RADIO FREQUENCY SYSTEMS
The Clear Choice®

TMA Installation, Configuration, Testing and Troubleshooting process Document

This document applies to the following RFS models of Tower Mounted Amplifiers.

First Generation (Firmware version TMA-A20-N_SW2_20.0.bin)
ATMAA1412D-1A20. AWS Twin Wideband Dual Duplex Tower Mounted Amplifier
(Firmware version TMA-A20-N_SW2_20.1.bin)
ATMAP1412D-1A20. PCS and AWS Dual Band, Dual Duplex Tower Mounted Amplifier

Second Generation (Firmware version UAM-1A20_SW2.00.8.bin)
ATMAWSD-1A20 AWS Twin Wideband Dual Duplex Tower Mounted Amplifier
ATMAP-1A20 PCS and AWS Dual Band, Dual Duplex Tower Mounted Amplifier
ATM1900D-1A20 PCS Twin Wideband Dual Duplex Tower Mounted Amplifier

The intent of this document is to ensure the long term, reliable operation of these TMA's and to limit un-necessary and costly returns of products, which have no technical problems, due to miss-testing or incorrect trouble shooting practices. Preventing this level of NFF can result in considerable opex savings.

The document is divided into 4 sections and a general appendix.

1. Installation
2. Software validation.
3. Proper testing procedures for Return Loss (VSWR), Gain and current draw.
4. General troubleshooting Tips.

Appendix

1. TMA Installation Instructions
2. AISG Cable – Connector installation Guidelines
3. Accessing the Optimizer RT software site
4. TMA firmware upload process
5. Site Master S332 Calibration process.

1. Installation

Like all precision electronics, the Tower Mounted amplifiers must be installed following proper installation instructions and techniques. These units may be damaged if proper attention to storage and installation are not followed.

Each TMA is provided with an **I** shaped mounting bracket (and hose clamps) designed for either Pipe (pole) or wall mounting. See Appendix 1 for proper mechanical installation. TMA's may be installed in any orientation **except** 2, inverted (upside down) or with the RFS logo facing up as water could pool on the vent.

Each TMA is currently provided with a weather proof black seal cap install on the AISG connector port, this cap should remain in place if the AISG connector is not going to be utilized for connections to an ACU. If connection to ACU's is planned, use this seal cap to seal the last unused ACU connector port. Additional female AISG connector caps are available from RFS as p/n **AISG-CAP-20M** (a pack of 20 caps). See Appendix 2 for proper methods of installing AISG cables. Failure to install AISG cables correctly could lead to connector damage or electrical issues, including shorts, if water is allowed to enter a connector.

All unused 716-DIN RF connectors must be properly sealed to prevent water entry. RFS has a seal cap available for this. Model number **716F-SEAL**

2. Software Validation.

The most current approved version of TMA firmware load should always be resident in the TMA's. As of the date of this handbook, the correct TMA firmware version is listed on page 1, and is available on the Optimizer RT software distribution site. Appendix 3 provides details on accessing this and all other AISG software products. Appendix 4 shows how to upload a new firmware load to the TMA. CAUTION: Operating the TMA with an incorrect firmware load can alter its RF performance and alarm operating conditions.

3. Testing

The three most commonly tested specifications on a TMA are, Return loss (or VSWR), Gain and Current draw. In order to provide useful feedback on the actual performance of the TMA two things must happen together, first the test must be performed correctly and second there must be a good understanding of what results constitute a passing or failing result.

It should be understood that these TMA's do not support Auto-bypass, so the Return loss and Gain tests should be done before connecting the TMA's to the transmission line system.

3a. TMA BTS Input Return Loss testing using Anritsu Site Master

The TMA's input return loss can be tested into the BTS port of the TMA, with the same channel Antenna port terminated with a 50 Ω load. For example, when testing the PCS BTS port, terminate the PCS antenna port. **For RFS model TMA's, bias is required to produce the operational impedance at the BTS port. Failure to properly apply bias voltage may result in a false failure indication.** The TMA Return Loss / VSWR shall be equal to or better than (within the Tx and Rx bands):

Pass/Fail limit:	**RL <= –18 dB (VSWR <= 1.3:1)**

Ensure test equipment is properly configured and calibrated (see Appendix 5).

AWS testing occurs in the two bands 1710-1755 and 2110-2155. (Figure 1) Set markers at the four frequency edges and look for any signals in either band exceeding the Limit threshold.

PCS testing occurs in the two bands 1850-1910 and 1930-1990. (Figure 2) Set markers at the four frequency edges and look for any signals in either band exceeding the Limit threshold.

If any apparent faults appear, reset the start and stop frequencies on the analyzer for the specific band where it occurred, re-calibrate the analyzer and then re-sweep. This step maximizes the sensitivity of the Site Master to avoid possible false fail indications.

WARNING: CARE MUST BE TAKEN THAT THE MAXIMUM DC INPUT POWER SPECIFICATION FOR THE TMA IS NOT EXCEEDED. THEREFORE IT IS RECOMMENDED TO USE THE RFS BIT2AS-AL20 BIAS TEE AND a PA-USB/485-2 FOR A BIAS SOURCE WHEN TESTING.

WARNING: BE SURE THAT THE BIAS TEE IS INSERTED CORRECTLY SO THAT THE 'SURGE' PORT IS TOWARDS THE *BTS PORT* OF THE TMA AND NOT INTO THE TEST EQUIPMENT.

