



**M900S™**  
**Wireless Broadband System**

**PROFESSIONAL INSTALLATION GUIDE**  
**FOR**  
**M900S-AP and M900S-SU**

**[draft]**

## 1. Overview

This manual covers configuration and installation of the optional external antennas for use with the M900S Access Point M900S-AP and Subscriber Unit M900S-SU. Since this device requires manual power limit settings for use with the higher gain antennas, it is classified by the FCC as a professional install device. To be in compliance with FCC requirements, the radio must be installed with one of several approved antennas listed in this document.

The M900S-SU subscriber unit (SU) works in conjunction with the M900S-AP access point. Please see the M900S User Manual for general information on overall system implementation, configuration, and management of the access point. The M900S User Manual also covers many important aspects of subscriber unit configuration and management.

## 2. FCC Information

This device complies with Part 15 of FCC Rules and Regulations. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with these instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in any particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of more of the following measures:

- 1) Reorient the antenna;
- 2) Increase the separation between the affected equipment and the unit;
- 3) Connect the affected equipment to a power outlet on a different circuit from that which the receiver is connected to;
- 4) Consult the dealer and/or experienced radio/TV technician for help.

**FCC ID: NCYM900S**

**Canada: XXXXXXXXXX**

### **IMPORTANT NOTE:**

Intentional or unintentional changes or modifications must not be made unless under the express consent of the party responsible for compliance. Any such modifications could void the user's authority to operate the equipment and will void the manufacturer's warranty. To comply with FCC RF exposure requirements, the following antenna installation and device operating configurations must be satisfied. The antenna for this unit must be fixed and mounted on outdoor permanent structures with a separation distance of at least two meters from all persons. Furthermore, it must not be co-located or operating in conjunction with any other antenna or transmitter.

## 3. Warranty Information

Radios from Trango Broadband Wireless are warranted from one year from date of purchase. Please see [www.trangobroadband.com](http://www.trangobroadband.com) for complete description of warranty coverage and limitations

## 4. General Information

### 4.1 Contents

Each SU or AP radio comes equipped with an internal dual polarization antenna, a power-over-Ethernet (POE) J-Box, an AC adapter, and mounting hardware for pole mounting. The radio also has one reverse-polarity SMA connectors on the side for attachment to an external antenna. The MAC ID and Serial # are printed on a label on the back of the radio.

### 4.2 Connections

See M900S User Manual for detailed diagram for connecting radio to network or PC utilizing the power over Ethernet (PoE) J-Box cat-5 cables.

**NOTE: DO NOT APPLY DC POWER TO THE M900S-SU or M900S-AP UNTIL THE ANTENNA IS ATTACHED WHEN USING THE “e” ANTENNA OPTION, OTHERWISE DAMAGE TO THE RADIO MAY OCCUR.**

## 5. Setting the Maximum RF Power

When installing M900S-AP or M900S-SU there are several FCC certified antennas options available. Due to FCC restrictions the professional installer must manually set the maximum power when any antenna gain greater than 10 dBi is used upon which antenna is being used, since the max power of the radio is +26 dBm and the max EIRP allowed is +36 dBm. The table below shows the maximum power the radio must have to achieve an EIRP of +36 dBm or 4 watts (FCC limit). Only the antennas listed below are allowed to be used with the radio.

| Antenna Model   | Antenna Gain (incl/cable loss) | Radio Max power setting      |
|-----------------|--------------------------------|------------------------------|
| BS915XL7 (Omni) | +8.65 dBi                      | +26 dBm (no change required) |
| PC9013N (Yagi)  | +15 dBi                        | +21 dBm                      |

Note that in all cases, Antenna Gain + Radio Max Power Setting = 36. Once set, the powerleveling feature in the SU will still operate normally, but the maximum EIRP will never exceed 4 watts (+36 dBm).

