DOCUMENT HISTORY

REV	DESCRIPTION	DATE	APPROVED
1	Preliminary Release	14-May-20	

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ENGINEER M. Rekrut	DATE	
APPROVED	DATE	TITLE Level 3A Maintenance Procedures at FSP, DSO TSGT
DO NOT SCALE DRAWING WORK FROM DIMENSIONS		

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02MQ7	11137-01610-031	1
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Level 3A Maintenance Procedures at FSP

DSO TSGT

Revision 1

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ABOUT THIS DOCUMENT

This document describes the DSO TSGT preventive maintenance procedures to be performed by a Level 1 Operator.

CAUTION ICON

A Caution icon in the manual indicates a hazardous situation that if not avoided, may result in injury. A Caution icon may also be used to indicate other unsafe practices or risks of damage to the TSGT equipment.

Caution! 	60 VDC HIGH CURRENT

POTENTIAL HAZARDS AND SAFETY PRECAUTIONS

While all precautions have been taken by Globecomm Systems, Inc to eliminate and identify potential safety hazards in the TSGT System, personnel should exercise caution when installing, operating and servicing the equipment.

Care should be taken to prevent injury from electrical shock, pinch points and RF Radiation. Globecomm Systems, Inc is not liable for any damage or injury arising from a technician's failure to follow instructions contained in this document or his or her failure to exercise due care and caution in the installation, operation and service of the TSGT equipment. Globecomm Systems, Inc shall not be responsible for injury or damage resulting from improper procedures or from the use of improperly trained or inexperienced personnel performing such tasks.

This document is intended as a general guide for trained and qualified personnel who are aware of the dangers of handling potentially hazardous electrical and electronic circuits. This document is not intended to contain a complete statement of all safety precautions that should be observed by personnel in using this or other electronic equipment.

This system is integrated with high power amplifiers of traveling wave tubes and other high power amplifier technology and is capable of transmitting microwave energy at varying power levels. If transmitting microwave power, Globecomm Systems, Inc cautions the end-user to review all applicable local, federal and international regulations and to comply with all such regulations in the operation and maintenance of the integrated system.

The electrical currents and voltages associated with the equipment, whether supplied by Globecomm Systems, Inc or others, are dangerous. Personnel must, at all times, observe safety regulations.

SAFETY GUIDELINES

- Do not remove, short-circuit or tamper with interlock switches on access covers, doors, enclosures, gates, panels or shields.

- Keep away from live circuits.
- Know your equipment and do not take risks.
- Always remove all power to the system prior to working on the antenna, the reflector assembly, the reflector backup assembly or the feed assembly.

RF Radiation Lockout Perimeter

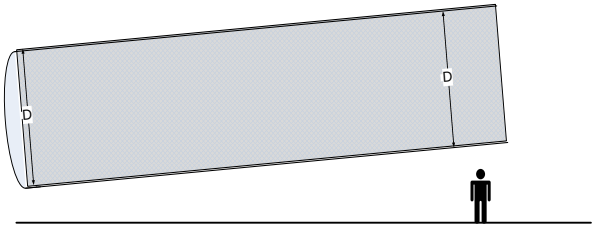
The TSGT antenna radiating surfaces can produce non-ionizing radiation levels more than maximum recommended exposure levels.

To determine the minimum 'safe' distance from the antenna requires calculating the Power Density in the direction of personnel or the object of concern. Minimum information required to calculate the Power Density is the distance to the object, angular offset of the antenna RF bore-sight to the object, and operating power levels. Formulae for calculating Power Density may be found in AECTP 250 Edition 1, Leaflet 258.

A simplified approach to determining safe area boundaries considers a baseline operating condition where only the lower limit of operational elevation angle is required. Baseline operating conditions are established for the T-1 and T-2 configurations as follows;

Configuration	**T-1**	**T-2**
Antenna	4.6m	2.4m
Antenna Centreline Height	3.1m	3.3m
HPA Configuration	1:1 Phase Combined	1:1 Phase Combined
Maximum TSGT EIRP	79 dBW	68 dBW
Near Field Length	148m	41m
Distance to Far Field	355m	97m
Max. Power Density Near Field	14 mW/cm²	19 mW/cm²
Max. Power Density Far Field	34 mW/cm²	3 mW/cm²

The baseline operating configurations result in radiation levels more than maximum recommended exposure levels when in line with the antenna main lobe. The antenna main lobe is a cone shaped projection assumed to have the same dimensions as the antenna main reflector.

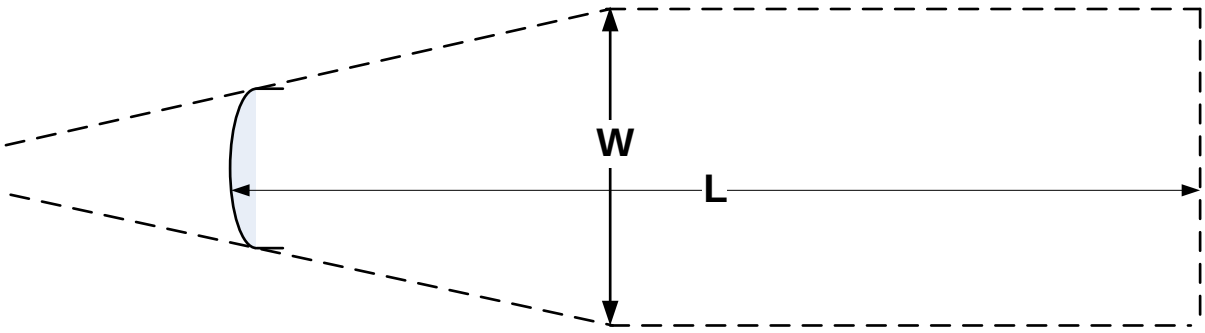


Antenna Main Lobe Projection

Due to the directivity of the radiated power a zone perimeter can be established by adhering to a few simple rules.

1. Never operate below a 5º antenna elevation angle

2. Always assume maximum transmitter power
3. Always verify the main lobe is not in line with personnel or buildings.
4. Always consider the main lobe to be twice the diameter of the antenna at distances of twice the antenna diameter
5. Always consider the radiation field extends a minimum of 500m
6. Always wear your personal Radiation Monitor when working on or around an operating TSGT



TSGT Radiation Zone Perimeter

Antenna Operational Elevation Angle (º)	T-1 Minimum Safe Area Dimension (m)		T-2 Minimum Safe Area Dimension (m)	
	Length (L)	Width (W)	Length (L)	Width (W)
5	38	9	14	5
10	19	9	7	5
15	12	9	5	5
20	9	9	4	3
25	7	5	3	3
30	6	5	2	3
35	5	5	2	3
40	4	5	2	3
45	3.5	5	2	3

TSGT Radiation Zone Perimeter Dimensions

The TSGT setup procedure calls for a “Lockout Perimeter” to be established around the terminal to protect personnel from RF radiation.

RF Radiation Monitor

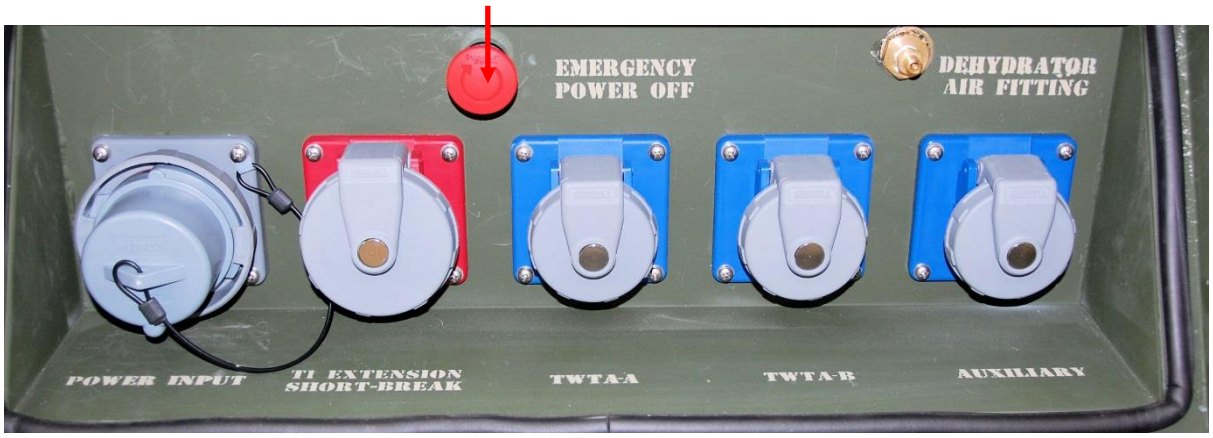
A personal RF Radiation Monitor is provided with the TSGT and should be worn at all times by any personnel working around a transmitting TSGT.

Emergency Power Off Controls

The TSGT is equipped with Power Emergency Off (EPO) switches at both the TSGT Container and the T-1 Extension Trailer.

One TSGT Container Emergency Power Off button is located on the Power ETB as illustrated below. Depressing this button cuts of all power to the TSGT terminal and should only be used in the event of an emergency.

TSGT Container
Emergency Power Off



TSGT Container Power ETB Emergency Power Off

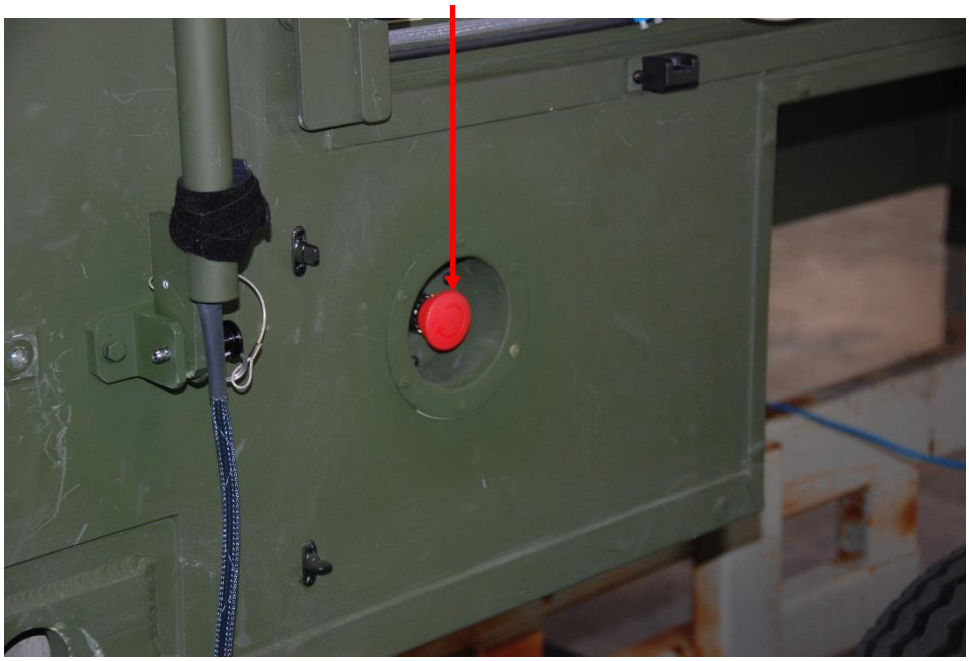
A second TSGT Container Emergency Power Off button is located the Left Side of the TSGT Container as illustrated below. Depressing this button cuts of all power to the TSGT terminal and should only be used in the event of an emergency.

TSGT Container Left Side
Emergency Power Off

TSGT Container Left Side Emergency Power Off

A third TSGT Container Emergency Power Off button is located the Right Side of the TSGT Container as illustrated below. Depressing this button cuts of all power to the TSGT terminal and should only be used in the event of an emergency.

TSGT Container Right Side Emergency Power Off



TSGT Container Right Side Emergency Power Off

The T-1 Extension Trailer is equipped with an Emergency Power Off button located at the front of the Trailer Power Panel and illustrated below. Depressing this button cuts of all power to the T-1 Extension Trailer and should only be used in the event of an emergency.

T-1 Trailer Emergency Power Off

T-1 Extension Trailer Power ETB Emergency Power Off Button

Emergency Power Off Protection Switches
The TSGT is equipped with Power Emergency Off (EPO) protection switches at the TSGT Container. If any of these switches are activated, all power to the TSGT is shut off.

- Dirty Power Panel Plate
- Clean Power Panel Plate
- Dirty Power Vault Access (TSGT Container centre aisle)
- Clean Power Vault Access (TSGT Container centre aisle)

Safety Procedures
The following safety procedures are listed to remind those performing any work on the antenna system that safety rules must be observed. Failure to observe safety rules may result in serious injury or death. Always work safely and in accordance with established procedures.

- Always wear the RF Radiation Monitor when working on or near a TSGT terminal.
- Care shall be taken in all operations to safeguard other people as well as property and to comply with all local safety procedures as established by the customer's site representative, as well as local building codes and fire protection standards.
- Never make internal adjustments or perform maintenance or service when alone or fatigued.
- Do not stand in the direct path of the feed system when the system is transmitting!
- Do not work on the feed system when the TSGT is transmitting!

WIND SPEED WARNINGS

T-1 4.6m Antenna
The T-1 4.6m antenna should not be deployed in wind speeds more than **10 m/s (36 km/h)**.

The T-1 4.6m antenna can survive in up to **30 m/s (108 km/h)** winds at any position. In winds above **30 m/s (108 km/h)**, the antenna must be stowed to ensure survival.

If wind speeds are below **10 m/s (36 km/h)**, the T-1 4.6m antenna can be stowed per the procedure described in Section **Error! Reference source not found.** of the DSO TSGT O&M manual.

To stow the T-1 4.6m antenna in winds speeds exceeding **10 m/s (36 km/h)**, the antenna must be stowed by an alternate method where the antenna wings are not folded and secured before the reflector is lowered to its stowed position, as described in Section **Error! Reference source not found.** of the DSO TSGT O&M manual.

T-2 2.4m Antenna

The T-2 2.4m antenna should not be deployed in wind speeds more than **33.5 m/s (120 km/h)**.

The T-2 2.4m antenna can survive in up to **33.5 m/s (120 km/h)** winds at any position. In winds above **33.5 m/s (120 km/h)**, the antenna must be stowed to ensure survival.

The T-2 4.6m antenna can be stowed per the procedure described on Section 3.4.2 of the DSO TSGT O&M manual.

VOLUME I - TABLE OF CONTENTS

1 LEVEL 3A TSGT MAINTENANCE AT CSSC

Level 3A TSGT Maintenance is the preventive maintenance to be performed every 2 years at the CSSC, including:

- Review of Level 1, and 2 Maintenance Records
- System Set-Up and Power-Up
- Antenna Control Subsystem Tests
- Measurements and Calibrations
    - RF Monitor/Test Panel
    - Tx and Rx Frequency Accuracy
    - Tx Levels and Phase Alignment
    - Tx Amplitude Response and Slope Equalizer Adjustment
    - Rx Chain Level Alignment
    - Rx Amplitude Response
- Functionality Checks

1.1 TSGT Training Check

In the space below, please indicate the NCIAA training courses that the Technician(s) performing these procedures has received on the DSO TSGT. Include the name of the Technician(s) and the name and dates of the training course(s).

2 DSO TSGT SAFETY PRECAUTIONS

Before proceeding with this document, read the section on TSGT safety, beginning on page v at the begging of this document.

Personal RF Radiation Meter

The Personal RF Radiation Monitor should be worn at all times while working around a transmitting TSGT Antenna.

To configure the Personal RF Radiation Meter:

1. Configure the alarm for Vibrate, Alternating or Audio
2. Turn ON the RF Radiation Monitor

Note: *While using the RF Radiation Monitor, an operator should not allow their person to be between the monitor and the Antenna for extended periods of time as this could decrease the effectiveness of the monitor. The RF Radiation monitor should not be worn under clothing.*

3 REFERENCED DOCUMENTS

The DSO TSGT O&M Manuals are good references to support the procedures in this document.

