

The Quintel QS Series MultiServ™ Multiband Multi Port Antennas with patented QTilt™ technology uniquely delivers multiple independent services in single slim-line antennas. This enables existing antenna constrained network sites to be upgraded to add new services such as LTE in the 700, AWS & WCS bands with the replacement of one antenna.

The Quintel MultiServ™ Multiband Multi Port Antennas are an ideal solution for independently optimizing multiple services when rapidly introducing new technologies. Technology agnostic, each band provides flexibility for existing and future technologies such as GSM, CDMA, UMTS, LTE and advanced 2Tx4Rx and 4Tx4Rx MIMO implementations.

The tilt of each band is controlled independently via internal RET actuators compliant to AISG1.1, AISG2.0 and 3GPP protocols. Depending on the model, the antenna provides a total of 2, 3, 4 or 6 independent tilts. Detailed specifications for each antenna model can be found in their respective datasheets. Datasheets are available for download at the following link: <http://www.quintelsolutions.com/datasheets-patterns.html>

Quick Facts:
 Product #: QS Family
 6,8,10 & 12 Ports
 SBT & Non-SBT Variants
 Polarisation: XXX
 Height: 52", 72" & 96"
 Beam Width: 65°

Features

Antenna component with:

- Product families providing multiple frequency options refer to specific data sheets per technical specifications.
- Simple Antenna swap out.
- Variable electrical tilt.

- Supports MIMO services with 2Tx4Rx & 4Tx4Rx capability depending on model
- AISG & 3GPP compliant internal Remote Electrical Tilt (RET)
- RET configurable for AISG 1.1/2.0 and 3GPP software via upload
- Provides Multi antenna Ports in a slim-line form factor
- Models with -5 suffix support AISG over RF through internal Smart Bias-T's (SBT)

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1 Installation Overview

This document describes the installation and configuration details for the Quintel antennas as summarized on page 1. Included is a description of the antenna mounting options, antenna port identification and AISG connections for each specific antenna models.

The mounting kit types supplied with the antenna are detailed below. These kits enable the antenna to be pole mounted with pre-set mechanical down tilt (-2° to 10°).

NOTE: Images contained in this document are of QS6658-3 product line and may not represent all antennas; however the bracket components and their installations are common.

1.1 Mounting Hardware Features include:

- Tilt adjustment arm for mechanical tilt.
- Pipe diameter: 30-120mm (1.18 – 4.72 inches) standard.

1.2 Supplied Mounting Hardware

- **AS-001184** Lower antenna mounting bracket assembly
- **AS-001182** Upper antenna mounting bracket assembly. (Adjustable from -2° to 10°)
- **AS-001034** Optional Lightning Finial

1.3 Mounting Hardware Mechanical Specifications

- Weight of kit, kg (15.6 lbs)
 - 4.6 kg (10.1 lbs) AS-001182 Upper mounting bracket
 - 2.0 kg (4.4 lbs) AS-001184 Lower mounting bracket
 - 0.4 kg (0.9 lbs) AS-001034 Lightning finial
- Mounting kit material
 - Aluminium & Galvanized steel
- Packaging material
 - Plastic sleeve

Tools Required

- 18mm (no Imperial equivalent) AF deep socket, spanner wrench
- 18mm Box-End Torque Wrench (40-65 ft lbs)
- 16mm AF socket and spanner wrench
- 13mm socket and Box-End Torque Wrench (16 ft lbs)

2 HEALTH & SAFETY

All operations relating to the installation of the Quintel range of antenna systems must be executed in accordance with industry approved safety standards and practices.

The installer shall also follow the safety practices recommended by the BTS provider to insure that the BTS operation is not compromised.

Safety Handling of Antennas

The installation of antennas and associated electrical equipment and systems should only be carried out by qualified persons. Antenna units may be heavy and should be handled by experienced persons with the aid of suitable lifting equipment only. Antenna casings are fragile and are susceptible to damage from impact and weight on the radome. When antenna units are stored ready for use, they should be supported to prevent any damage.

High Frequency Radiation Hazard

The RBS, antenna line equipment, and the antennas generate high frequency electric and magnetic fields when in operation. It is important that all personnel working with the installation and maintenance of transmitting equipment and antennas have a suitable level of knowledge of RF safety. The following cautions described below should be observed:

Caution

Excessive RF exposure can result in potentially adverse health effects. If it is suspected that RF exposure limits may be exceeded, ensure that transmitting antennas are switched off, or reduce output power whilst working with, or near, antennas.

Caution

Do not stand or work in front of an operational antenna, unless it has been verified or documented that RF exposure levels are within specified safety limits.

Caution

Always be aware of other RF transmission antennas located close to the antenna you will be working with. If the RF exposure level is unknown, contact the equipment operator or ensure that measurements are done to verify that levels are below specified safety limits before starting work.

Caution

Broken or disconnected RF cables can lead to exposure levels reaching, or exceeding, specified safety limits. Repair or reconnect cables before starting work. Opening of enclosed units is not permitted.



UNPACKING

Make sure that the antenna and the accessory items listed below are provided and have not been damaged during transport:

Table 1: Mounting components shipped with antenna

Kit	Description	Quantity	Item No.
Upper Arm & Mount Assy.	Quintel Kit # AS-001182	1	See Page 3
Lower Arm & Mount Assy.	Quintel Kit # AS-001184	1	See Page 6
Lightning Finial	Quintel Kit # AS-001034	1	See Page 8

Table 2: Torque Settings

Location	Size	Rating
Upper & Lower Mounting Kit(s)	M12	88 Nm (65 ft.-lbs.) (Unless otherwise stated)
	M10	50 Nm (37 ft.-lbs.)
Upper/Lower Pole Clamp Mount Only (4)	M12	54 Nm (40 ft.-lbs.)
(Optional) Finial	M8	21 Nm (15.7 ft.-lbs.)

3 Upper Arm & Mount Assembly: AS-001182, supplied as part of AS-000977

1. All bolts assembled loosely until installation except where shown.
2. Torque M12 bolts where shown to 65 Ft. Lbs (88 N-m).
3. **NOTE:**
 - The addition or replacement of any items supplied in this kit may compromise structural integrity.

