RET WORKSHOP

Trainer: Vuth Ith

June - 2019

connecting the mobile world

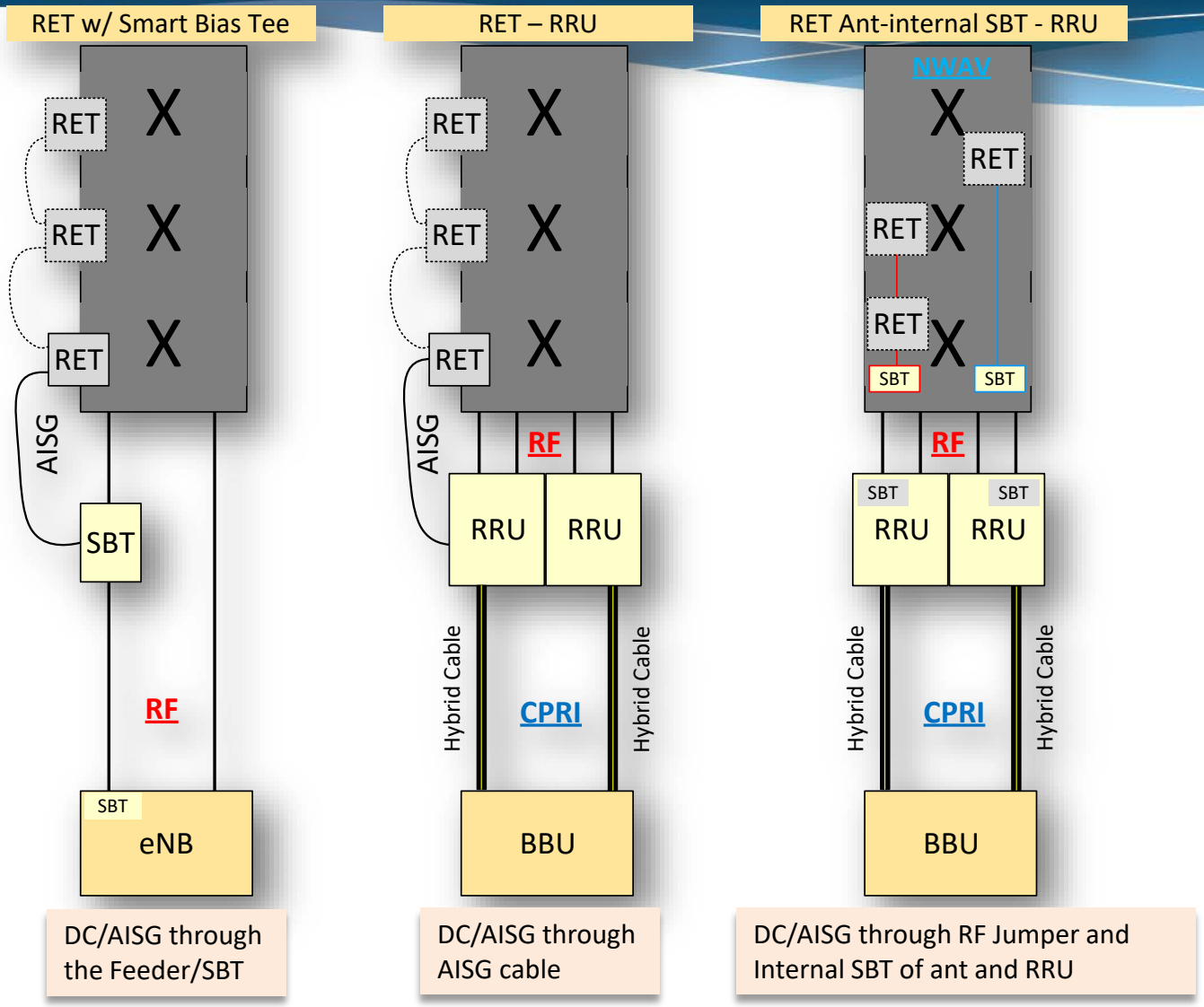
TRAINING OBJECTIVES

- Gain knowledge on basic RET Systems
- Become familiar with Legacy & NWAV RET antennas
- Understand the testing and troubleshooting of RETs
- Learn the operation of the JMA RET Controller and GUI

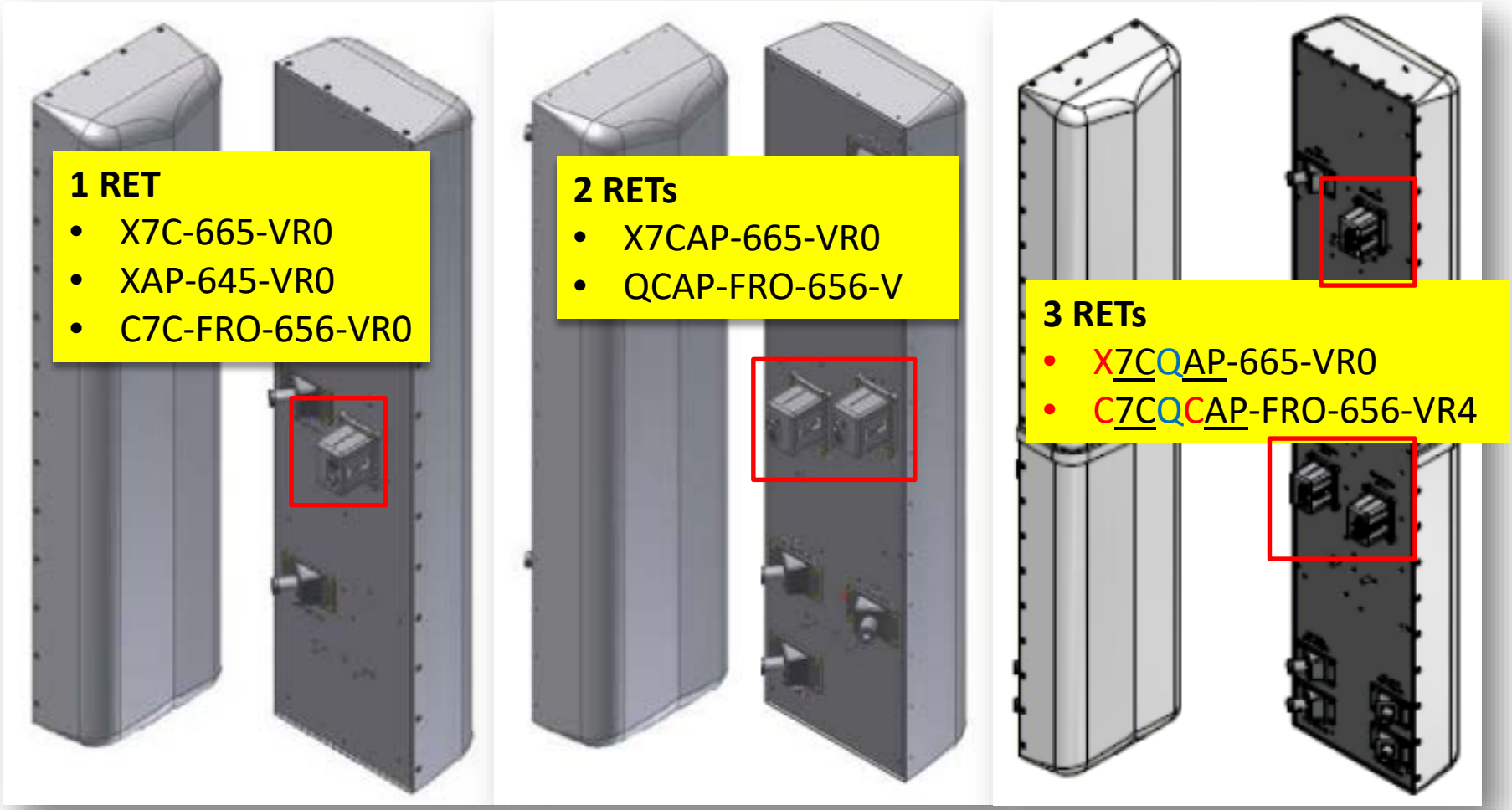
TRAINING - AGENDA

- RET SYSTEM DIAGRAMS
- ANT LABEL & RET DIAGRAMS
- LEGACY RETS & GUI OPERATION
- PRE-TESTING & COMMISSIONING
- TROUBLESHOOTING
- NWAV RETS & GUI OPERATION
- JMA WEBSITE & SUPPORT

