



SUNSIGHT MICROWAVE PATH
ALIGNMENT SYSTEM
Models MW and MW Max

Issue 2 4/2024

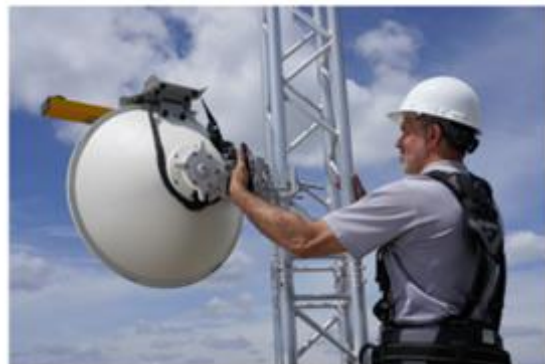



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Document Change History

| Issue | Date | Description |
|--------------|-------------------|-----------------------|
| 1 | 12/15/2023 | Original Issue |

 Safety

The MW unit(s) should be handled with the following considerations:



Avoid impacting, dropping or rough handling of the MW unit, as it contains sensitive electronic components. Rough handling may result in internal component damage.



Care should be taken to avoid impact to the black GNSS antennas on the top of the MW unit.



The MW unit is water resistant, but not waterproof. Do not submerge. All sealing caps and doors must be secured while in use, particularly during inclement weather.



Use only the Sunsight supplied smart charger to recharge the LiFePO₄ battery pack. Use of a non-approved battery charger will void the battery warranty and may damage the battery pack.



Never attempt to recharge the batteries outdoors in inclement conditions.



Never short the battery terminals and never attempt to disassemble the battery pack or dispose of the pack in a fire. If disposing of the Sunsight product, any exhausted battery packs must be disposed of properly. CONTACT SUNSIGHT INSTRUMENTS IF YOU ARE UNSURE OF HOW TO PROPERLY DISPOSE OF THE BATTERY.



All internal repairs must be performed by Sunsight Instruments. Unauthorized disassembly of the MW unit may result in warranty termination.

If you suspect the MW unit is operating incorrectly, contact Sunsight Technical Support via +1-321-244-9443, www.sunsight.com, or an authorized Sunsight Instruments distributor for support.

The Sunsight Microwave Path Alignment System

The Sunsight Microwave Path Alignment System is used to precisely mechanically align devices in azimuth, elevation angle (aka Pitch or tilt) and height. The MW system guides the user to physically align the antennas to calculated azimuth and elevation based on GNSS location. As such, it is frequency and distance-independent. It is commonly used to align point-to-point communication links. The system consists of a measurement unit mounted on the antenna at each end of the link to be aligned. Using Sunsight's patented End-to-End Alignment* technology, the two measurement systems communicate with each other to determine the required target alignment parameters of azimuth and elevation. The users at both ends are displayed target data as well as the actual current alignment measurements of the antennas. The user then adjusts the antenna position to match the target data and secures the antenna in the correctly aligned position. The devices (microwave antennas) can be aligned independently once the data is transmitted and the target values are displayed (i.e. technicians at each end and move ahead with antenna adjustment without affecting the opposite end). The system requires no external power or disconnection of the antenna from RF sources (coax, waveguides, or radio/ODU). The alignment results are captured in a comprehensive report. Optionally one MW unit can be used to align one end of the link by using the GNSS coordinates and MSL height from the remote end of the link. A complete link can be measured and captured in a single comprehensive report.

Important

Each MW included in the Sunsight MW Microwave Path Alignment System may also be used independently to align single microwave antennas or cellular RF panel sites. In this way, each Sunsight MW Microwave Path Alignment Kit may be employed as an End-to-End alignment system, two individual microwave antenna aligners, or two complete cellular RF panel alignment systems. Instructions for use as an RF Panel alignment tool can be found on the www.sunsight.com support page. The MW Max units are too large for use with RF panel antenna mounts.



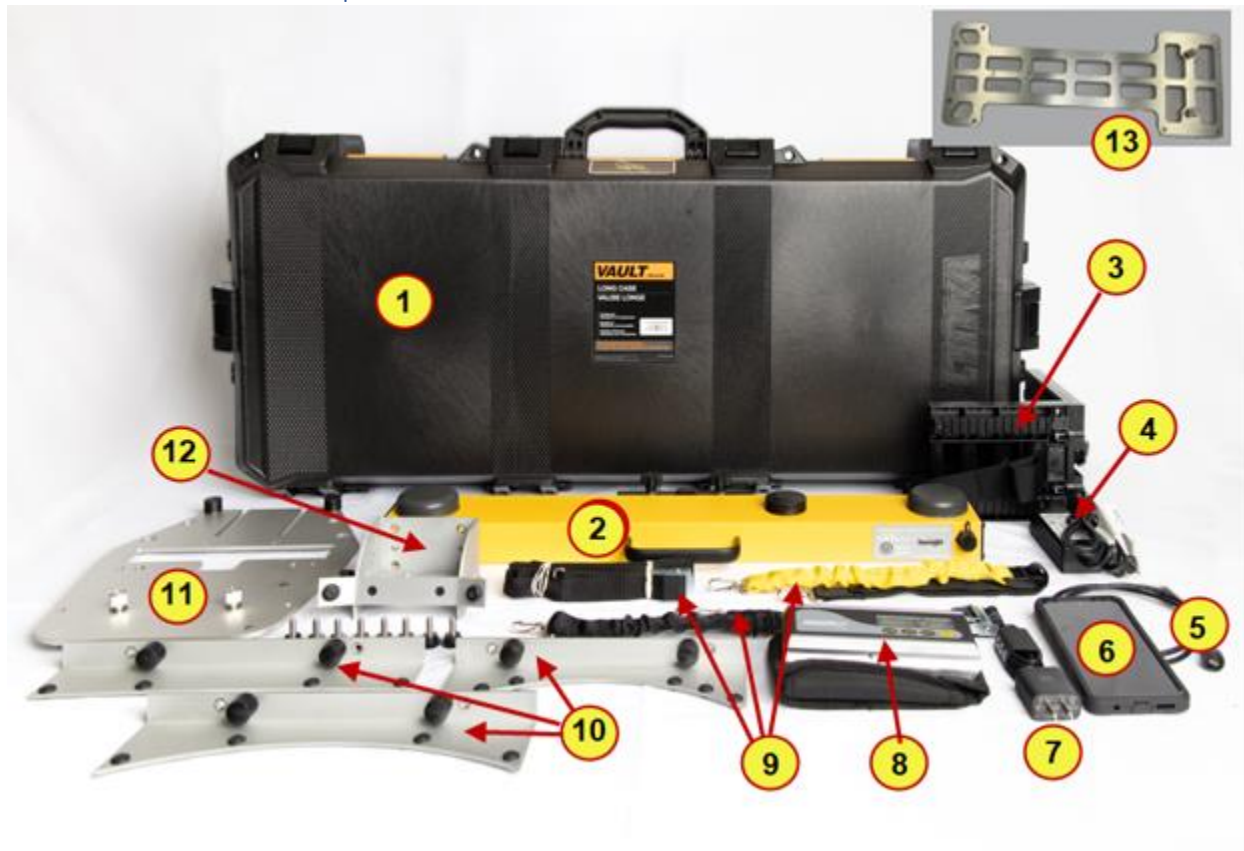
**End-to-End Alignment technology is a patented design belonging to Sunsight.*