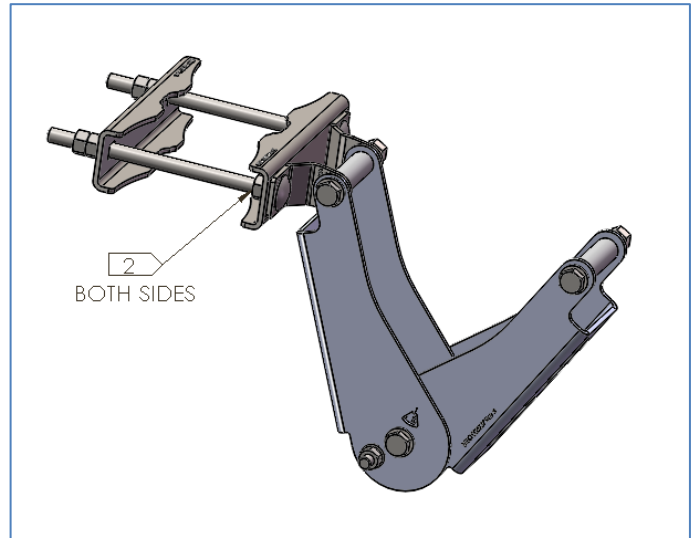


Figure 1: Upper Arm

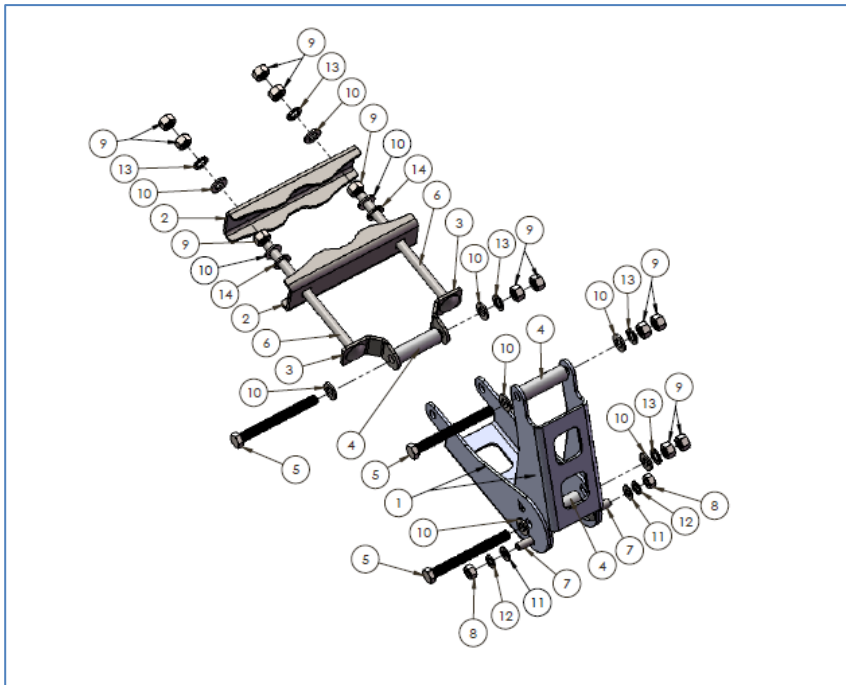


Figure 2: Upper Arm Exploded View

ITEM NO.	PART NUMBER	QTY.
1	MEC-008937	2
2	MEC-008938	2
3	MEC-008939	2
4	MEC-008956	3
5	Bolt-M12x1.75x120 ISO 4014	3
6	MEC-010791	2
7	MEC-010792	2
8	Nut-Hex M10x1.5 B18.2.4.1M	2
9	NUT-Hex M12x1.75	12
10	Washer DIN 125 - A 13	10
11	Washer DIN 125 - B 10.5	2
12	Washer-Split Lk M10	2
13	Washer-Split Lk M12	5
14	Washer-Split Lk M14	2

Upper arm mount position for 4FT & 6FT antenna models.

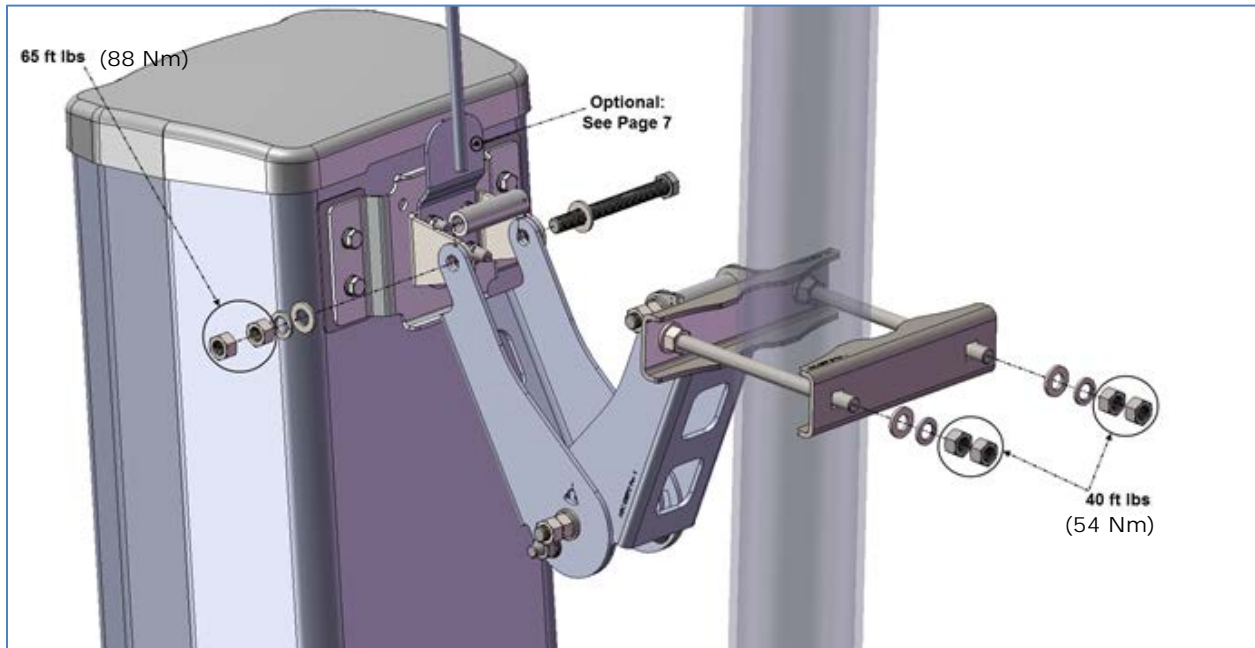


Figure 3: Pole Mount of Upper Arm & Mount Assembly (AS-001182)

Upper arm mount position for 8FT antenna models.

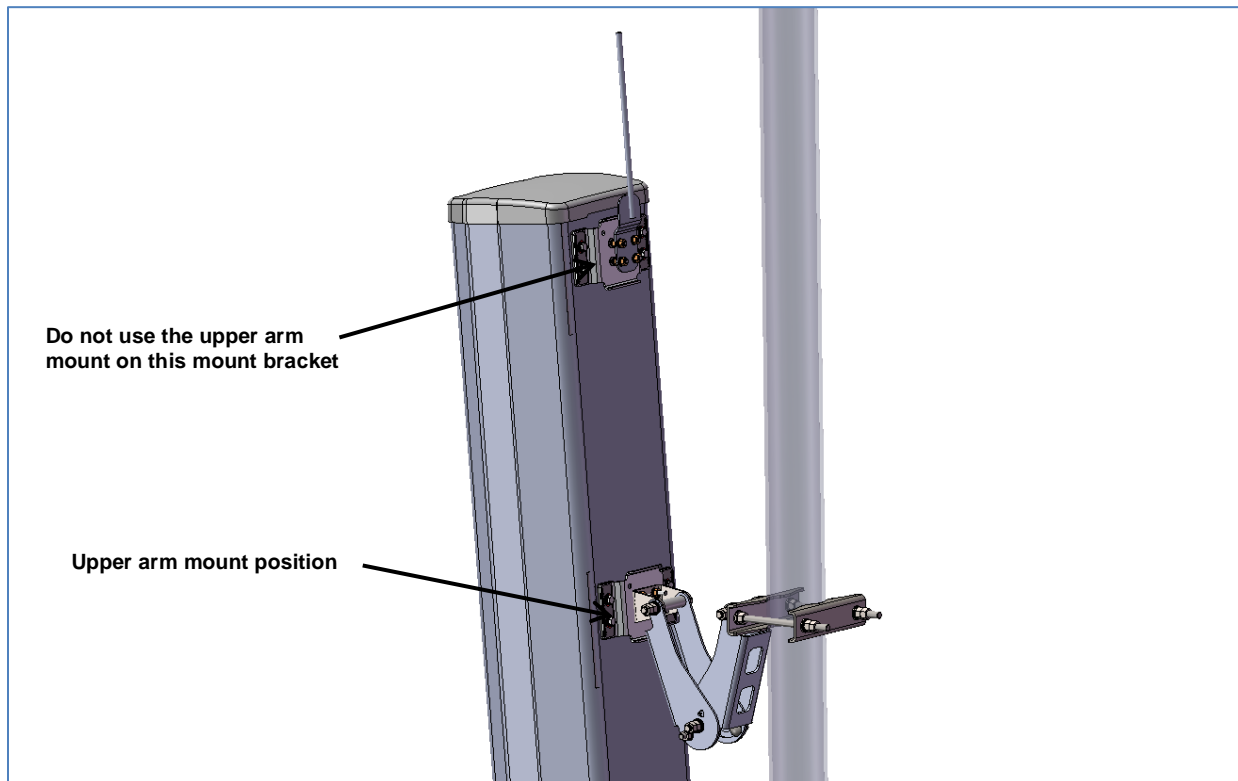


Figure 4: Upper Arm Mount Position For 8ft Antenna Models

NOTE:

- Use of a digital inclinometer is recommended for antenna positioning accuracy.
- See above illustrations and Table 2 on page 4 for torque settings.