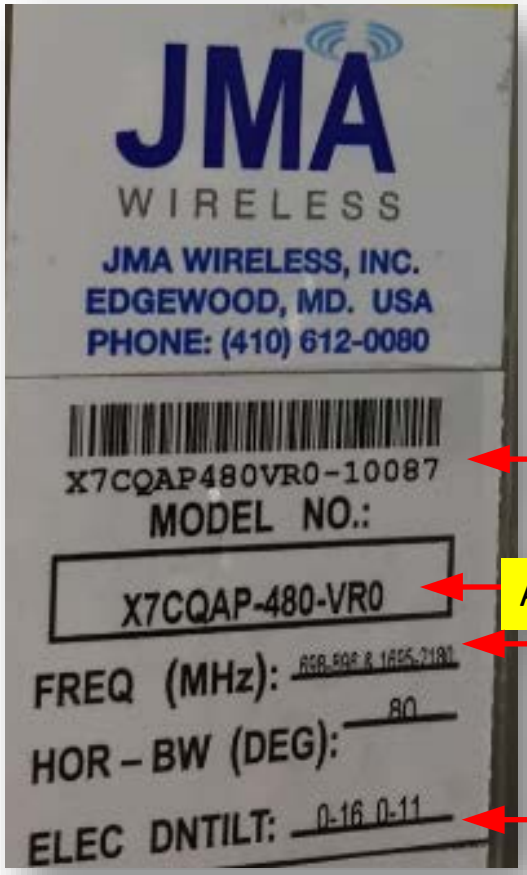
RET SYSTEM DIAGRAMS



JMA RET ANTENNAs



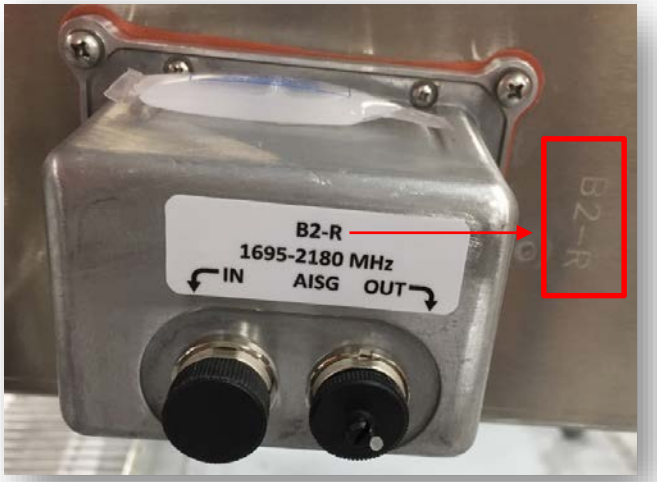
JMA ANTENNA & RET LABELs – GEN1



Ant Serial#

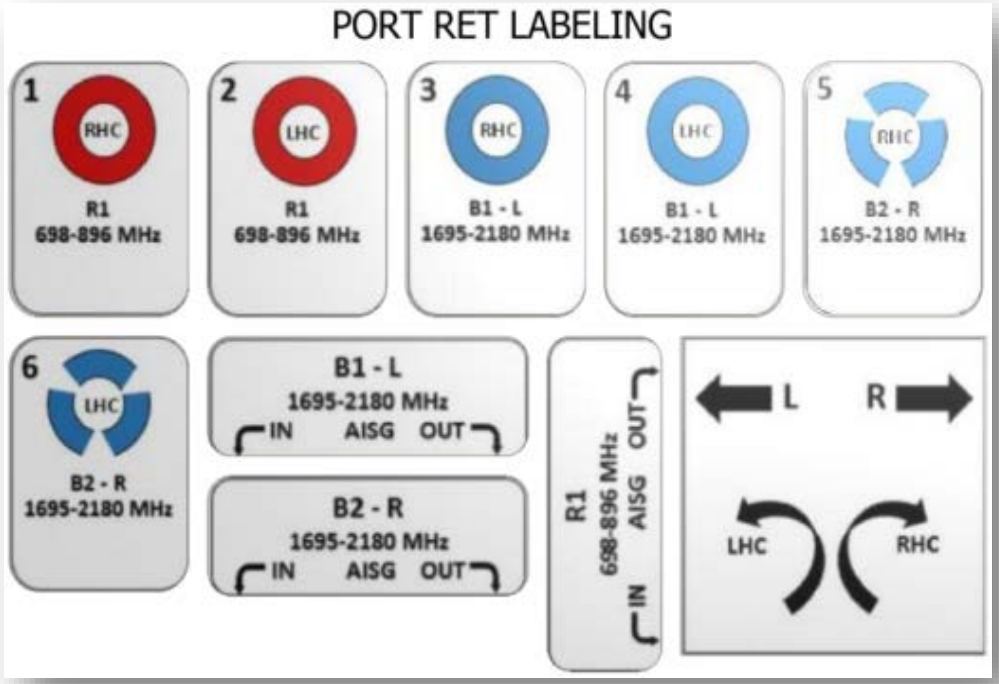
Ant Model#

Ant Info

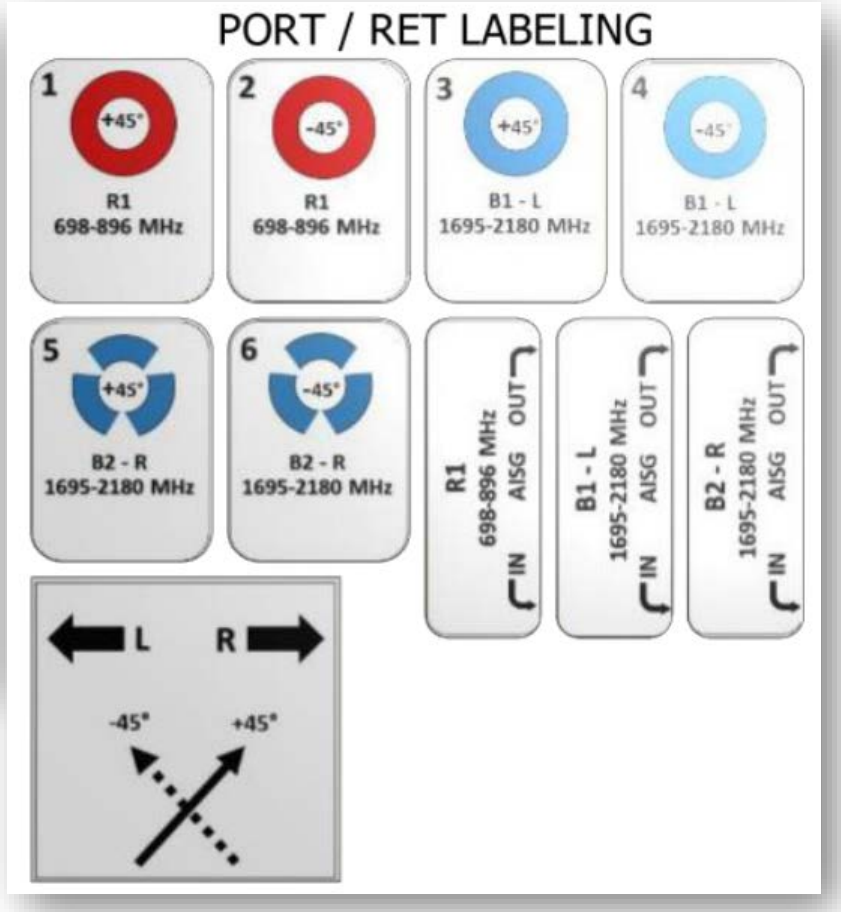


JMA ANTENNA PORT & RET LABELs – GEN1

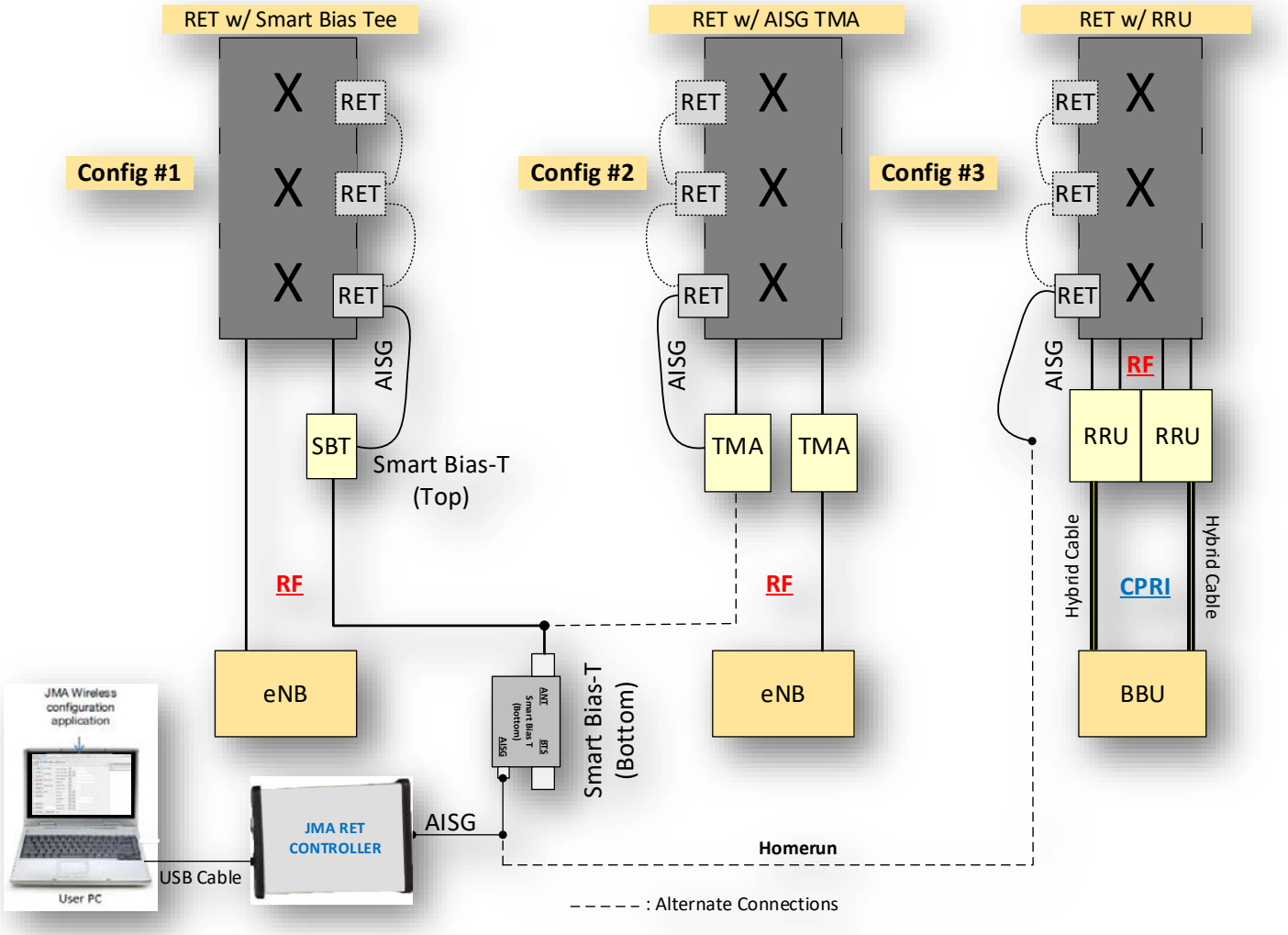
CP Antennas



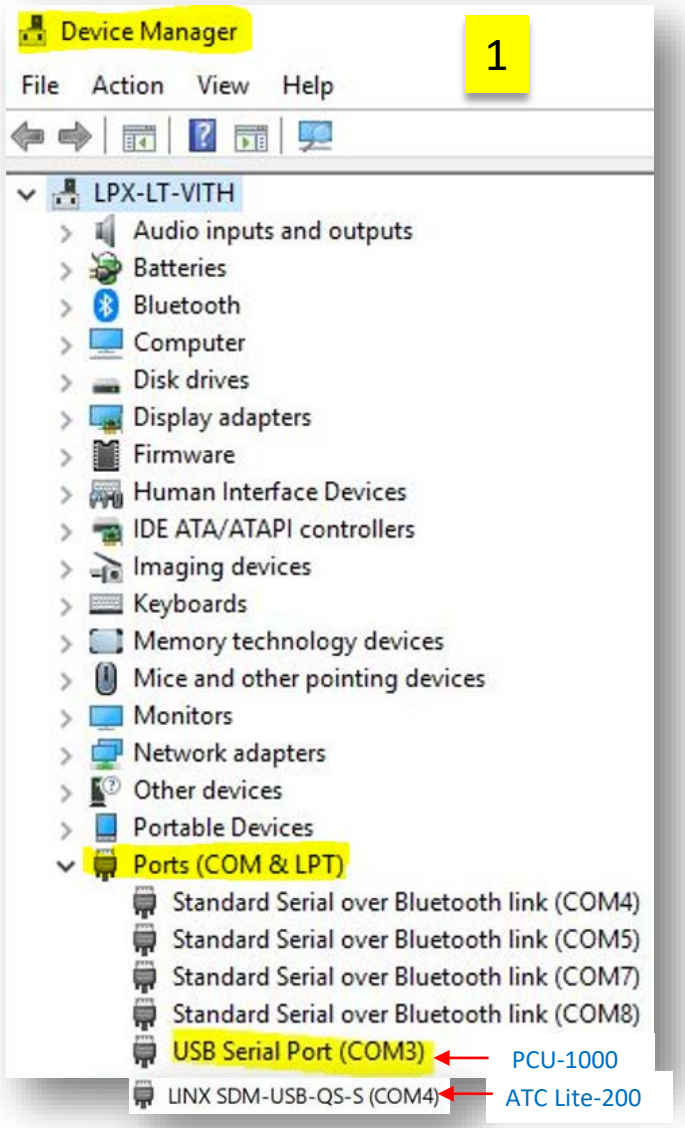
X-Pol Antennas

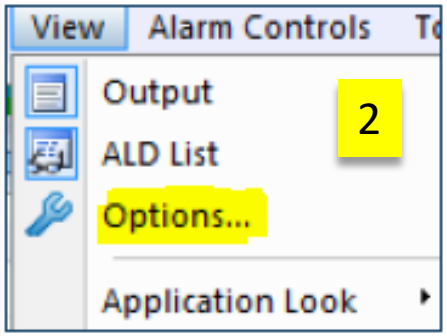