Definitions

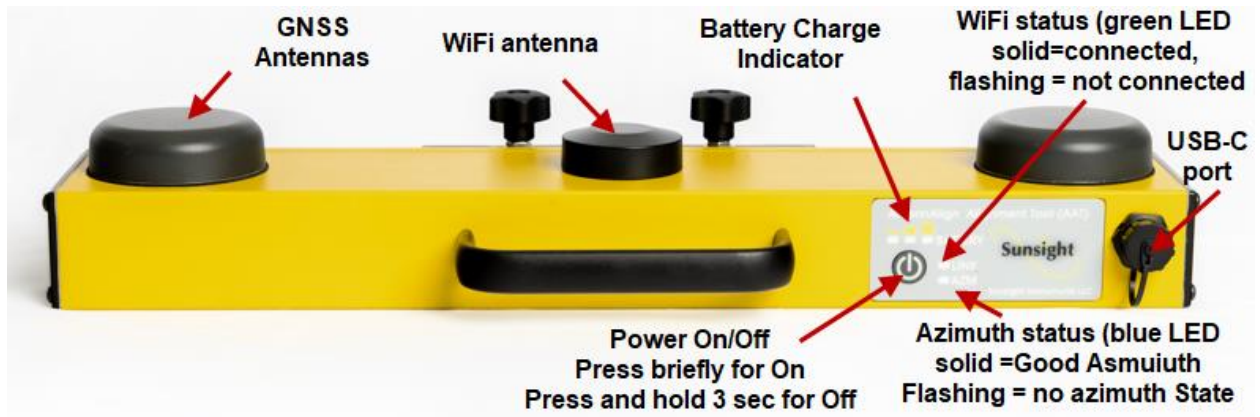
- **Azimuth** – compass heading or bearing. All Sunsight products show azimuth referenced to **true north**, not magnetic north
- **Snapshot** – A snapshot is the action of recording measurements to the MW unit. Typically, the tower technician will adjust the antenna to the required alignment values and record the results by performing a snapshot. The snapshot data is then used to generate reports.
- **Elevation (aka Pitch or Tilt)** – Measured in degrees and refers to antenna alignment in the vertical plane. A positive tilt value indicates the MW unit is facing above the horizon.
- **GNSS** is a satellite-based positioning systems that is used by the MW unit to determine exact latitude and longitude of the MW unit. Also, and most importantly, the satellites are used to determine the azimuth for the MW unit. GNSS subsystem in the MW unit uses satellites from GPS, GLONASS, Galileo, Beidou and SBAS (correction).
- **MW or MW MAX kit** - each kit comprises two MW units, along with two sets of microwave antenna mounts, two rugged Android devices and two RF Panel alignment mounts (MW kit only)
- **MW or MW MAX Single Unit** - each Single unit comprises one MW unit, along with one set of microwave antenna mounts, one rugged Android device and one RF Panel alignment mount (MW only). A Single Unit is used to align each end of a microwave link independently (one at a time). The MW Single Unit can also be used to align a cellular RF panel antenna.
- **Report** - Reports are formatted alignment results that can be created in PDF or CSV formats. Reports can be created for one individual set of measurements (ex. one antenna) or can be created for an entire site's worth of data (several antennas on one report).
- **RF Panel Antenna** - An RF panel antenna is an antenna used for broadcasting cellular signals to handsets. They are typically mounted on towers or rooftops in a tri-sector configuration.
- **Roll** – Sometimes referred to as “plumb” and measured in degrees. Refers to antenna alignment in the horizontal plane. A positive or negative roll value indicates the top of the antenna is not level.
- **Android Device** – the MW products come with 5G Android smartphones that use the Sunsight Android app to operate the Sunsight products. Note that any Android device (tablet or Smartphone) with Android Operating System greater than 11.0 can also be used in place of the provided devices. The Sunsight Android app would need to be installed on the Android device.

For the remainder of this document the term Android device will mean the Android device supplied with the MW products or any other Android device running the Sunsight Android app.