- 11137-01604-001, Operation and Maintenance (O&M) Manual, TSGT, DAC DSO, Volume 1, 2, and 3.
- 11137-01604-002, Operation and Maintenance (O&M) Manual, TSGT, DCIS DSO, Volume 1, 2, and 3.

4 REVIEW OF TSGT MAINTENANCE RECORDS

Maintenance records should have been submitted for TSGT Level 1 and Level 2 maintenance during the past two years. Confirm that these records have been received and reviewed.

Confirm receipt and review of:

- Recent Level 1 Maintenance Records: _____check (✓)
- Recent Level 2 Maintenance Records: _____check (✓)

5 SYSTEM SET-UP AND POWER-UP

5.1 Installation / Visual Inspection

PROCEDURE / REPORT OF TEST Nº 5.1						
TEST NAME: Installation / Visual Inspection		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-1 Trailer Checks Before Disconnecting from AMV					
1.	Check Trailer Brakes and operation.			OK	**OK**	
2.	Check Trailer Lights.			OK	**OK**	
	T-1 Trailer and Antenna Inspection					
1.	Inspect Trailer for physical damage, punctures, bodywork. Inform metal workshop on action items if applicable			OK	**OK**	
2.	Check T-1 antenna for wear and tear, corrosion, and painting removal available.			OK	**OK**	
3.	Check Transport support Z braces and tie-down straps.			OK	**OK**	
4.	Check Air Suspension valve system and Air cushions operation.			OK	**OK**	
5.	Check Trailer feet and support pins are in place and working properly.			OK	**OK**	
6.	Check Antenna reflector EL Transport support bar and switch operation and lubrication.			OK	**OK**	
7.	Check EL Motor Transport support bar and switch operation.			OK	**OK**	
8.	Check Feedboom clamps and pads are in good condition.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.1						
TEST NAME: Installation / Visual Inspection		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
9.	Check antenna feed is placing on stow brackets properly.			OK	**OK**	
10.	Check antenna Stow Bracket is in good condition pins and joints are maintained, safe and lubricated properly. Switch is functional and locking mechanism working properly. Check in the Limit Switch Logic Box that the STOW BRACKET LED is OFF when switch actuated.			OK	**OK**	
11.	Check Antenna Stow bracket, Velocity Switch, pads and spring are in good condition and working properly.			OK	**OK** **OK**	
12.	Check Antenna Feed Waveguide Assembly connections are in good condition, tight and free of corrosion.			OK	**OK**	
	T-1 Trailer Positioning					
1.	Position Trailer.			OK	**OK**	
2.	Install support feet.			OK	**OK**	
3.	Level Trailer.			OK	**OK**	
4.	Inspect power and signal ETB.			OK	**OK**	
5.	Install and inspect grounding and lightning rod connectivity.			OK	**OK**	
	T-1 Trailer Prepare for Deployment					
1.	Deploy outriggers and level Trailer			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.1						
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PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
2.	Remove AZ and EL stow bars			OK	**OK**	
3.	Unclamp feedboom			OK	**OK**	
4	Remove the stow bracket safety lanyards			OK	**OK**	
5.	Remove X/Z braces			OK	**OK**	
	T-2 Container Positioning					
1.	Position Container.			OK	**OK**	
2.	Remove top cover.			OK	**OK**	
3.	Unclamp feedboom.			OK	**OK**	
4.	Unlock all doors.			OK	**OK**	
5.	Remove and inspect lifting jacks.			OK	**OK**	
6.	Install lifting jacks and level Container.			OK	**OK**	
7.	Install grounding and inspect grounding and lightning rod connectivity.			OK	**OK**	
	T-2 Container Prepare for Deployment					
1.	Inspect power and signal ETB and T-1 power and signal wiring harnesses for damaged/loose/incomplete connectors, dust caps, water tightness etc			OK	**OK**	
2.	Connect T-2 power and signal wiring harness to the Container and the Trailer.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.1						
TEST NAME: Installation / Visual Inspection		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
3.	Install and connect the weather mast assembly on the Container.			OK	**OK**	
4.	Inspect Container for physical damage, punctures, doors, handles, bodywork, weather seals, RF shielding. Inform metal workshop on action items if applicable			OK	**OK**	
5.	Check Fibre Patch Panel and fibre connectors			OK	**OK**	
6.	Remove all of the following equipment for calibration: • FO reels • Power meter and power sensor • Spectrum analyser • DVM • Attenuators (3, 6, 10 and 20 dB) • WAN Tester • Personal radiation meter			OK	**OK**	
7	Confirm SNs, check calibration stickers, and reinstall test equipment and FO reels with calibrated equipment.					
	WAN Tester			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
	Power Meter			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	

PROCEDURE / REPORT OF TEST Nº 5.1						
TEST NAME: Installation / Visual Inspection		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	Power Sensor			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
	DVM			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
	Personal Radiation Monitor			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
	MCL Attenuator 3 db.			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
	MCL Attenuator 6 db.			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
	MCL Attenuator 10 db.			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
	MCL Attenuator 20 db.			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	

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PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	Spectrum Analyzer			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
	F/O 250meter HMA 4CH.SM			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
	F/O 250meter HMA 4CH.SM			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	

5.2 System Power-On and Initial Assessment

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	Pre-Power on Checks					
1.	Confirm all EPO Switches are not engaged: • At Container Power ETB • At left side of Container • At right side of Container • At Trailer ETB			OK	**OK** **OK** **OK** **OK**	
2.	Confirm all CBs located in the Clean and Dirty Power Distribution Panels are in the OFF position.			OFF	**OK**	
3.	Confirm all Inverter Module CBs are ON.			ON	**OK**	
4.	Confirm all CBs on the Summing and Distribution Assembly are ON			ON	**OK**	
	System Initial Power-On Checks					
1.	Connect MAIN POWER from the PGS or Commercial Power socket to the Main Power Input on the Power ETB.			OK	**OK**	
2.	Close CB25 and CB32 at the Clean Power Distribution Panel.			OK	**OK**	
3.	Close CB1 at the Dirty Power Distribution Panel. Verify that that the voltage displayed at the AC Power Meter located in the Dirty Power Distribution Panel is within the range 360 – 440VAC (400VAC ± 10%)			400VAC ±10%	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
4.	Record the readings at the AC Power Meter			3Phase Voltage: _____ V_{AVG} 3Phase Current: _____ I_{AVG} 3Phase Power: _____ kW 3Phase Frequency: _____ Hz.		
	EPO Checks					
1.	Engage the EPO Switch located on the PETB and confirm the following: • CB1 at Dirty Power Distribution Panel trips • 48VDC EPO Switch in LVDS assembly at rear of UPS opens			OK OK	**OK** **OK**	
2.	Disengage the EPO Switch at the Power ETB and restore CB1 to apply power to system.			OK	**OK**	
3.	Engage the EPO Switch located on the Container left side and confirm the following: • CB1 at Dirty Power Distribution Panel trips • 48VDC EPO Switch in LVDS assembly at rear of UPS opens			OK OK	**OK** **OK**	
4.	Disengage the EPO Switch on the left side of the Container and restore CB1 to apply power to system.			OK	**OK**	

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TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
5.	Engage the EPO Switch located on the Container right side and confirm the following: • CB1 at Dirty Power Distribution Panel trips • 48VDC EPO Switch in LVDS assembly at rear of UPS opens			OK OK	**OK** **OK**	
6.	Disengage the EPO Switch on the right side of the Container and restore CB1 to apply power to system.			OK	**OK**	
7.	Close CB9 on the Dirty Power Distribution Panel to apply mains power to the Trailer.			OK	**OK**	
8.	Engage the EPO Switch on the Trailer.			OK	**OK**	
9.	Confirm that CB1 at the Trailer trips			OK	**OK**	
10.	Disengage the EPO Switch at the Trailer and close CB1.			OK	**OK**	
	Power-Up and Check the ECUs					
1.	Power-up ECU A, set it to AUTO mode and set its temperature to a setting that will trigger heating (above ambient temperature by at least 4 degrees).			OK	**OK**	
2.	Confirm that ECU A starts heating and is functioning properly.			OK	**OK**	
3.	Set ECU A temperature to a setting that will trigger cooling (below ambient temperature by at least 4 degrees).			OK	**OK**	
4.	Confirm that ECU A starts cooling and is functioning properly.			OK	**OK**	
5.	Set ECU A temperature to +25 degrees.			OK	**OK**	
6.	Power-down ECU A.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
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NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
7.	Power-up ECU B, set it to AUTO mode and set its temperature to a setting that will trigger heating (above ambient temperature by at least 4 degrees).			OK	**OK**	
8.	Confirm that ECU B starts heating and is functioning properly.			OK	**OK**	
9.	Set ECU B temperature to a setting that will trigger cooling (below ambient temperature by at least 4 degrees).			OK	**OK**	
10.	Confirm that ECU B starts cooling and is functioning properly.			OK	**OK**	
11.	Set ECU B temperature to +25 degrees.			OK	**OK**	
12.	Power-down ECU B.			OK	**OK**	
13.	Power-up ECU C, set it to AUTO mode and set its temperature to a setting that will trigger heating (above ambient temperature by at least 4 degrees).			OK	**OK**	
14.	Confirm that ECU C starts heating and is functioning properly.			OK	**OK**	
15.	Set ECU C temperature to a setting that will trigger cooling (below ambient temperature by at least 4 degrees).			OK	**OK**	
16.	Confirm that ECU C starts cooling and is functioning properly.			OK	**OK**	
17.	Set ECU C temperature to +25 degrees.			OK	**OK**	
18.	Power-down ECU C.			OK	**OK**	
19.	Power-up any two ECUs.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
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PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	Power-Up and Check the UPS					
1.	At the Clean Power Distribution Panel, switch ON rectifiers 1-7 (at CB2-CB8) one-by-one while monitoring the output voltage at the Rectifier Controller (Faulty rectifiers tend to “pull down” the output voltage).			54.4 VDC	Voltage: _____VDC	
2.	Confirm Inverters are powered-on and are not displaying any faults.			OK	**OK**	
3.	With a (maintenance) laptop with PowCom installed, check if UPS is configured as shown in the PowCom screen captures below. Correct the settings as necessary.			OK	**OK**	

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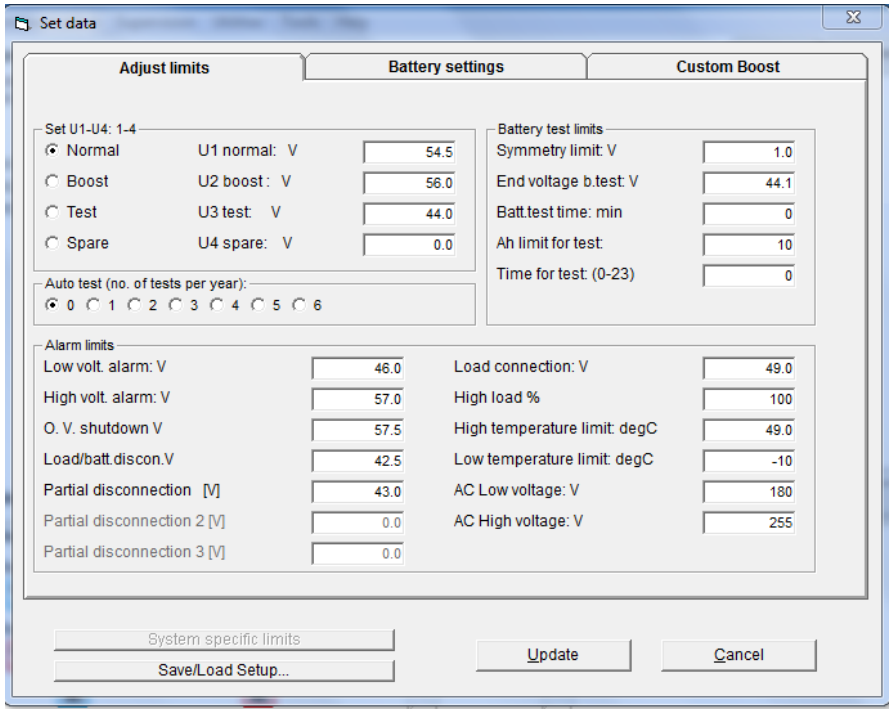
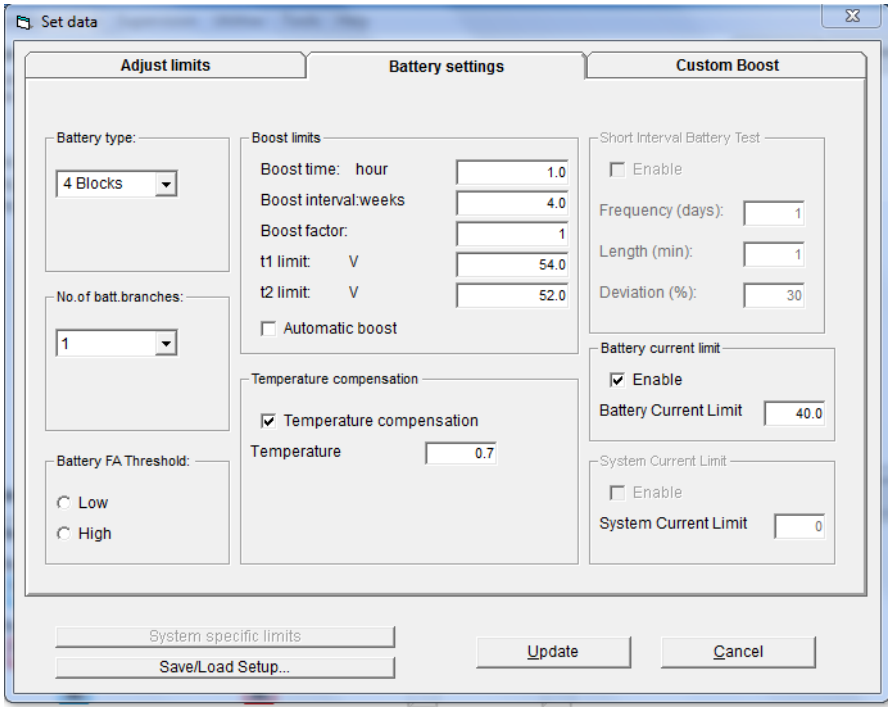
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**





PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	Power-Up Equipment Racks					
1.	Turn on Clean Power Distribution Panel circuit breakers to apply power to the equipment racks. Verify that power has been applied to all racks. • CB15 (Right R1/R2) • CB16 (Right R3/R4) • CB17 (Left R5/R6) • CB20 (Right R1) • CB21 (Right R2/R3) • CB22 (Right (R4) • CB23 (Left R5) • CB24 (Left R6/R7)			OK	**OK**	
2.	Power ON all independent units by switching them ON and check all having initial power ON status.					
3.	Boot T-1 ACU for T-1 Operation			Boot sequence for T-1	**OK**	
4.	Boot T-2 ACU for T-2 Operation			Boot sequence for T-2	**OK**	
5.	T-2 PDU			Initial power up	**OK**	
6.	EMS SERVER COMPUTER LMCa			EMS GUI operation Log GUI Revision. REV.2.1.12	**OK** **OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
7.	EMSe 1 MODEM			Booting Modems without any alarm	**OK**	
8.	EMSe 2 MODEM			Booting Modems without any alarm	**OK**	
9.	EMSe 3 MODEM			Booting Modems without any alarm	**OK**	
10.	EMSe 4 MODEM			Booting Modems without any alarm	**OK**	
11.	ASNMC LCAm SERVER COMPUTER			Windows Win7 prof. operating system starts ASNMC GUI Interface starts. ASNMC VER.1.2.1 iDirect GUI access	**OK** **OK** **OK**	
12.	ASNMC DWS CLIENT COMPUTER			Windows Win7 prof. operating system starts ASNMC GUI Interface starts. ASNMC VER.1.2.1 iDirect GUI access	**OK** **OK** **OK**	
13.	ASNMC VPN ROUTER&SWITCH			Initial power up	**OK**	
14.	ASNMC NU PHONE			Initial Power up	**OK**	
15.	ASNMC NR PHONE			Initial Power up	**OK**	
16.	ASNMC SWITCH			Initial Power up	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
17.	EBEM MODEM#1			Initial power up Check FW version Rev. 02.03.02	**OK**	
18.	EBEM MODEM#2			Initial Power up Check FW version Rev. 02.03.02	**OK**	
19.	EBEM MODEM#3			Initial Power up Check FW version Rev. 02.03.02	**OK**	
20.	EBEM MODEM#4			Initial Power up Check FW version Rev. 02.03.02	**OK**	
21.	EBEM MODEM#5			Initial Power up Check FW version Rev. 02.03.02	**OK**	
22.	LINE AMPLIFIERS			Initial Power up	**OK**	
23.	NETCLOCK TFRS #1			Initial Power up	**OK**	
24.	NETCLOCK TFRS #2			Initial Power up	**OK**	
25.	SPECTRA TFRS DISTRIBUTION AMPLIFIER1			Initial Power up	**OK**	
26.	SPECTRA TFRS DISTRIBUTION AMPLIFIER2			Initial Power up	**OK**	
27.	GPS ANTENNA			Initial Power up	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
28.	(On DAC 1-4) DXC #1 & FO-MICE EQUIPMENT			Initial Power up	**OK**	
29.	(On DAC 1-4) DXC #2 & FO-MICE EQUIPMENT			Initial Power up	**OK**	
30.	(On DCIS & DCAOC) FDMA ROUTER #1			Initial Power up	**OK**	
31.	(On DCIS & DCAOC) FDMA Switch #1			Initial Power up	**OK**	
32.	(On DCIS & DCAOC) EMS ROUTER #2			Initial Power up	**OK**	
33.	(On DCIS & DCAOC) EMS Switch #2			Initial Power up	**OK**	
34.	ORION SYSTEM MANAGEMNET SUBSYSTEM AMP#1 16 PORT			Initial Power up	**OK**	
35.	ORIONSYSTEM MANAGEMNET SUBSYSTEM DELL SWITCH			Initial Power up	**OK**	
36.	BUC A (BLOCK UP CONVERTER) for T-1			Initial Power up	**OK**	
37.	BUC SWITCHING UNIT for T-1			Initial Power up	**OK**	
38.	BUC B (BLOCK UP CONVERTER) for T-1			Initial Power up	**OK**	
39.	BUC A (BLOCK UP CONVERTER) for T-2			Initial Power up	**OK**	
40.	BUC SWITCHING UNIT for T-2			Initial Power up	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
41.	BUC B (BLOCK UP CONVERTER) for T-2			Initial Power up	**OK**	
42.	BDC A (BOCK DOWN CONVERTER) for T-1			Initial Power up	**OK**	
43.	BDC SWITCHING UNIT for T-1			Initial Power up	**OK**	
44.	BDC B (BOCK DOWN CONVERTER) for T-1			Initial Power up	**OK**	
45.	BDC A (BOCK DOWN CONVERTER) for T-2			Initial Power up	**OK**	
46.	BDC SWITCHING UNIT for T-2			Initial Power up	**OK**	
47.	BDC B (BOCK DOWN CONVERTER) for T-2			Initial Power up	**OK**	
48.	UPLINK EQUALIZER T-1			Initial Power up	**OK**	
49.	UPLINK EQUALIZER T-2			Initial Power up	**OK**	
50.	SSPA SUBSYSTEM #			Initial Power up	**OK**	
51.	SSPA #A			Initial Power up	**OK**	
52.	SSPA #B			Initial Power up	**OK**	
53.	LNA SUBSYSTEM			Initial Power up	**OK**	
54.	LNA #A			Initial Power up	**OK**	
55.	LNA #B			Initial Power up	**OK**	
56.	ANTI_ICING SYSTEM			Initial Power up	**OK**	
57.	DEHYDRATOR Check duty cycle and operation of Dehydrator on ASNMC			<10%	_____ %	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
58.	CONTAINER AND BATTERY TEMP Check Container temperature operation on ASNMC.				Container: _____ °C Battery: _____ °C	
59.	Confirm that the weather information at the ASNMC is accurate.			Correct weather	**OK**	
60.	MISC. ALARMS T-2			Initial Power up	**OK**	
61.	PGS (POWER GENERATION SYSTEM) SUBSYSTEM			Initial Power up	**OK**	
62.	T-1 PDU			Initial Power up	**OK**	
63.	T-1 PMU			Initial Power up	**OK**	
64.	T-1 HPA SUBSYSTEM			Initial Power up	**OK**	
65.	HPA #A			Initial Power up	**OK**	
66.	HPA #B			Initial Power up	**OK**	
67.	T-1 LNA SUBSYSTEM			Initial Power up	**OK**	
68.	LNA #A			Initial Power up	**OK**	
69.	LNA #B			Initial Power up	**OK**	

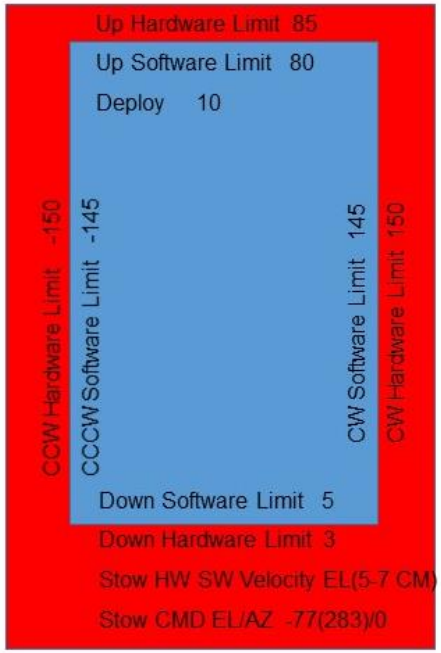
6 ANTENNA CONTROL SUBSYSTEM TESTS

6.1 T-2 Antenna and Antenna Control System

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	***Note**: Reference 600-1219 Rev B 2_4m O-M MANUAL and NCIA CSSC EMB TSS PMI procedures for questions on configuring TSGT for antenna operation.*					
	T-2 Antenna Inspection and Maintenance					
1.	Check PDU for label indicating that it has been ruggedized.			OK	**OK**	
2.	Check antenna Feed Membrane and Air leakage			Less than 10% Duty Cycle on dehydrator	**OK**	
3.	Inspect Azimuth and El gear boxes for leakage.			OK	**OK**	
4.	Check Elevation Hand Crank operation is smooth and quiet.			OK	**OK**	
5.	Check Azimuth Hand Crank operation is smooth and quiet.			OK	**OK**	
6.	Check Elevation pivot bearings.			OK	**OK**	
7.	Check Azimuth bearing operation.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
8.	Check: • All visible hardware • Cable harness • Feed boom struts • Feed pallet struts • Ferrous metal surfaces • Painting, cracks and rusting • Waveguide connections and support brackets • Antenna surface			OK	**OK** **OK** **OK** **OK** **OK** **OK** **OK** **OK**	
9.	Apply recommended rust preventive re-coating on Ferrous parts and clean the dust and excessive oil			OK	**OK**	
10.	Apply De-icing system and blister check procedure. ***Notes***: 1. *Only one SSPA (T-2) and one TWTA Beam (T-1) can be turned ON when antenna Anti-Icing is enabled.* 2. *Only one ECU can be in operation when Antenna Anti-Icing is enabled.*			OK	**OK**	
	T-2 ACU Deploy, Stow and Jog					
1.	DEPLOY the antenna and verify there are no fault messages present. Verify that the antenna elevation angle is 10 degrees.			OK	**OK**	
2.	Activate STOW Mode and check antenna stowing. And Check and record antenna STOW command.			Elevation Stow command -77	Command: _____	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
3.	Check antenna is centred on AZ to 0 degree and fitting into the frame, Check AZ STOW Centre switch operation.			Check AZ centre Offset =0 Check Centre Switch	Offset=0.0 **OK**	
4.	Check antenna, slowing when antenna reaches 5-7cm to final stow position. If not, adjust the Velocity switch, located under the cover at the inner left-side of the elevation axle shaft.				**OK**	
5.	Check Antenna STOWED messages and actual STOW position			Elevation Stow actual value Stowed message	Actual Value: **OK**	
6.	DEPLOY the antenna again and check Manual ACU / Antenna JOG Commands.			OK	**OK**	
7.	Check Manual AZ Hand Cranking			OK	**OK**	
8.	Check Manual EL Hand Cranking			OK	**OK**	
	T-2 ACU Emergency Stop Check					
1.	Verify the Emergency Stop on T-2 ACU stops antenna movement.			OK	**OK**	
2.	Verify ACU Emergency Stop activation reports to ASNMC			OK	**OK**	
3.	Verify resetting the ACU Emergency Stop restores antenna drive capability.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-2 Antenna Travel Limits					
This figure summarizes the azimuth and elevation angle settings for the T-2 antenna and can be used a reference for the procedures in this section. 						

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Connect the PMU Handheld Maintenance Unit to the T-2 PDU.			OK	**OK**	
2.	Manually move the antenna to be positioned over the Container centre line and record the azimuth and elevation angles.			OK	AZ: _____ EL: _____	
3	Calculate the approximate setting for the azimuth CW and CCW Pre-Limits. They are set at the factory to be approximately ±150 degrees from the centre line setting. • CW limit = Centre line azimuth +150 degrees. • CCW limit = Centre line azimuth -150 degrees.			OK	CW Pre-Limit: _____ CCW Pre-Limit: _____	
4.	Drive the antenna CW to a valid point, record the azimuth angle and verify that there are no alarms present in the ACU or ASNMC.			OK	AZ Angle: _____ **OK**	
5.	Drive the antenna in the CW direction. The ACU will alarm at the soft limit. Record the azimuth angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.			OK	Soft CW Limit: _____ **OK**	
6.	Continue driving the antenna in the CW direction. The antenna will stop near the Az CW Pre-Limit, calculated in step 3. Record the azimuth angle at the CW Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	CW Pre-Limit: _____ **OK**	
7.	Drive the antenna CCW to a valid point, record the azimuth angle and verify that there are no alarms present in the ACU or ASNMC.			OK	AZ Angle: _____ **OK**	
8.	Drive the antenna in the CCW direction. The ACU will alarm at the soft limit. Record the azimuth angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.			OK	Soft CCW Limit: _____ **OK**	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
9.	Continue driving the antenna in the CCW direction. The antenna will stop near the Az CCW Pre-Limit, calculated in step 3. Record the azimuth angle at the CCW Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	CCW Pre-Limit: _____ **OK**	
10.	Drive the antenna in the CW direction back to the centre.			OK	**OK**	
11.	Drive the antenna UP to a valid point, record the elevation angle and verify that there are no alarms present in the ACU or ASNMC.			OK	EL Angle: _____ **OK**	
12.	Drive the antenna in the UP direction. The ACU will alarm at the soft limit. Record the elevation angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.			OK	Soft UP Limit: _____ **OK**	
13.	Continue driving the antenna in the UP direction. The antenna will stop near the UP Pre-Limit, set at approximately 88 degrees. Record the elevation angle at the UP Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	UP Pre-Limit: _____ **OK**	
14.	Drive the antenna DOWN to a valid point off centre, record the elevation angle and verify that there are no alarms present in the ACU or ASNMC.			OK	EL Angle: _____ **OK**	
15.	Drive the antenna in the DOWN direction. The ACU will alarm at the soft limit. Record the elevation angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.			OK	Soft DN Limit: _____ **OK**	
16.	Continue driving the antenna in the DOWN direction. The antenna will stop near DOWN Pre-Limit, set at approximately -2 degrees. Record the elevation angle at the DOWN Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	DN Pre-Limit: _____ **OK**	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-2 Antenna Safe-to-Transmit Limits					
1.	Point the antenna to clear sky and record the azimuth and elevation angles. This will be the antenna "set" position.			OK	AZ: _____ EL: _____	
2.	Set up Modem and Spectrum Analyzer: 1. Confirm all modems are OFF. 2. At the L-Band Uplink Patch Panel, connect the output of EBEM #1 to T-2 antenna. 3. Set EBEM #1 transmit to 1200 MHz CW at -20 dBm. 4. Connect a Spectrum Analyzer on feed coupler DC1 directly or at the RF Monitor/Test Panel port 25 to view transmitted carrier at RF.			OK	**OK** **OK** **OK** **OK**	
3	Configure the T-2 for normal operating conditions with the SSPAs in "Combined Offline" mode and operating at 10 dB output back-off.			OK	**OK**	
4.	At the T-2 ACU, set the safe-to-transmit angular limits to: • Azimuth CW: +5 degrees from antenna set position • Azimuth CCW: -5 degrees from antenna set position • Elevation Up: +5 degrees from antenna set position • Elevation Down: -5 degrees from antenna set position			OK	**OK**	
5.	Drive the antenna in azimuth CW +3 degrees from the set position. Verify the SSPAs are not inhibited (mute).			OK	**OK**	
6.	Drive the antenna in azimuth CW another +3 degrees (-6 degrees from the set position). Verify the SSPAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
7.	Drive the azimuth CCW -6 degrees. Clear the ACU alarm and verify the SSPAs transmit.			OK	**OK**	
8.	Drive the antenna in azimuth CCW -3 degrees. Verify the SSPAs are not inhibited.			OK	**OK**	
9.	Drive the antenna in azimuth CCW another -3 degrees (-6 degrees from the antenna set position). Verify the SSPAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	
10.	Drive the azimuth CW +6 degrees. Clear the ACU alarm and verify the SSPAs transmit.			OK	**OK**	
11.	Drive the antenna elevation up +3 degrees. Verify the SSPAs are not inhibited.			OK	**OK**	
12.	Drive the antenna elevation up another +3 degrees (+6 degrees from the antenna set position). Verify the SSPAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	
13.	Drive the antenna elevation down -6 degrees. Clear the ACU alarm and verify the SSPAs transmit.			OK	**OK**	
14.	Drive the antenna elevation down -3 degrees. Verify the SSPAs are not inhibited.			OK	**OK**	
15.	Drive the antenna elevation down another -3 degrees (-6 degrees from the antenna set position). Verify the SSPAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	
16.	Drive the antenna elevation up +6 degrees (back to the antenna set position). Clear the ACU alarm and verify the SSPAs transmit.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-2 Satellite Acquisition					
1.	Verify that all the required preconditions are met: • GPS quality minimum of 8 • Compass heading available • Inclinometers feedback available (Tilt/Cross) • Feedboom clamps released			OK	**OK** **OK** **OK** **OK**	
2.	Check Satellite Preset list is configured for the 6 satellites as shown in the table below.			OK	**OK**	

Satellite Name	Satellite Inclination	Track mode	S/S Antenna pointed	Input signal level	Beacon Settings
GOVSAT	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SKY 5B	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SKY 5C	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SKY 5D	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SCRALL1B	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SYRACUSE3A	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:280Khz