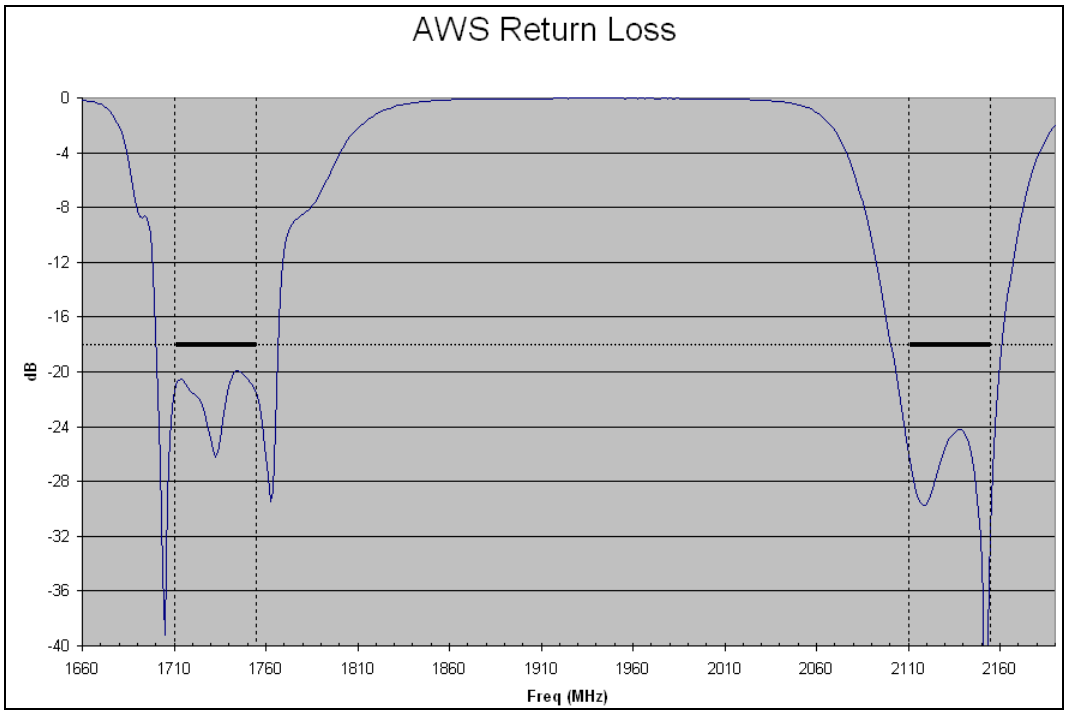

Figure 1 - Sample TMA AWS Return Loss Measurement

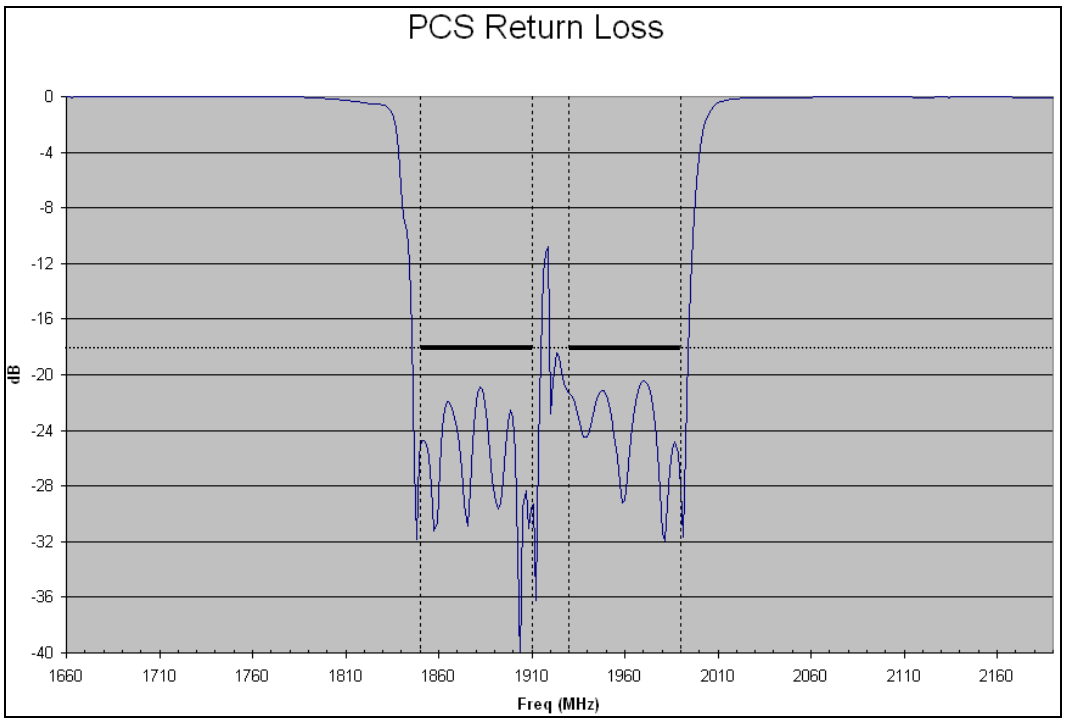

Figure 2 - Sample TMA PCS Return Loss Measurement

3b. TMA Gain

For RFS model TMA's, bias is required to produce operational gain at the BTS port.