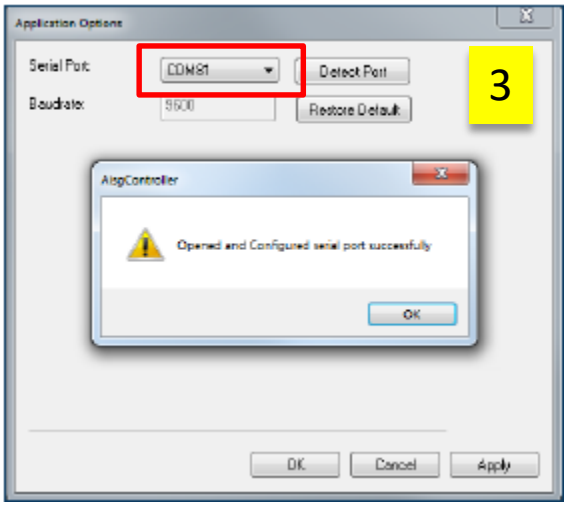
RET – 200 TEST DIAGRAM

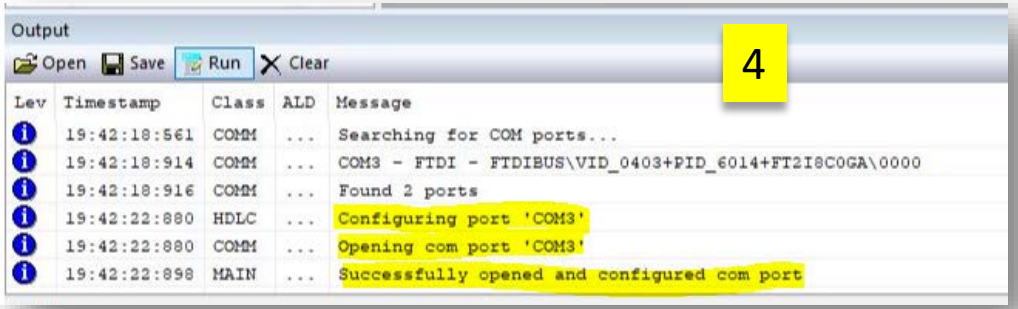


GUI OPERATION – COM SET UP

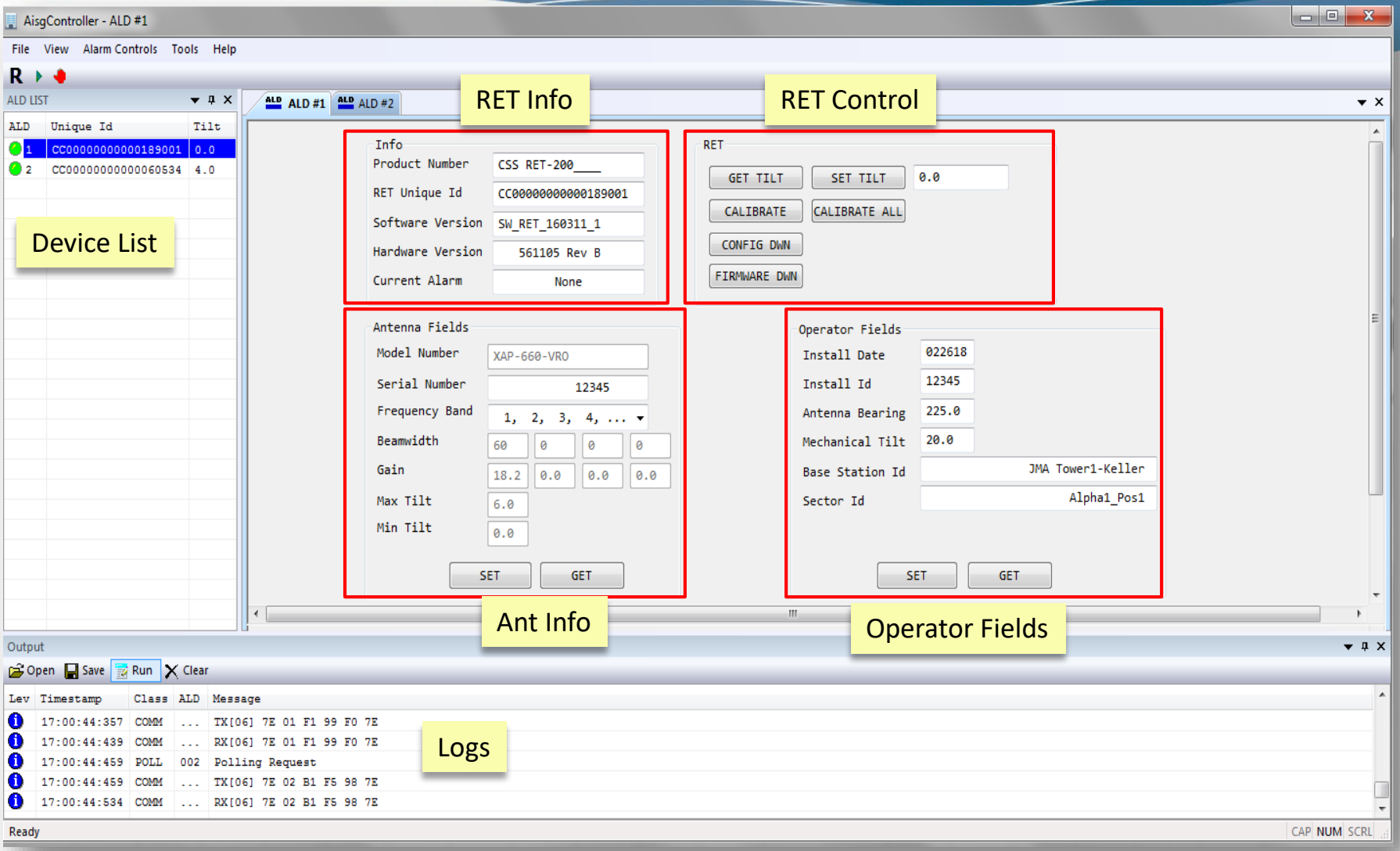








GUI OPERATION – RET-200



ANTENNA FILE SELECTION – RET-200

2. ACF selection is based on antenna model, frequency band, and RET firmware rev. See *Figure 20* for an example.

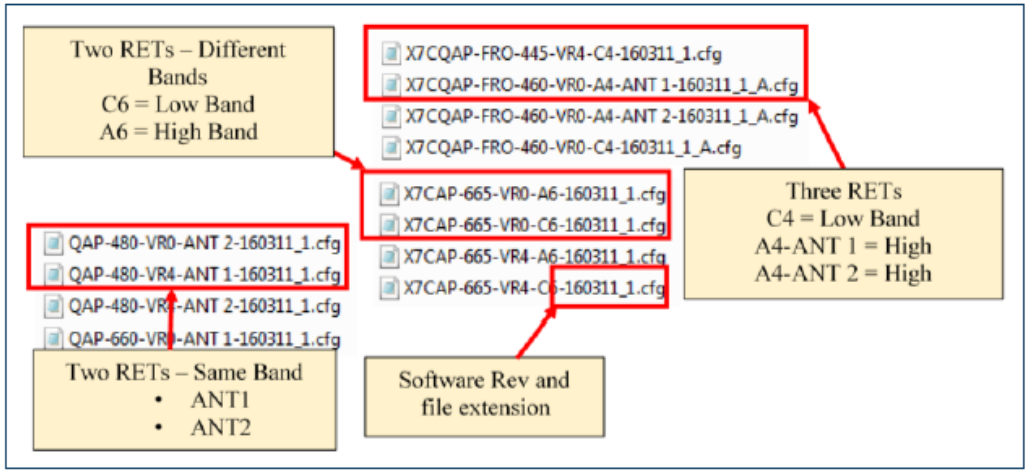
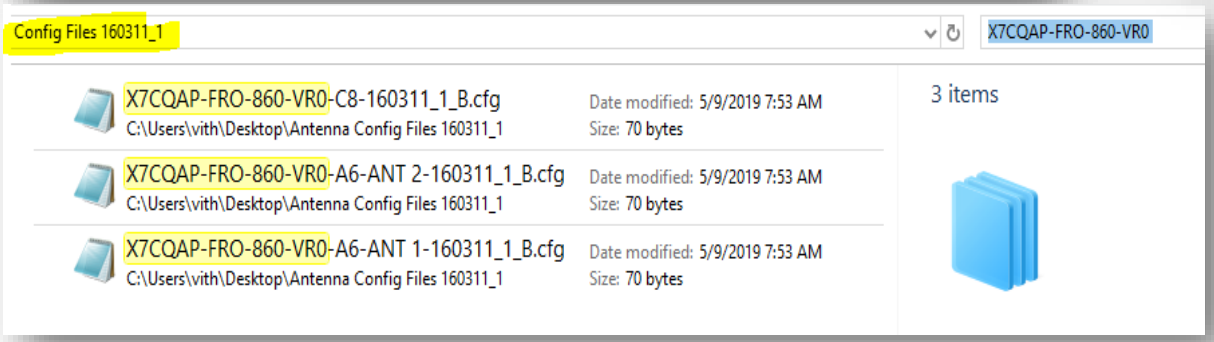