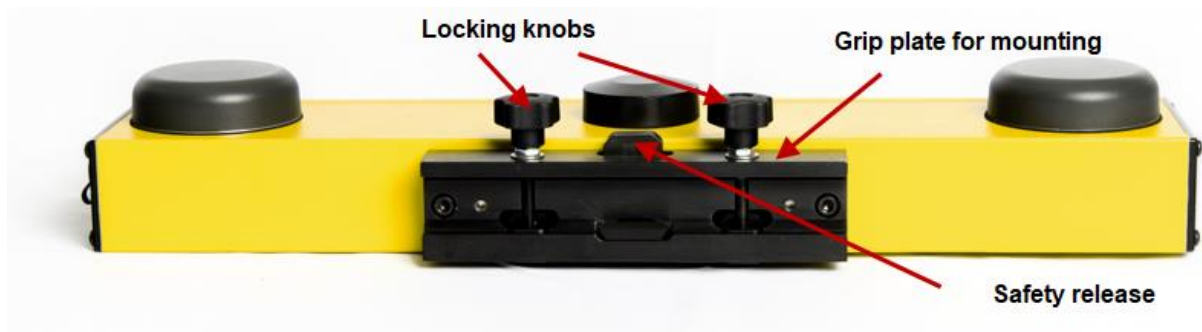
Case contents – 2 cases per kit



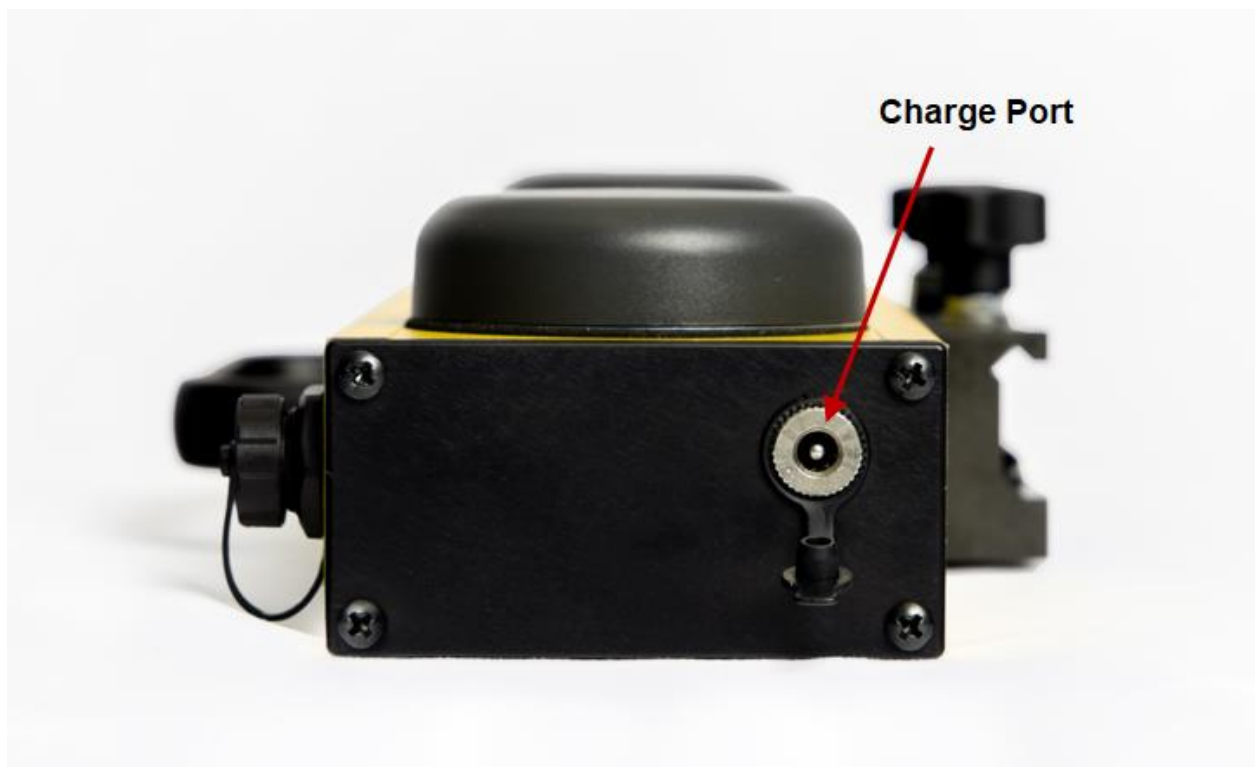
1. MW or MW MAX hard case
2. MW or MW MAX alignment tool
3. Side Mount with strap – for use on standard RF panel antenna (MW only)
4. LiFePO4 Battery Charger
5. USB-C cable
6. Android 5G smartphone
7. Battery Charger for Smart Phone
8. Electronic digital level w/soft case
9. Adjustable Mount Straps
10. MW Mount Adapter plates (3 pieces)
 - a. 1' – 1.5' (.3m – .5m) diameter antenna adapter
 - b. 1.5' – 4' (0.5m – 1.25m) diameter antenna adapter
 - c. 4' – 12' (1.25m – 4m) diameter antenna adapter
11. MW Mount Baseplate
12. MW Mount Articulated Brace
13. MW Extension Bracket



Front view



Back view



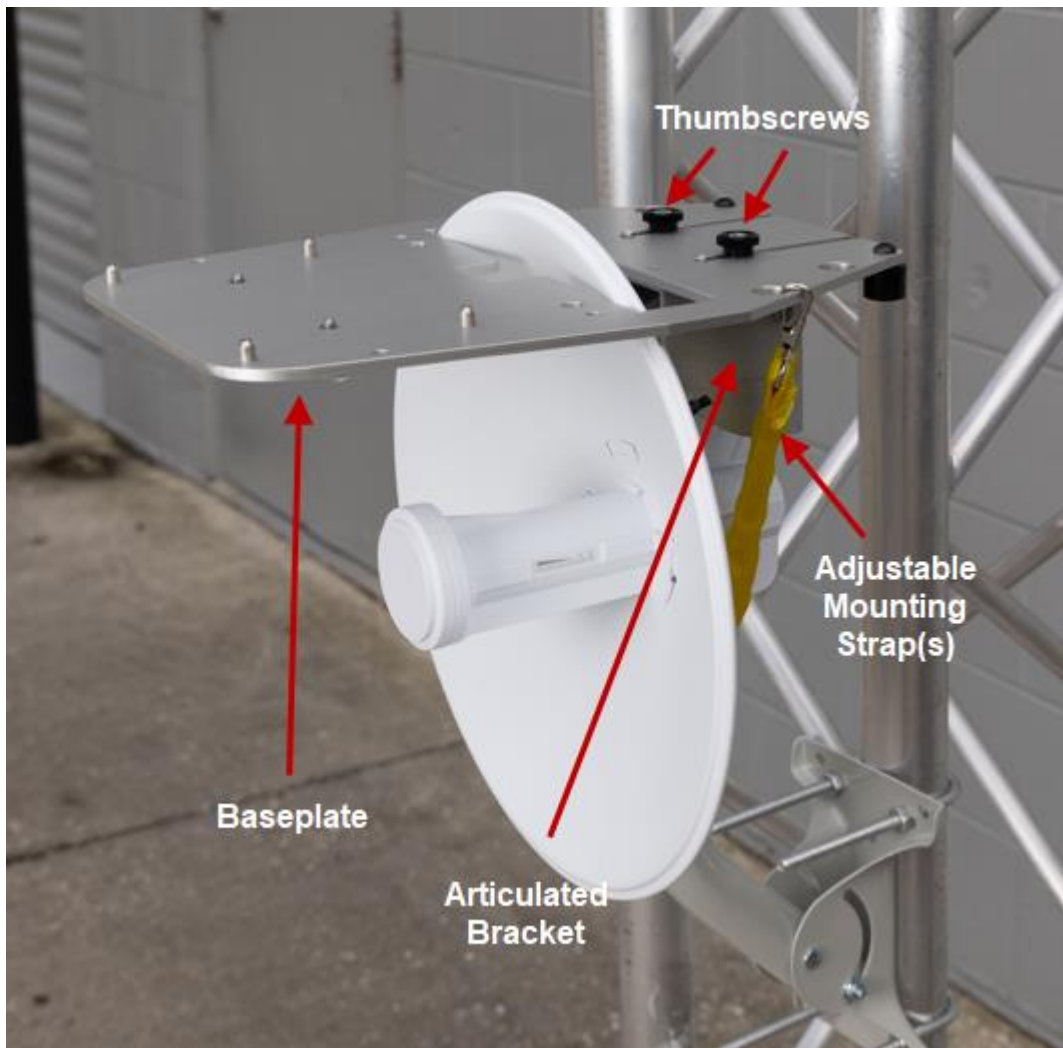
Charge port

Please take time to review the following steps and pictures. It is necessary to understand how to assemble the mount correctly before attempting to use the system in the field.

