 1/4" Wench for bolts to connect mount to the HP-TMA
- 1/4" Wench for bolts to connect mount to the vehicle

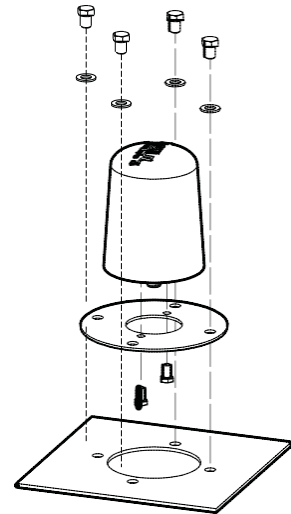


Figure 4

(Optional) Universal Mounting Bracket (HDW-TMA-UMB) *Figure 5*

The Tactical Mesh Antenna (HP-TMA) can be mounted to a pole using the Universal mounting bracket.

1. Use the two 1/4-20 by 1/2" screws to connect the Universal Mounting Bracket to the HP-TMA.
2. Use the two 2" U-Bolts to attach the mounting bracket to pole with a diameter of 1" to 2".

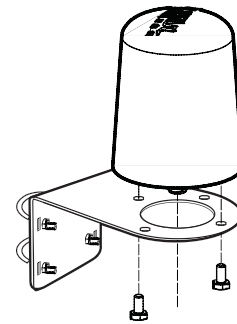


Figure 5

Note: See page 13 for Mounting Template



NOTE: For poles larger than 2" in diameter the bracket has slots for mounting straps.

Required Tools

- 1/4" Wench for bolts to connect mount to the HP-TMA
- 1/4" Wench for bolts to connect mount to the vehicle

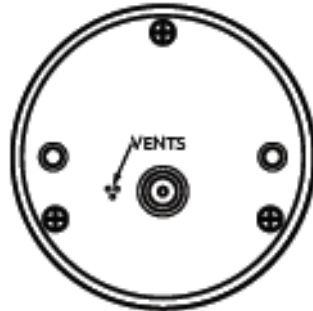


Figure 6



WARNING: The bottom of the HP-TMA has three small pressure equalizing vent holes, Figure 6. These vents must not be obstructed or penetrated.

Coax CABLE Information

Cable Requirements

The HP-TMA and SPOC injector requires a Coax cable with an Impedance of 50 Ohm and N-Male Connectors. Check with your radio manufacturer's documentation for the coax cable and connector requirements for your radio.

Connecting Coax CABLE



CAUTION: Disconnect all power before connecting or disconnecting any cables, coax or antennas to or from these devices. Failure to do so will void the warranty

1. Connect the coax from the appropriate antenna port of your radio to the side of the SPOC labeled INPUT, Figure 7, 1. (Radios with multiple antennas often have a primary antenna port. The HP-TMA should be connected to this primary port. See your radio manufacturer's set-up guide for more information) The SPOC has an N-Male connector, (See your radio's manufacturer set-up guide for more information on the required connector for your Radio).
2. Connect an N-Male to N-male coax cable between the side of the SPOC labeled OUTPUT, 2 and the HP-TMA, 3.
3. If desired you may add an optional Lightning Arrestor (ACC-TW-LP-005N) or Gas Tube Surge Arrestor (ACC-GT-NFF-AL) between the SPOC and your Radio.

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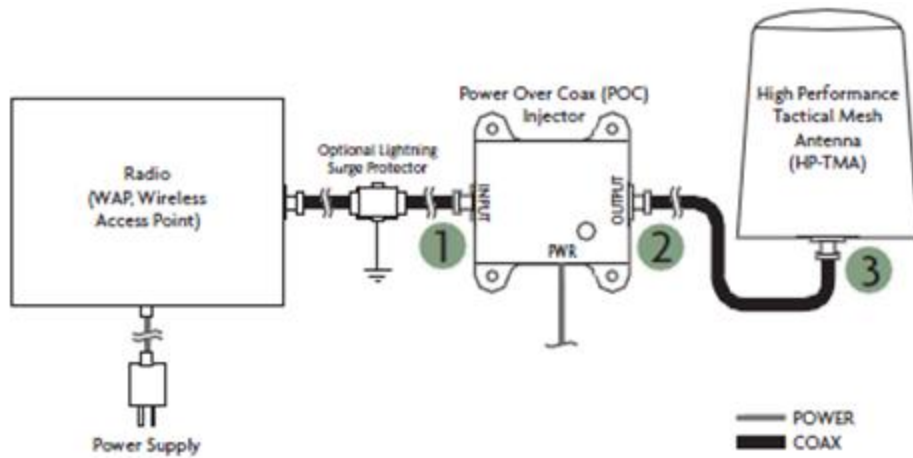