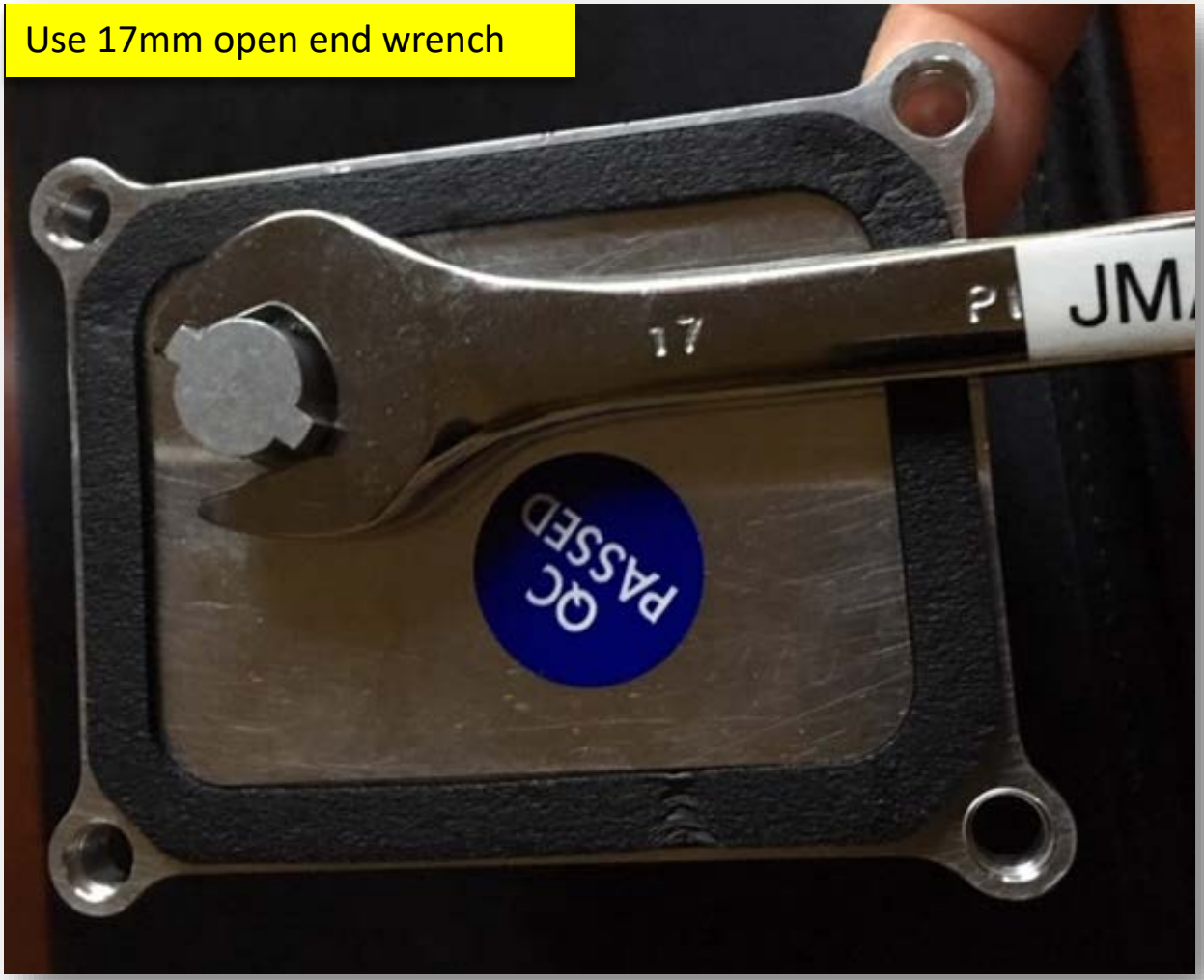
Fig. 20 – ACF selection guide

- Antenna models with one RET will only have one file.
- If antenna models have two or three RETs:
  - For different bands, one for low and one for high band:
    - A is High Band file (Remember A for AWS)
    - C is Low Band file (Remember C for Cell)
  - For two of the same bands:
    - -1 is for Ant 1
    - -2 is for Ant 2

RET Labels



RET-200 – CAL TEST



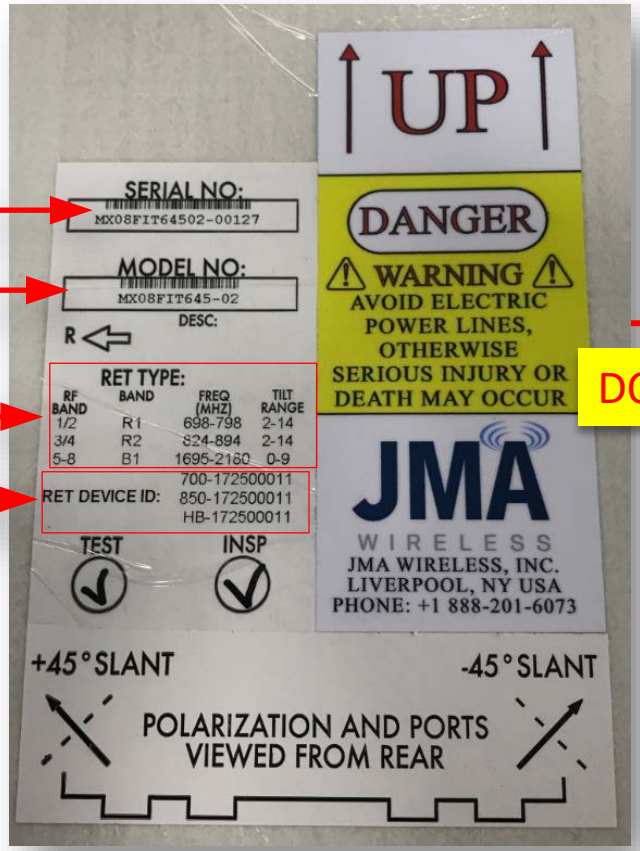
NWAV ANTENNA LABEL

Ant Serial#

Ant Model#

Ant/RET Info

RET UIDs



DO NOT REMOVE Factory installed brackets

NWAV ANTENNA NOMENCLATURE

All NWAV™ antennas contain 13 characters:

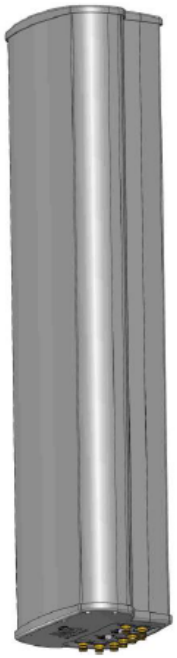
MX08FRO660-02

(actual model label)

MX08FRO660-02

M	Product series
X	Polarization
08	No. of antenna ports
FRO	Product feature
6	Package
60	Horizontal beamwidth
02	Variant

NWAV antenna nomenclature: label categories
Product Series
M = macro
C = cylinder
S = stadium
D = DAS
Polarization
V = vertical
X = X-Pol
C = circular
No. of antenna ports
2, 4, 6, 8, 10, 12
Product feature
FRO = Fast Roll Off
FIT = Form Is Tighter
OMI = Omni
TRI = Trisector
Package
1, 2, 4, 6, 8
Horizontal beamwidth
xx – represents horizontal beamwidth in degrees
Variant
01 = RET with external AISG ports only
02 = RET with Smart Bias Tee and external AISG ports
03 = Extended low-band frequency range 698-960 with RET
04 = Extended low-band frequency range 698-960 with MET



nwav technology

Tilt Summary

- **Four Foot**
  - 698-798 MHz 2-16 Degrees
  - 824-894 MHz 2-16 Degrees
  - 1695-2180 MHz 0-9 Degrees
- **Six Foot**
  - 698-798 MHz 2-14 Degrees
  - 824-894 MHz 2-14 Degrees
  - 1695-2180 MHz 0-9 Degrees
- **Eight Foot**
  - 698-798 MHz 2-12 Degrees
  - 824-894 MHz 2-12 Degrees
  - 1695-2180 MHz 0-9 Degrees
- **Note:**
  - 698-798 MHz Independent Tilt
  - 824-894 MHz Independent Tilt
  - 1695-2180 MHz Independent Tilt

NWAV - RET & PORT TOPOLOGY

RET & RF Connector Topology

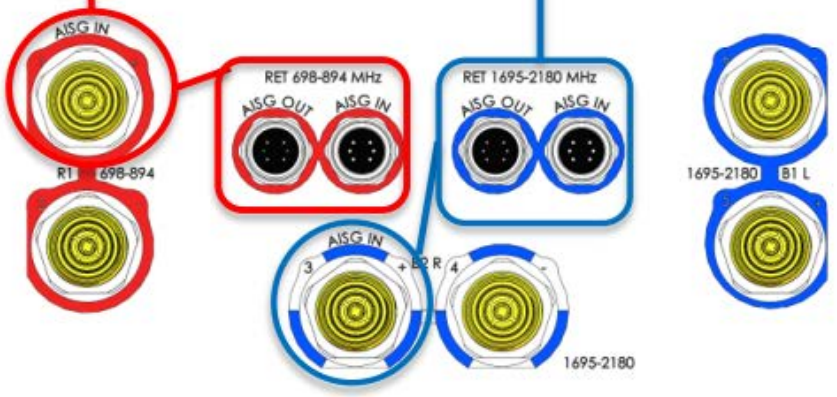
Each RET device can be controlled either via the designated external AISG connector or RF port as shown below

-Two SETS of DC/AISG Bus: LB (**RED**) & HB (**BLUE**)
-ONLY one DC/AISG connection per path is allowed