Gain measurements are as simple a powering up the TMA channel (applying bias voltage). Injecting an appropriate frequency signal into the antenna port (recommended < 0dBm) and comparing the output power from the BTS port to the input level into the Antenna port.

Comparing the power out of the BTS port, with the TMA powered on, to the power out of the BTS port, with the TMA powered off is NOT A VALID MEASURMENT OF GAIN. Because this TMA does not support bypass this type of test is actually comparing the Active gain to the passive insertion loss. This typically would look as if the gain was approximately 7-8 dB too high.

3c. Current Draw.

Typically the reason for measuring current is either to try and troubleshoot high current alarms or to prove in some initial commissioning pass / fail criteria.

High current type alarms are the single most common false failure mode experienced with these TMA's, and account for approximately 75% of all NFF (**N**o **F**ault **F**ound) returns.

The main issues involved in these failures are twofold, firstly maintaining a good connection long enough and stable enough to get a valid measurement, and secondly knowing what the correct current measurement should actually be.

In order to make a valid measurement of the current draw into one of the BTS ports on the TMA, connection must be maintained for a minimum of 10 seconds in order to let all alarms and current regulators to set correctly. Current draw measurements made prior to 10 seconds are not valid. Any fluctuations in maintaining a good contact (even momentarily) can reset the TMA, and reset this 10-second timer. A customized inline current probe using AISG connectors is recommended.

Once a stable measurement is made, it needs to be understood that there are different current draws on the two different BTS ports, and the current draw on the Primary BTS port (BTS AWS1 port on the Twin, and BTS AWS port on the Dual band), will vary considerably based on the mode of operation (AISG vs. CWA) and by how many ACU's are connected. To accurately predict what the current draw should be requires a calculation based on all of this information. A simple Excel based AISG current calculator can be found on the Optimizer RT web site that can be used to accurately predict the current draw that should be measured. See Appendix 3 for access details and to download the calculator.

4. Troubleshooting

Prior to returning a TMA for a possible fault please follow the basic troubleshooting steps below.

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1. Symptom. A TMA, which formerly was operational, starts to indicate a high current condition or ACU's connected to the TMA fail.
    a. Remove the AISG cable connecting the ACU's from the TMA
    b. Check the cable and TMA connectors for signs of water or discoloration
    c. Cycle power to the TMA and check to see if any fault condition still exists. If the TMA still indicates High current, it should be replaced. **END**
    d. If the TMA appears to be operational, reconnect the AISG cable and recheck the status. If the system still operates correctly, it is likely that some water had at some point entered one of the AISG connections and has since dried / evaporated. All connections should be rechecked and sealed as shown in Appendix 2. **END**
    e. If the fault condition re-appears, Check all other AISG connection points for water or corrosion, replace any AISG cable that appears to be corroded and ensure all cables are properly connected and sealed. If the condition continues then the ACU's attached to the TMA should be checked for proper operation.

2. Symptom. The TMA fails Return loss sweep.
    a. Ensure test equipment is properly calibrated as shown in Appendix 5
    b. Ensure Bias voltage is applied to the BTS port of the side of the TMA being swept. This Bias voltage must be applied regardless of whether the sweep is of the Antenna port or the BTS port.
    c. Ensure that the opposite port on that side of the TMA is terminated with a good quality 50 Ohm load.