4 Tilt Angle Indicator Guide for various Antenna Products

4.1.1 Tilt Angle Indicator Guide for 4FT 65Deg 6/8/10/12P Products

Tilt Indicator Table for 4FT 65Deg 6/8/10/12P		
Angle (Degrees) Lower arm Position 1	Angle (Degrees) Lower arm Position 2	Indicator
0	-2	1.0
1	-1	2.0
2	0	3.3
3	1	4.5
4	2	5.7
5	3	6.9
6	4	8.0
7	5	9.1
8	6	10.5
9	7	11.8
10	8	13.0

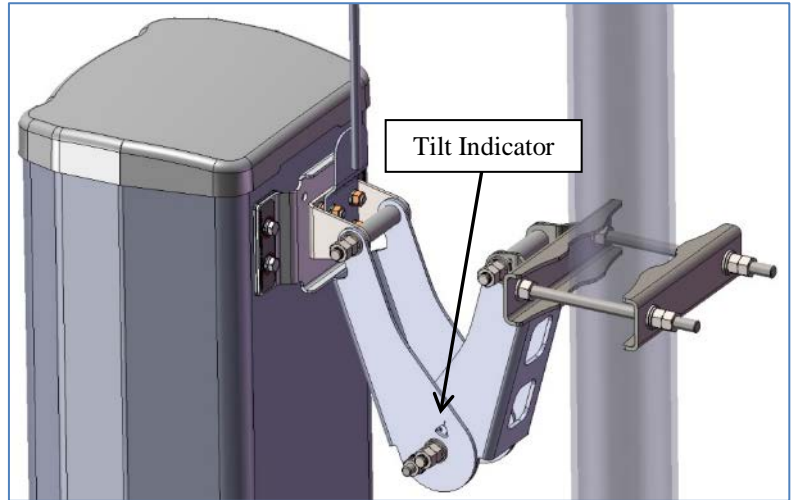


Figure 5: Tilt Indicator

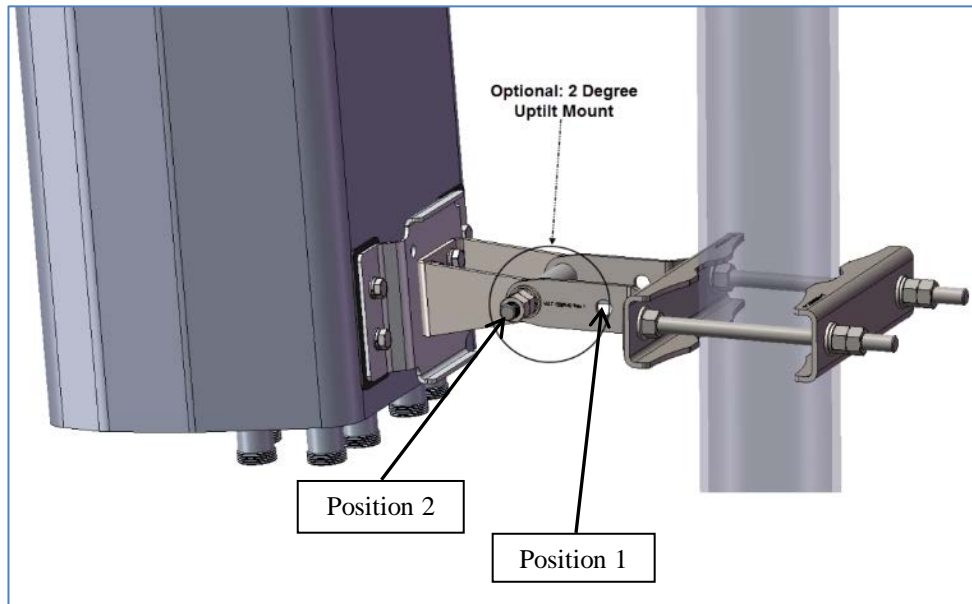


Figure 6: 2 Degree Up Tilt Mount

4.1.2 Tilt Angle Indicator Guide for 6&8FT 65Deg 6/8/10/12P Products

Tilt Indicator Table for 6&8FT 65Deg 6/8/10/12P		
Angle (Degrees) Lower arm Position 1	Angle (Degrees) Lower arm Position 2	Indicator
0	-2	0.0
1	-1	1.5
2	0	3.0
3	1	5.0
4	2	6.5
5	3	8.3
6	4	10.0
7	5	12.0
8	6	14.0
9	7	16.0
10	8	18.5

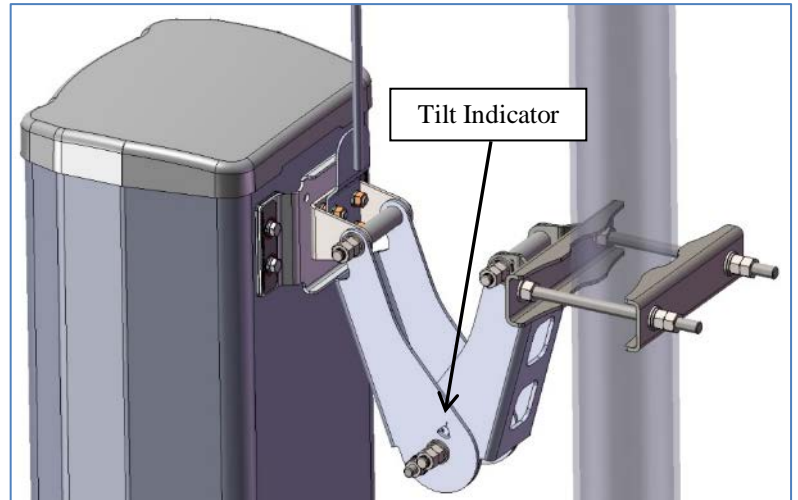


Figure 5: Tilt Indicator

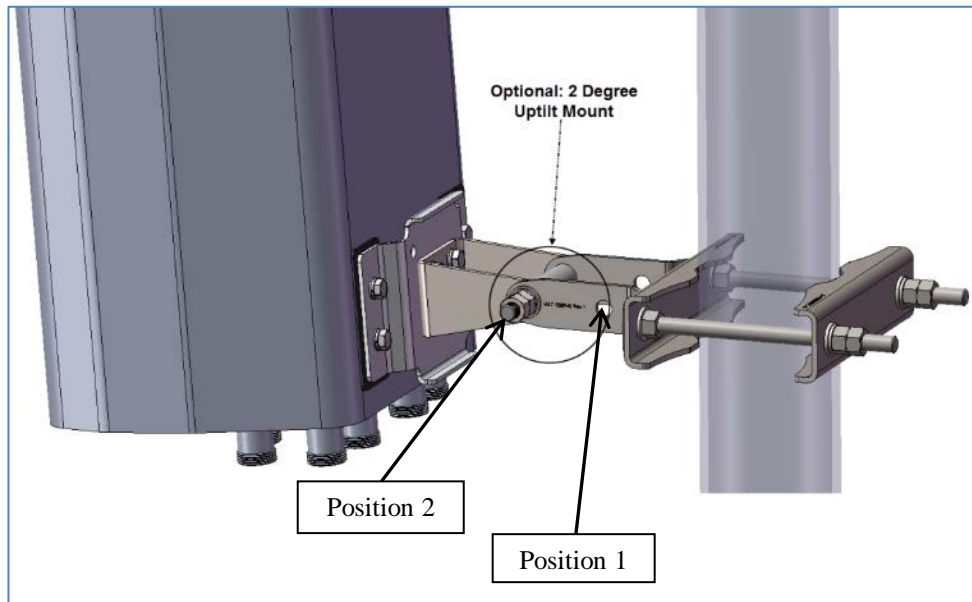


Figure 6: 2 Degree Up Tilt Mount

4.1.3 Tilt Angle Indicator Guide for 6&8FT 45Deg 6/8P Products

Tilt Indicator Table for 6&8FT 45Deg 6/8P		
Angle (Degrees) Lower arm Position 1	Angle (Degrees) Lower arm Position 2	Indicator
0	-2	0.0
1	-1	1.6
2	0	3.2
3	1	4.9
4	2	6.5
5	3	8.2
6	4	10.0
7	5	11.8
8	6	13.8
9	7	15.8
10	8	18.0