RET Device	Band	RF Port
1	698-894	1-2

HEX PORT
-One LB ant, 1 RET
-Two HB ant, 1 RET

RET Device	Band	RF Port
2	1695-2180	3-6



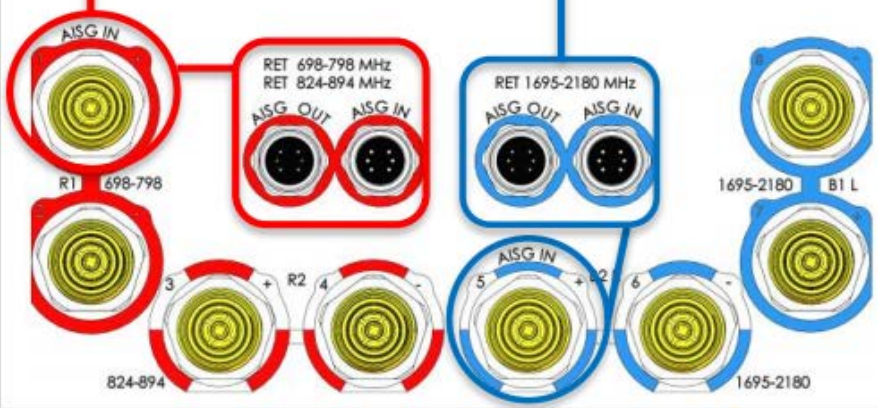
RET & RF Connector Topology

Each RET device can be controlled either via the designated external AISG connector or RF port as shown below

RET Device	Band	RF Port
1	698-798	1-2
2	824-894	3-4

OCTO PORT
-Two LB ant, 2 RETs
-Two HB ant, 1 RET

RET Device	Band	RF Port
3	1695-2180	5-8



NWAV – ARRAY TOPOLOGY

Array Topology

3 sets of radiating arrays

R1: 698–894MHz
B1: 1695–2180MHz
B2: 1695–2180MHz

HEX PORT
-One LB ant
-Two HB ant

Band	RF Port
1695–2180	3–4
698–894	1–2
1695–2180	5–6

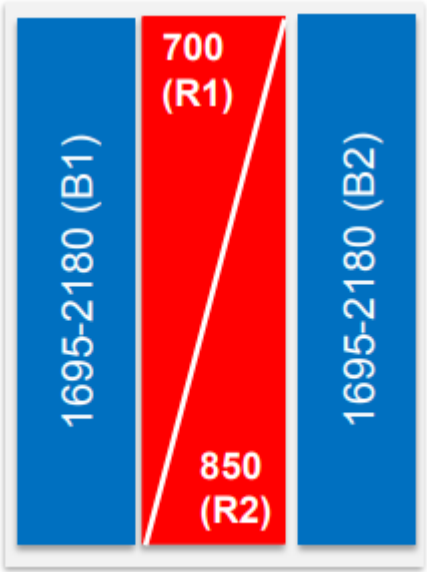
Array topology

3 sets of radiating arrays

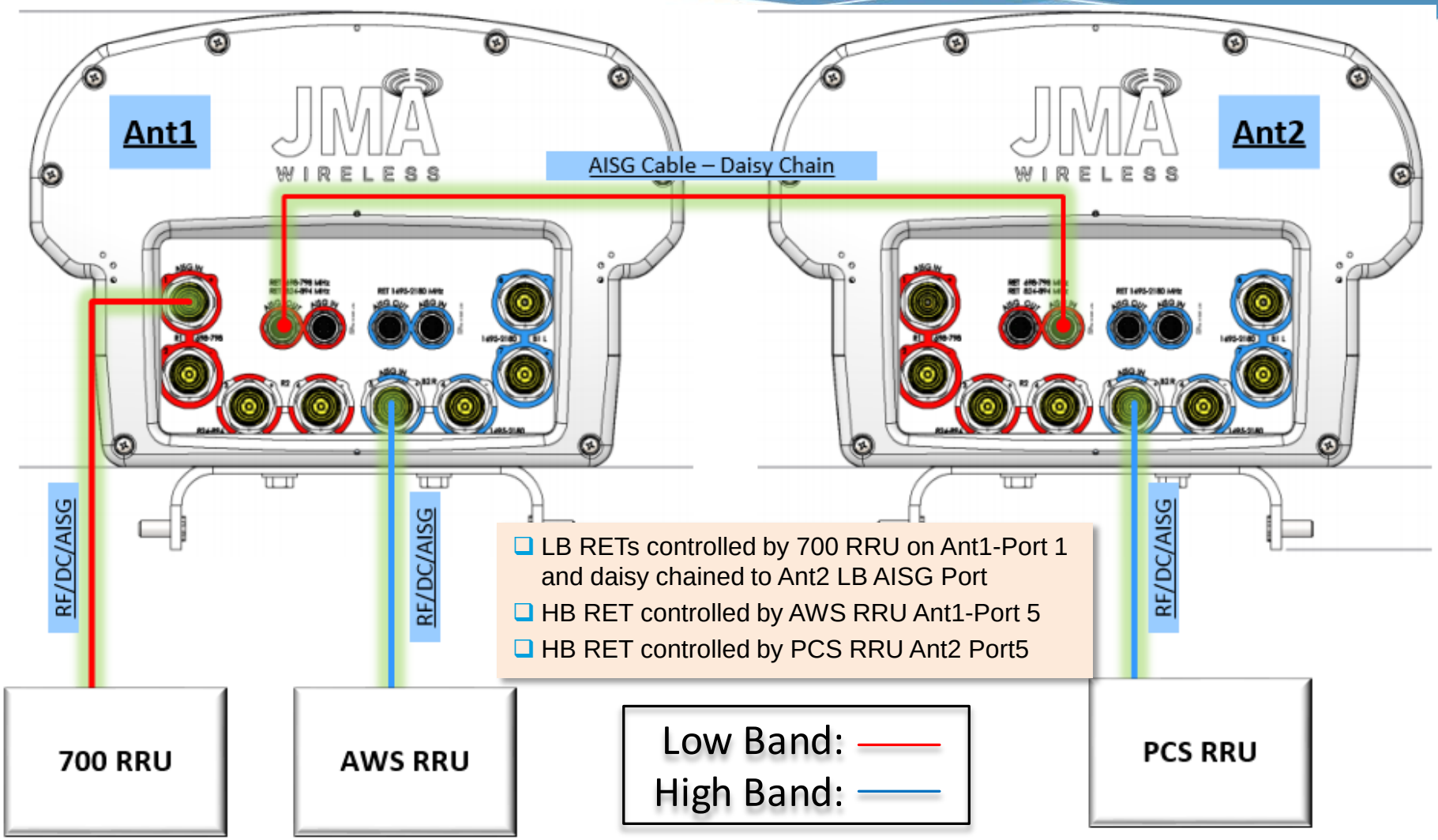
R1/R2 – 698-894MHz
B1 – 1695-2180MHz
B2 – 1695-2180MHz

OCTO PORT
-Two LB ant
-Two HB ant

Band	RF Port
1695-2180	5-6
698-798	1-2
824-894	3-4
1695-2180	7-8



RRU - RET CONNECTION DIAGRAM EXAMPLE



RET CONTROLLER TEST DIAGRAM 1

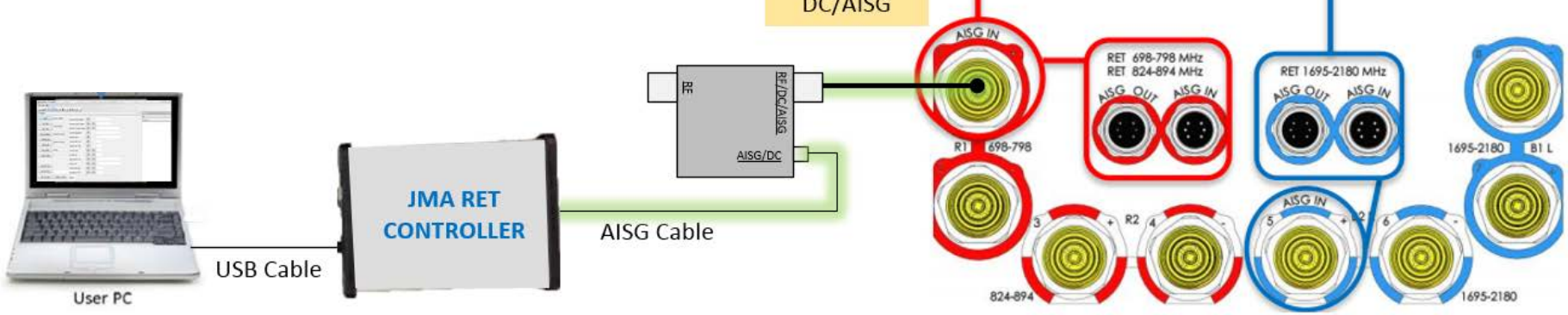
(RF PORT – INTERNAL SBT)

Testing RET Through Antenna RF Port

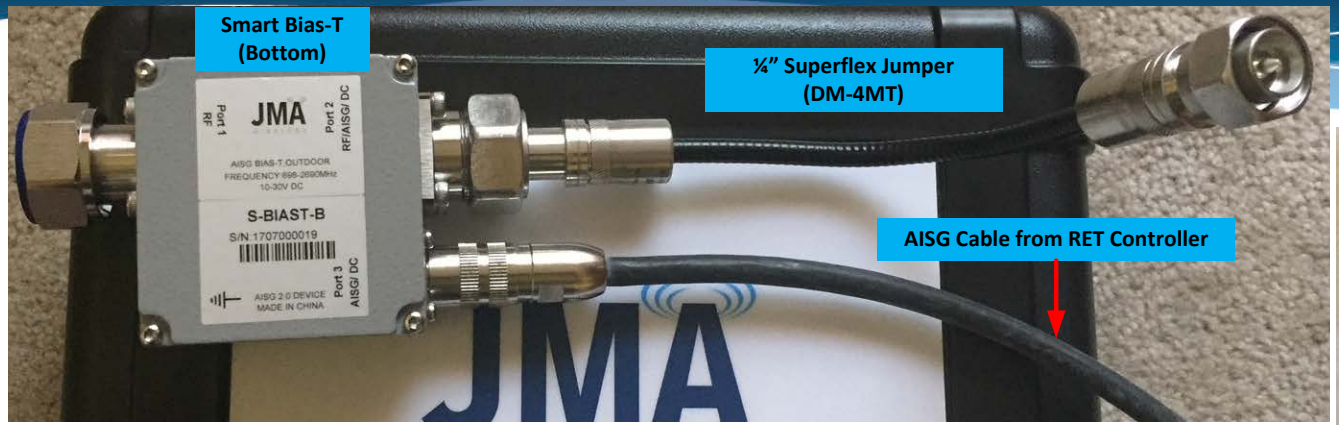
- Via Ant RF AISG port – internal SBT
- Port 1 and Port 3 (Hex Port Ant)
- Port 1 and Port 5 (Octo Port Ant)
- Use external SBT-Bottom to inject DC/AISG