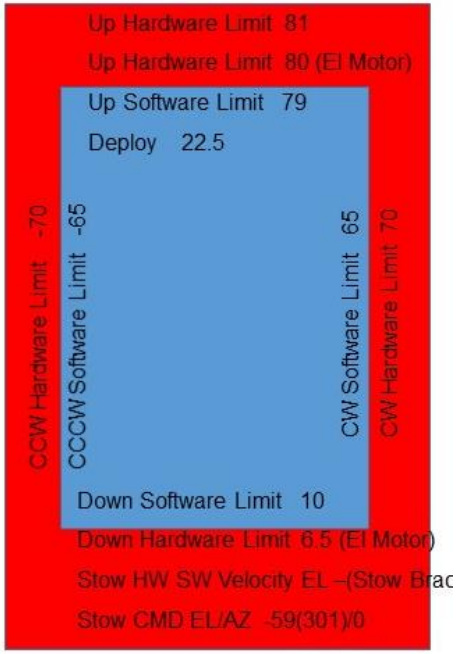
6.2 T-1 Antenna and Antenna Control System

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-1 Antenna Maintenance					
1.	Check antenna motors/brakes and lubrication and perform cleaning and lubrication.			OK	**OK**	
2.	Lubricate EL Drive Shaft and check motor operations for any abnormal noise.			OK	**OK**	
3.	Lubricate AZ Drive Sector and check motor operations for any abnormal noise.			OK	**OK**	
4.	Open, clean and check AZ Brake and clutch system functioning properly.			OK	**OK**	
5.	Check antenna Feed Membrane and Air leakage.			OK	**OK**	
	T-1 ACU Deploy, Stow and Jog					
1.	Check PDU for label indicating that it has been ruggedized.			OK	**OK**	
2.	Check that antenna drives in slow speed until the velocity switch is released.			OK	**OK**	
3.	Check that antenna stops for the stow bracket to be lowered.			OK	**OK**	
4.	DEPLOY the antenna and verify there are no fault messages present. Verify that the antenna elevation angle is 22.5 degrees.			OK	**OK**	
5.	Engage ‘’HANDLE LATCH” Check in the Limit Switch Logic Box that the HANDLE LATCH LED is OFF when switch actuated			OK	**OK** **OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
6.	DEPLOY Antenna Wings Check in the 'Limit Switch Logic Box that the L WING DEPLOYED LED is OFF when switch actuated Check in the Limit Switch Logic Box that the R WING DEPLOYED LED is OFF when switch actuated			OK	**OK** **OK** **OK**	
7.	Activate STOW Mode and check antenna stowing and record antenna STOW command.			Elevation Stow command -58	Command:	
8.	Check antenna is centred on AZ properly to 0 degree and fitting into the frame, Check AZ STOW Centre switch operation. Check in the Limit Switch Logic Box that the AZ CENT LED is OFF when switch actuated			Check AZ centre Offset =0 Check Centre Switch	Offset= 0.0 **OK**	
9.	STOW Antenna Wings Check in the Limit Switch Logic Box that the L WING STOWED LED is OFF when switch actuated Check in the Limit Switch Logic Box that the R WING STOWED LED is OFF when switch actuated			OK	**OK** **OK**	
10.	Check antenna Stow Velocity switch activates and stops Antenna Elevation Drive and unit creates STOWED message. Check in the Limit Switch Logic Box that the EL VELOCITY LED is OFF when switch actuated			Check Antenna stops when velocity switch is actuated	**OK** **OK**	
11.	Check Antenna STOWED messages and actual STOW position Check in the Limit Switch Logic Box that the STOWED LED is OFF when switch actuated			Elevation Stow actual value Stowed message	Actual Value: _____ **OK**	
12.	Activate Emergency STOW mode with Wings open			HW Bypass ON	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
13.	DEPLOY the antenna again and check Manual ACU / Antenna JOG Commands.			OK	**OK**	
14.	Release the Azimuth Brake and check Manual AZ Hand Cranking Check in the Limit Switch Logic Box that the AZ HANDCRANK LED is OFF when switch actuated Engage the Azimuth Brake.			OK	**OK** **OK**	
15.	Check Manual EL Hand Cranking Check in the Limit Switch Logic Box that the EL HANDCRANK LED is OFF when switch actuated			OK	**OK**	
16.	Check Feed Assembly is in good condition.			OK	**OK**	
	T-1 ACU Emergency Stop Checks					
1.	Verify the Emergency Stop on T-1 ACU stops antenna movement.			OK	**OK**	
2.	Verify ACU Emergency Stop activation reports to ASNMC			OK	**OK**	
3.	Verify resetting the ACU Emergency Stop restores antenna drive capability.			OK	**OK**	
4.	Verify the Emergency Stop on T-1 PDU stops antenna movement.			OK	**OK**	
5.	Verify PDU Emergency Stop activation reports to ASNMC			OK	**OK**	
6.	Verify resetting the ACU Emergency Stop restores antenna drive capability.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-1 AC Safe-to-Rotate Checks					
1.	Verify the Safe-to-Rotate activation at T-1 trailer stops antenna movement.			OK	**OK**	
2.	Verify Safe-to-Rotate activation reports to ASNMC			OK	**OK**	
3.	Verify resetting the Safe-to-Rotate restores antenna drive capability.			OK	**OK**	
	T-1 Antenna Travel Limits					

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
This figure summarizes the azimuth and elevation angle settings for the T-1 antenna and can be used a reference for the procedures in this section. 						
1.	Connect the PMU Handheld Maintenance Unit to the T-1 PDU.				**OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
2.	Manually move the antenna to be positioned over the Container centre line and record the azimuth and elevation angles.				AZ: _____ EL: _____	
3	Calculate the approximate setting for the azimuth CW and CCW Pre-Limits. They are set at the factory to be approximately ±65 degrees from the centre line setting. • CW limit = Centre line azimuth +65 degrees. • CCW limit = Centre line azimuth -65 degrees.				CW Pre-Limit: _____ CCW Pre-Limit: _____	
4.	Record the azimuth angle and verify that there are no alarms present in the ACU or ASNMC.				AZ Angle: _____ **OK**	
5.	Drive the antenna in the CW direction. The ACU will alarm at the soft limit. Record the azimuth angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.				Soft CW Limit: _____ **OK**	
6.	Continue driving the antenna in the CW direction. The antenna will stop near the Az CW Pre-Limit, calculated in step 3. Record the azimuth angle at the CW Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.				CW Pre-Limit: _____ **OK**	
7.	Confirm at the Limit Switch Logic Box that the AZ CW LED is OFF.				**OK**	
8.	Drive the antenna CCW to a valid point, record the azimuth angle and verify that there are no alarms present in the ACU or ASNMC and that the Limit Switch Logic Box that the AZ CW LED is ON.				AZ Angle: _____ **OK**	
9.	Drive the antenna in the CCW direction. The ACU will alarm at the soft limit. Record the azimuth angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.				Soft CCW Limit: _____ **OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
10.	Continue driving the antenna in the CCW direction. The antenna will stop near the Az CCW Pre-Limit, calculated in step 3. Record the azimuth angle at the CCW Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	CCW Pre-Limit: _____ **OK**	
11.	Confirm at the Limit Switch Logic Box that the AZ CCW LED is OFF.			OK	**OK**	
12.	Drive the antenna in the CW direction back to the centre and verify that there are no alarms present in the ACU or ASNMC and that the Limit Switch Logic Box AZ CCW LED is ON.			OK	**OK** **OK**	
13.	Drive the antenna UP to a valid point, record the elevation angle and verify that there are no alarms present in the ACU or ASNMC and that the Limit Switch Logic Box AZ CCW LED is ON.			OK	EL Angle: _____ **OK** **OK**	
14.	Drive the antenna in the UP direction. The ACU will alarm at the soft limit. Record the elevation angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.			OK	Soft UP Limit: _____ **OK**	
15.	Continue driving the antenna UP. The antenna will stop near the UP Pre-Limit, set at approximately 85 degrees. Record the elevation angle at the UP Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	UP Pre-Limit: _____ **OK**	
16.	Confirm at the Limit Switch Logic Box that the EL UP and EL UP-BACKUP LEDs are OFF.			OK	**OK** **OK**	
17.	Drive the antenna DOWN to a valid point, record the elevation angle and verify that there are no alarms present in the ACU or ASNMC and that the Limit Switch Logic Box that the EL UP and EL UP-BACKUP LEDs are OFF.			OK	EL Angle: _____ **OK** **OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
18.	Drive the antenna DOWN. The ACU will alarm at the soft limit. Record the elevation angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.			OK	Soft DN Limit: _____ **OK**	
19.	Continue driving the antenna DOWN. The antenna will stop near DOWN Pre-Limit, set at approximately 0 degrees. Record the elevation angle at the DOWN Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	DN Pre-Limit: _____ **OK**	
	T-1 Antenna Safe-to-Transmit Limits					
1.	Point the antenna to clear sky and record the azimuth and elevation angles. This will be the antenna "set" position.			OK	AZ: _____ EL: _____	
2.	Set up Modem and Spectrum Analyzer: 1. Confirm all modems are OFF. 2. At the L-Band Uplink Patch Panel, connect the output of EBEM #1 to T-1 antenna. 3. Set EBEM #1 transmit to 1200 MHz CW at -20 dBm. 4. Connect a Spectrum Analyzer on feed coupler DC1 directly or at the RF Monitor/Test Panel port 1 to view transmitted carrier at RF.			OK	**OK** **OK** **OK** **OK**	
3	Configure the T-1 for normal operating conditions with the TWTAs in "Combined Offline" mode and operating at 10 dB output back-off.			OK		

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
4.	At the T-1 ACU, set the safe-to-transmit angular limits to: • Azimuth CW: +5 degrees from antenna set position • Azimuth CCW: -5 degrees from antenna set position • Elevation Up: +5 degrees from antenna set position • Elevation Down: -5 degrees from antenna set position			OK	**OK**	
5.	Drive the antenna in azimuth CW +3 degrees from the set position. Verify the TWTAs are not inhibited (mute).			OK	**OK**	
6.	Drive the antenna in azimuth CW another +3 degrees (-6 degrees from the set position). Verify the TWTAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	
7.	Drive the azimuth CCW -6 degrees. Clear the ACU alarm and verify the TWTAs transmit.			OK	**OK**	
8.	Drive the antenna in azimuth CCW -3 degrees. Verify the TWTAs are not inhibited.			OK	**OK**	
9.	Drive the antenna in azimuth CCW another -3 degrees (-6 degrees from the antenna set position). Verify the TWTAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	
10.	Drive the azimuth CW +6 degrees. Clear the ACU alarm and verify the TWTAs transmit.			OK	**OK**	
11.	Drive the antenna elevation up +3 degrees. Verify the TWTAs are not inhibited.			OK	**OK**	
12.	Drive the antenna elevation up another +3 degrees (+6 degrees from the antenna set position). Verify the TWTAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
13.	Drive the antenna elevation down -6 degrees. Clear the ACU alarm and verify the TWTAs transmit.			OK	**OK**	
14.	Drive the antenna elevation down -3 degrees. Verify the TWTAs are not inhibited.			OK	**OK**	
15.	Drive the antenna elevation down another -3 degrees (-6 degrees from the antenna set position). Verify the TWTAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	
16.	Drive the antenna elevation up +6 degrees (back to the antenna set position). Clear the ACU alarm and verify the TWTAs transmit.			OK	**OK**	
	T-1 Satellite Acquisition					
1.	Verify that all the required preconditions are met: • GPS quality minimum of 8 • Compass heading available • Inclinometers feedback available (Tilt/Cross) • Feedboom clamps released			OK	**OK** **OK** **OK** **OK**	
2.	Check Satellite Preset list is configured for the 6 satellites as shown in the table below.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**

Satellite Name	Satellite Inclination	Track mode	S/S Antenna pointed	Input signal level	Observations
GOVSAT	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SKY 5B	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SKY 5C	**0**	**optrack**	**N/R**		Offset -45/low sig thr -80 /Bw:4Khz
SKY 5D	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SCRALL1B	**0**	**optrack**	**N/R**		Offset -45/low sig thr -80 /Bw:4Khz
SYRACUSE3A	**0**	**optrack**	**N/R**		Offset -45/low sig thr -80 /Bw:280Khz

7 MEASUREMENTS AND CALIBRATIONS

7.1 TX RF Output Frequency Accuracy

PROCEDURE / REPORT OF TEST Nº 7.1						
TEST NAME: Tx RF Output Frequency Accuracy		**ELEMENT UNDER TEST:** Transmission Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-1 BUC Output Frequency Accuracy					
1.	Switch T-1 BUC A Off-line.			OK	**OK**	
2.	Inject a -20 dBm, 1200 MHz CW signal into Uplink Patch Panel where U-link connects EBEM #1 to Combiner B.			OK	**OK**	
3.	Connect the Frequency Counter to the T-1 BUC OFF-LINE OUT port 5 of the RF Monitor/Test Panel.			OK	**OK**	
4.	Measure and record the T-1 BUC A output frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
5.	Remove the External Reference Input from T-1 BUC A. Measure the T-1 BUC A output frequency and adjust the BUC oscillator to achieve 8,150,000,000 ± 100 Hz. Record the frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
6.	Reconnect the External Reference input to BUC A.			OK	**OK**	
7.	Switch T-1 BUC B Off-line. Measure and record the T-1 BUC B output frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
8.	Remove the External Reference Input from T-1 BUC B. Measure the T-1 BUC B output frequency and adjust the BUC oscillator to achieve 8,150,000,000 ± 100 Hz. Record the frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
9.	Reconnect the External Reference input to BUC B.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.1						
TEST NAME: Tx RF Output Frequency Accuracy		**ELEMENT UNDER TEST:** Transmission Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-2 BUC Output Frequency Accuracy					
1.	Switch T-2 BUC A Off-line.			OK	**OK**	
2.	Inject a -20 dBm, 1200 MHz CW signal into Uplink Patch Panel where U-link connects EBEM #1 to Combiner A.			OK	**OK**	
3.	Connect the Frequency Counter to the T-2 BUC OFF-LINE OUT port 23 of the RF Monitor/Test Panel.			OK	**OK**	
4.	Measure and record the T-2 BUC A output frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
5.	Remove the External Reference Input from T-2 BUC A. Measure the T-2 BUC A output frequency and adjust the BUC oscillator to achieve 8,150,000,000 ± 100 Hz. Record the frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
6.	Reconnect the External Reference input to BUC A.			OK	**OK**	
7.	Switch T-2 BUC B Off-line. Measure and record the T-2 BUC B output frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
8.	Remove the External Reference Input from T-2 BUC B. Measure the T-2 BUC B output frequency and adjust the BUC oscillator to achieve 8,150,000,000 ± 100 Hz. Record the frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
9.	Reconnect the External Reference input to BUC B.			OK	**OK**	
10.	Remove the Signal Generator and Frequency Counter and restore the U-Link to the L-Band Uplink Patch Panel.			OK	**OK**	