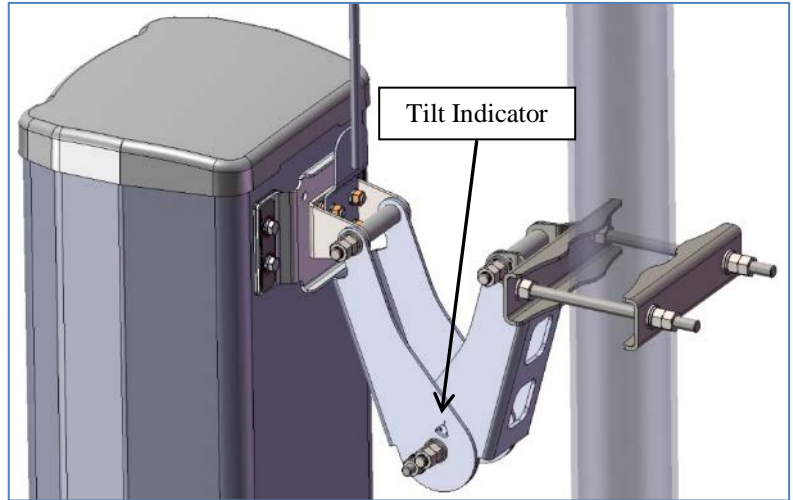


Figure 5: Tilt Indicator

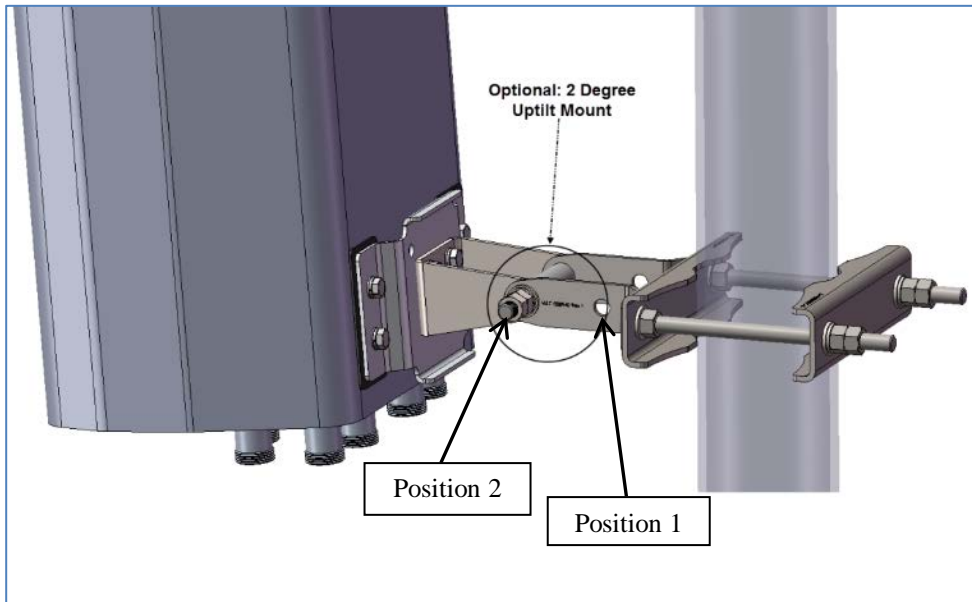


Figure 6: 2 Degree Up Tilt Mount

5 Lower Mount Assembly: AS-001184, supplied as part of AS-000977

1. All bolts assembled loosely until installation except where shown.
2. Torque M12 bolts where shown to 65 Ft. Lbs (88 N-m).
3. **NOTE:**
 - The addition or replacement of any items supplied in this kit may compromise structural integrity.

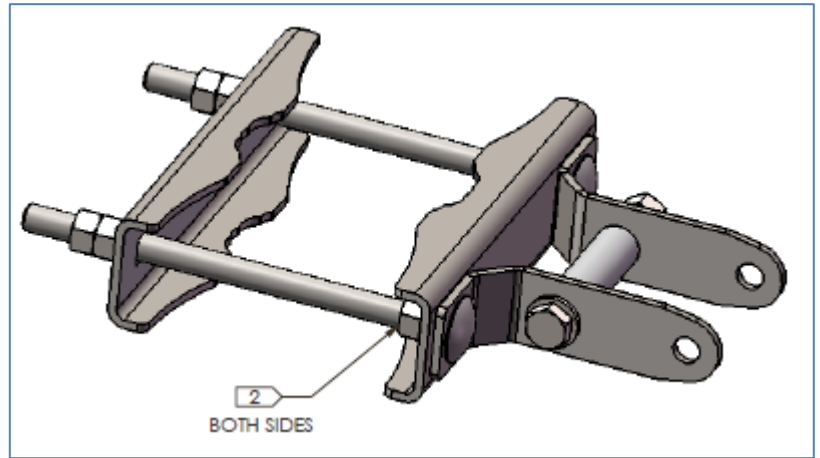


Figure 7: Lower Mount Assembly

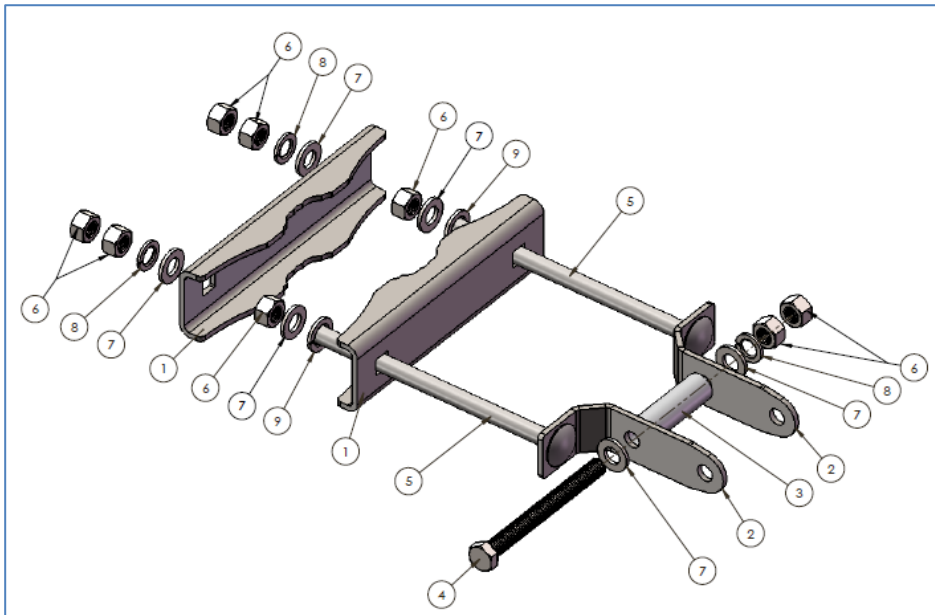


Figure 8: Lower Mount Assembly Exploded View

ITEM NO.	PART NUMBER	QTY.
1	MEC-008938	2
2	MEC-008940	2
3	MEC-008956	1
4	Bolt-M12x1.75x120 ISO 4014	1
5	Bolt-Carriage M12-1.75x200 ISO 8677	2
6	NUT-Hex M12x1.75	8
7	Washer DIN 125 - A 13	6
8	Washer-Split Lk M12	3
9	Washer-Split Lk M14	2

Lower arm mount position for all antenna models.