Using the Microwave Mount

There are many shapes and sizes of microwave antennas as shown on the following pages. The included microwave antenna mount is designed to be very flexible in this regard, allowing a broad range of fitment. The microwave mount consists of the following:

1. MW Mount Baseplate
2. Curved Adapter brackets – 3 sizes to support various antenna diameters
3. Articulated Brace - Front/Rear support bracket
4. Straps (x3) to secure mount to antenna
5. Thumbscrews (x4) to secure Curved Adapters and Articulated Brace to main body (spare thumbscrews included)
6. MW Extension Bracket



*****Do not attempt to remove the rubber bumpers secured to the mount main body or adapters.
Attempted removal may damage the bumpers or mount*****

Common Microwave Antenna Styles



Shielded or "Drum Style"



Parabolic with front shield



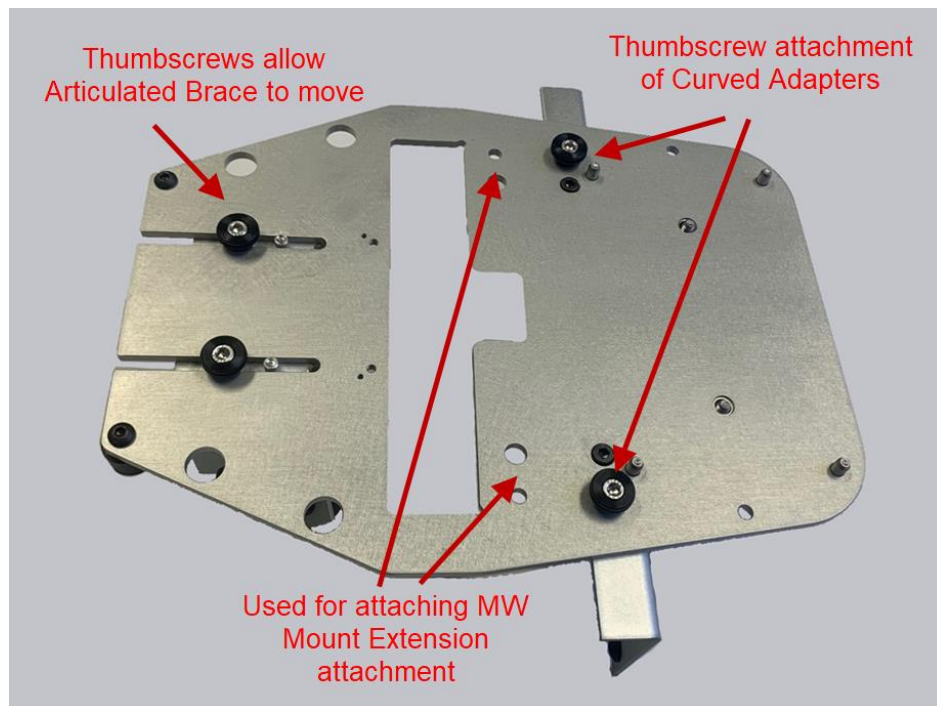
Unshielded Parabolic

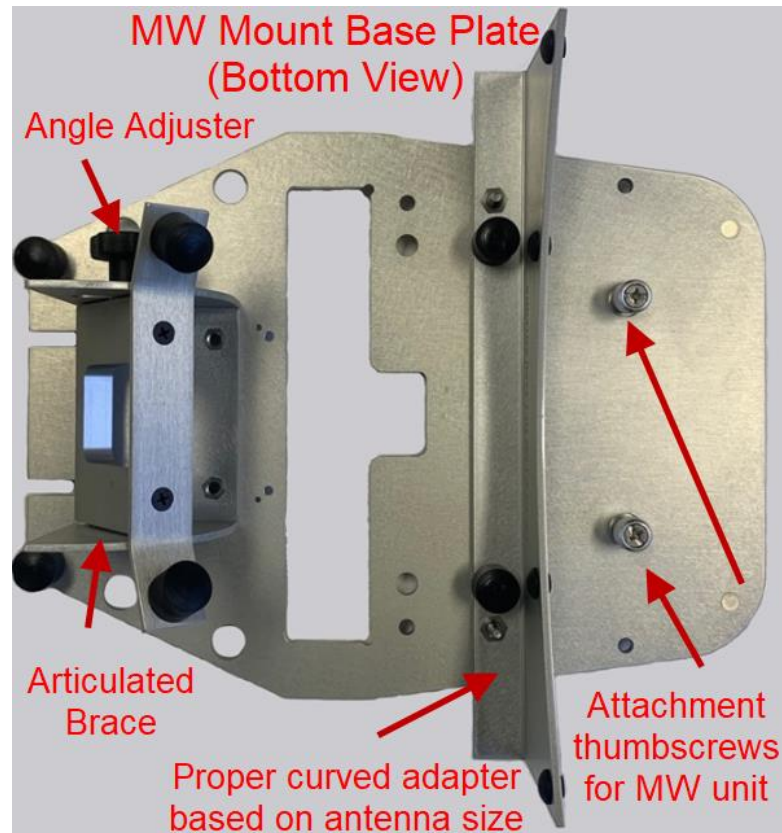
Assembling the Microwave Mount- General Assembly

Note: Curved Adapter brackets may be reversed to accommodate antennas with a better inside lip. Photographs below represent basic assembly procedures. Always use the proper adapter brackets to ensure the mount is sufficiently and safely supported on the antenna. Regardless of the antenna type, always secure the mount to the microwave antenna using the included elastic straps and adjustable end straps.

*****ALWAYS USE THE SAFETY LANYARD TO PROTECT MOUNT AND MW UNIT FROM ACCIDENTAL FALLS Note: The safety lanyard is NOT the same as the yellow/black elastic straps used to the secure the mount to the antenna*****

1. Assemble Articulated Brace to Baseplate using two thumbscrews as shown below
2. Choose the correct curved adapter to match the diameter of the antenna being aligned. The assembled mount should look like this:





3. The elastic mounting straps typically loop under the center of the antenna and back up to the mount. On some shielded “drum” style antennas, the strap can be wrapped around the circumference of the drum. Use the correct straps based on the antenna’s diameter. The three mount straps supplied with the microwave alignment kit can be attached end-to-end, allowing a large range of adjustment for various antenna diameters.

Always start with an elastic strap. For very small parabolic antennas use the yellow elastic strap.