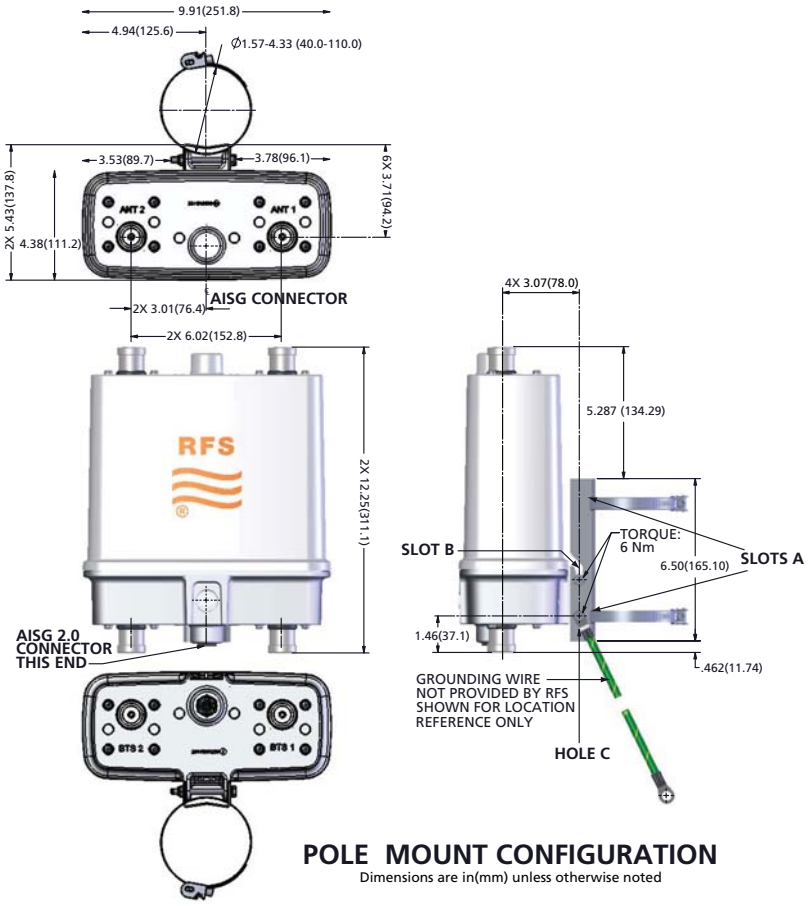
Recommended Installation Instructions

Twin AWS & PCS/AWS Dual-Band AISG 2.0 TMAs

Tower Mount Amplifiers | **ATMAA1412D-1A20, ATMAP1412D-1A20**

POLE MOUNT

1. Insert M6 bolt and nut into the top hole in the TMA. Do not tighten.
2. Open the hose clamps and slide them through Slots A in the bracket.
3. Wrap the hose clamps and bracket around the pole. Check that the hose clamps are horizontal before tightening.
4. With the M6 bolt and nut on the TMA, rest the TMA on Slot B.
5. Align the bottom hole in the TMA with Hole C in the bracket. Insert the grounding strap, M6 bolt and nut. Tighten both the M6 bolts and nuts to 6 Nm (4.5 lbf-ft).
7. Jumpers must be used to connect the TMA to the feeder and to the antenna. Ensure that no undue strain is placed on the connectors.
8. Please ensure that the jumpers are connected to the correct port. Follow the port designators described in the connection chart on the other side of this document.
9. Connectors are to be torqued to 25 N-m (18 lbf-ft).
10. **Note:** Regarding the ATMAP1412D-1A20 TMA, some Ericsson BTS's can supply the DC power directly to the PCS port of the TMA, through the main RF feeder, preventing the use of a Bias-T in the PCS branch. In this case, only one AISG 2.0 Bias-T is needed in the AWS branch of the TMA. For other BTS manufacturers, two AISG 2.0 Bias-Ts are required, one in each branch.



POLE MOUNT CONFIGURATION
Dimensions are in(mm) unless otherwise noted

WALL MOUNT

1. Align the bracket to the wall with four screws.
2. Insert the M6 bolt and nut into the top hole in the TMA. Do not tighten.
3. With the M6 bolt and nut on the TMA, rest the TMA on Slot B.
4. Align the bottom hole in the TMA with Hole C in the bracket. Insert the grounding strap, M6 bolt and nut.
5. Tighten both the M6 bolts and nuts to 6 Nm (4.5 lbf-ft).
6. Jumpers must be used to connect the TMA to the feeder and to the antenna. Ensure that no undue strain is placed on the connectors.
7. Please ensure that the jumpers are connected to the correct port. Follow the port designators described in the connection chart on the other side of this document.
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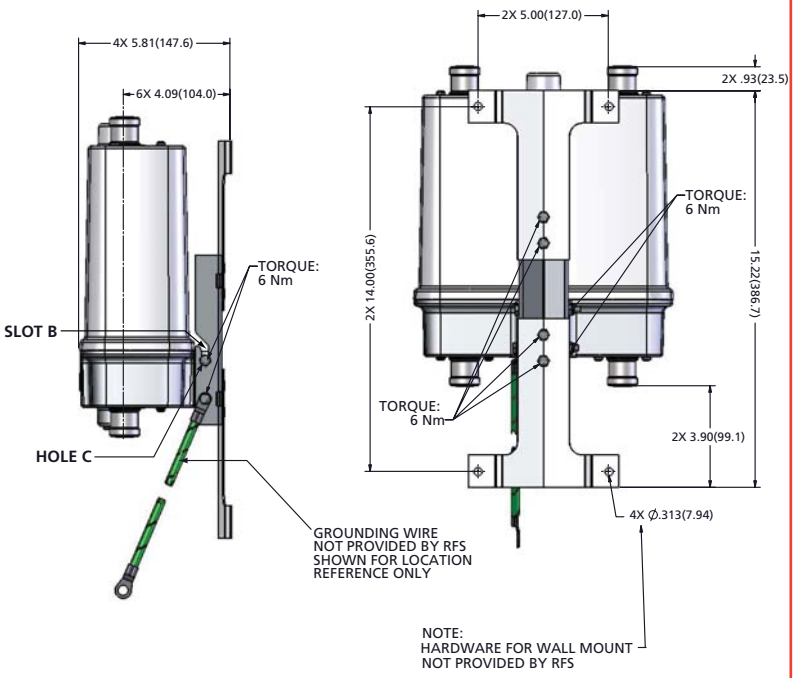
9. **Note:** Regarding the ATMAP1412D-1A20 TMA, some Ericsson BTS's can supply the DC power directly to the PCS port of the TMA, through the main RF feeder, preventing the use of a Bias-T in the PCS branch. In this case, only one AISG 2.0 Bias-T is needed in the AWS branch of the TMA. For other BTS manufacturers, two AISG 2.0 Bias-Ts are required, one in each branch.



WALL MOUNT CONFIGURATION
Dimensions are in(mm) unless otherwise noted

WATER SEALING

In order to ensure quality of transmission and to avoid water ingress into the system, make sure that the two vent caps on the front of the unit and the vent cap on the back are not damaged during installation.

RFS recommends that all connectors (antenna-to-jumper, jumper-to-TMA, TMA-to-jumper and jumper-to-feeder cable) be tightened to a 25 Nm (18 lbf-ft) and that all connections be sealed with either Cell-Tape weather sealant or by using a heat-shrink boot. If a heat-shrink boot is used, caution should be taken not to overheat or damage the base of the unit.