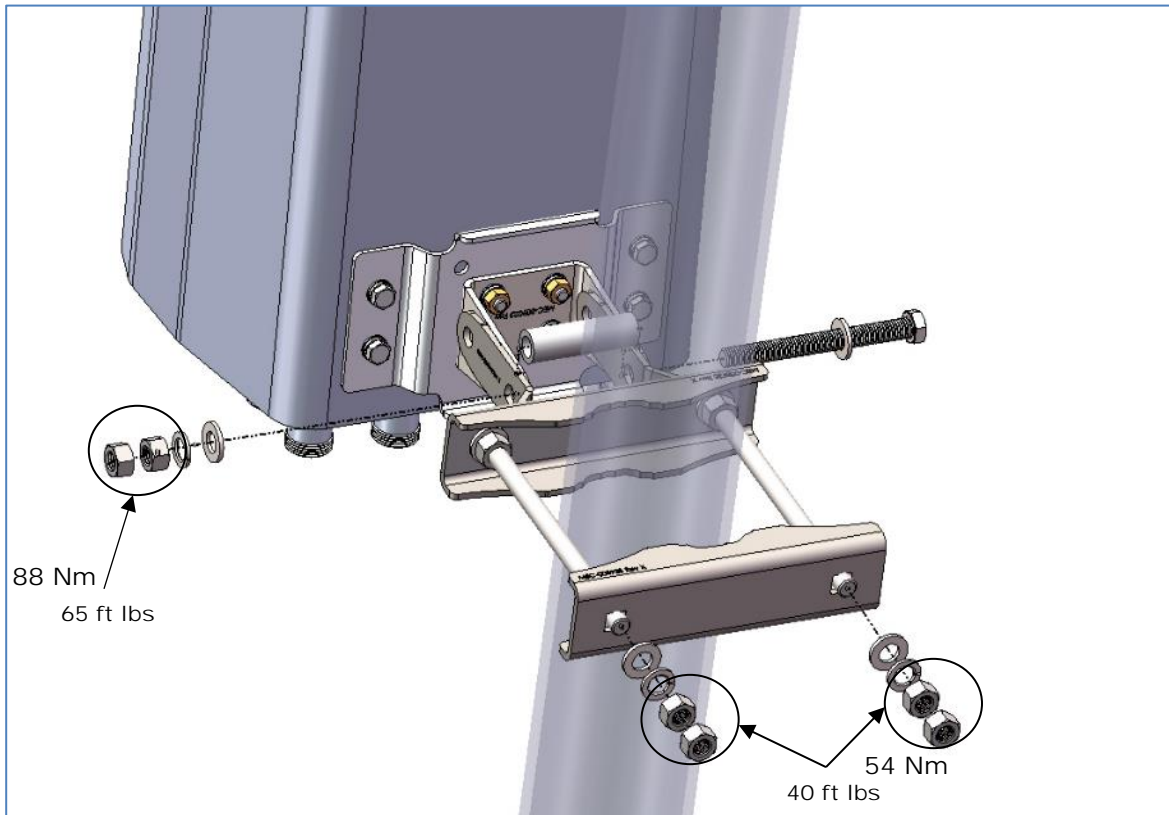


Figure 9: Pole Mount of Lower Mount Assembly (AS-001184)

NOTE:

- Use of a digital inclinometer is recommended for antenna positioning accuracy.
- See above illustration and Table 2 on page 4 for torque settings.

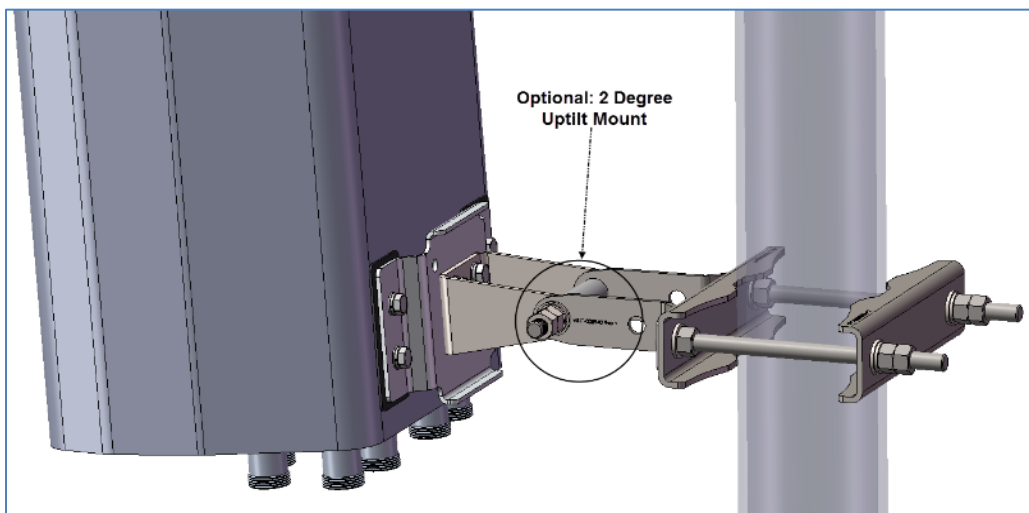


Figure 10: Illustration showing 2 Degree Up Tilt

6 Optional Lightning Finial AS-001034

Does the mast require lightning protection?

The lightning finial is to be fitted where the antenna extends above the top of the tower or building. The finial is best installed prior to the antenna installation on the tower/pole.

Step 1: Place finial on top of washers

Step 2: Add 4 - Flat washers, 4 - Lock washers, and 4 - M8 - Hex nuts

Step 3: Torque per Table 2

***DO NOT LOOSEN OR TIGHTEN BOLTS GOING INTO ANTENNA OR WARRANTY IS VOIDED**

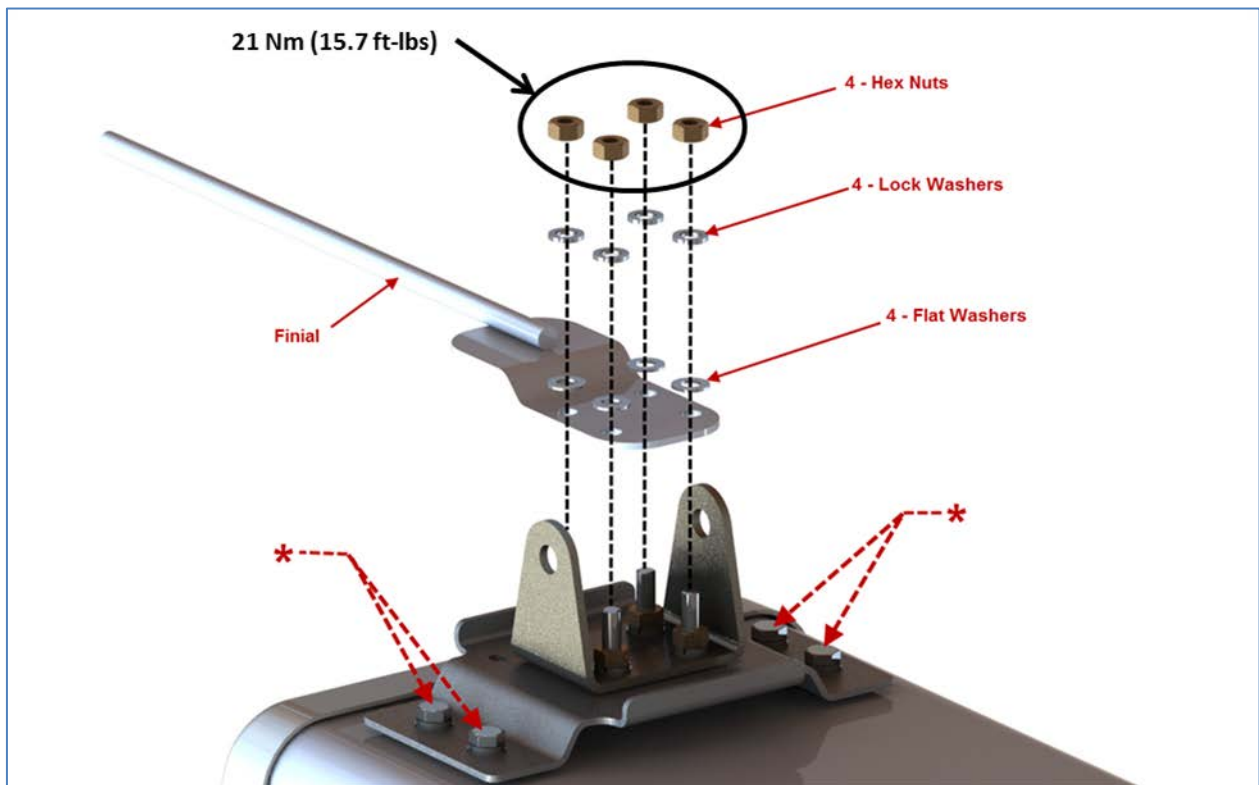


Figure 11: Lightning Finial Assembly

7 AISG & RF Connections for 6-port Antennas, SBT and non-SBT versions

These diagrams refer to 6-port models of all lengths. The antennas are factory configured for AISG 2.0.

The Device type classification is **Type 1**.

All AISG RET Devices are communicating through the single or dual input and output DIN connectors or using "AISG over RF" on the antenna connector plate as shown below.

Wire the AISG connections and attach the antenna jumpers according to the RFDS (Radio Frequency Design Specification) supplied by engineering.