4. Place the mount on the antenna and secure it using the elastic straps. Be sure the Curved Adapter is in good contact with the front of the antenna
5. Adjust the Articulated Brace to make the baseplate sit as flat as possible on top of the antenna. **Note that shielded antennas typically do not use the Articulated Brace.**
6. **Ensure the mount is secure and mounted as flat as possible on top of the antenna. The mount should be very stable on the antenna.**

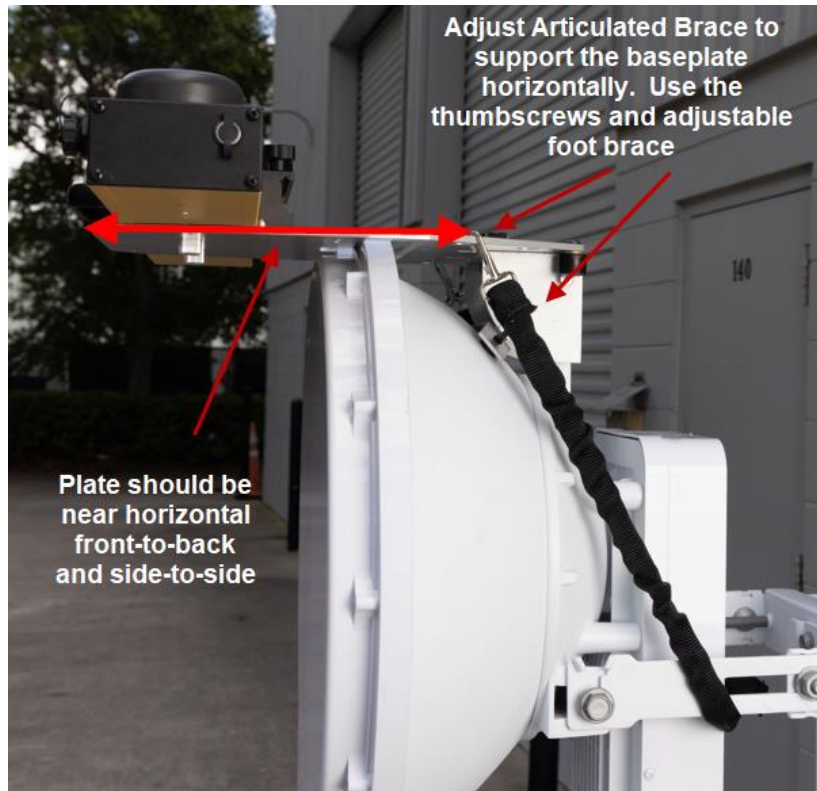


Figure 1

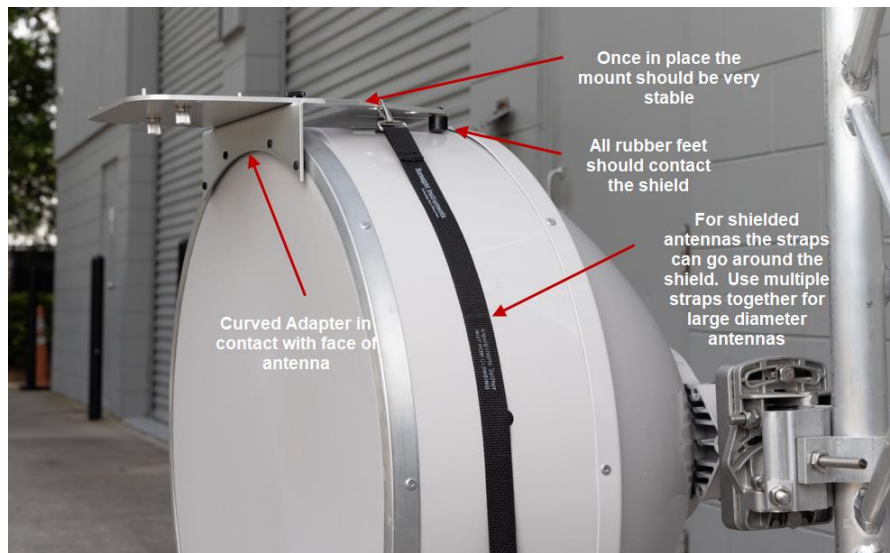


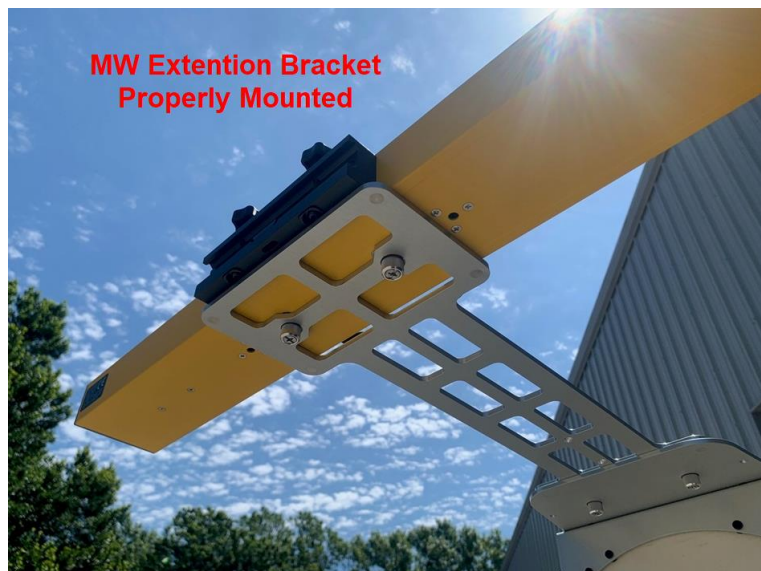
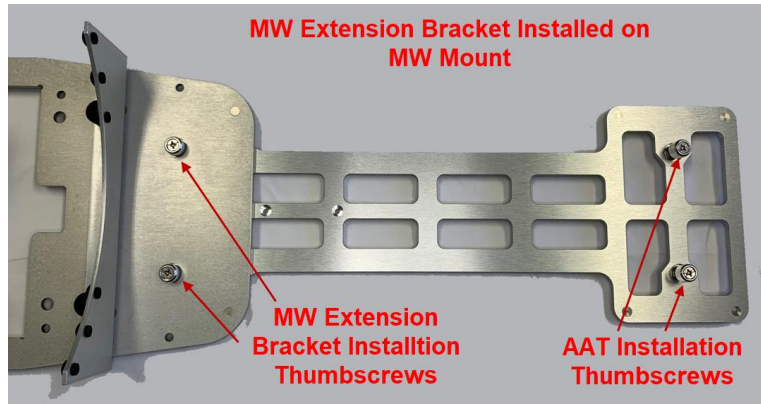
Figure 2

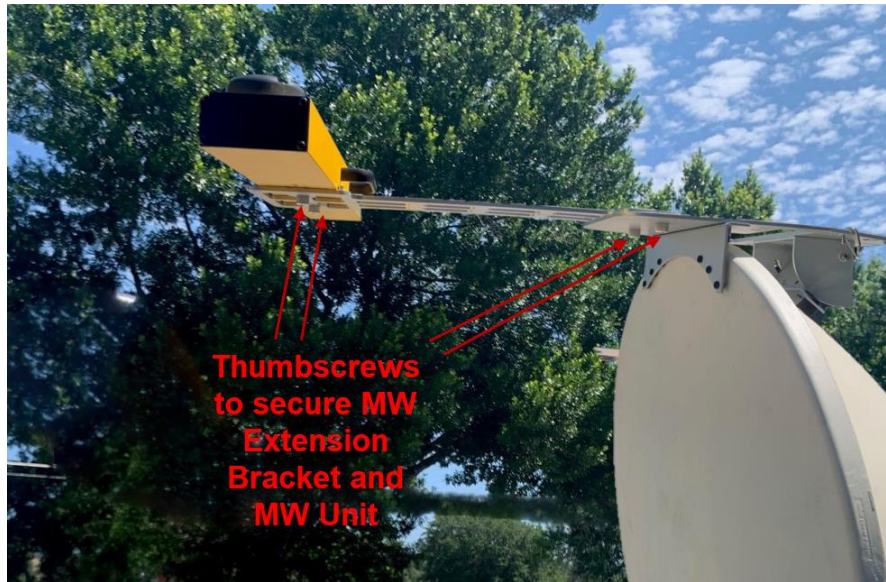
*****ALWAYS USE THE SAFETY LANYARD TO PROTECT MOUNT AND MW UNIT FROM ACCIDENTAL FALLS Note: The safety lanyard is NOT the same as the yellow/black elastic straps used to the secure the mount to the antenna*****

