

Path alignment and cross polarization procedure for parabolic microwave antennas

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1.0 Introduction

Aligning parabolic antennas requires a thorough understanding of alignment fundamentals. Before proceeding further with this procedure, the basic techniques described in TP-108828-EN, "Alignment Fundamentals for Parabolic Microwave Antennas," should be thoroughly understood.

NOTICE: The installation, maintenance or removal of antenna systems requires qualified, experienced personnel. CommScope installation instructions have been written for such installation personnel. Antenna systems should be inspected once a year by qualified personnel to verify proper installation, maintenance and condition of equipment. Andrew disclaims any liability or responsibility for the results of improper or unsafe installation practices.

2.0 Path alignment procedure

2.1 Setting azimuth marker

- 2.1.1 Convert true azimuth bearing, usually given on site plan, into corrected magnetic azimuth.
- 2.1.2 Stand away from tower a distance equal to or greater than tower height (minimum 50 meters). Locate true azimuth position (magnetic azimuth corrected for declination) and set azimuth marker in ground. Care must be taken to locate azimuth marker as accurately as possible.

2.2 Test equipment

When using customer-supplied radio to measure signal strength, waveguide must be connected to antenna. Loosen all waveguide hangers within eight feet of antenna output to prevent kinking of waveguide during adjustment. When using independent path alignment transceiver to measure signal strength, connect transceiver to vertical polarization port at each site. Set transceiver controls according to manufacturers' instructions.

2.3 Preparing antenna for adjustment

- 2.3.1 There are many different types of microwave antennas. The installation instructions supplied with the antenna must ALWAYS be followed during the installation and alignment process.

2.4 Loosening antenna and feed assembly

- 2.4.1 Loosen feed assembly mounting bolts. Place bubble level across feed horn in back of antenna to measure horizontal level (see Figure 2). Rotate feed assembly until horizontally level. Tighten feed assembly mounting bolts.

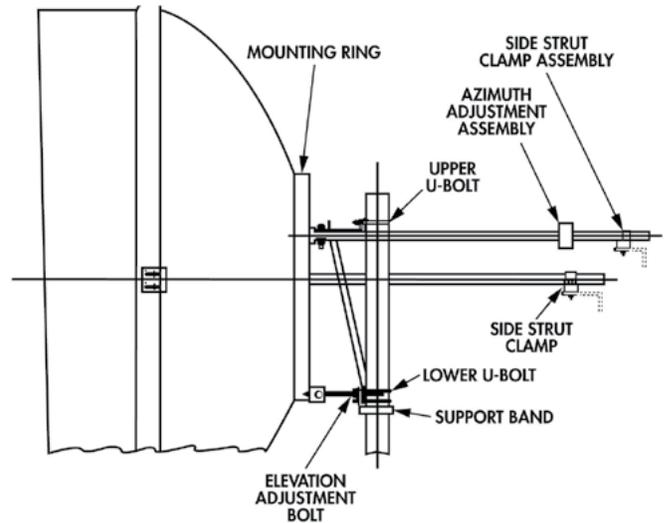


Figure 1

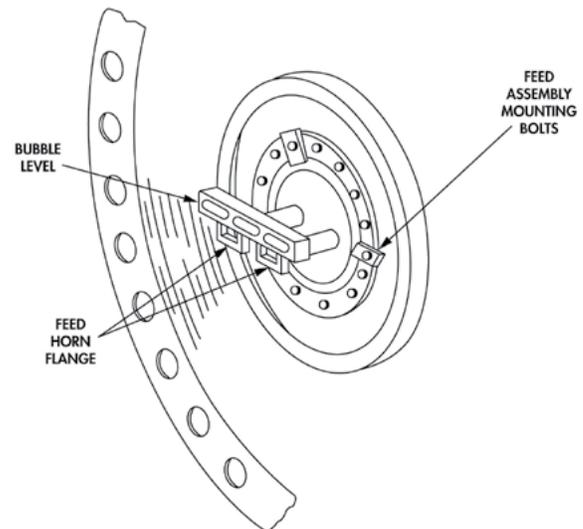


Figure 2

- 2.4.2 Place bubble level vertically on mounting ring of reflector. (see Figure 3). Adjust elevation bolt until antenna is vertically level.
- 2.4.3 Verify that other antenna site has proceeded this far. Designate one site as site 1 and the other as site 2. Continue when both sites are ready.