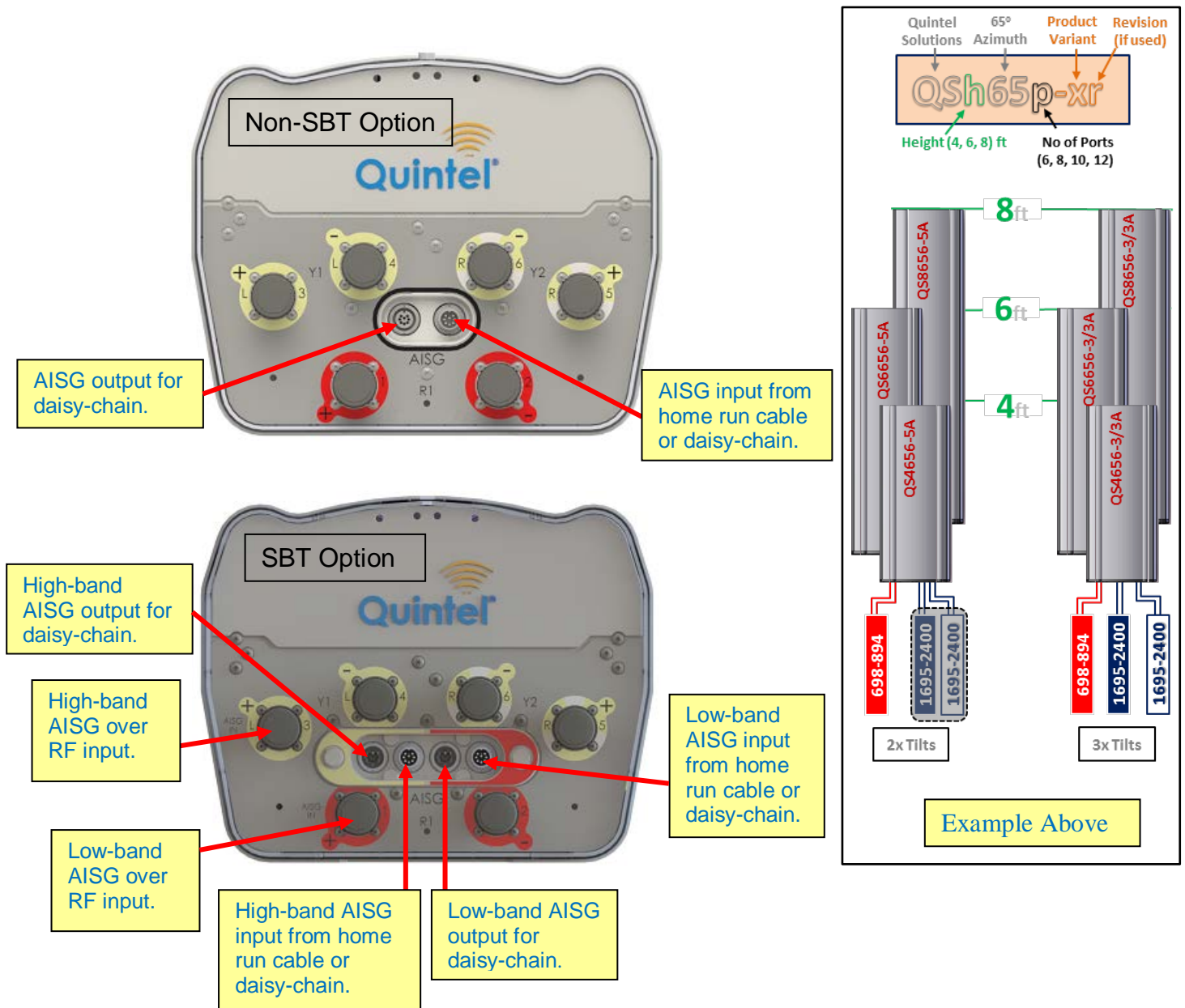


Figure 12: AISG & RF Connections for 6-port Antennas

8 AISG & RF Connections for 8-port Antennas, SBT and non-SBT versions

These diagrams refer to 8-port models of all lengths. The antennas are factory configured for AISG 2.0.

The Device type classification is **Type 1**.

All AISG RET Devices are communicating through the single or dual input and output DIN connectors or using "AISG over RF" on the antenna connector plate as shown below.

Wire the AISG connections and attach the antenna jumpers according to the RFDS (Radio Frequency Design Specification) supplied by engineering.

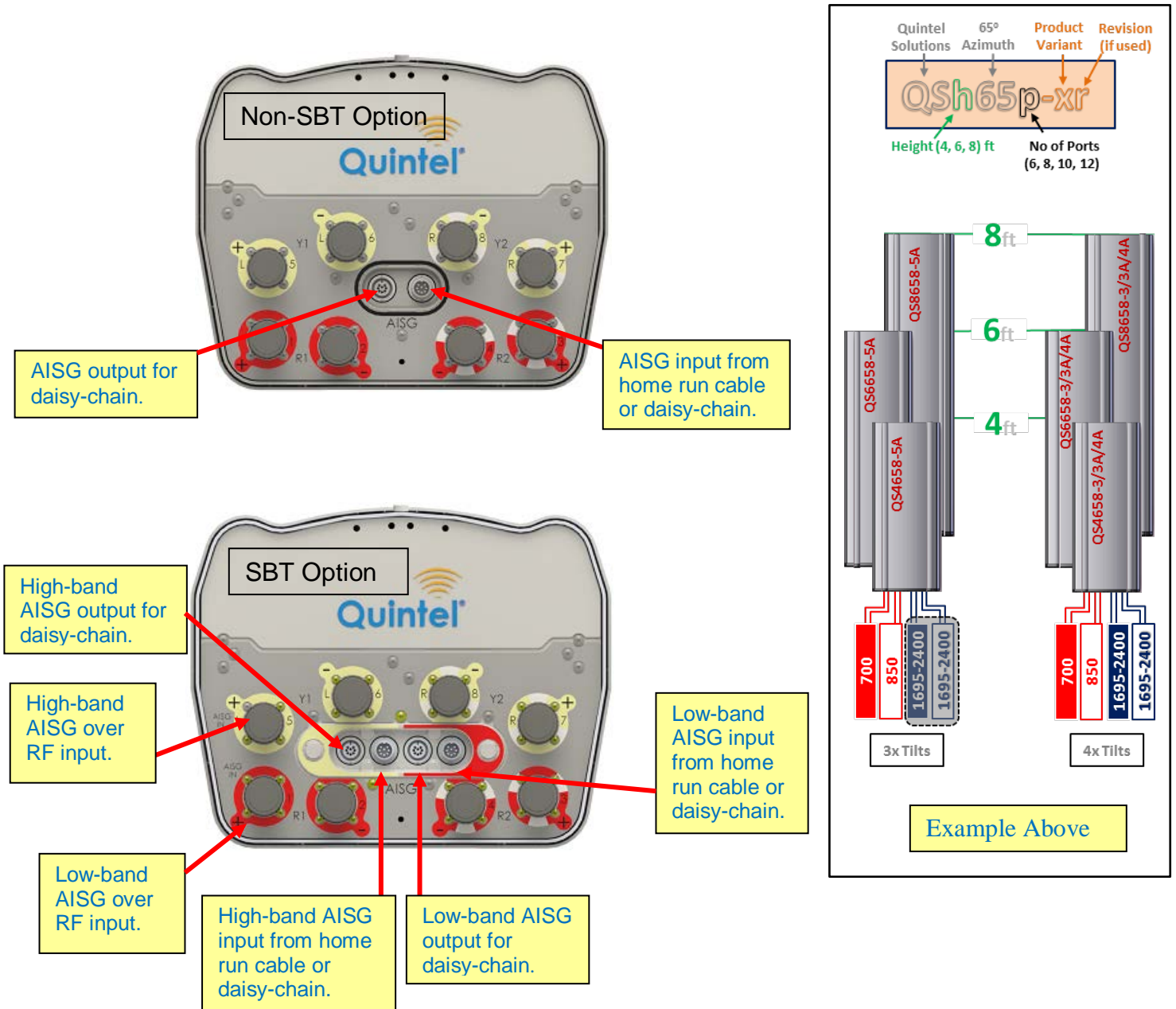


Figure 13: AISG & RF Connections for 8-port Antennas

9 AISG & RF Connections for 10-port Antennas SBT and non-SBT versions

These diagrams refer to 10-port models of all lengths. The antennas are factory configured for AISG 2.0.

The Device type classification is **Type 1**.