(See instructions below on sealing with C-Tape.)

Step 1

USING CELL-Tape

1. Start separating the tape from the backing.
2. Peel away two to three inches of backing.
3. Press and hold tape firmly to the top of the coupling nut of the connector. Begin to wrap the connector by stretching out the tape to half its original width maintaining good tension.
4. Wrap the connection joint thoroughly with a 1/2 to 2/3 overlap of tape, filling in gaps around the coupling nut.
5. Complete the wrap by overlapping until all of the connectors are covered completely.

Step 3

CELL-Tape Weather Sealant and Marking Tape 2 rolls (0.3" x 1" x 15')

Model Number	Color
CTAPE-1	Black
CTAPE-2	White
CTAPE-3	Yellow
CTAPE-4	Red
CTAPE-5	Blue
CTAPE-6	Green

Step 5

Connection Chart

Model Number	Description	Number of Ports	Port Designator	Connected to
ATMAP1412D-1A20	Dual Band Tower Mounted Amplifier, Dual Duplexed, PCS and AWS	5	AWS BTS	AWS Feeder
			PCS BTS	PCS Feeder
			AISG 2.0 CONN	AISG Control Cable to ACU*
			AWS ANT	AWS Antenna port
			PCS ANT	1900MHz PCS Antenna port
ATMAA1412D-1A20	Twin Tower Mounted Amplifier, Dual Duplexed, AWS	5	AWS BTS 1 (AISG)	Feeder 1
			AWS BTS 2	Feeder 2
			AISG 2.0 CONN	AISG Control Cable to ACU*
			AWS ANT 1	AWS Antenna port 1
			AWS ANT 2	AWS Antenna port 2

*ACU – Antenna Control Unit: Motor attached to the antenna to provide Remote Electrical Tilt.

Recommended Installation Instructions

Twin Tower Mounted Amplifier (TMA) Auto Bypass

ATM181412D-3, ATM181412D-1A20, ATM1900D-1CWA, ATM1900D-1A20, ATM2100D-1A20, ATM261612D-1A20 ATMAWSD-1A20, ATMAP-1A20

PACKAGE CONTENTS

Please find the following products inside the box:

- (1) Twin Tower Mounted Amplifier
- (2) Hose Clamps (For pole mounting – diameter 40-110mm)
- (1) Installation Instructions.

RECOMMENDED TOOLS

The following tools are needed for proper installation

- **5 mm Allen Key** – for fixation of the hose clamps onto the tower [Torque 5.5 Nm (4.1 ft-lb)]
- **10 mm Spanner** – for fixation of the ground cable to the TMA
- **Additional Tools** – for fixation of the ground cable onto the TMA, for fixation of the ground cable onto the tower grounding point, for tightening the 7/16 connector swivels and for mounting the TMA onto the wall

POLE MOUNTING INSTRUCTIONS

1. **Check that RF signals and DC power coming from the Base Station are OFF/disconnected.**
2. Fix the hose clamps onto the TMA.
3. Mount the TMA to the pole by tightening the hose clamps with 5.5 Nm (4.1 ft-lb) torque.
4. Attach a grounding cable (RFS Models CA020-2 or CA030-2 – Not Included) to the grounding screw.
5. Tighten the ground cable nut with 4 Nm (3 ft-lb) torque.
6. Adjust the length of the ground cable and fix it onto the tower ground connection.
7. Connect the jumpers between the 7-16 connectors of the antennas and the 7-16 connectors (ANT 1 and 2) of the TMA(s). Connect the jumpers between the 7-16 connectors (BTS 1 and 2) of the TMA(s) and the 7-16 connectors of the feeder cables.
8. When attaching the jumper cable 7-16 connector swivel to the TMA 7-16 female connector it is mandatory that the jumper cable meets with the 7-16 female connector of the TMA straight in line. Press the inner part of the jumper cable connector into the TMA connector and maintain this pressure when turning the swivel. Hereby the swivel will fit the thread of the female connector correctly and it will run smoothly. Tighten the swivel by hand.

   Note: No angular torque from the jumper cable is allowed at any time.
9. Tighten the connector assembly with 25 Nm (18.4 ft-lb) torque.
10. Seal all connectors. The tape around the connectors must connect with the TMA top/bottom plates for correct weather protection. See section "Connector Insulation" details.

IMPORTANT SAFEGUARDS

IMPORTANT: All national safety rules and regulations must be followed during installation and maintenance of the TMA.