The MW Kit(s) also include the **MW Extension Bracket**. This bracket is used to extend the MW unit further out in front of the antenna to allow the GNSS antennas a clear view of the sky. The typical application for the MW Extension bracket is to extend the MW past an overhead ice shield or other overhead structure blocking the GNSS antennas of the MW unit.

To use the MW bracket:

- 1) Install the MW bracket onto the MW Mount Baseplate securing it with the thumbscrews
- 2) Mount the entire MW bracket onto the antenna making sure it is very secure and stable
- 3) Install the MW at the end of the MW Extension Bracket securing it with the thumbscrews





*****ALWAYS USE THE SAFETY LANYARD TO PROTECT MOUNT AND MW UNIT FROM ACCIDENTAL FALLS Note: The safety lanyard is NOT the same as the yellow/black elastic straps used to the secure the mount to the antenna*****

Using the Microwave Alignment System in the Field

| Single-Ended Microwave Alignment | End-to-End Microwave Alignment |
|--|--|
| MW unit and Android device are charged | Both MW units and Android devices are charged |
| One crew at one end of a microwave link | Crews at both ends of a microwave link |
| One microwave alignment kit case and contents | Both microwave alignment kit cases and contents |
| No SIM cards required | SIM cards must be installed and activated in Android devices |
| Targets determined by manual input | Targets determined by location of MW units |
| Remote (other) antenna latitude, longitude and MSL height required for targeting | No remote (other) antenna location information required |
| See Page 12 for Single-Ended Alignment | See Page 16 for End-to-End Alignment |

Preparation before going to field

1. Ensure that the main MW unit(s) and Android device(s) batteries are charged. If using optional LASER rangefinder, ensure that the LASER rangefinder is charged or has new batteries.
2. If performing a **Single-Ended** alignment (aligning only one end of link at a time), proceed to the [Single-Ended Alignment](#) section. Be sure to have the latitude, longitude and height of the remote antenna's location.
3. If performing an **End-to-End** alignment (teams at both ends of the link and using paired MW units simultaneously), proceed to [End-to-End Alignment](#) section on page 16.

Single-ended Alignment

Aligning only one end of the link - i.e. no team member at remote site, or no cellular service to support end to end alignment

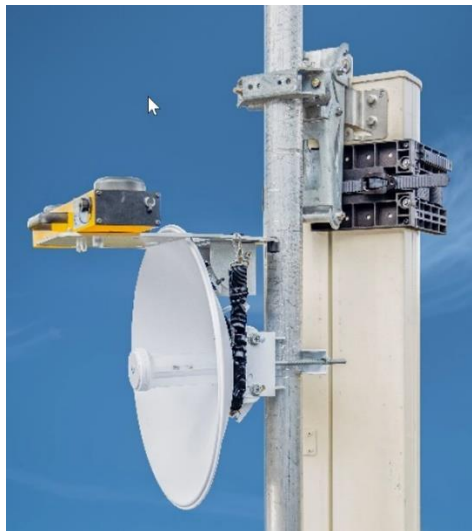
*****NOTE: The latitude, longitude and MSL height of the remote antenna must be available in order to calculate accurate target alignment data*****

Three items are required for performing a single ended alignment

1. **Latitude, longitude and MSL height of the remote antenna site**
2. **Calibrate the MW mount using the included digital level**
3. **Enter the diameter of the remote antenna. This is used to center the azimuth and elevation measurements to the remote end.**

At the site

1. Ensure that the main MW unit(s) and Android device(s) batteries are charged. If using optional LASER rangefinder, ensure that the LASER rangefinder is charged or has new batteries.
2. Configure and attach the MW mount to the antenna
*****ALWAYS USE A SAFETY LANYARD TO PROTECT MOUNT AND MW UNIT FROM ACCIDENTAL FALLS Note: The safety lanyard is NOT the same as the black elastic straps used to secure the mount to the antenna*****
3. Attach the MW unit to the mount using the captured thumbscrews



4. Power on the Android device and MW unit

***** Azimuth accuracy improves dramatically with time. Wait 7-10 minutes after powering on MW unit for best results *****

Use the Sunsight app to connect to the MW unit via WiFi or USB-C cable

6. From the Main Menu, choose Single Ended Microwave

7. At this point, the user can start a Snapshot/Measurement session where the user enters the remote antenna data directly and begin the alignment. Alternatively, the user can pre-program the remote alignment data using the Add Target function. After adding a target, the user can choose to start a Snapshot session by selecting a pre-programmed target(s).

The following steps are for a going directly to the Snapshot/Measurement screen (no pre-programmed target)

8. Select the orientation of the MW unit (front/back/left/right). Typically, this would be "back"

a. Enter the remote antenna information (lat/long and msl height)

9. Next, the Elevation Offset must be set to remove any discrepancy between the MW mount (tilted up or down) as attached and the actual antenna. There are two methods for this. These methods are 1) "Set antenna to boresight" or 2) "Use Digital level to measure current angle.

Option 1) the boresight level method requires the antenna be leveled to horizontal and then pressing the calibrate button to tell the MW unit that the antenna is now level

a. Place the included digital level on a reference surface of the antenna and adjust the antenna so that the antenna boresight is exactly horizontal

b. Press the "Calibrate" button. MW unit is calibrated for elevation

Option 2) leaves the antenna where it is currently located and the digital level is used to determine the actual angle of the mounted antenna and tell the MW unit that angle so that the MW unit corrects the displayed angles.

c. Place digital level on back of antenna and enter angle on screen.

d. Choose whether the antenna is pointed above or below the horizon and click the appropriate button and press "Calibrate" the MW unit is now calibrated for elevation



Tilt calibration can be reset at any time if the MW mount/unit are disturbed in such a way that would affect elevation measurements.