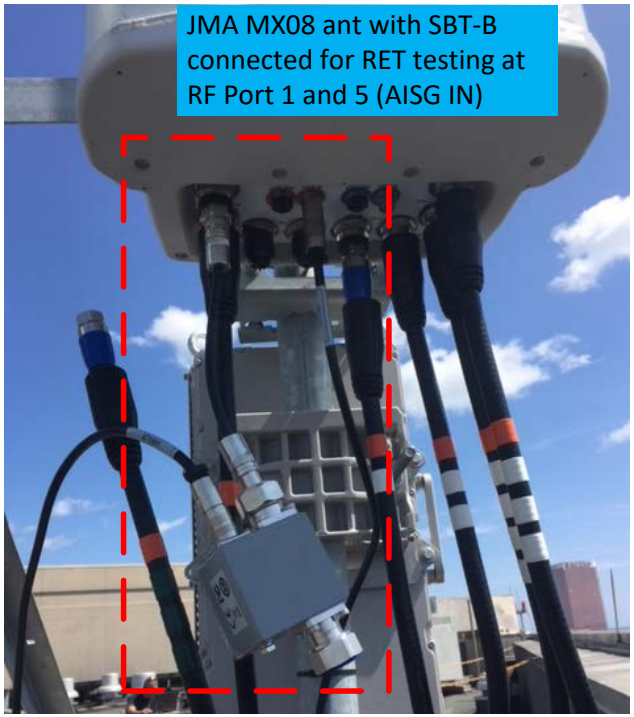
RET Device	Band	RF Port
1	698-798	1-2
2	824-894	3-4

RET Device	Band	RF Port
3	1695-2180	5-8

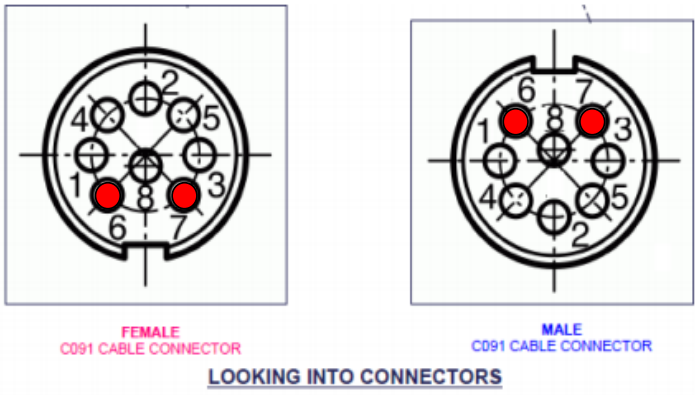


TEST KIT





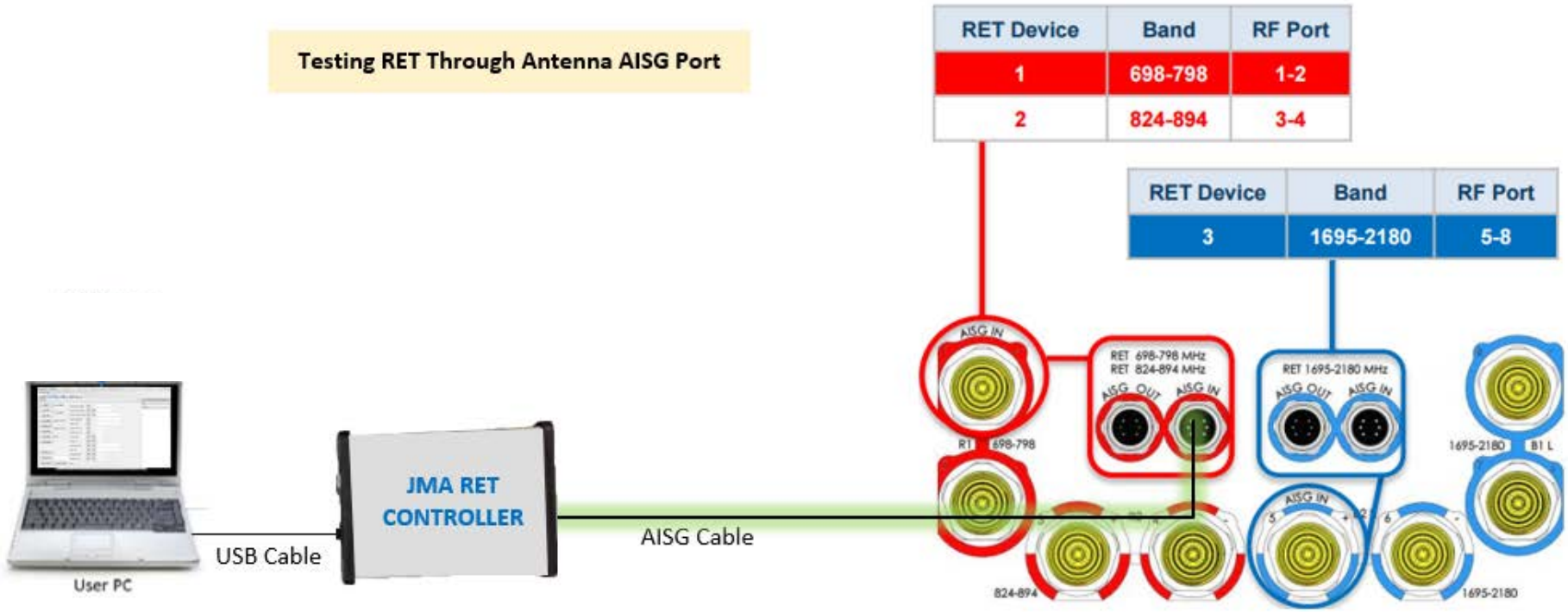
AISG Pin Connection



Pin Connections
(as defined in AISG v2.0 Section 6.3.1)

Pin Number	Signal (Function)
1	+12 VDC
2	No Connection
3	RS485 B
4	No Connection
5	RS485 A
6	10V - 30V DC
7	DC Return
8	No Connection

RET CONTROLLER TEST DIAGRAM 2
(AISG PORT)



GROUND TESTING & COMMISSIONING

- Complete RET Worksheet
  - Ant Model and S/N
  - Tilt Range
  - RET S/N
  - Note Sector and Position
- Connect RET controller for testing
  - Commission the RET(s) according to RRU connection diagram – refer to test diagram 1 or 2
  - Daisy chain as required – Follow RRU connection diagram
  - Test with RET cables that will be part of the installation
- Detailed MOP on RET Controller and GUI operation is available on our website
- RET Test and Configuration
  - Scan to find connected RET(s)
  - Calibrate RET(s) if status is "Not Calibrated"
  - Set Tilt per RFDS
  - Enter configuration data– *Date, Installer & Site ID…..*
  - Save RET Report
- Note: Remember to use dielectric grease on **ALL AISG** Ports during the installation process.
  - AISG Connection – hand tight only!

SAMPLE RET REPORT

ADDRESS	STATUS	TYPE	VENDOR	RET UNIQUE ID	PRODUCT NUMBER	SOFTWARE VERSION	HARDWARE VERSION	ALARM	RET TILT	ANTENNA MODEL NUMBER	ANTENNA SERIAL NUMBER	A
1	CONNECTED	SINGLE - RET	CC	CC180208IOT20001-R1	R1000	DW_V1.2.0	HW_R1000_C	NONE	8	MX08FRO660024R1	TS-iRETDemo-12345	
2	CONNECTED	SINGLE - RET	CC	CC180208IOT20001-R2	R1000	DW_V1.2.0	HW_R1000_C	NONE	6	MX08FRO660024R2	TS-iRETDemo-12345	
3	CONNECTED	SINGLE - RET	CC	CC180208IOT20001-B1	R1000	DW_V1.2.0	HW_R1000_C	NONE	0	MX08FRO660024B1	TS-iRETDemo-12345	1

csv Format

iRET Demo Report.txt - Notepad

File Edit Format View Help

```
############################################################
ADDRESS                    , 1
STATUS                     , CONNECTED
TYPE                       , SINGLE RET
VENDOR                     , CC
RET Unique Id              , CC180208IOT20001-R1
PRODUCT NUMBER             , R1000
SOFTWARE VERSION           ,       DW_V1.2.0
HARDWARE VERSION           ,      HW_R1000_C
ALARM                      , NONE
RET TILT                   , 8.0
ANTENNA MODEL NUMBER       , MX08FRO660024R1
ANTENNA SERIAL NUMBER      , TS-iRETDemo-12345
ANTENNA FREQUENCY BAND     , 12: 13: 14
ANTENNA BEAMWIDTH          , 60 0 0 0
ANTENNA GAIN               , 0.0 0.0 0.0 0.0
ANTENNA MAX TILT           , 14.0
ANTENNA MIN TILT           , 2.0
OPERATOR INSTALL DATE      , 030518
OPERATOR INSTALL ID        ,  1234
OPERATOR BASESTATION ID    ,                    JMA-Liverpool
OPERATOR SECTOR ID         ,                       Alpha1-700
OPERATOR ANTENNA BEARING   , 20.0
OPERATOR MECHANICAL TILT   , 30.0
############################################################
ADDRESS                    , 2
STATUS                     , CONNECTED
TYPE                       , SINGLE RET
VENDOR                     , CC
RET Unique Id              , CC180208IOT20001-R2
PRODUCT NUMBER             , R1000
SOFTWARE VERSION           ,       DW_V1.2.0
HARDWARE VERSION           ,      HW_R1000_C
ALARM                      , NONE
RET TILT                   , 6.0
ANTENNA MODEL NUMBER       , MX08FRO660024R2
ANTENNA SERIAL NUMBER      , TS-iRETDemo-12345
ANTENNA FREQUENCY BAND     , 5: 15: 19
ANTENNA BEAMWIDTH          , 60 0 0 0
ANTENNA GAIN               , 0.0 0.0 0.0 0.0
ANTENNA MAX TILT           , 14.0
ANTENNA MIN TILT           , 2.0
OPERATOR INSTALL DATE      , 030518
OPERATOR INSTALL ID        ,  1234
OPERATOR BASESTATION ID    ,                    JMA-Liverpool
OPERATOR SECTOR ID         ,                       Alpha2-800
OPERATOR ANTENNA BEARING   , 20.0
OPERATOR MECHANICAL TILT   , 15.0
############################################################
```