7.2 RX L-Band Output Frequency Accuracy

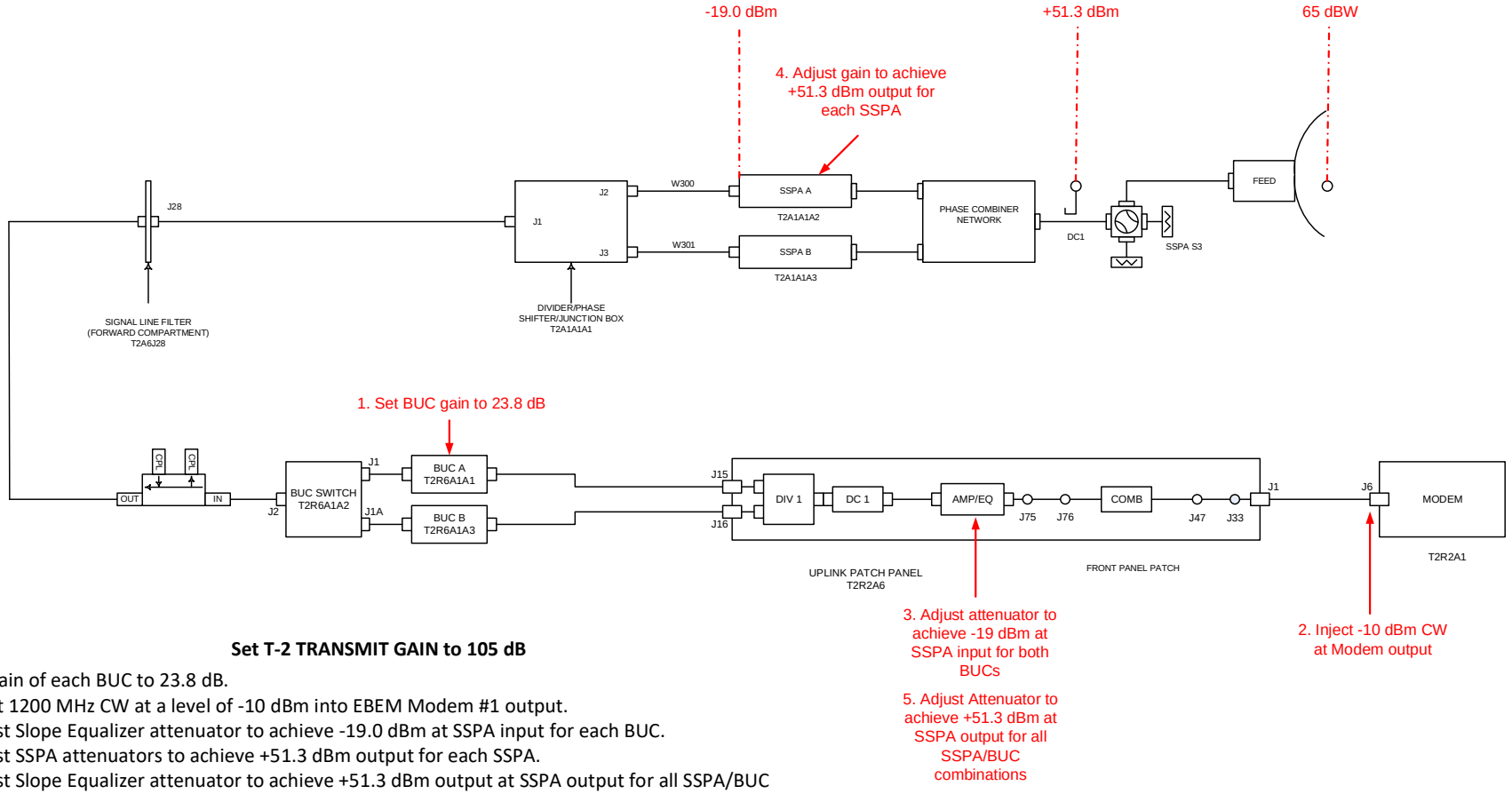
PROCEDURE / REPORT OF TEST Nº 7.2						
TEST NAME: Rx L-Band Output accuracy		**ELEMENT UNDER TEST:** Receive Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Verify the Signal Generator and the Frequency Counter are locked to the 10 MHz TFRS Distribution.			OK	**OK**	
	T-1 BDC Output Frequency Accuracy					
1.	Inject a -15 dBm, 7500 MHz CW signal to the T-1 BDC IN port 10 of the RF Monitor/Test Panel.			OK	**OK**	
2.	Connect the Frequency Counter to Downlink Patch Panel where U-link connects EBEM #1 to Divider B.			OK	**OK**	
3.	Switch BDC A on-line. Measure and record the T-1 BDC A output frequency.			1200 MHz ± 100 Hz	_____ Hz	
4.	Remove the External Reference Input from T-1 BDC A. Measure the T-1 BDC A output frequency and adjust the BDC oscillator to achieve 1,200,000,000 ± 100 Hz. Record the frequency.			1200 MHz ± 100 Hz	_____ Hz	
5.	Reconnect the External Reference input to BDC A.			OK	**OK**	
6.	Switch T-2 BDC B on-line. Measure and record the T-1 BDC B output frequency.			1200 MHz ± 100 Hz	_____ Hz	
7.	Remove the External Reference Input from T-1 BDC B. Measure the T-1 BDC B output frequency and adjust the BDC oscillator to achieve 1,200,000,000 ± 100 Hz. Record the frequency.			1200 MHz ± 100 Hz	_____ Hz	
8.	Reconnect the External Reference input to BDC B.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.2						
TEST NAME: Rx L-Band Output accuracy		**ELEMENT UNDER TEST:** Receive Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-2 BDC Output Frequency Accuracy					
1.	Inject a -15 dBm, 7500 MHz CW signal to the T-1 BDC IN port 10 of the RF Monitor/Test Panel.			OK	**OK**	
2.	Connect the Frequency Counter to Downlink Patch Panel where U-link connects EBEM #1 to Divider A.			OK	**OK**	
3.	Switch BDC A on-line. Measure and record the T-1 BDC A output frequency.			1200 MHz ± 100 Hz	_____ Hz	
4.	Remove the External Reference Input from T-1 BDC A. Measure the T-1 BDC A output frequency and adjust the BDC oscillator to achieve 1,200,000,000 ± 100 Hz. Record the frequency.			1200 MHz ± 100 Hz	_____ Hz	
5.	Reconnect the External Reference input to BDC A.			OK	**OK**	
6.	Switch T-2 BDC B on-line. Measure and record the T-1 BDC B output frequency.			1200 MHz ± 100 Hz	_____ Hz	
7.	Remove the External Reference Input from T-1 BDC B. Measure the T-1 BDC B output frequency and adjust the BDC oscillator to achieve 1,200,000,000 ± 100 Hz. Record the frequency.			1200 MHz ± 100 Hz	_____ Hz	
8.	Reconnect the External Reference input to BDC B.			OK	**OK**	
9.	Remove the Signal Generator and Frequency Counter and restore the U-Link to the L-Band Uplink Patch Panel.			OK	**OK**	

7.3 TX Levels and Phase Alignment

7.3.1 T-2 TX Levels and Phase Alignment

The procedures in this section are summarized in the T-2 Transmit System figure below.



Set T-2 TRANSMIT GAIN to 105 dB

1. Set gain of each BUC to 23.8 dB.
2. Inject 1200 MHz CW at a level of -10 dBm into EBEM Modem #1 output.
3. Adjust Slope Equalizer attenuator to achieve -19.0 dBm at SSPA input for each BUC.
4. Adjust SSPA attenuators to achieve +51.3 dBm output for each SSPA.
5. Adjust Slope Equalizer attenuator to achieve +51.3 dBm output at SSPA output for all SSPA/BUC combinations.

PROCEDURE / REPORT OF TEST Nº 7.3.1						
TEST NAME: T-2 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Point Antenna to cold sky.			OK	**OK**	
2.	Set BUC A to 23.8 dB gain. 1. Inject a 1200 MHz CW at -29.9 dB into BUC A RF In 2. Adjust BUC A gain to -5.7 dBm at 8150 MHz RF Out			OK	**OK**	
3.	Match BUC B to BUC A 1. Inject L-Band at J75 of Uplink L-Band Patch Panel (1200 MHz, -21 dBm). 2. Measure at RF Monitor/Test Panel Test Point 22 (T-2 On-line BUC Out). 3. Switch BUC B on-line. 4. Adjust BUC B gain to match level of BUC A at RF Monitor/Test Panel Test Point 22.			OK	**OK**	
4.	Set the T-2 Slope Equalizer to -0.6 dB and 19.0 dB and confirm in the table below:			OK	**OK**	
5.	Remove T-2 PIM Shield.			OK	**OK**	
6.	Inject -10 dBm, 1200 MHz at cable W212 (EBEM 1 Tx, J6) and patch EBEM 1 for T-2 transmit operations.			OK	**OK**	
7.	Monitor input to SSPA A with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 8150 MHz.			OK	**OK**	
8.	Switch to BUC A.			OK	**OK**	
9.	Adjust Slope Equalizer attenuator to achieve -19 dBm at SSPA A input. Record attenuator setting in the SSPA and Slope Equalizer Settings table below.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.1						
TEST NAME: T-2 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**

***Note**: This table will be filled in during the remainder of this procedure with SSPA and Slope Attenuator settings.*

2.4m Tx Levels SSPA Input Settings			
Step (BUC)	**Slope Setting**	**Attenuator Setting**	**SSPA Input Level**
9 (BUC A)	-0.6	_____ (dB)	19.0 dB _____ (Check)
11 (BUC B)	-0.6	_____ (dB)	19.0 dB _____ (Check)
2.4m Tx Levels SSPA Attenuator Linear Setting			
Step (SSPA)	**Slope Setting**	**Attenuator Setting**	**SSPA Attenuator**
20 (SSPA A)	-0.6	_____ (dB)	_____ (dB)
24 (SSPA B)	-0.6	_____ (dB)	_____ (dB)
32 (Combined SSPA)	-0.6	_____ (dB)	51.3 dBm _____ (Check)

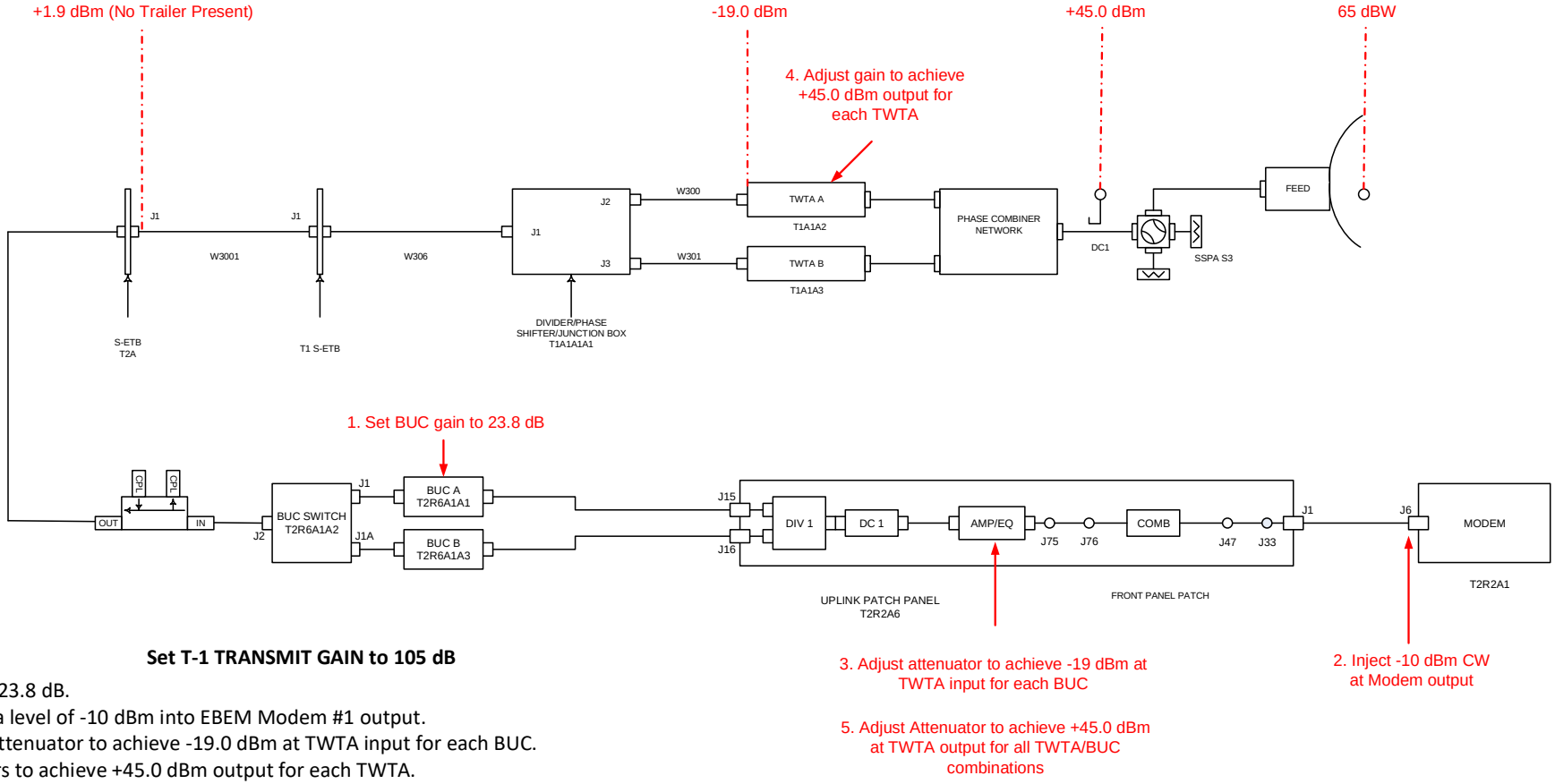
10.	Switch to BUC B.	OK	**OK**	
11.	Adjust Slope equalizer attenuator to achieve -19 dBm at SSPA A input. Record attenuator setting in the SSPA and Slope Equalizer Settings table.	OK	**OK**	
12.	Switch to BUC A.	OK	**OK**	
13.	Set Slope equalizer attenuator to figure recorded in step 9.	OK	**OK**	
14.	Remove the Spectrum Analyzer and normalise the input to SSPA A.	OK	**OK**	
15.	Ensure the SSPAs are set to Combine Off-Line.	OK	**OK**	
16.	Monitor DC1 with a Power Meter. Ensure that the coupling factor is accounted for at 8150 MHz	OK	**OK**	
17.	Apply power to both SSPAs and set both SSPA A and B attenuators to 10 dB.	OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.1						
TEST NAME: T-2 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
18.	Set SSPA A to Maintenance.			OK	**OK**	
19.	Command SSPA A to transmit and allow it to warm until the temperature settles out.			OK	**OK**	
20	Adjust SSPA A's attenuator to achieve 51.3 dBm at DC1 and record the attenuator setting in the SSPA and Slope Equalizer Settings table.			OK	**OK**	
21.	Command SSPA A to Standby.			OK	**OK**	
22.	Set SSPA B to Maintenance.			OK	**OK**	
23.	Command SSPA B to transmit and allow it to warm until the temperature settles out.			OK	**OK**	
24.	Adjust SSPA B's attenuator to achieve 51.3 dBm at DC1 and record the attenuator setting in the SSPA and Slope Equalizer Settings table.			OK	**OK**	
25.	Command SSPA B to Standby.			OK	**OK**	
26.	Set SSPAs to Combine Off-Line.			OK	**OK**	
27.	Set the Slope equalizer attenuator to 3 dB lower that the figure recorded in step 9.			OK	**OK**	
28.	Monitor DC 2 with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 8150 MHz.			OK	**OK**	
29.	Command both SSPAs to transmit.			OK	**OK**	
30.	While monitoring DC2 via the Spectrum Analyzer optimize the Phase Shifter for minimum reflected level at DC2.			OK	**OK**	
31.	Remove the Spectrum Analyzer from DC2.			OK	**OK**	
32.	Using the Power Meter at DC1 adjust the Slope Equalizer attenuator to achieve 51.3 dBm at DC1 and record the attenuator setting in the SSPA and Slope Equalizer Settings table.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.1						
TEST NAME: T-2 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
33.	Set Backup Slope Equalizer to -0.6 and 19.0 dB.			OK	**OK**	

7.3.2 T-1 TX Levels and Phase Alignment

The procedures in this section are summarized in the T-1 Transmit System figure below.



Set T-1 TRANSMIT GAIN to 105 dB

1. Set gain of each BUC to 23.8 dB.
2. Inject 1200 MHz CW at a level of -10 dBm into EBEM Modem #1 output.
3 Adjust Slope Equalizer attenuator to achieve -19.0 dBm at TWTA input for each BUC.
4. Adjust TWTA attenuators to achieve +45.0 dBm output for each TWTA.
5. Adjust Slope Equalizer attenuator to achieve +45.0 dBm output at TWTA output for all TWTA/BUC combinations.