Figure 7



CAUTION: Certain Lightning Protectors will cause the SPOC to malfunction if installed between the SPOC and HP-TMA. If using a Lightning Protector be sure it is installed between the radio and SPOC.

SMART POC

The SMART (Serially Manageable And Reporting TMA) SPOC Injector is intended to work with the various HP-TMA variations to allow for ease of installation and a simple method of determining if the system is operational.

Powering the SMART POC

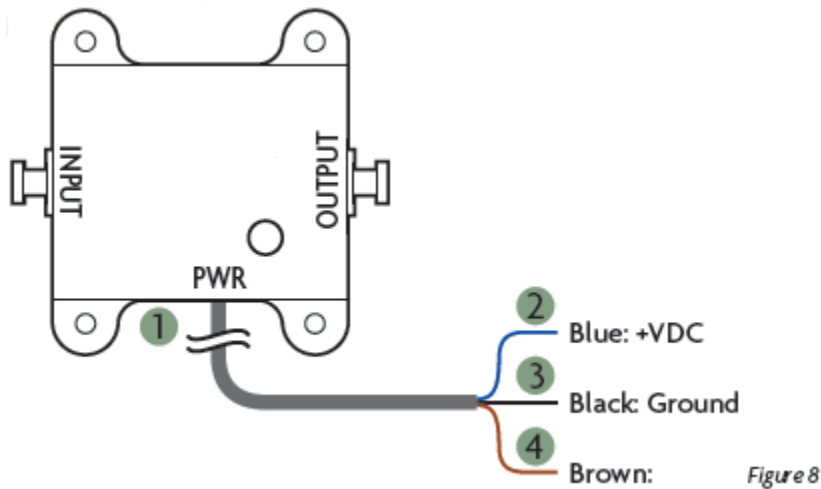


CAUTION: Disconnect all power before connecting or disconnecting any cables, coax or antennas to or from these devices. Failure to do so will void the warranty

1. Connect the direct DC (M12 connector) cable to the PWR port of the SPOC injector, Figure 7 1 (next page).

2. Connect the power cable pigtail, to your power source as specified:

- **Blue:** +VDC, Figure 8 2
- **Black:** Ground, Figure 8 3
- **Brown:** Disconnected, Figure 8 4



CAUTION:

- The operating DC Input Voltage:
36-57 VDC for an operational temperature range of
-40F (-40C) to +158F (70C)
- 24-57 VDC for an operational temperature range of
-4F (-20c) to +158F (70C)



NOTE: Grounding the brown wire disables the LED indicator

Once the SPOC injector has been connected to the power source and all other cables are connected, power can now be applied.

Other Power Connection Options

- PWR-120V - 120V Power Supply for SPOC Injector
- PWR-POE - 2' cable with M12 to RJ45 coupler for connecting SPOC injector to POE source (Additional RJ45 cable and non-802.3af POE injector required)

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SMART SPOC LED Indicator

The SMART SPOC injector has a single multi color LED indicator, Figure 9, for determining operational status of the HP-TMA.

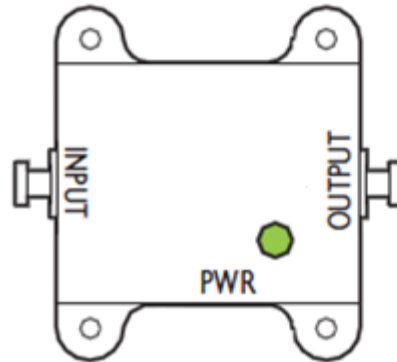


Figure 9

Power Up LED Functionality

- **Red/Amber, flashing:** During initial power up you will see Red/Amber flashing as the system confirms the presence of the HP-TMA.