10. Make sure the blue Azimuth LED is solid and not flashing. A solid blue LED indicates that the MW unit has calculated azimuth.
11. Adjust the antenna to closely match the target azimuth and tilt.
 - a. Note that one or two tenths of a degree in azimuth is not critical.
 - b. Be sure to give the MW unit adequate time - up to a minute - to “settle” on an azimuth after making minor adjustments.
12. Once the antenna is aligned as desired, secure the antenna in position.
 - a. With alignment complete, press the “Save” button and follow the instructions to complete saving and viewing results
13. Reports can be viewed and downloaded by navigating to the Microwave Single End → Reports page or Microwave Single End -> Existing Targets page.
14. The Single-Ended alignment is now complete.
15. Power down MW unit and Android device and secure for transport.

After returning from the field

1. Retrieve reports from Android device/MW unit.
2. Charge the MW unit and Android device prior to long term storage.
3. Be sure to turn off data/phone plan to conserve costs. This can also be accomplished by turning off the Android device(s).

END OF SINGLE-ENDED ALIGNMENT PROCEDURE



Manual Microwave Alignment Report Lighthouse Example

| MW-Unit 5010012 | | | |
|---------------------------------|---|---|---------------------------|
| Site Description | Lighthouse peak | | |
| Link Name | Example Link Target | | |
| Call Sign | 5678 | | |
| Emission Designator | J47-3 | | |
| Licensee Code | QRUUBN | | |
| Antenna Make | Ericsson | | |
| Antenna Model | A9822-AA | | |
| Antenna Diameter ft / m | 3.0 ft | / | 0.91 m |
| Radio Make | Ericsson | | |
| Radio Model | GH8892-DFF | | |
| Azimuth Actual / Target | 11.6 | / | 11.2 |
| Elevation Actual / Target | 0.0 | / | 1.2 |
| Lat/Long Dec. / DMS | 29.058822, -80.933002 / N/+ 29° 3' 31.7592", W/- 80° 55' 58.8072" | | |
| MSL Height ft / m | 9.28 ft | / | 2.83 m |
| AGL Height ft / m | - | / | - |
| Distance mi / km | 1.53 mi | / | 2.47 km |
| Orientation | Back | | |
| Notes | Notes for the lighthouse example | | |
| Timestamp | 2023-12-22 16:07:46 (UTC) | / | 2023-12-22 11:07:46 (EST) |
| Manually entered Remote Antenna | | | |
| Lat/Long Dec. / DMS | 29.080589, -80.928058 / N/+ 29° 4' 50.1204", W/- 80° 55' 41.0088" | | |
| MSL Height ft / m | 175.00 ft | / | 53.34 m |

Note: this report was generated using Manual Alignment Mode, which means the remote latitude, longitude and MSL height values were manually entered and not automatically obtained from another MW-Unit.

Example Single-Ended Microwave Alignment report

End-to-End Alignment

End-to-End - Aligning both ends of the link simultaneously – crews at each end of the link with paired MW units. **Only available through SunSight (patented)**

NOTE: End-to-End Alignment requires both Android devices to have network access. SIM cards must be installed and activated in both Android devices. Cellular network coverage is required.

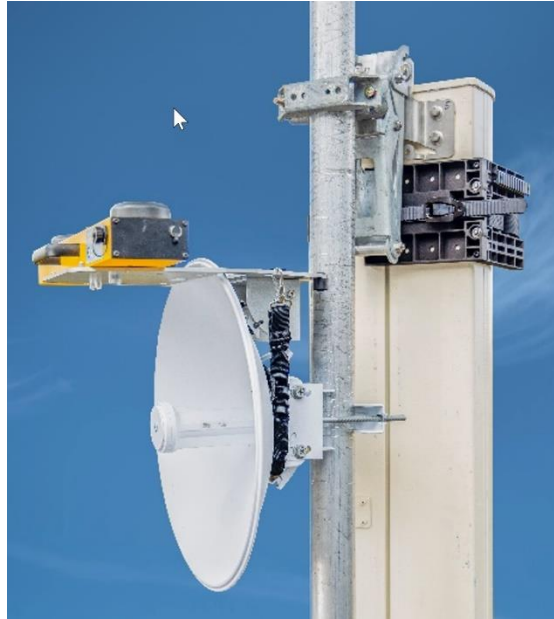
At the site

•

1. Ensure that the main MW unit(s) and Android device(s) batteries are charged. If using optional LASER rangefinder, ensure that the LASER rangefinder is charged or has new batteries.
- 2.
3. Configure and mount the MW mount to the antenna

*****ALWAYS USE THE SAFETY LANYARD TO PROTECT MOUNT AND MW UNIT FROM ACCIDENTAL FALLS Note: The safety lanyard is NOT the same as the black elastic straps used to secure the mount to the antenna*****

4. Attach the MW unit to the mount using the captured thumbscrews



5. Power on the Android device and MW unit

***** Azimuth accuracy improves dramatically with time. Wait 7-10 minutes after powering on MW unit for best results *****

6. Use the Sunsight app to connect to the MW unit via WiFi or USB-C cable
7. From the Main Menu, choose Microwave End-to-End
8. At this point, the user can start a Snapshot/Measurement session. Alternatively, the user can pre-program the remote alignment data using the Add Target function. After adding a target, the user can choose to start a Snapshot session by selecting the pre-programmed target(s).

The following steps are for a going directly to the Snapshot/Measurement screen (no pre-programmed target)

9. Select the orientation of the MW unit (front/back/left/right). Typically, this would be "back"
10. Enter/Select the MW unit serial number for the remote end of the link. This decides what MW unit will send and receive alignment data. The MW unit serial number decal is located on the back of the unit and is formatted 501xxxx.
11. Next, the Elevation Offset must be set to remove any discrepancy between the MW mount (tilted up or down) as attached and the actual antenna. There are two methods for this. These methods are 1) "Set antenna to boresight" or 2) "Use Digital level to measure current angle.

Option 1) the boresight level method requires the antenna be leveled to horizontal and then pressing the calibrate button to tell the MW unit that the antenna is now level

- a. Place the included digital level on a reference surface of the antenna and adjust the antenna so that the antenna boresight is exactly horizontal
- b. Press the “Calibrate” button. MW unit is calibrated for elevation

Option 2) leaves the antenna where it is currently located and the digital level is used to determine the actual angle of the mounted antenna and tell the MW unit that angle so that the MW unit corrects the displayed angles.

- c. Place digital level on back of antenna and enter angle on screen.
- d. Choose whether the antenna is pointed above or below the horizon and click the appropriate button and press “Calibrate” the MW unit is now calibrated for elevation



Tilt calibration can be reset at any time if the MW mount/unit are disturbed in such a way that would affect elevation measurements.