PROCEDURE / REPORT OF TEST Nº 7.3.2						
TEST NAME: T-1 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Point Antenna to cold sky.			OK	**OK**	
2.	<u>Set BUC A to 23.8 dB gain.</u> 1. Inject a 1200 MHz CW at -29.9 dB into BUC A RF In 2. Adjust BUC A gain to -5.7 dBm at 8150 MHz RF Out.			OK	**OK**	
3.	<u>Match BUC B to BUC A</u> 1. Inject L-Band at J79 Uplink L-Band Patch Panel (1200 MHz, -21 dBm). 2. Measure at RF Monitor/Test Panel Test Point 4 (T-1 On-line BUC Out). 3. Switch BUC B on-line. 4. Adjust BUC B gain to match level of BUC A RF Monitor/Test Panel Test Point 4.			OK	**OK**	
4.	Set the T-1 Slope Equalizer to -0.6 dB and 19.0 dB.			OK	**OK**	
5.	Remove T-1 weather cover.			OK	**OK**	
6.	Inject -10 dBm, 1200 MHz at cable W212 (EBEM 1 Tx, J6) and patch EBEM 1 for T-1 transmit operations.			OK	**OK**	
7.	Monitor input to TWTA A with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 8150 MHz.			OK	**OK**	
8.	Switch to BUC A.			OK	**OK**	
9.	Adjust Slope Equalizer attenuator to achieve -19 dBm at TWTA A input. Record attenuator setting in the TWTA and Slope Equalizer Settings table below.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.2						
TEST NAME: T-1 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**

***Note**: This table will be filled in during the remainder of this procedure with TWTA and Slope Attenuator settings.*

4.6m Tx Levels TWTA Input Settings			
Step (BUC)	**Slope Setting**	**Attenuator Setting**	**TWTA Input Level**
9 (BUC A)	-0.6	_____ (dB)	19.0 dB _____ (Check)
11 (BUC B)	-0.6	_____ (dB)	19.0 dB _____ (Check)
4.6m Tx Levels TWTA Attenuator Linear Setting			
Step (TWTA)	**Slope Setting**	**Attenuator Setting**	**TWTA Attenuator**
20 (TWTA A)	-0.6	_____ (dB)	_____ (dB)
24 (TWTA B)	-0.6	_____ (dB)	_____ (dB)
32 (Combined TWTA)	-0.6	_____ (dB)	45.0 dBm _____ (Check)

10.	Switch to BUC B.	OK	**OK**	
11.	Adjust Slope equalizer attenuator to achieve -19 dBm at TWTA A input. Record attenuator setting in the TWTA and Slope Equalizer Settings table.	OK	**OK**	
12.	Switch to BUC A.	OK	**OK**	
13.	Set Slope equalizer attenuator to figure recorded in step 9.	OK	**OK**	
14.	Remove the Spectrum Analyzer and normalise the input to TWTA A.	OK	**OK**	
15.	Ensure the TWTAs are set to Combine Off-Line.	OK	**OK**	
16.	Monitor DC1 with a Power Meter. Ensure that the coupling factor is accounted for at 8150 MHz	OK	**OK**	
17.	Apply power to both TWTAs and set both TWTA A and B attenuators to 15 dB.	OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.2						
TEST NAME: T-1 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
18.	Set TWTA A to Maintenance.			OK	**OK**	
19.	Command TWTA A to transmit and allow it to warm until the temperature settles out.			OK	**OK**	
20	Adjust TWTA A's attenuator to achieve 45.0 dBm at DC1 and record the attenuator setting in the TWTA and Slope Equalizer Settings table.			OK	**OK**	
21.	Command TWTA A to Standby.			OK	**OK**	
22.	Set TWTA B to Maintenance.			OK	**OK**	
23.	Command TWTA B to transmit and allow it to warm until the temperature settles out.			OK	**OK**	
24.	Adjust TWTA B's attenuator to achieve 45.0 dBm at DC1 and record the attenuator setting in the TWTA and Slope Equalizer Settings table.			OK	**OK**	
25.	Command TWTA B to Standby.			OK	**OK**	
26.	Set TWTAs to Combine Off-Line.			OK	**OK**	
27.	Set the Slope equalizer attenuator to 3 dB lower that the figure recorded in step 9.			OK	**OK**	
28.	Monitor DC 2 with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 8150 MHz.			OK	**OK**	
29.	Command both TWTAs to transmit.			OK	**OK**	
30.	While monitoring DC2 via the Spectrum Analyzer optimize the Phase Shifter for minimum reflected level at DC2.			OK	**OK**	
31.	Remove the Spectrum Analyzer from DC2.			OK	**OK**	
32.	Using the Power Meter at DC1 adjust the Slope Equalizer attenuator to achieve 45.0 dBm at DC1 and record the attenuator setting in the TWTA and Slope Equalizer Settings table.			OK	**OK**	

7.3.3 T-2 Amplitude Response and Slope Equalizer Adjustment

PROCEDURE / REPORT OF TEST Nº 7.3.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Configure and calibrate Network Analyzer for -10 dBm input of a swept 1200 MHz ± 250 MHz, measuring an upconverted frequency of 8150 MHz ± 250 MHz and measurements of 502 points, 0.996 MHz.			OK	**OK**	
2.	Adjust Network Analyzer settings to: 1. Averaging = 10 2. Smoothing = 2 3. IF BW = 30K 4. Scale Per Div = 1 5. Coupler Factor Offset			OK	**OK**	
3.	Ensure the SSPAs are set to Combine Off-Line.			OK	**OK**	
4.	Apply power to both SSPAs and ensure both are commanded to Standby.			OK	**OK**	
5.	Set the Slope Equalizer slope and attenuator to the “Combined SSPA” values in the table on page 48.			OK	**OK**	
6.	Confirm that the SSPA attenuators are set as per table on page 48.			OK	**OK**	
7.	Connect the Network Analyzer port 1 inject J47 of the Uplink L-Band Patch Panel and patch EBEM 1 for T-2 transmit operations.			OK	**OK**	
8.	Connect the Network Analyzer port 2 receive cable to T-2 DC1.			OK	**OK**	
9.	Switch to BUC A.			OK	**OK**	
10.	Command the SSPAs to transmit and allow them to warm until the temperature settles out.			OK	**OK**	
11.	On the Network Analyzer, activate markers, low-mid-high band. (7900, 8150 and 8400 MHz).			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
12.	Record the measured level for the mid-band marker.			_____ dBm		
13.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in table below for BUC A / Comb. SSPAs.			OK	**OK**	

T-2 Amplitude Response and Slope Equalizer Alignment					
Slope Equalizer	**Initial Slope (dB)**	**On-Line BUC**	**On-Line SSPA**	**Slope Preset (dB)**	**Attenuation (dB)**
2.4m		A	A+B		
2.4m		B	A+B		
2.4m		A	A		
2.4m		B	B		
2.4m		A	B		
2.4m		B	A		
Back Up		A	A+B	-0.6	19.0
Back Up		B	A+B	-0.6	19.0
Back Up		A	A	-0.6	19.0
Back Up		B	B	-0.6	19.0
Back Up		A	B	-0.6	19.0

PROCEDURE / REPORT OF TEST Nº 7.3.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
14.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 12. 4. Record the final BUC A / Comb. SSPAs Slope Equalizer settings in table above. **Caution**: The slope and gain settings of the equalizer are interactive. Changing slope compensation will change gain. The output level of the SSPA must be carefully monitored while adjusting the slope equalizer. Overdrive of the SSPAs can result in an SSPA failure.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
15.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC A / COMB SSPA Amplitude Response JPG here.						
16.	Switch to BUC B.			OK	**OK**	
17.	Set the Slope Equalizer slope and attenuator to the “Combined SSPA” values in the table on page 48.			OK	**OK**	
18.	Record the measured level for the mid-band marker.			_____ dBm		
19.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC B / Comb. SSPAs.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
20.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 18. 4. Record the final BUC B / Comb. SSPAs Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
21.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC B / COMB SSPA Amplitude Response JPG here.						
22.	Switch to SSPAs to SSPA A Maintenance mode.			OK	**OK**	
23.	Set the Slope Equalizer slope and attenuator to the “SSPA A” values in the table on page 48.			OK	**OK**	
24.	Record the measured level for the mid-band marker.			_____ dBm		
25.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC B / SSPA A.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
26.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 24. 4. Record the final BUC B / SSPA A Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
27.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC B / SSPA A Amplitude Response JPG here.						
28.	Switch to BUC A.			OK	**OK**	
29.	Set the Slope Equalizer slope and attenuator to the “SSPA A” values in the table on page 48.			OK	**OK**	
30.	Record the measured level for the mid-band marker.			_____ dBm		
31.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC A / SSPA A.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
32.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 30. 4. Record the final BUC A / SSPA A Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).		
33.	Capture the Network Analyzer Trace and paste it below.					
Paste BUC A / SSPA A Amplitude Response JPG here.						
34.	Switch to SSPAs to SSPA B Maintenance mode.			OK	**OK**	
35.	Set the Slope Equalizer slope and attenuator to the “SSPA B” values in the table on page 48.			OK	**OK**	
36.	Record the measured level for the mid-band marker.			_____ dBm		
37.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC A / SSPA B.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
38.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 36. 4. Record the final BUC A / SSPA B Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
39.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC A / SSPA B Amplitude Response JPG here.						
40.	Switch BUC B.			OK	**OK**	
41.	Set the Slope Equalizer slope and attenuator to the “SSPA B” values in the table on page 48.			OK	**OK**	
42.	Record the measured level for the mid-band marker.			_____ dBm		
43.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC B / SSPA B.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
44.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 42. 4. Record the final BUC B / SSPA B Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
45.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC B / SSPA B Amplitude Response JPG here.						
46	Set both SSPAs to Standby and switch the SSPAs to Combined Off-line mode.			OK	**OK**	

7.3.4 T-1 Amplitude Response and Slope Equalizer Adjustment

PROCEDURE / REPORT OF TEST Nº 7.3.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Configure and calibrate Network Analyzer for -10 dBm input of a swept 1200 MHz ± 250 MHz, measuring an upconverted frequency of 8150 MHz ± 250 MHz and measurements of 502 points, 0.996 MHz.			OK	**OK**	
2.	Adjust Network Analyzer settings to: 1. Averaging = 10 2. Smoothing = 2 3. IF BW = 30K 4. Scale Per Div = 1 5. Coupler Factor Offset			OK	**OK**	
3.	Ensure the TWTAs are set to Combine Off-Line.			OK	**OK**	
4.	Apply power to both TWTAs and ensure both are commanded to Standby.			OK	**OK**	
5.	Set the Slope Equalizer slope and attenuator to the “Combined TWTA” values in the table on page 53.			OK	**OK**	
6.	Confirm that the TWTA attenuators are set as per table on page 53.			OK	**OK**	
7.	Connect the Network Analyzer port 1 inject at J61 of the Uplink L-Band Patch Panel and patch EBEM 1 for T-1 transmit operations.			OK	**OK**	
8.	Connect the Network Analyzer port 2 receive cable to T-1 DC1.			OK	**OK**	
9.	Switch to BUC A.			OK	**OK**	
10.	Command the TWTAs to transmit and allow them to warm until the temperature settles out.			OK	**OK**	
11.	On the Network Analyzer, activate markers, low-mid-high band. (7900, 8150 and 8400 MHz).			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
12.	Record the measured level for the mid-band marker.			_____ dBm		
13.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in table below for BUC A / Comb. TWTAs.			OK	**OK**	

T-1 Amplitude Response and Slope Equalizer Alignment					
Slope Equalizer	**Initial Slope (dB)**	**On-Line BUC**	**On-Line TWTA**	**Slope Preset (dB)**	**Attenuation (dB)**
4.6m		A	A+B		
4.6m		B	A+B		
4.6m		A	A		
4.6m		B	B		
4.6m		A	B		
4.6m		B	A		

PROCEDURE / REPORT OF TEST Nº 7.3.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
14.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 12. 4. Record the final BUC A / Comb. TWTAs Slope Equalizer settings in table above. **Caution**: The slope and gain settings of the equalizer are interactive. Changing slope compensation will change gain. The output level of the TWTA must be carefully monitored while adjusting the slope equalizer. Overdrive of the TWTAs can result in an TWTA failure.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
15.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC A / COMB TWTA Amplitude Response JPG here.						
16.	Switch to BUC B.			OK	**OK**	
17.	Set the Slope Equalizer slope and attenuator to the “Combined TWTA” values in the table on page 53.			OK	**OK**	
18.	Record the measured level for the mid-band marker.			_____ dBm		
19.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC B / Comb. TWTAs.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
20.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 18. 4. Record the final BUC B / Comb. TWTAs Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
21.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC B / COMB TWTA Amplitude Response JPG here.						
22.	Switch to TWTAs to TWTA A Maintenance mode.			OK	**OK**	
23.	Set the Slope Equalizer slope and attenuator to the “TWTA A” values in the table on page 53.			OK	**OK**	
24.	Record the measured level for the mid-band marker.			_____ dBm		
25.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC B / TWTA A.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
26.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 24. 4. Record the final BUC B / TWTA A Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
27.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC B / TWTA A Amplitude Response JPG here.						
28.	Switch to BUC A.			OK	**OK**	
29.	Set the Slope Equalizer slope and attenuator to the “TWTA A” values in the table on page 53.			OK	**OK**	
30.	Record the measured level for the mid-band marker.			_____ dBm		
31.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC A / TWTA A.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
32.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 30. 4. Record the final BUC A / TWTA A Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).		
33.	Capture the Network Analyzer Trace and paste it below.					
Paste BUC A / TWTA A Amplitude Response JPG here.						
34.	Switch to TWTAs to TWTA B Maintenance mode.			OK	**OK**	
35.	Set the Slope Equalizer slope and attenuator to the “TWTA B” values in the table on page 53.			OK	**OK**	
36.	Record the measured level for the mid-band marker.			_____ dBm		
37.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC A / TWTA B.			OK	**OK**	

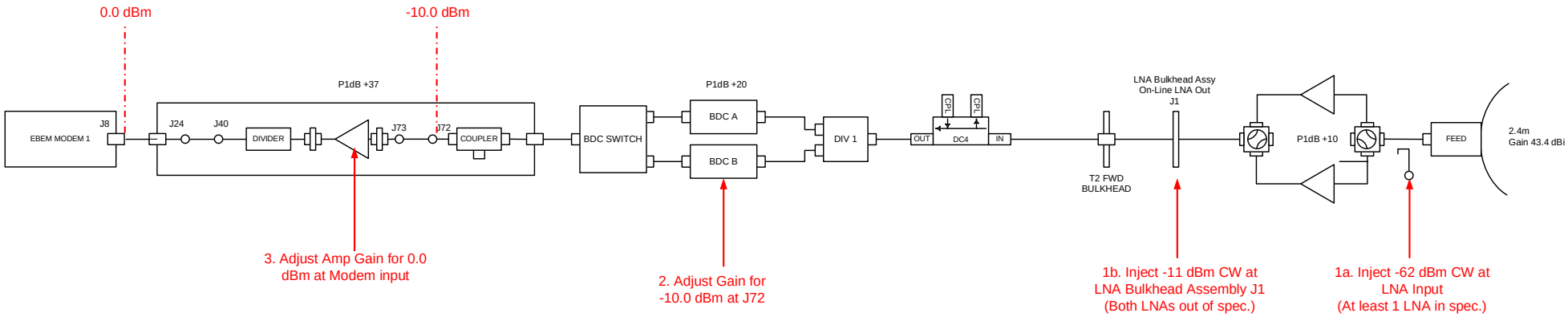
PROCEDURE / REPORT OF TEST Nº 7.3.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
38.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 36. 4. Record the final BUC A / TWTA B Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
39.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC A / TWTA B Amplitude Response JPG here.						
40.	Switch BUC B.			OK	**OK**	
41.	Set the Slope Equalizer slope and attenuator to the “TWTA B” values in the table on page 53.			OK	**OK**	
42.	Record the measured level for the mid-band marker.			_____ dBm		
43.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC B / TWTA B.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.3.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
44.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 42. 4. Record the final BUC B / TWTA B Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
45.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC B / TWTA B Amplitude Response JPG here.						
46	Set both TWTAs to Standby and switch the TWTAs to Combined Off-line mode.			OK	**OK**	

7.4 RX Receive Chain Level Alignment

7.4.1 T-2 LNA Gain and Receive Chain Level Alignment

The procedures in this section are summarized in the T-2 Receive System figure below.