Text Format

SAMPLE RET REPORT

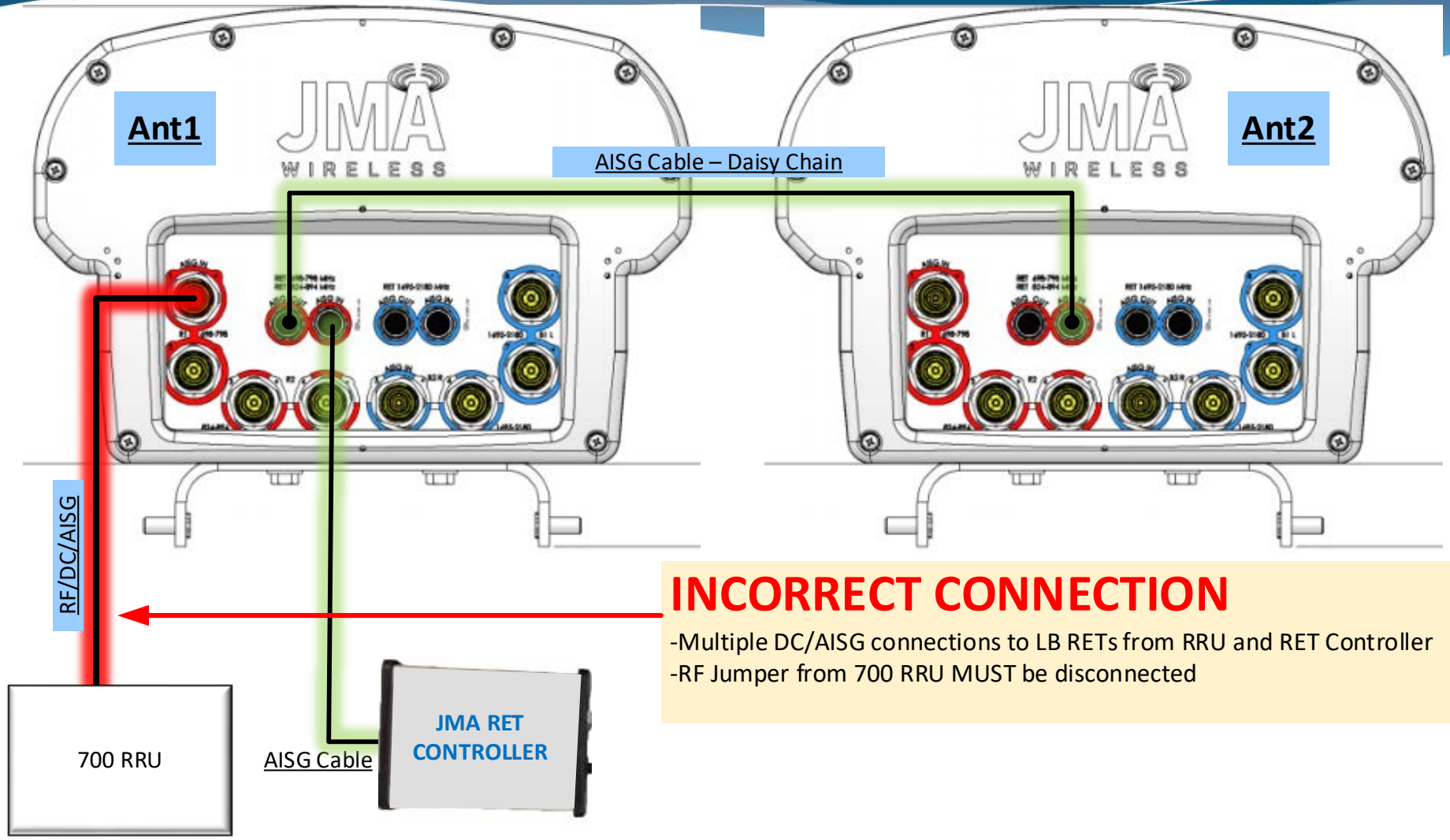
```
##############################################################
ADDRESS                    , 1
STATUS                     , CONNECTED
TYPE                       , SINGLE RET
VENDOR                     , CC
RET Unique Id              , CC180208IOT20001-R1
PRODUCT NUMBER             , R1000
SOFTWARE VERSION           ,       DW_V1.2.0
HARDWARE VERSION           ,     HW_R1000_C
ALARM                      , NONE
RET TILT                   , 8.0
ANTENNA MODEL NUMBER       , MX08FRO660024R1
ANTENNA SERIAL NUMBER      , TS-iRETDemo-12345
ANTENNA FREQUENCY BAND     , 12: 13: 14
ANTENNA BEAMWIDTH          , 60 0 0 0
ANTENNA GAIN               , 0.0 0.0 0.0
ANTENNA MAX TILT           , 14.0
ANTENNA MIN TILT           , 2.0
OPERATOR INSTALL DATE      , 030518
OPERATOR INSTALL ID        ,  1234
OPERATOR BASESTATION ID    ,                    JMA-Liverpool
OPERATOR SECTOR ID         ,                       Alpha1-700
OPERATOR ANTENNA BEARING   , 20.0
OPERATOR MECHANICAL TILT   , 30.0
##############################################################
ADDRESS                    , 2
STATUS                     , CONNECTED
TYPE                       , SINGLE RET
VENDOR                     , CC
RET Unique Id              , CC180208IOT20001-R2
PRODUCT NUMBER             , R1000
SOFTWARE VERSION           ,       DW_V1.2.0
HARDWARE VERSION           ,     HW_R1000_C
ALARM                      , NONE
RET TILT                   , 6.0
ANTENNA MODEL NUMBER       , MX08FRO660024R2
ANTENNA SERIAL NUMBER      , TS-iRETDemo-12345
ANTENNA FREQUENCY BAND     , 5: 15: 19
ANTENNA BEAMWIDTH          , 60 0 0 0
ANTENNA GAIN               , 0.0 0.0 0.0
ANTENNA MAX TILT           , 14.0
ANTENNA MIN TILT           , 2.0
OPERATOR INSTALL DATE      , 030518
OPERATOR INSTALL ID        ,  1234
OPERATOR BASESTATION ID    ,                    JMA-Liverpool
OPERATOR SECTOR ID         ,                       Alpha2-800
OPERATOR ANTENNA BEARING   , 20.0
OPERATOR MECHANICAL TILT   , 15.0
```

-Single RET – Type 1
-Internally mounted
-Not field replaceable

-UID must be 19 characters
-Vendor code “CC” for JMA/CSS

-Confirm the desired tilt per RET worksheet
-Verify installation and site info is correct

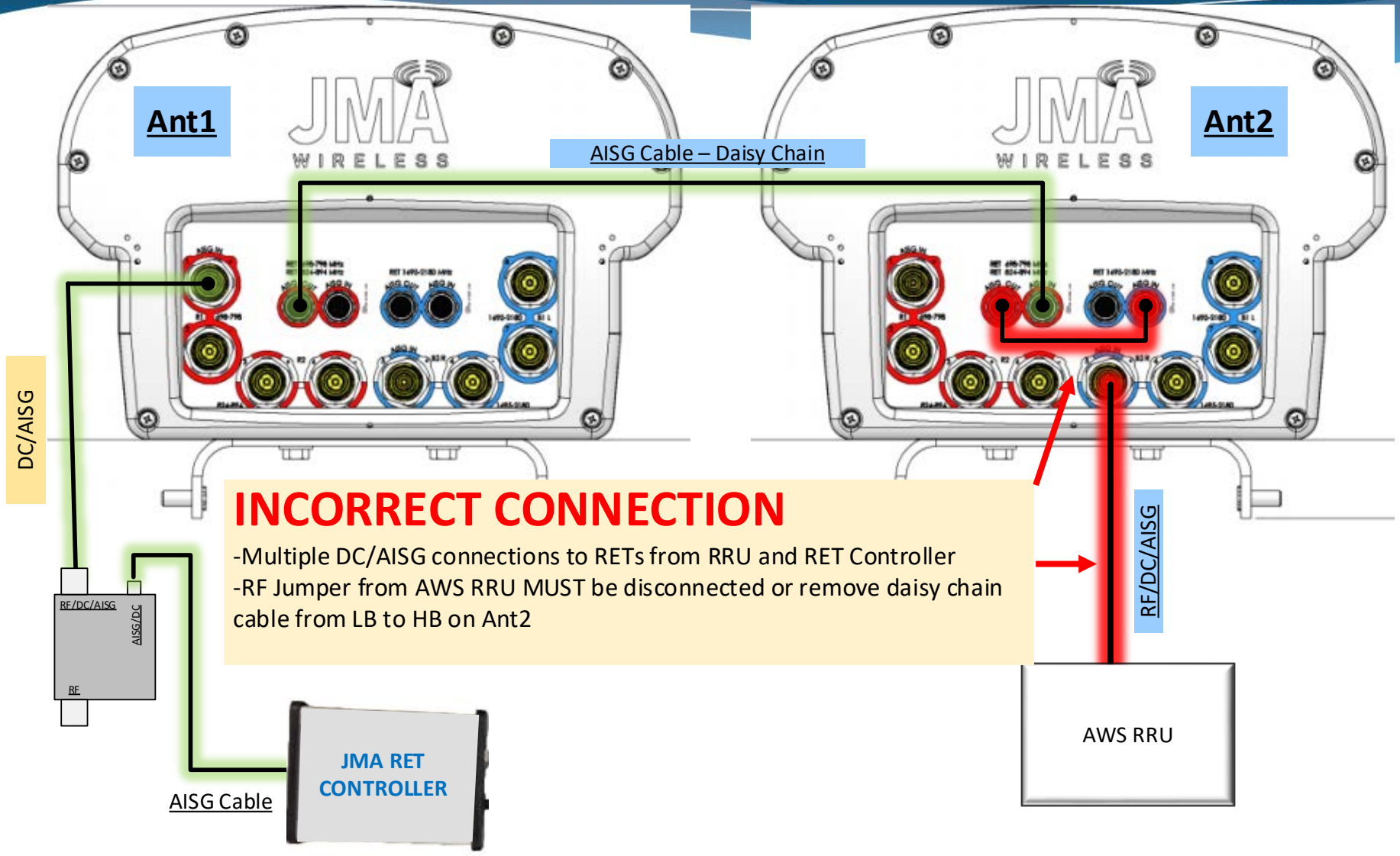
INCORRECT CONNECTION – EXAMPLE 1



INCORRECT CONNECTION

-Multiple DC/AISG connections to LB RETs from RRU and RET Controller
-RF Jumper from 700 RRU MUST be disconnected