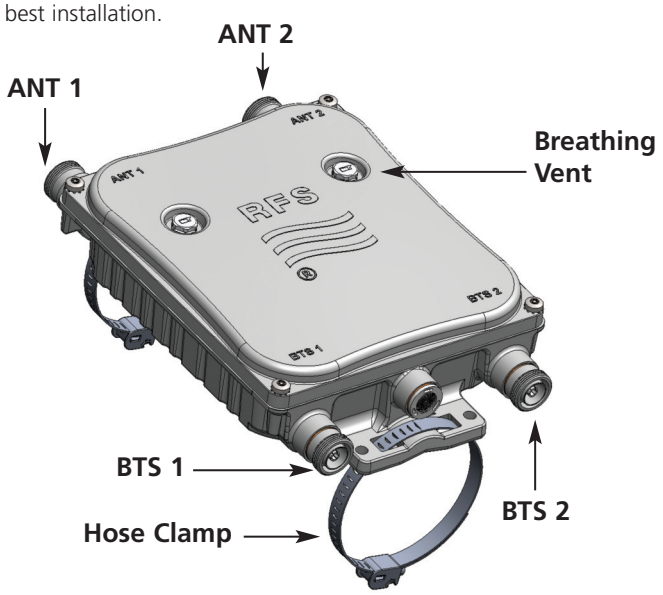
! Make sure that the Base Station is sending the proper DC input voltage (10-30VDC) through the feeder cables. The DC input voltage MUST be applied on both the TMA BTS Port 1 and the BTS Port 2.

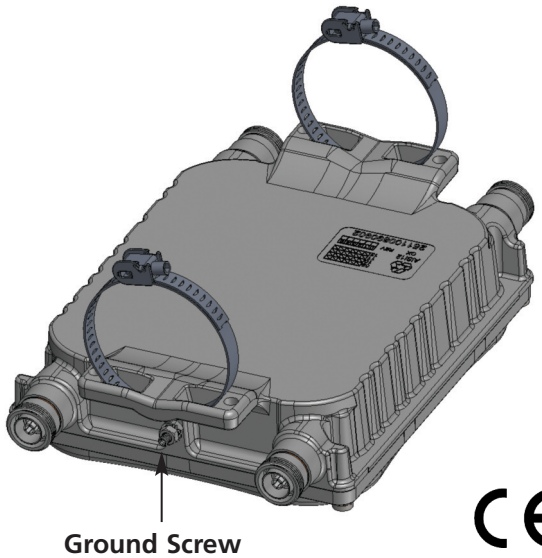
! It is important that no RF and DC power is floating in the associated RF feeder cables and, in general, that no power is radiated from the tower or site during the TMAs installation.

! RFS recommends using the shortest jumper cables from the TMA ANT Ports to the Antenna in order to optimize system performance.

! RFS recommends applying additional anti-corrosion protection and using best practices when products are installed in areas with high-salt concentration, on chimneys (SO2) or other extreme harsh environment, to lengthen the product lifetime.

! RFS recommends using RFS accessories and cables to ensure the best installation.





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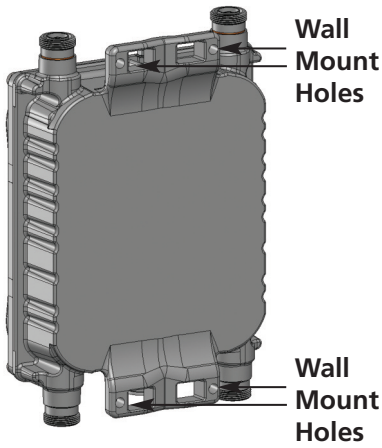
Recommended Installation Instructions

Twin Tower Mounted Amplifier (TMA) Auto Bypass

ATM181412D-3, ATM181412D-1A20, ATM1900D-1CWA, ATM1900D-1A20, ATM2100D-1A20, ATM261612D-1A20 ATMAWSD-1A20, ATMAP-1A20

WALL MOUNTING INSTRUCTIONS

1. Mount the TMA to the wall using the 4 holes (8.5 mm) on the brackets.
2. Follow instructions 8-15 on the Pole Mounting Instructions.



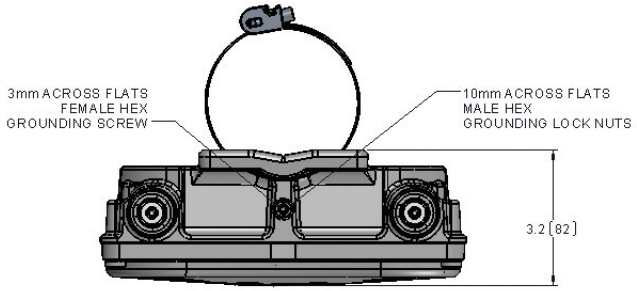
CONNECTOR INSULATION

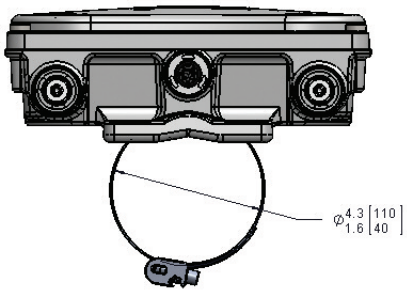
In order to ensure the best quality of transmission and to avoid water ingress, RFS recommends insulating all connections. This insulation is carried out after all connections (Antenna-to-Jumper, Jumper-to-TMA, TMA-to-Jumper, Jumper-to-Feeder Cable and TMA-to-ACU) have been tightened.