Set T-2 RECEIVE GAIN to 105 dB

1a. If at least 1 LNA is found to be in specification during testing, inject 7500 MHz CW at a level of -62 dBm into LNA input.
1b. If both LNAs are found to be in specification during testing, inject 7500 MHz CW at a level of -11 dBm into J1 of LNA Bulkhead Assembly.
2. Adjust the gain of each BDC to achieve a level of -10 dBm at J72 of Downlink L-Band Patch Panel.
3. Adjust the gain of the L-Band Amplifier in the Downlink L-Band Patch Panel to achieve a level of 0 dBm at the input to EBEM Modem #1.

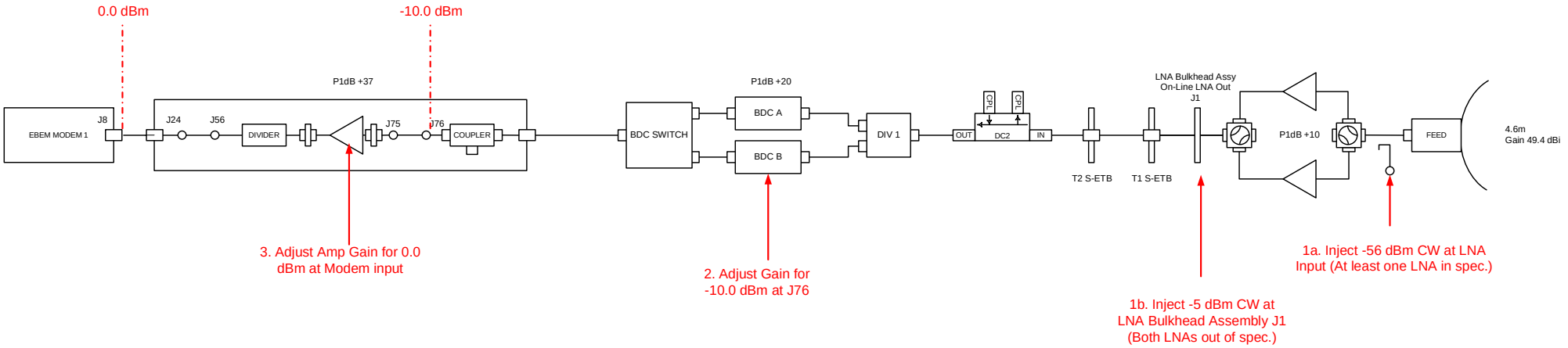
PROCEDURE / REPORT OF TEST Nº 7.4.1						
TEST NAME: T-2 LNA Gain and Receive Chain Level Alignment		**ELEMENT UNDER TEST:** RX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Point the T-2 antenna to cold sky.			OK	**OK**	
2.	Command LNA A on-line			OK	**OK**	
3.	Configure and calibrate Network Analyzer to inject a swept 7500 MHz ± 250 MHz at -62 dBm with measurements of 502 points, 0.996 MHz at DC3. (Set input level to account for DC3 Coupling Factor)			OK	**OK**	
4.	Adjust Network Analyzer settings to: 1. Averaging = 10 2. Smoothing = 2 3. IF BW = 30K 4. Scale Per Div = 1 5. Coupler Factor Offset			OK	**OK**	
5.	Connect the Network Analyzer port 1 inject cable to DC3.			OK	**OK**	
6.	Connect the Network Analyzer port 2 receive cable to J1 at the LNA Plate.			OK	**OK**	
7.	On the Network Analyzer, activate markers, low-mid-high band. (7250, 7500 and 7750 MHz)			OK	**OK**	
8.	Record LNA A gain at 7500 MHz.			>50 dB	_____ dB	
9.	Capture Network Analyzer Trace for the LNA A and paste it below.			OK	**OK**	
Paste LNA-A > Amplitude Response JPG here.						
10.	Command LNA B on-line			OK	**OK**	
11.	Record LNA B gain at 7500 MHz.			>50 dB	_____ dB	
12.	Capture Network Analyzer Trace for the LNA B and paste it below.			OK	**OK**	
Paste LNA-B > Amplitude Response JPG here.						

PROCEDURE / REPORT OF TEST Nº 7.4.1						
TEST NAME: T-2 LNA Gain and Receive Chain Level Alignment		**ELEMENT UNDER TEST:** RX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	***Note**: If practical, as the test setup is still configured for sweeping single LNAs, consider sweeping the T-1 LNAs now (in Section 7.4.2), and then continuing with the full Rx-chain calibration of the T-2.*					
13.	Inject a CW of 7500 MHz ± 250 MHz at -62 dBm (Set input level to account for DC3 Coupling Factor). ***Note**: If both LNAs are below specification and not replaced, the next part of this procedure should be completed injecting a CW of 7500 MHz at -11 dB in to J1.*			OK	**OK**	
14.	Command the LNA on-line that is closest to normal specification (51 dB). Record which LNA is selected.			LNA A or LNA B	**LNA A**	
15.	Command BDC A on-line.			OK	**OK**	
16.	Monitor J72 at the Downlink Patch Panel with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 1200 MHz.			OK	**OK**	
17.	Adjust the gain of BDC A until -10 dBm is measured at J72.			OK	**OK**	
18.	Command BDC B on-line.			OK	**OK**	
19.	Adjust the gain of BDC B until -10 dBm is measured at J72.			OK	**OK**	
20.	Slide out the Downlink Patch Panel and remove the top cover.			OK	**OK**	
21.	Monitor J40 at the Downlink Patch Panel with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 1200 MHz.			OK	**OK**	
22.	Adjust the gain of the T-2 Downlink Amplifier until 0 dBm is measured at cable W231 J8 on EBEM 1 (Patch Modem 1 for T-2 receive operation).			OK	**OK**	
23.	Command BDC A online.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.1						
TEST NAME: T-2 LNA Gain and Receive Chain Level Alignment		**ELEMENT UNDER TEST:** RX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
24.	Adjust the gain of the T-2 Downlink Amplifier until 0 dBm is measured at cable W231 J8 on EBEM 1.			OK	**OK**	
25.	Remove test equipment and normalise the T-2 downlink.			OK	**OK**	
26.	Connect a Multimeter to the T-2 LNA A test point on top of the LNA Controller, Check and Adjust POT as required. Record the result.			6.5 VDC	_____ VDC	
27.	Connect a Multimeter to the T-2 LNA B test point on top of the LNA Controller, Check and Adjust POT as required. Record the result.			6.5 VDC	_____ VDC	

7.4.2 T-1 LNA Gain and Receive Chain Level Alignment

The procedures in this section are summarized in the T-1 Receive System figure below.



Set T-1 RECEIVE GAIN to 105 dB

1a. If at least one LNA is found to be in specification during testing, inject 7500 MHz CW at a level of -56 dBm into LNA input and use that LNA for the rest of the procedure.
1b. If both LNAs are found to be out of specification during testing, inject 7500 MHz CW at a level of -5 dBm into J1 of LNA Bulkhead Assembly.
2. Adjust the gain of each BDC to achieve a level of -10 dBm at J76 of Downlink L-Band Patch Panel.
3. Adjust the gain of the L-Band Amplifer in the Downlink L-Band Patch Panel to achieve a level of 0 dBm at the input to EBEM Modem #1.

PROCEDURE / REPORT OF TEST Nº 7.4.2						
TEST NAME: T-1 LNA Gain and Receive Chain Level Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Point the T-1 antenna to cold sky.			OK	**OK**	
2.	Command LNA A on-line			OK	**OK**	
3.	Configure and calibrate Network Analyzer to inject a swept 7500 MHz ± 250 MHz at -62 dBm with measurements of 502 points, 0.996 MHz at DC3. (Set input level to account for DC3 Coupling Factor)			OK	**OK**	
4.	Adjust Network Analyzer settings to: 1. Averaging = 10 2. Smoothing = 2 3. IF BW = 30K 4. Scale Per Div = 1 5. Coupler Factor Offset			OK	**OK**	
5.	Connect the Network Analyzer port 1 inject cable to DC3.			OK	**OK**	
6.	Connect the Network Analyzer port 2 receive cable to J1 at the LNA Plate.			OK	**OK**	
7.	On the Network Analyzer, activate markers, low-mid-high band. (7250, 7500 and 7750 MHz)			OK	**OK**	
8.	Record LNA A gain at 7500 MHz.			>50 dB	_____ dB	
9.	Capture Network Analyzer Trace for the LNA A and paste it below.			OK	**OK**	
Paste LNA-A > Amplitude Response JPG here.						
10.	Command LNA B on-line			OK	**OK**	
11.	Record LNA B gain at 7500 MHz.			>50 dB	_____ dB	
12.	Capture Network Analyzer Trace for the LNA B and paste it below.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.2						
TEST NAME: T-1 LNA Gain and Receive Chain Level Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
Paste LNA-B > Amplitude Response JPG here.						
13.	Inject a CW of 7500 MHz ± 250 MHz at -62 dBm (Set input level to account for DC3 Coupling Factor). ***Note**: If both LNAs are below specification and not replaced, the next part of this procedure should be completed injecting a CW of 7500 MHz at -5 dB in to J1.*			OK	**OK**	
14.	Command the LNA on-line that is closest to normal specification (51 dB). Record which LNA is selected.			LNA A or LNA B	**LNA A**	
15.	Command BDC A on-line.			OK	**OK**	
16.	Monitor J76 at the Downlink Patch Panel with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 1200 MHz.			OK	**OK**	
17.	Adjust the gain of BDC A until -10 dBm is measured at J76.			OK	**OK**	
18.	Command BDC B on-line.			OK	**OK**	
19.	Adjust the gain of BDC B until -10 dBm is measured at J76.			OK	**OK**	
20.	Slide out the Downlink Patch Panel and remove the top cover.			OK	**OK**	
21.	Monitor J56 at the Downlink Patch Panel with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 1200 MHz.			OK	**OK**	
22.	Adjust the gain of the T-2 Downlink Amplifier until 0 dBm is measured at cable W231 J8 on EBEM 1 (Patch Modem 1 for T-2 receive operation).			OK	**OK**	
23.	Command BDC A online.			OK	**OK**	
24.	Adjust the gain of the T-2 Downlink Amplifier until 0 dBm is measured at cable W231 J8 on EBEM 1.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.2						
TEST NAME: T-1 LNA Gain and Receive Chain Level Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
25.	Remove test equipment and normalise the T-2 downlink.			OK	**OK**	
26.	Connect a Multimeter to the T-1 LNA A test point on top of the LNA Controller, Check and Adjust POT as required. Record the result.			6.5 VDC	_____ VDC	
27.	Connect a Multimeter to the T-1 LNA B test point on top of the LNA Controller, Check and Adjust POT as required. Record the result.			6.5 VDC	_____ VDC	

7.5 RX Amplitude Response

7.5.1 T-2 Rx Amplitude Response

PROCEDURE / REPORT OF TEST Nº 7.5.1						
TEST NAME: T-2 Rx Amplitude Response		**ELEMENT UNDER TEST:** T-2 Rx Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Point the T-2 the antenna to cold sky.					
2.	Configure and calibrate Network Analyzer to inject a swept 7500 MHz ± 250 MHz at -62 dBm with measurements of 502 points, 0.996 MHz at DC3. (Set input level to account for DC3 Coupling Factor)			OK	**OK**	
3.	Adjust Network Analyzer settings to: 1. Averaging = 10 2. Smoothing = 2 3. IF BW = 30K 4. Scale Per Div = 1 5. Coupler Factor Offset			OK	**OK**	
4.	Connect the Network Analyzer port 1 inject cable to DC3.			OK	**OK**	
5.	Connect the Network Analyzer port 2 receive cable to J40 of the Downlink L-Band Patch Panel and patch Modem 1 for T-2 receive operation.			OK	**OK**	
6.	Command LNA A on-line and BDC A on-line			OK	**OK**	
7.	Command BDC A on-line			OK	**OK**	
8.	On the Network Analyzer, activate markers, low-mid-high band. (950, 1200 and 1450 MHz)			OK	**OK**	
9.	T-2 LNA A - BDC A, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA A - BDC A Amplitude Response JPEG Here						

PROCEDURE / REPORT OF TEST Nº 7.5.1						
TEST NAME: T-2 Rx Amplitude Response		**ELEMENT UNDER TEST:** T-2 Rx Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
10.	Command BDC B on-line			OK	**OK**	
11.	T-2 LNA A - BDC B, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA A - BDC B Amplitude Response JPEG Here						
12.	Command LNA B on-line			OK	**OK**	
13.	T-2 LNA B - BDC B, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA B - BDC B Amplitude Response JPEG Here						
14.	Command BDC A on-line			OK	**OK**	
15.	T-2 LNA B - BDC A, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA B - BDC A Amplitude Response JPEG Here						
16.	Command LNA A on-line.			OK	**OK**	

7.5.2 T-1 Rx Amplitude Response

PROCEDURE / REPORT OF TEST Nº 7.5.2						
TEST NAME: T-1 Rx Amplitude Response		**ELEMENT UNDER TEST:** T-1 Rx Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Point the T-1 the antenna to cold sky.					
2.	Configure and calibrate Network Analyzer to inject a swept 7500 MHz ± 250 MHz at -56 dBm with measurements of 502 points, 0.996 MHz at DC3. (Set input level to account for DC3 Coupling Factor)			OK	**OK**	
3.	Adjust Network Analyzer settings to: 1. Averaging = 10 2. Smoothing = 2 3. IF BW = 30K 4. Scale Per Div = 1 5. Coupler Factor Offset			OK	**OK**	
4.	Connect the Network Analyzer port 1 inject cable to DC3.			OK	**OK**	
5.	Connect the Network Analyzer port 2 receive cable to J56 of the Downlink L-Band Patch Panel and patch Modem 1 for T-1 receive operation.			OK	**OK**	
6.	Command LNA A on-line and BDC A on-line			OK	**OK**	
7.	Command BDC A on-line			OK	**OK**	
8.	On the Network Analyzer, activate markers, low-mid-high band. (950, 1200 and 1450 MHz)			OK	**OK**	
9.	T-1 LNA A - BDC A, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA A - BDC A Amplitude Response JPEG Here						
10.	Command BDC B on-line			OK	**OK**	