12. Make sure the blue Azimuth LED is solid and not flashing. A solid blue LED indicates that the MW unit has calculated azimuth.
13. The MW unit is now sending alignment data toward the MW unit at the remote end of the link
14. Once the remote end technician has setup their unit following the steps above, both users should see their respective targets (azimuth and elevation) as well as lat/long and msl from the opposite end.
15. Adjust the antennas to closely match the targets for azimuth and tilt.
 - a. Note that one or two tenths of a degree in azimuth is not critical.
 - b. Be sure to give the MW unit adequate time - up to a minute - to “settle” on an azimuth after making minor adjustments.
16. Once the antennas are aligned at the local and remote ends of the link, secure the antennas in position.
 - a. Press the “Save” button and follow the instructions to complete saving and viewing results. This should be performed at both ends of the link. Note that each

report will have the local alignment data as well as the remote data, but it is still best practice to capture reports at both ends.

17. Reports can be viewed and downloaded by navigating to the Microwave End-to-End → Reports page or Microwave End-to-End -> Existing Targets page.
18. The End-to-End alignment is now complete.
19. Power down MW unit and Android device and secure for transport.
- 20.

After returning from the field

1. Retrieve reports from Android device/MW unit.
2. Charge the MW unit and Android device prior to long term storage.
3. Be sure to turn off data/phone plan to conserve costs. This can also be accomplished by turning off the Android device(s).

END OF END-TO-END ALIGNMENT PROCEDURE

**End-to-End Alignment technology is a patented design belonging to SunSight.*

| SunSight Alignment Solutions | | Microwave Path Alignment Report End to End Example | |
|---------------------------------|--|---|---------------------------|
| MW-Unit 5010012 | | | |
| Site Description | Site description goes here | | |
| Link Name | E2E example Link name | | |
| Call Sign | Call sign goes here | | |
| Emission Designator | Emission Designator here | | |
| Licensee Code | Code in this fields | | |
| Antenna Make | Ericsson | | |
| Antenna Model | 1334 | | |
| Antenna Diameter ft / m | 3.0 ft | / | 0.91 m |
| Radio Make | Ericsson | | |
| Radio Model | 444 ki | | |
| Azimuth Actual / Target | 233.3 | / | 233.3 |
| Elevation Actual / Target | 0.0 | / | 0.0 |
| Lat/Long Dec. / DMS | 29.058825, -80.932997 / N/+ 29° 3' 31.7700", W/- 80° 55' 58.7892" | | |
| MSL Height ft / m | 9.55 ft | / | 2.91 m |
| AGL Height ft / m | - | / | - |
| Distance mi / km | 29.35 mi | / | 47.24 km |
| Orientation | Back | | |
| Notes | Enter notes about site, or issues with site here | | |
| Timestamp | 2023-12-22 16:24:32 (UTC) | / | 2023-12-22 11:24:32 (EST) |
| Remote MW-Unit 5010020 | | | |
| Azimuth Actual / Target | 53.1 | / | 53.2 |
| Elevation Actual / Target | -0.8 | / | 0.0 |
| Lat/Long Dec. / DMS | 28.804461, -81.322218 / N/+ 28° 48' 16.0596", W/- 81° 19' 19.9848" | | |
| MSL Height ft / m | 37.07 ft | / | 11.30 m |
| Orientation | Back | | |

Example End-to-End Microwave Alignment report

Aligning RF Cellular Panel Antennas

Using the Microwave Path Alignment Kit to align RF cellular panel antennas

Each half of the MW Microwave Path Alignment Kit (MW only, not the MW Max) may also be used independently for RF Cellular Panel Alignment with the included RF panel antenna mount. In this mode,

the MW acts as a standard AAT. Instructions for use as an RF Panel alignment tool can be found on the www.sunsight.com support page.

Checking tilt and roll calibration

Sunsight recommends that users periodically check the tilt and roll calibration of the MW unit's internal sensors. The frequency with which these checks should be performed will depend on how often the MW unit is used and how it is cared for, but calibration checks should be performed monthly at a minimum.

The MW unit does not require return to Sunsight for calibration.

To check tilt and roll

1. Place the MW unit on a flat surface and record the tilt and roll values displayed on the cellular alignment page – Main Menu-> Cellular Alignment->Snapshot/Measure. Be sure to let the unit settle for about 20 seconds before recording the values for tilt and roll.
2. Turn the MW unit 180 degrees and place it back in the location. Let the unit settle again and compare the tilt and roll values recorded in step 1. If the values are the same except with opposite signs, then the no calibration is required. They can vary +/- .1 degrees and still be in calibration.

If calibration is required

1. From the Main Menu select Tools -> Tilt Roll Calibration and follow the instructions

Troubleshooting

- Checking current firmware version
 - Log in to the MW unit. Scroll to the bottom of any MW unit webpage, where the user can find the MW unit serial number and firmware version currently installed.
- The MW unit will not power on
 - Ensure that the onboard LiFePO4 battery is charged using only the approved charger. Use of any other charger or power supply may cause insufficient charge, overcharge, or electrical damage to the unit.
- Webpages not available
 - Ensure Wi-Fi is enabled on your Android device. Power on the MW. Use the Sunsight app to connect to your MW. Note that the app indicates the connection is made successfully and the MW unit can be operated normally.
- The MW unit will not display azimuth
 - GNSS is line-of-sight technology and, as such, both GNSS antennas at the top of the MW unit must have as clear a view of the sky as possible.
 - The MW unit should always be mounted as high on the antenna to be measured as possible.
 - Use the indicators on the MW unit's **Diagnostic** page to help determine optimal placement.

Use and care of the Sunsight MW unit

- The MW unit utilizes state-of-the-art GNSS technology in order to provide highly accurate azimuth calculations. GNSS is a line-of-sight technology For optimal results, the black, round antennas at the top of the MW unit should be offered the best "view" of the

sky as possible. Physical obstructions over either antenna may result in difficult or no-azimuth conditions. Position the MW unit so as to eliminate or minimize physical obstructions.

- The MW unit and its accessories are weather resistant, not water-proof! Do not immerse or submerge the MW unit in liquid of any type. All caps must be in good working order and secured while the MW unit and its accessories are in use, especially in inclement weather.
- Do not store the MW unit or its accessories in a wet case. Allow the case(s) to air dry prior to storing the MW unit and its accessories.
- The MW unit housing is fabricated of aluminum for durability, but still contains highly sensitive electronic components. Avoid sharp impacts and drops.
- The MW unit and its accessories contain no user-serviceable components. Do not attempt to disassemble the MW unit for any reason. Unauthorized disassembly may result in component damage and warranty termination.
- Sunsight strives to provide the best user experience possible with our products. To that end, we continue to develop hardware and software solutions to meet the needs of our customers. Sunsight will periodically issue firmware updates to enhance performance and function of our products. To receive update notifications, please register your MW unit at: <https://www.sunsight.com/index.php/register-AAT>. Your information is never shared or sold and is used only by Sunsight to notify users of product updates.

For questions regarding use or care of the MW unit and its accessories, please contact Sunsight Instruments Technical Support. Live technical support is available Monday – Friday from 9:00am to 5:30pm Eastern via support@sunsight.com or 1-321-244-9443 x2