**NOTE: IT IS THE RESPONSIBILITY OF THE INSTALLER TO ENSURE THAT THE FCC REQUIREMENTS DESCRIBED ABOVE ARE MET.**

The telnet command to change the maximum power is:

***maxpower <max power in dBm>***

The flash memory must be updated after running the command.

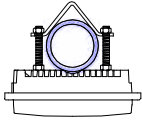
The command must be run on the M900S-AP or M900S-SU (via telnet or serial port session) prior to installing the antenna and while the Opmode is OFF.

Example: To set the max power to 21 dBm for the Cushcraft Yagi Antenna:

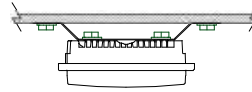
```
#> maxpower 21
#> Updateflash systemsetting
```

## 6.0 INSTALLATION INSTRUCTIONS

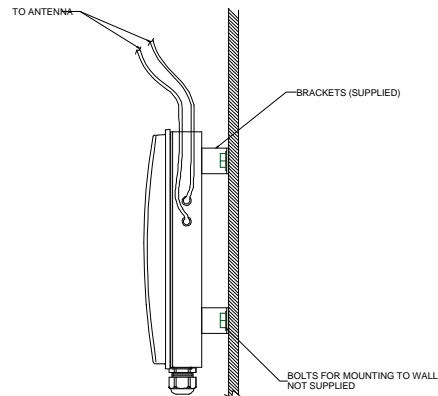
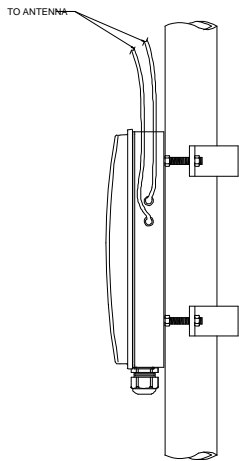
The radio unit may be installed on a pole or a flat surface per the drawing below:



POLE MOUNTING



WALL MOUNTING



Please see the M900S User Manual for instruction on grounding and weatherproofing the installation. In addition to the guidelines listed in the User Manual, installers must cover cable-SMA connector with heat shrink tubing to provide weatherproofing of the RF cable connectors.

## 6.1 Yagi Antenna

To install the Cushcraft Yagi PN # PC9013N antenna please see the drawing below

**Add Drawing of antenna mounting**

## 6.2 Omni Antenna

To install the Comtelco PN #BS915XL7 antenna, please follow the instructions below. These antennas recommended for access points only, but may be used with subscriber units.

**Insert Omni mounting picture**

## 7. Antenna Alignment (Applies to SU Only)

To align the SU antenna for optimal performance, follow the procedure below.

Once the SU is installed and aimed in the general direction of the AP, it is time to perform an RSSI test to determine the signal strength from the AP, and to precisely align the SU antenna for maximum signal strength.

### SU Antenna Alignment Procedure

1. Ensure AP is in opmode AP
2. Telnet into the SU (while in opmode "OFF") or access the radio via hyperterminal
3. Type command **SSRSSI <channel> <e>** - Example **SSRSSI 3 e** (chan. 3, external antenna port)
4. Telnet session screen will begin a continuous readout of the received signal strength.
5. As you view the RSSI reading, move the antenna in the horizontal and vertical planes until the maximum RSSI reading is achieved. For short links you can expect an RSSI of -70 dBm or better. For longer links and RSSI of -80 dBm is acceptable. Any RSSI of less than -85 dBm may be too weak for the radios to reliably associate and pass data.
6. If it is not possible to receive an adequate RSSI reading, it may be necessary to reorient the AP (up/down, left/right), to increase the output power of the AP, or to move the SU to a location with better line-of-sight conditions to the AP.

Once you are satisfied with the RSSI reading, tighten down the antenna in the optimum position. To stop the RSSI continuous readout, hit SPACE, then ENTER.

Note: The RSSI LED indicators will illuminate as the signal gets stronger , providing a guide for aligning the antenna .

This concludes the installation process.