All AISG RET Devices are communicating through the single or dual input and output DIN connectors or using "AISG over RF" on the antenna connector plate as shown below.

Wire the AISG connections and attach the antenna jumpers according to the RFDS (Radio Frequency Design Specification) supplied by engineering.

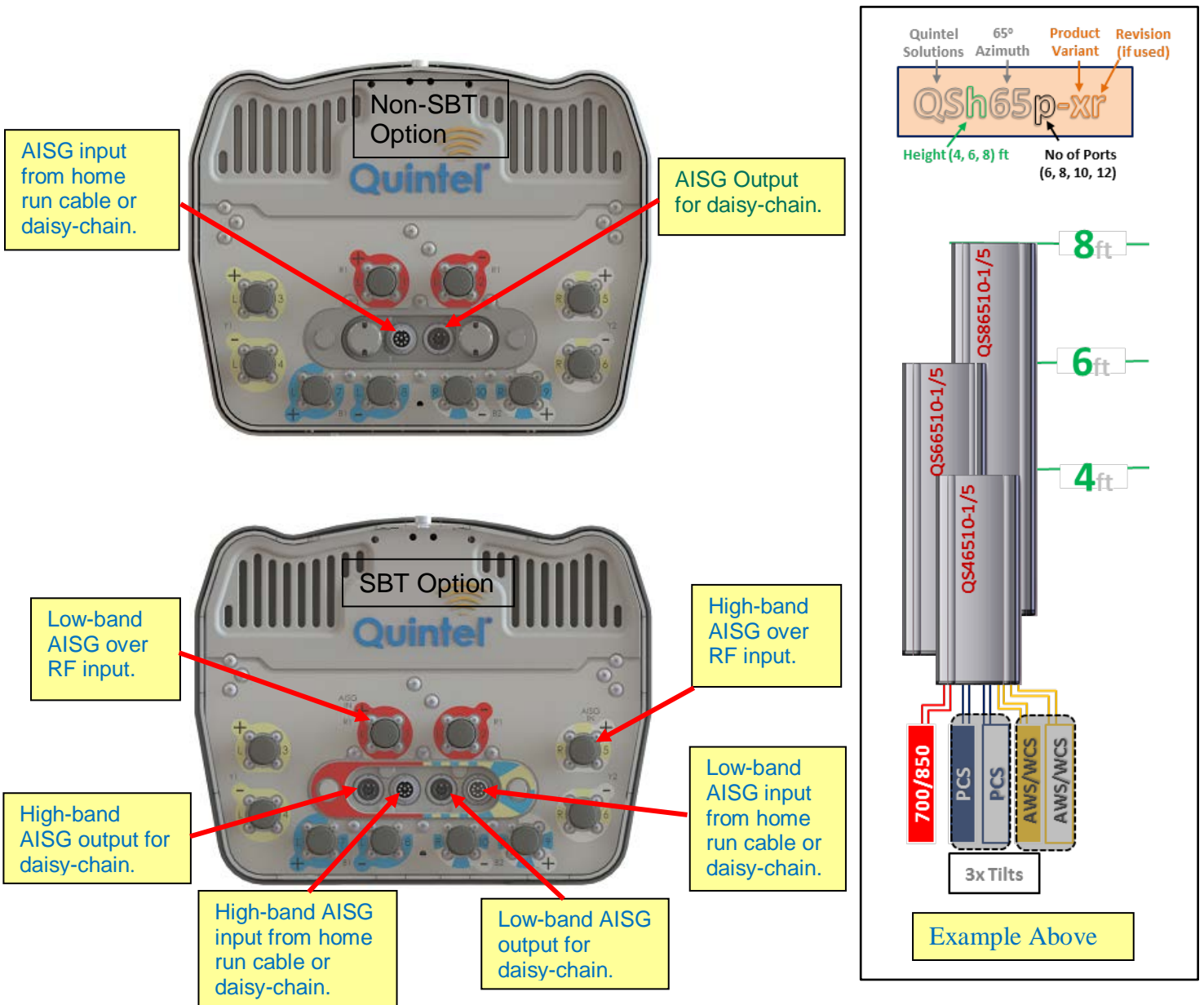


Figure 14: AISG & RF Connections for 10-port Antennas

10 AISG & RF Connections for 12-port Antennas, SBT and non-SBT versions

These diagrams refer to 12-port models of all lengths. The antennas are factory configured for AISG 2.0.

The Device type classification is **Type 1**.

All AISG RET Devices are communicating through the single or dual input and output DIN connectors or using "AISG over RF" on the antenna connector plate as shown below.

Wire the AISG connections and attach the antenna jumpers according to the RFDS (Radio Frequency Design Specification) supplied by engineering.

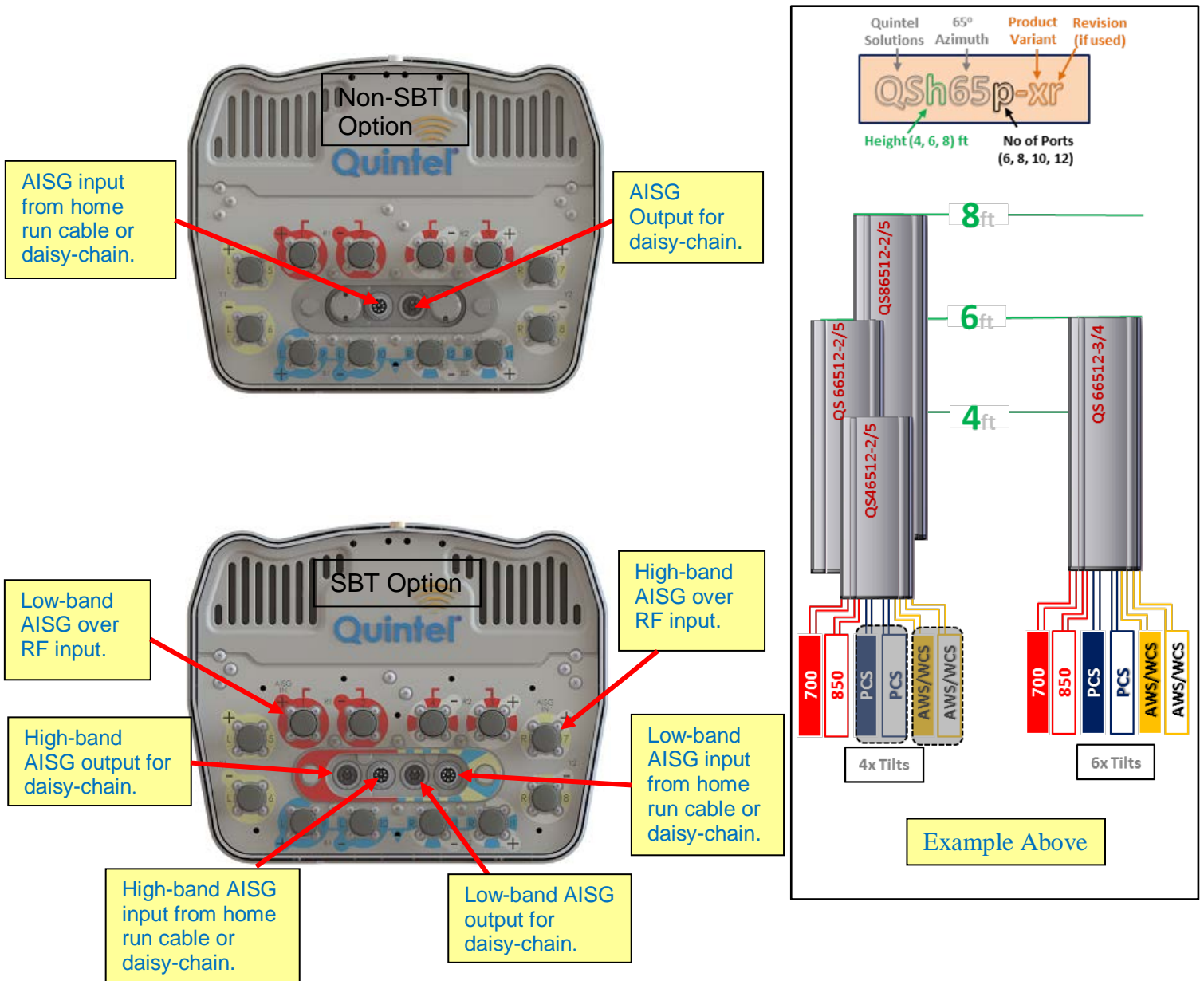


Figure 15: AISG & RF Connections for 12-port Antennas

11 AISG Controller Display

The antenna models listed below will use the following naming convention:

- a) All 6-port antenna models, Example: QS6656-XR where X=model and R=revision
- b) All 8-port antenna models, Example: QS6658-XR where X=model and R=revision
- c) All 10-port antenna models, Example: QSX6510-XR where X=model and R=revision
- d) All 12-port antenna models, Example: QSX6512-XR where X=model and R=revision

The naming convention used in the AISG display corresponds to the antenna port labels on the bottom of the antenna.