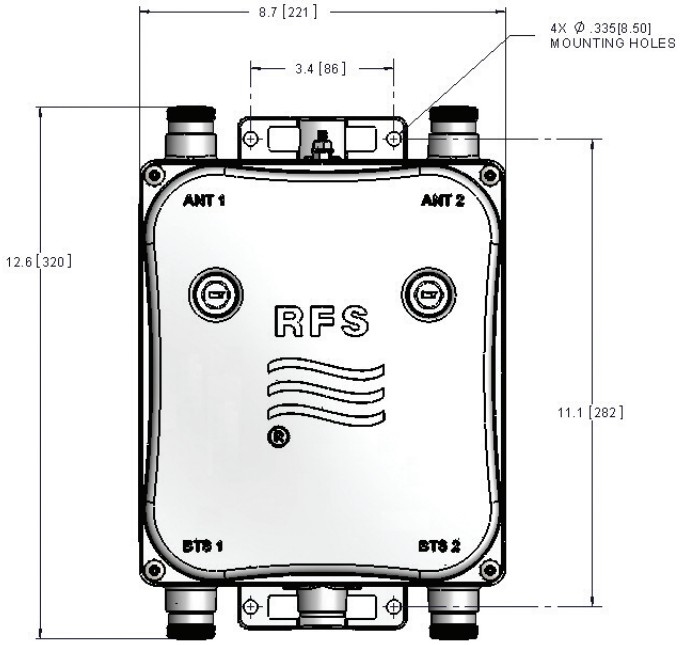
VPET: Vinyl Plastic Electric Tape **LRST:** Liners Rubber Splicing Tape

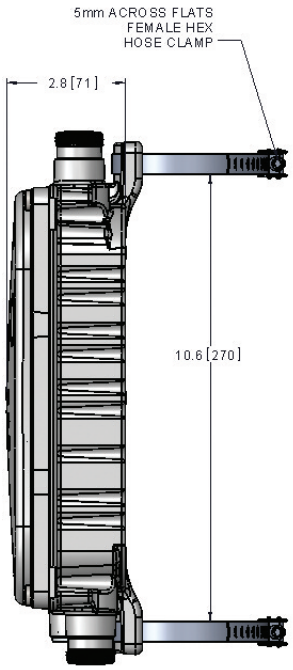
1. The inner layer of the VPET tape protects the connectors from the strong glue on the LRST tape. It eases connector dismantling if disassembling may be needed later on.
2. Apply the VPET tape from the top of the connector, wrapped downwards by overlapping itself to half-width until 50 mm beyond the connection is reached (on the TMA all of the 7/16 connectors must be covered and meet the top/bottom plate around the connectors).
3. Apply the LRST tape in two layers over the connection overlapping itself to half-width. The first layer of LRST tape shall not exceed the VPET tape; the second layer must exceed both the first layer of LRST tape and the first layer of VPET tape.
4. Apply VPET over the LRST, wrapped downwards by overlapping itself to half-width until the LRST is completely covered.

TOWER MOUNTED AMPLIFIER DRAWINGS









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Appendix 2.

RADIO FREQUENCY SYSTEMS
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RFS APPLICATION ENGINEERING TECHNICAL BULLETIN
Revision: 6/14/2010

AISG Cable / Connector installation guidelines.

The following guidelines should always be followed to ensure proper long-term, trouble free connection of AISG compliant cables to AISG hardware components.

1. Cables should ALWAYS be routed so that the male connector is directed towards the AISG controller (Protocol adapter, TMA, BTS, RRH, etc.).
2. All unused connectors should be sealed with a connector-sealing cap (provided with all ACU's and TMA's) to prevent water from entering or pooling in the connector. This applies to cables and any hardware component such as ACU's (RET Motor's) and TMA's. Male caps (to seal Female sockets) are available in kits of 20 pc under the part number AISG-CAP-20M
   Note: the clear plastic caps shipped on ACU motors are NOT weather seals and will not prevent water incursion.
3. Male connector bodies (on both cables and ACU's) should be filled with a moisture blocking, electrically non-conductive compound (such as Dow Corning® 4) prior to connecting them to other connectors. The photo below shows the appropriate usage of the moisture-blocking compound. Compound should fill the cavity to the top of the connector's pins. This will require approximately 0.5 grams.
   (Note: if paining is required, all exterior surfaces must be free of compound)

4. When connecting the male connector to the female connector care must be taken to ensure that the connectors do not become cross-threaded. Damaged connectors should not be used.

5. To ensure that the connectors are tightened appropriately
    a. The connector should be fully tightened hand tight (.6 to 1.0 Nm).
    b. Jiggle the cable / connector, and re-tighten to take up any slack
    c. Repeat step b until no more movement of the connector shell is possible
    d. Typical hand tightening results in a torque value at the low end of this range. Insufficient torque will affect the weather seal allowing water intrusion. Tightening 1/8th turn beyond hand tight will help to achieve the minimum torque without risk of over tightening. Care should be taken not to deform the connector's knurled backnut if hand tools are used (nylon jawed pliers, strap wrench).
6. RFS recommends the use of an exterior weather seal using a self-amalgamating tape, such as RFS CTAPE (see picture, note Yellow for illustration only, CTAPE-1 is black). This will also serve to lock the knurled connector in place preventing loosening due to tower / mounting vibration. Tape with a narrow width will be easier to locate so to bridge the connector interface and butt against the device's base plate. Tape should also cover the backend of the connector overlapping onto the jumper cable.

7. If future re-installation is required repeat steps 3-6.

RADIO FREQUENCY SYSTEMS
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OPTIMIZER® RT
Complete Solution Set from RFS

Process to Download RT related software.

The software distribution site is on line, allowing access to software for the support of the OptimizerRT system. This includes Software, User guides and Manuals, and FAQ's as well as the global AISG Configurator..