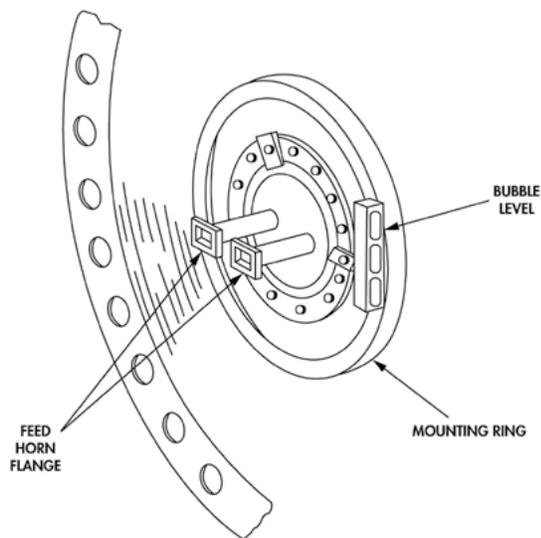


Figure 3

2.5 Setting azimuth and elevation

- 2.5.1 (Site 1). Very slowly swing antenna from left to right, moving at least 20 degrees either side of azimuth marker, searching for maximum receive signal. Secure antenna at maximum signal position. If signal cannot be located, refer to Section 5.0, Locating signal (supplement).
- 2.5.2 (Site 2). Repeat Step 1 at Site 2.
- 2.5.3 (Site 1). Adjust antenna up and down in elevation, searching for maximum receive signal. Secure antenna at maximum signal position.
- 2.5.4 (Site 2). Repeat Step 3 at Site 2.
- 2.5.5 (Site 1). Using fine azimuth adjustment assembly, turn antenna to left until signal drops 3 dB below peak level. Turn antenna to right, counting adjustment nut turns, until signal rises past peak, and again drops 3 dB below peak. Now move antenna to left, exactly half the counted adjustment nut turns for peak signal position.
- 2.5.6 (Site 1). Tighten azimuth adjustment hardware.
- 2.5.7 (Site 1). Adjust antenna in elevation again for maximum receive signal.

2.5.8 (Site 1). Lower antenna in elevation until signal drops 3 dB below peak. Raise antenna, counting adjustment nut turns, until signal rises past peak, and again drops 3 dB below peak. Now lower antenna exactly half the counted adjustment nut turns for peak signal position. Tighten elevation nuts firmly.

2.5.9 (Site 1). Tighten elevation adjustment hardware. Verify signal is still at peak level.

2.5.10 (Site 1). Fully tighten all hardware to the torque values specified on the supplied instructions.

2.5.11 (Site 2). Repeat Steps 2.5.5-2.5.10 at Site 2.

2.5.12 Both antennas are on main beam if measured receive signal level and calculated net path loss are within customer specifications. See TP-108828-EN for calculating net path loss. If antennas are NOT both on main beam, refer to Section 5.0 and adjust antennas for maximum main beam receive signal.

3.0 Cross polarization adjustment

Cross polarization adjustment is performed after path alignment is complete. Ensure that the radio or transceiver is turned off before connecting or disconnecting from the antenna.

- 3.1 (Site 1). Loosen feed assembly mounting bolts.
- 3.2 (Site 1). Set up test equipment to measure receive signal at vertical polarization port.
- 3.3 (Site 2). Set up test equipment to transmit signal from horizontal polarization port.
- 3.4 (Site 1). Rotate feed assembly for minimum receive signal (cross polarization null) at vertical polarization port. Record minimum cross polar signal reading for later reference. Tighten feed assembly mounting bolts.
- 3.5 (Site 1). horizontal set up test equipment polarization port to measure receive signal at
- 3.6 (Site 2). Set up test equipment to transmit signal from vertical polarization port.
- 3.7 (Site1). Record cross polar receive signal level. The difference in signal strength between the two recorded signal levels must be within 3 dB. If the difference exceeds 3 dB, rotate feed assembly slightly and repeat Steps 3.1-3.7 until the measured receive signals are within 3 dB.

4.0 Diversity antenna alignment

Alignment of diversity antenna is performed after path alignment and cross polarization adjustment is complete.

Diversity antennas are aligned with opposite site primary antenna. (see Figure 4). Perform path alignment and cross polarization adjustment on diversity antennas the same way as primary antennas. However, DO NOT move the primary antenna or primary feed. Adjust ONLY the diversity antenna and diversity feed.

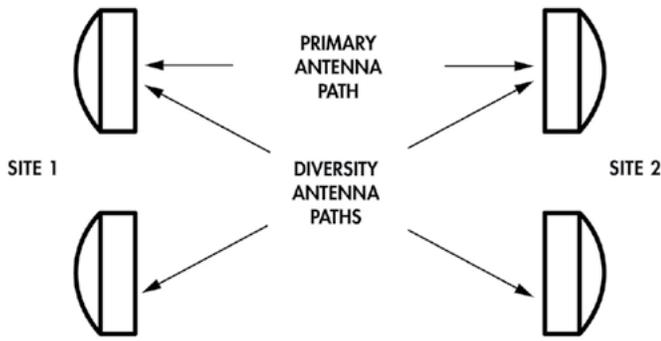


Figure 4

5.0 Locating signal (supplement)

When no signal can be found, perform the steps indicated below. As soon as signal is located, position antenna on maximum receive signal and continue with path alignment procedure.

5.1 (Site 1). Move antenna from left to right (+ 20 degrees from azimuth marker) in search of signal. If no signal can be found, position antenna toward azimuth marker.

5.2 (Site 2). Repeat Step 5.1 at Site 2.

5.3 (Site 2). If no signal is found, position antenna toward azimuth marker. Place mark on right-side strut next to side strut clamp.

5.4 (Site 2). Move antenna to right so mark on side strut is 100 millimeters from side strut clamp.

5.5 (Site 1). Repeat Step 5.1 in search of signal.

5.6 (Site 2). If no signal is found, move antenna farther to the right so mark on side strut is 200 millimeters from clamp.

5.7 (Site 1). Repeat Step 5.1 in search of signal.

5.8 Repeat this sequence until mark on side strut has moved 400 millimeters either side of clamp, or until signal is located.

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