R1 – Low band ports, refer to data sheet for details.

R2 – Low band ports covering, refer to data sheet for details.

Y1 – High band left ports, refer to data sheet for details.

Y2 – High band right ports, refer to data sheet for details.

B1 – High band left ports, refer to data sheet for details.

B2 – High band right ports, refer to data sheet for details.

Y1Y2 – High band left and right ports, refer to data sheet for details.

B1B2 – High band left and right ports, refer to data sheet for details.

The tilts for each device and sector naming conventions should be set according to the RFDS (Radio Frequency Design Specification) supplied by engineering and in a manner appropriate to the AISG controller being used. Please refer to the AISG controller manufacturer's documentation for further information.

11.1 Example of 4-Tilt QS66512-2 Display

KATHREIN
Central Control Unit

Site ID : Your Site Name

Copyright © 2002-2010, Kathrein Werke KG

CCU Setup CCU Status Devices Setup Devices Status Software Update

RET Status:

Name	[Antenna]	Sector ID	Antenna Model	Down Tilt		Status			
				elec.	total				
C RET 1		1	698-787 MHz	RFS : QS665122_R1_A	2.0	2.0	Set Tilt	OK	Details
C RET 2		1	824-894 MHz	RFS : QS665122_R2_A	2.0	2.0	Set Tilt	OK	Details
C RET 3		1	1850-1990 MHz	RFS : QS665122_B1B2_A	2.0	2.0	Set Tilt	OK	Details
C RET 4		1	1695-1780/2110-2400 MHz	RFS : QS665122_Y1Y2_A	2.0	2.0	Set Tilt	OK	Details

Reconnect to Devices Update Status

Annotations:

- 700MHz single tilt by band entry.
- 850MHz single tilt by band entry.
- PCS high band Left & Right common tilt entry.
- AWS/WCS high band Left & Right common tilt entry.
- Sector ID set by user. Information for reference only.

11.2 **Example** of 6-Tilt QS66512-3 Display

KATHREIN
Central Control Unit

Site ID : Your Site Name

Copyright © 2002-2010, Kathrein Werke KG

CCU Setup CCU Status Devices Setup Devices Status Software Update

RET Status:

Name	[Antenna]	Sector ID	Antenna Model	Down Tilt		Status
				elec.	total	
A RET 1	1	1850-1990 MHz	RFS : QS665123_B2_A	2.0	2.0	Set Tilt OK Details
A RET 2	1	698-787 MHz	RFS : QS665123_R1_A	2.0	2.0	Set Tilt OK Details
A RET 3	1	1695-1780/2110-2400 MHz	RFS : QS665123_Y1_A	2.0	2.0	Set Tilt OK Details
A RET 4	1	1695-1780/2110-2400 MHz	RFS : QS665123_Y2_A	2.0	2.0	Set Tilt OK Details
A RET 5	1	1850-1990 MHz	RFS : QS665123_B1_A	2.0	2.0	Set Tilt OK Details
A RET 6	1	824-894 MHz	RFS : QS665123_R2_A	2.0	2.0	Set Tilt OK Details

Reconnect to Devices Update Status

Callouts:

- PCS high band Right single tilt entry. (points to RET 1)
- 700MHz single tilt by band entry. (points to RET 2)
- AWS/WCS high band Left single tilt entry. (points to RET 3)
- AWS/WCS high band Right single tilt entry. (points to RET 4)
- Sector ID set by user. Information for reference only. (points to RET 6)
- 850MHz single tilt by band entry. (points to RET 5)
- PCS high band Left single tilt entry. (points to RET 6)

12 AISG Controller Display – QSX65X-3 Models

The antenna models listed below will use the following, older naming convention:

- a) All 6-port antenna models without a trailing revision letter, Example: QS6656-3
- b) All 8-port antenna models without a trailing revision letter, Example: QS6658-3

Example: This diagram refers specifically to antenna model QS6658-3, with a total of four (4) RET devices:

- One for independently tilting 700MHz – Labeled RFS: QS6658_3_700
- One for independently tilting 850MHz – Labeled RFS: QS6658_3_850
- One for independently tilting 1710-2400MHz on the Left hand array – Labeled RFS: QS6658-3_17_24_L
- One for independently tilting 1710-2400MHz on the Right hand array – Labeled RFS: QS6658-3_17_24_R

The tilts for each device and sector naming conventions should be set according to the RFDS (Radio Frequency Design Specification) supplied by engineering and in a manner appropriate to the AISG controller being used. Please refer to the AISG controller manufacturer's documentation for further information.

12.1 **Example** of 4-Tilt QS6658-3 Display

The screenshot shows the Kathrein Central Control Unit interface. At the top, it displays 'KATHREIN Central Control Unit', 'Site ID : Quintel', and 'Copyright © 2002-2007, Kathrein Werke KG'. Below this are navigation buttons: 'CCU Setup', 'CCU Status', 'Devices Setup', 'Devices Status', and 'Software Update'. The main section is titled 'RET Status:' and contains a table with the following data:

Name	[Antenna]	Sector ID	Antenna Model	Down Tilt		Status
				elec.	total	
RET 1	1	---	RFS : QS6658_3_850	2.0	2.0	Set Tilt OK Details
RET 2	1	---	RFS : QS6658-3_17_24R	2.0	2.0	Set Tilt OK Details
RET 3	1	---	RFS : QS6658-3_17_24L	2.0	2.0	Set Tilt OK Details
RET 4	1	---	RFS : QS6658_3_700	2.0	2.0	Set Tilt OK Details

Callouts from yellow boxes point to the following entries in the table:

- 850MHz single tilt by band entry. (Points to RET 1)
- 1710-2400MHz Right single tilt by band entry. (Points to RET 2)
- 1710-2400MHz Left single tilt by band entry. (Points to RET 3)
- 700MHz single tilt by band entry. (Points to RET 4)

At the bottom of the interface are buttons for 'Reconnect to Devices' and 'Update Status'.

13 RET control

For direct RET control via a PC, it is recommended to use the RFS PA-USB/485 protocol adaptor, details can be found at http://www.rfsworld.com/userfiles/pdf/pa_usb485_datasheet_rev.c.pdf, along with user instructions and software driver details at http://www.rfsworld.com/WebSearchECat/datasheets/media/?q=images/Site_Optimization_Products/412818_PA-USB485_Installation_Instructions.pdf.

It is required that any direct power connection to the RET device shall be a "limited power source" that does not exceed 100 Watts.

Please refer to relevant Network Operator Operating Procedures regarding connecting and programming RET devices with OEM eNodeBs.

External AISG & RF Cable connections

For all external RF and AISG cable connections it is recommended that they are weather proofed in accordance with the cable manufacturers and network operator's guidelines for weather proofing. Failure to do so, may lead to degradation in the product performance or in worse case a product failure.

Important Note:

The installation, maintenance and removal of an antenna requires qualified personnel. Antenna systems must be inspected at least once a year and after any severe weather by qualified personnel to verify maintenance and condition of equipment.

Technical Support

Please contact technical support at the appropriate number or email contact listed below should you have any questions regarding this installation guide.

About Quintel

Quintel is a leading innovator in the design, development, and delivery of network-efficient antenna solutions for wireless operators worldwide. The company's products enable global wireless operators to independently deploy and optimize multiple air interfaces or services on a single standard antenna platform. Quintel is the only antenna maker whose products can increase a wireless network's capacity and provide additional services, without increasing the number or size of antennas. Quintel is headquartered in Rochester, New York with additional offices throughout North America and Europe.

More information about Quintel is available at www.quintelsolutions.com.

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