The site link is http://myrfs.rfsworld.com/OptimizerRT

Note: If you cannot access the site, the most common cause is that your company's Internet firewall is blocking access. Try and access the site from a connection outside of your corporate firewall, for example, from your personal home Internet account.

Products currently available on the site are.

Under the 'Software' Tab

- Under the 'AISG Support' tab

NEM-ALD-A 3.2.1 Serial control software for the Protocol Adapter (either the PA-USB/485-2 or the legacy PA-1) . (The ZIP file includes the User Guide)
PA-USB/485 Protocol Adapter drivers (ZIP File). (The ZIP file includes the User Guide)

AISG Remote Tilt antenna installation Guide
AISG System Frequently Asked Questions Guide
AISG Global Configurator
AISG System Guide (general information)
Most current version of both the ACU (RET) and TMA firmware loads

Login information for the installed software

The NEM-ALD A software will require the following Login information

COM port. This is the actual COM port number assigned by Windows to the Protocol Adapter during It's setup / Installation. The entry format is capital letters 'COM' and the COM port number.
Example **COM4** The **COM** port number to use can be found on your computer by going to your start menu then go to Windows Control Panel / System / Hardware / Device Manager / Ports (COM & LPT)

Username and **Password** are both the same. ' **admin** '

TMA SOFTWARE UPLOAD PROCESS

The procedure for Upgrading / Updating the TMA software will vary depending on the location of the TMA and if deployed, the configuration of the site. Below are several possible scenarios covering these cases, find the scenario that best describes your situation and use that procedure. In all cases the appropriate control software (NEM-ALD) and TMA Software load (See appendix A) must have been installed on the control PC used to complete the update.

To update the software in the TMA's connection must be made to the proper port on the unit as shown here.

- On the ATMAA1412D-1A20 (Twin) TMA the port is identified as AWS BTS 1 (AISG)
- On the ATMAP1412D-1A20 (Dual) TMA the port is identified as AWS BTS

Scenario
TMA's are installed on site and have an RF cable attached to the AISG control port. An AISG Bias Tee (RFS model BIT2S-AL20 (SAP# 12805)) must be attached to the bottom of the RF cable with the 'SURGE' port towards the TMA. Upload will be done using a Protocol adapter. Connect the Protocol adapter to the bias Tee.

- Use the NEM-ALD-A 3.2.1 AISG2.0 software on the control PC
- Use the TMA upload process shown for NEM-ALD-A in Appendix A.

NEM-ALD-A Process:

1. Select the TMA to upload from the 'Overview' screen.
2. Note the 'Software Version' number shown in the 'Device Data' field.
3. Open the 'Status' screen by pressing the status button at the top of the page.
4. Scroll to the bottom of the 'Status' screen.
5. Press the 'Perform Software Upload' button.
6. Select the upload speed. Select the 115200 Baud rate.
7. Press the 'Perform Software Upload' button.
8. Open the file containing the firmware load by selecting the 'TMA AISG 2.0' folder then press 'Open'
9. Pick the file to upload by selecting it's icon 'TMA-A20-N_SW2_20.bin' then press 'Open'

At this point the software uploader will start. The progress of the upload is shown as a percentage completed. When the upload reaches 100%, the system will do an automatic rescan of the devices. (This may take several seconds)

At this point the 'Software Version' number shown in the 'Device Data' field should be updated to the new version number.

This process should then be repeated for each TMA.

Appendix 5 - Anritsu Site Master S332 Calibration & Setup for TMA RL testing

Turn on Anritsu Site Master

connect	Test Cable to the Reflection port and Bias Tee to the Test cable		
press	"MAIN" soft key		
press	"MODE" soft key		
select	"RETURN LOSS"	*press*	"ENTER"
press	"FREQ" soft key		
press	"F1" soft key	*type*	"1700 ENTER"
press	"F2" soft key	*type*	"2165 ENTER"
press	"MAIN" soft key		
press	"SCALE" soft key		
press	"TOP" soft key	*type*	"0 ENTER"
press	"BOTTOM" soft	*type*	" 40 ENTER"
press	"LIMIT " soft key	*type*	"18.0 ENTER"
press	"MAIN" soft key		
press	"MEAS/DISP" soft key		
press	"Resolution" soft key		
press	"517" soft key		

(This sets up the sweep and screen. Note the limit chosen here reflects pass / fail for the TMA, based on current specifications and measurement tolerances.)

press	"MODE" soft key		
select	"RETURN LOSS"	*press*	"ENTER"
press	"Start Cal"		
select	"OSL"	*press*	"ENTER"
connect	Open circuit to the Bias Tee	*press*	"ENTER"
connect	Short circuit to the Bias Tee	*press*	"ENTER"
connect	Load circuit to the Bias Tee	*press*	"ENTER"

This calibrates the Site Master for return loss mode.

WARNING: THE <u>BIAS TEE MUST NOT BE POWERED ON</u> DURING CALIBRATION TO AVOID DAMAGING TEST EQUIPMENT.

CAUTION: Verify that the correct calibrat ion standard is connect ed at the appropriat e step. The test device typically does not detect, for example, that a 'short' is connected when an 'open' is expected.

<u>ATTENTION: To Maximize test accuracy:</u>
- Ensure all test connections are tight.
- Ensure Test equipment and Test standards are calibrated at least once a year.
- Replace worn or damaged adapters as required.
- Test loads <u>must</u> have a return loss of at least 28 dB.