CAUTION: If SPOC is powered with no HP-TMA attached or has a failure to communicate with a HP-TMA, there will be constant Red/Amber flashes

- **Blue or Purple, solid:** After discovering the HP-TMA, you will see one of the following colors for 10 seconds, indicating the HP-TMA's frequency.

- Blue 2.4GHz
- Purple 5.8GHz

Normal Operation LED Functionality

- **Green, solid:** The SPOC is properly communicating with the HP-TMA.
- **Green, flashing:** Indicates that TX traffic is being detected by the HP-TMA

Error Code LED Functionality

- **Red/Amber, flashing constantly:** SPOC is powered but has no HP-TMA attached or is not communicating with the HP-TMA.
 - Probable Cause:
 - HP-TMA has been removed or damaged.
 - Disconnected or bad coax.
 - Corrective Action:
 - Check for damage to the HP-TMA.
 - Check coax for damage or loose connection.
- **Red/Blue flashing:** Low input power
 - Probable Cause:
 - Low radio TX output power or too much signal loss between radio port and HP-TMA.
 - Corrective Action:
 - Check coax for damage or loose connection.
 - Adjust radio TX output power to suggested radio settings
 - Reduce the coax length between the HP-TMA and the radio
 - Replace with a lower loss coax between the HP-TMA and the radio



NOTE: Due to some radio TX packet configurations the occasional Red/Blue flash may occur. If the system is functioning properly, these can be ignored.

- **Red flashing:** Low HP-TMA TX output power
- Possible Cause:
 - HP-TMA failure
- Corrective Action:
 - Contact Technical Support

Check troubleshooting section, at the end of this document, for additional corrective action suggestions.

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Optimizing your Radio

The HP-TMA operates best when the input power to the HP-TMA, from the radio, is between +10dBm to +20dBm. Radio power may need to be adjusted for optimal performance. Be sure to factor the dB loss for the SPOC and coax. The SPOC has approximately 1dB of loss.

Specifications for Cables Available from MMI

Cable	Frequency	ATTENUATION dB/100FT	ATTENUATION Db/100m	POWER HANDLING (Kw)
LL-195	2500	17	N/A	0.09
	5800	28.3	93.10	.06
LMR [®] -400	2500	6.80	22.31	0.33
	5800	10.80	35.50	0.21

LMR[®] is a registered trademark of Times Microwave Systems.



NOTE: See your coax manufacturer's specifications for coax loss.

TROUBLESHOOTING

If you make any changes to the system or notice any abnormal behavior we suggest you power cycle the radio and equipment.

- Make sure the cables are properly connected and that there is power to the TMA and your radio.
- Sometimes, radios with multiple antennas have primary and secondary antenna ports. Be sure to connect the signal booster to the primary antenna port of the radio as many secondary ports are receive only, or do not transmit at the same power level as the primary antenna port. If your radio has more than one antenna port, try connecting to a different port and/or, if available, change the administration settings disable the secondary antenna port. (See your radio's documentation).
- Dual band radios have separate antennas for each band. Be sure you are connecting the TMA's coax cable to the appropriate antenna port.
- Ensure the TMA is properly positioned. Omni antennas should be centered in the desired coverage area. Sector Antennas should be positioned with the "BACK" indicator away from the desired coverage area. For optimal performance antennas should have 2 feet (.6 meters) of clearance with no obstructions.
- Circular Polarized signal is superior for penetrating wood, concrete, and stucco, but all wireless signals can be disrupted by certain obstructions, including large metal objects, or strong magnetic fields. Try orienting the antenna where line-of-sight access to the desired coverage area is available.

After checking the above items, if your MMI product still does not seem to be functioning properly, please contact Technical Support at:
Phone: +1.847.671.6690 or Email: Info@mobilemark.com

NOTE: The HP-TMA is not FCC Certified and is available for use by The United States Military or for export only

Results may vary depending on building layout, type of construction and other environmental factors including Wi-Fi traffic, Microwave Ovens, Cordless Phones, etc.

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TMA Mounting Template