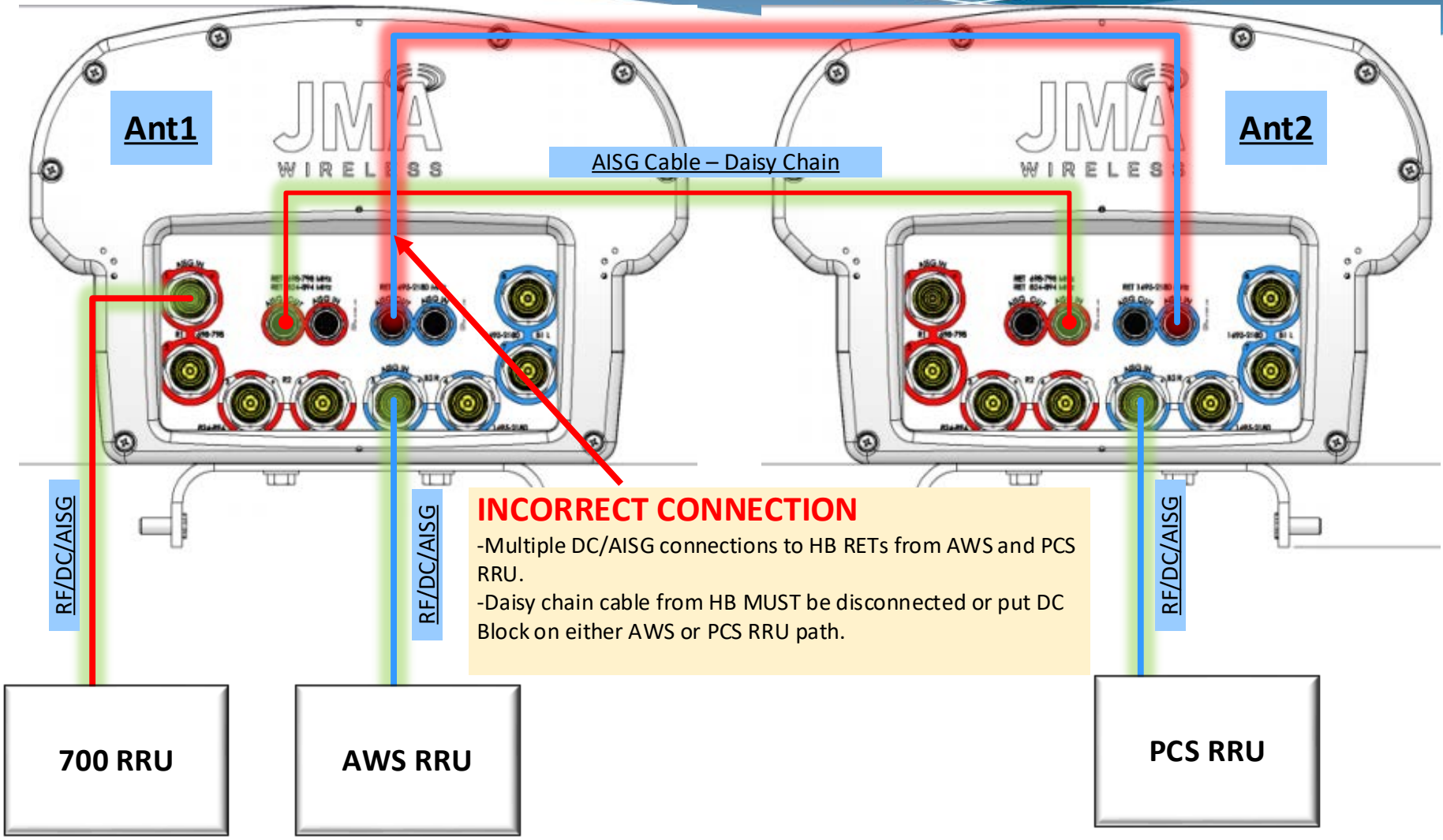
INCORRECT CONNECTION – EXAMPLE 2



INCORRECT CONNECTION

-Multiple DC/AISG connections to RETs from RRU and RET Controller
-RF Jumper from AWS RRU MUST be disconnected or remove daisy chain cable from LB to HB on Ant2

INCORRECT CONNECTION – EXAMPLE 3



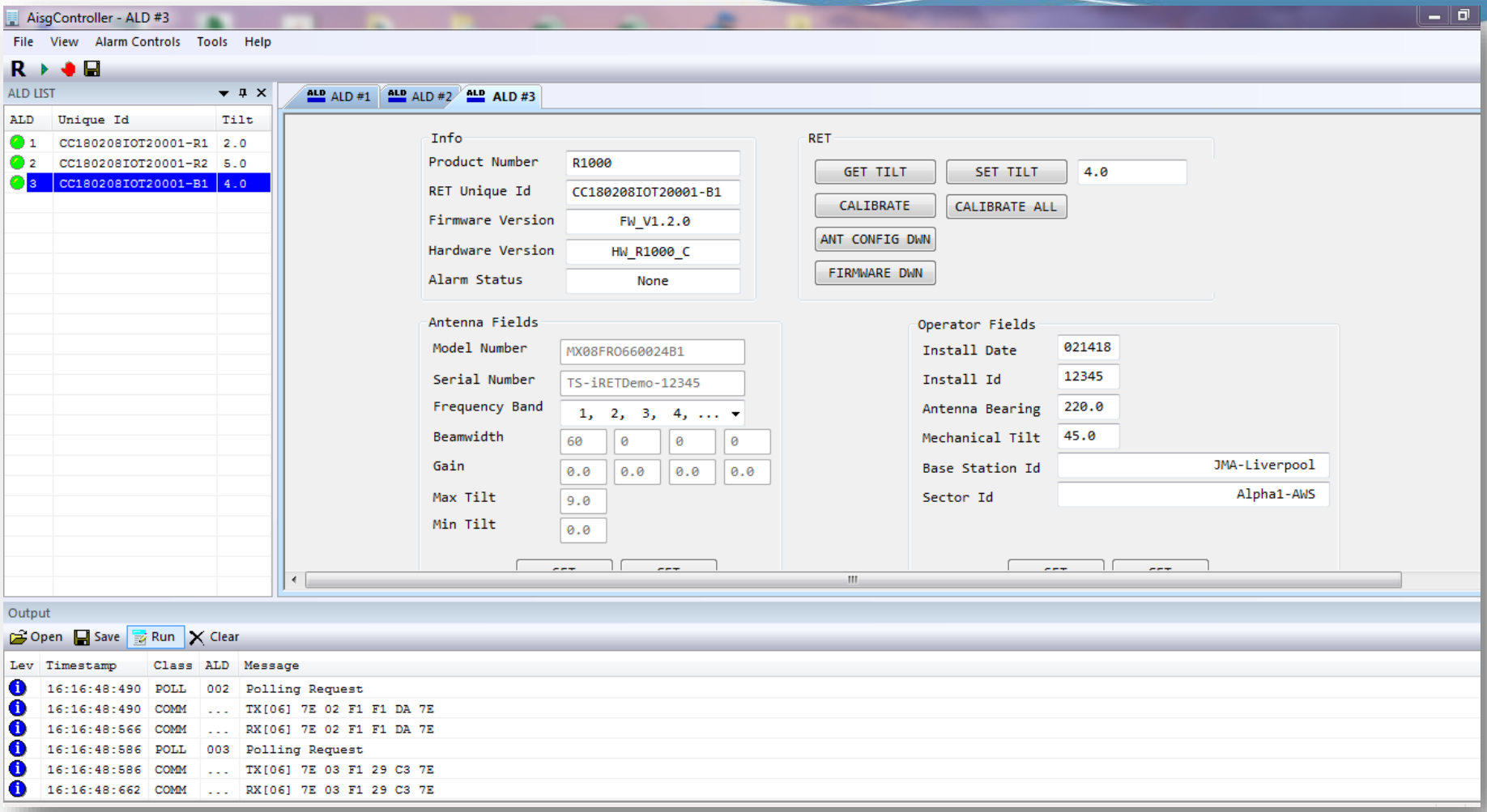
TROUBLESHOOTING - RET CONTROLLER

- Cannot Discover RETs
  - Ensure the RET controller is the only DC/AISG source to the RET(s)
    - No RRU connection – refer to Incorrect Connection 1
    - Check the daisy chain – refer to Incorrect Connection 2
  - Verify Com setting is working properly on RET Controller
    - Verify alternating LED for Tx/Rx during the scan
    - Verify all connections are tight
  - If using SBT to connect to RF Port
    - Verify SBT connection – refer to Test Diagram1
    - Check DC/AISG pass thru for all ALDs (multi-band combiners, *x*plexers)
    - Bypass all ALDs and Isolate
  - Verify DC voltage on AISG cable/connector (Pin 6 & 7)
    - JMA RET Controller output is +24VDC
    - Refer to AISG Pin Connection diagram
    - Check for DC voltage on AISG port of Antenna

TROUBLESHOOTING – Cont.

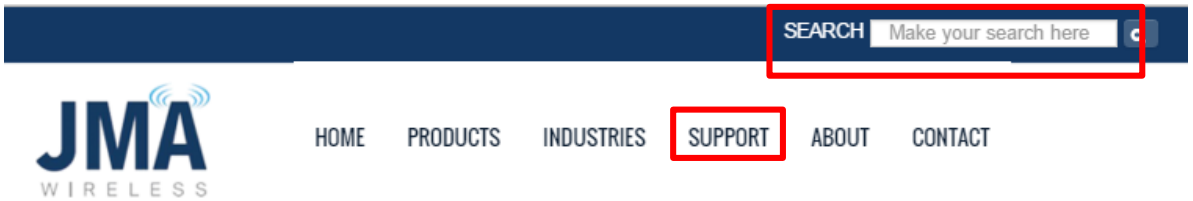
- RET-Actuator Jam
  - During Calibration
    - Try the calibration several times
    - Try Resetting the bus and re-calibrating
    - Still Jammed - Contact JMA Tech Support
  - During tilt adjustment
    - Verify the RET is Calibrated before setting tilt
    - Try Resetting the bus and re-calibrating
    - Still Jammed - Contact JMA Tech Support

GUI OPERATION - iRET



JMA WEBSITE & SUPPORT

Support Hours	▪ Weekday Hours: 8AM to 5PM EST ▪ After Hours, Weekend & Holiday Hours: • Via Customer Service Representative (CSR) - 24X7
Phone Support	▪ 1-888-201-6073
Email Support & Web Site	▪ techsupport@jmawireless.com ▪ customerservice@jmawireless.com ▪ http://www.jmawireless.com



Antenna Systems

- RET Training Video
- Fixed Tilt Product Selection Matrix
- RET Product Selection Matrix
- Antenna Model Nomenclature
- RET PCU-220 Controller Support
- RET-200 Motor Support
- Antenna Painting Options
- Stadium Antenna - Weep Hole Guide
- NWAV Macro Antenna Bracket Installation Guide

RF Conditioning

- Multi-Band Combiner Matrix
- In-Band Combiner Matrix

Thank You

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