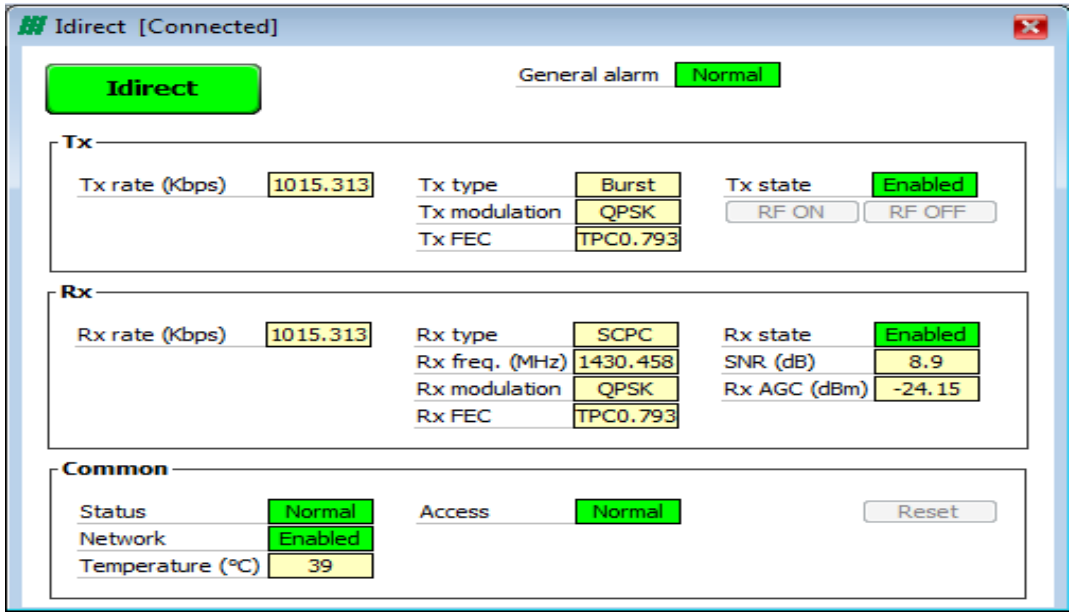
PROCEDURE / REPORT OF TEST Nº 7.5.2						
TEST NAME: T-1 Rx Amplitude Response		**ELEMENT UNDER TEST:** T-1 Rx Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
11.	T-1 LNA A - BDC B, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA A - BDC B Amplitude Response JPEG Here						
12.	Command LNA B on-line			OK	**OK**	
13.	T-1 LNA B - BDC B, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA B - BDC B Amplitude Response JPEG Here						
14.	Command BDC A on-line			OK	**OK**	
15.	T-1 LNA B - BDC A, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA B - BDC A Amplitude Response JPEG Here						
16.	Command LNA A on-line.			OK	**OK**	

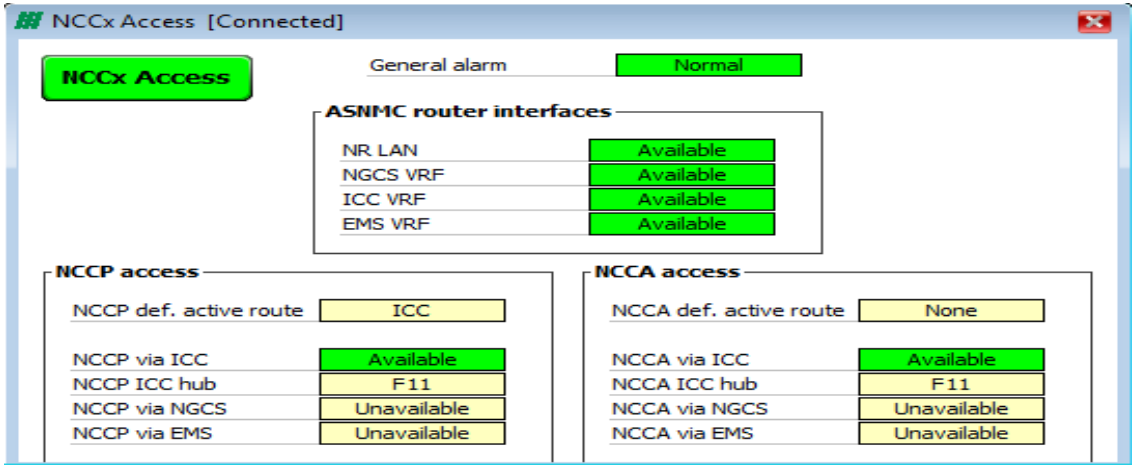
8 FUNCTIONALITY CHECKS

8.1 ASNMC Functionality Test

PROCEDURE / REPORT OF TEST Nº 8.1						
TEST NAME: ASNMC Functionality		**ELEMENT UNDER TEST:** ASNMC			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	1.6.1_20150127_NU_ASNMC_Functionalty_Test_Procedure Open Computer and check Fan operations clean inlet and outlets				**OK**	
2.	Check available Backup batteries and replace if needed				**OK**	
3.	Check ASNMC Computer is having latest version installed and functioning properly			**Win7 prof.** **ASNMC Ver.1.2.1**	**OK**	
4.	Check ASNMC Computer is having latest desktop NCIA BG Info logo installed and functioning properly				**OK**	
5.	Check the IP configuration recording to be sure the MACS has the proper IP address.				**OK**	
6.	Check RDP (Remote Desk Top operation) Functioning properly				**OK**	
7.	Check SMS kit Installation performed and Ports are configured.				**N/A**	
8.	Check iDirect EOW modem is reachable via ASNMC Computer. Download modem configuration to desktop and check modem is having latest operational option file loaded. (desired for dedicated Network)				**OK**	
9.	Configure EOW iDirect modem of the ASNMC or signal generator as follow; CW, CF 950 MHz, Output power -15 dBm.				**OK**	

PROCEDURE / REPORT OF TEST Nº 8.1						
TEST NAME: ASNMC Functionality		**ELEMENT UNDER TEST:** ASNMC			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
10.	Configure setup for T-1, measure the CW signal at the TX Power out port of the T-1 Antenna. CF 950 MHz CF 1200 MHz CF 1450 MHz			LBAND /XBAND -23.5 dBm /33.0 dBm -23.5 dBm /33.0 dBm -23.5 dBm /33.0 dBm		
11.	Configure setup for T-2, measure on “RF TX OUT”, apply measurements for /Read, and record the value measured. CF 950 MHz CF 1200 MHz CF 1450 MHz			LBAND /XBAND -23.5 dBm /39.0 dBm -23.5 dBm /39.0 dBm -23.5 dBm /39.0 dBm		
12.	Go to the right satellite (depending on the option file) and make sure that the IDirect modem gets Rx lock. The most left LED will be steady green. Switch the HPAs combined to antenna and wait till all LEDs on the modem are steady green Capture print screen of iDirect on ASNMC GUI.			Sync/ All LEDs green	**OK**	

PROCEDURE / REPORT OF TEST Nº 8.1						
TEST NAME: ASNMC Functionality		**ELEMENT UNDER TEST:** ASNMC			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
						
13.	Logon to the LCA and start the ASNMC software. Double click on the **NCCx Access** field and make sure that, in the resulting window, NCCA and NCCP access is available over ICC. Capture print screen of NCCx Access on ASNMC GUI.				**OK**	

PROCEDURE / REPORT OF TEST Nº 8.1						
TEST NAME: ASNMC Functionality		**ELEMENT UNDER TEST:** ASNMC			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
						
14.	Connect the SNOM NR IP phone to the dedicated port on the EIoW channel on the extended iDirect modem port perform a functionality test			**OK**		
15.	Establish connectivity between the ASNMC VPN router and the remote post connect SNOM NU IP phone to the dedicated port on the remote port SW and perform a functionality test			**OK**		
16.	Establish connectivity between the ASNMC VPN router and connect the remote ASNMC computer to the dedicated port on the Remote port SW and perform a functionality test			**OK**		
17.	Establish connectivity between the ORION M&C switch and the remote M&C computer and perform a functionality test			**OK**		

PROCEDURE / REPORT OF TEST Nº 8.1						
TEST NAME: ASNMC Functionality		**ELEMENT UNDER TEST:** ASNMC			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
18.	Log on to ASNMC DWS computer and check current ASNMC GUI version for Ver. ASNMC Ver.1.2.1			**Win7 prof. ASNMC Ver.1.2.1**	**OK**	
19.	Check ASNMC DWS Computer is having latest desktop NCIA BG. Info logo installed and functioning properly				**OK**	
20.	Log on VPN ROUTER/SWITCH and Check Configured Properly. Cooling Fans and Backup battery is keeping configuration.				**OK**	

8.2 Modem Tests

8.2.1 EMS CW Carrier Transmission

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	1.7.1_20150127_NU_EMS_Functionalty_Test_Procedure Open Computer and check Fan operations clean inlet and outlets				**OK**	
2.	Check EMS Computer and VM is having latest Firmware/SW installed and communicating			**V.02.01.12**	**OK**	**.**

<table>
<tr><td colspan="7">PROCEDURE / REPORT OF TEST Nº 8.2.1</td></tr>
<tr><td colspan="2">TEST NAME: T-1 only EMS CW carrier transmission.</td><td colspan="3">ELEMENT UNDER TEST: EMS</td><td colspan="2">Serial Nº and/or version:</td></tr>
<tr><td rowspan="2">PROJECT: TSGT</td><td rowspan="2">TEST MATRIX:
4.5 (FAT)</td><td>TEST CONDUCTOR:</td><td>QA ENG:</td><td>CUSTOMER:</td><td>DATE START:</td><td>DATE END:</td></tr>
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<tr><td>STEP</td><td colspan="3">TEST SEQUENCE</td><td>EXPECTED RESULT</td><td>RESULT</td><td>REMARKS</td></tr>
<tr><td>3.</td><td colspan="3">Check EMS 8U Modem Rack is having latest Firmware/SW installed and communicating
logging-on to LMC, launch LMS. > Display MR autotest:</td><td></td><td></td><td></td></tr>
<tr><td></td><td colspan="3">
<table>
<tr><th>Component</th><th>Version</th><th>Sub-component</th><th>Version</th></tr>
<tr><td rowspan="5">EMU</td><td rowspan="5">V9.6</td><td>LIA</td><td>V3.01</td></tr>
<tr><td>BOOTPP</td><td>V4.09</td></tr>
<tr><td>TESTCAGE</td><td>V5.28</td></tr>
<tr><td>GESTCARMIN</td><td>V1.15</td></tr>
<tr><td>LCTL-EMU</td><td>V9.6</td></tr>
<tr><td rowspan="2">ECU</td><td rowspan="2">V1.1</td><td>SMS</td><td>V1.1</td></tr>
<tr><td>STS</td><td>V1.1</td></tr>
<tr><td rowspan="10">UC G2.0</td><td rowspan="10">Ed2
V3.05</td><td>FPGATEST</td><td>01.01</td></tr>
<tr><td>FPGAMFC2[1]</td><td>02.10</td></tr>
<tr><td>BOOTPP</td><td>05.03</td></tr>
<tr><td>DSP_LPP</td><td>03.03</td></tr>
<tr><td>DSP_NEMS[2]</td><td>03.22</td></tr>
<tr><td>DSP_TEST</td><td>03.02</td></tr>
<tr><td>LOG_OPE</td><td>12K20</td></tr>
<tr><td>LIA</td><td>04.04</td></tr>
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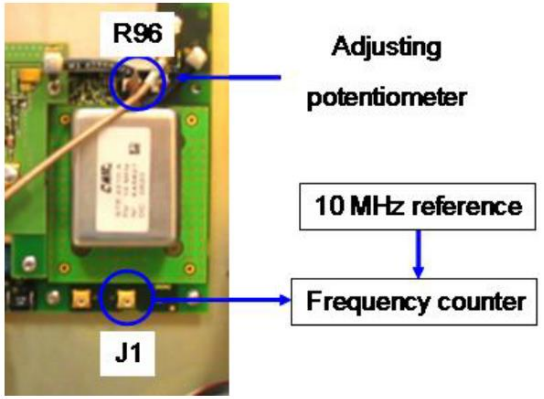
</td><td></td><td></td></tr>
<tr><td>11.</td><td colspan="3">Check all CU cards working Properly</td><td>Only 8U Modem Rack</td><td>OK</td><td></td></tr>
<tr><td>12.</td><td colspan="3">Check all PSUs are working Properly</td><td>Only 8U Modem Rack</td><td>OK</td><td></td></tr>
<tr><td>13.</td><td colspan="3">Check cooling fan Try cooling Properly</td><td>Only 8U Modem Rack</td><td>OK</td><td></td></tr>
<tr><td>9.</td><td colspan="3">Replace the back-up battery. Apply a battery replacement label on the board.</td><td>Only 8U Modem Rack</td><td>OK</td><td></td></tr>
<tr><td>10.</td><td colspan="3">Apply 10 MHz reference calibration on 8U Modem Rack</td><td></td><td>OK</td><td></td></tr>
</table>

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**

SET THE FREQUENCY COUNTER

- Connect the frequency counter to the J1 connector (SMB connector).



PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
14.	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, CU1 as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm. Install TX ,RX RF Chain for CUs.			**LBAND TX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		

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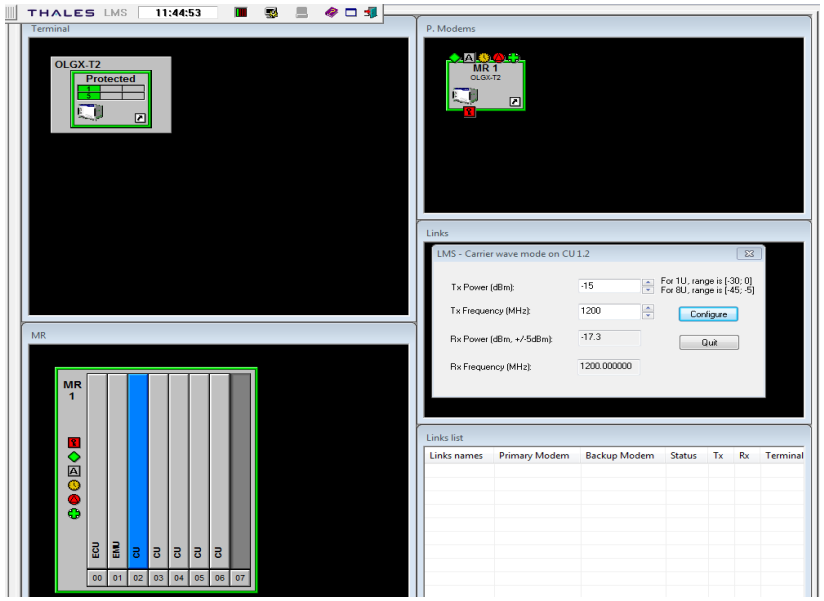
<tr><td colspan="7"> 
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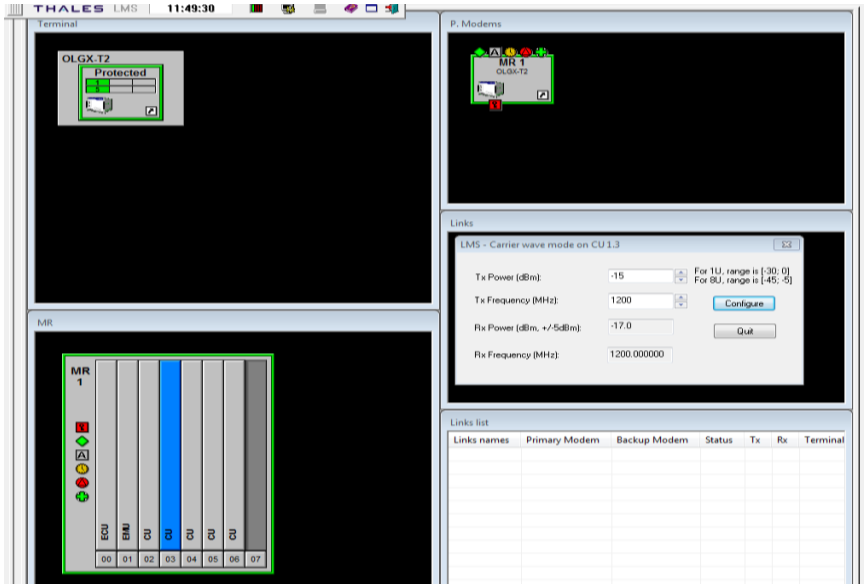
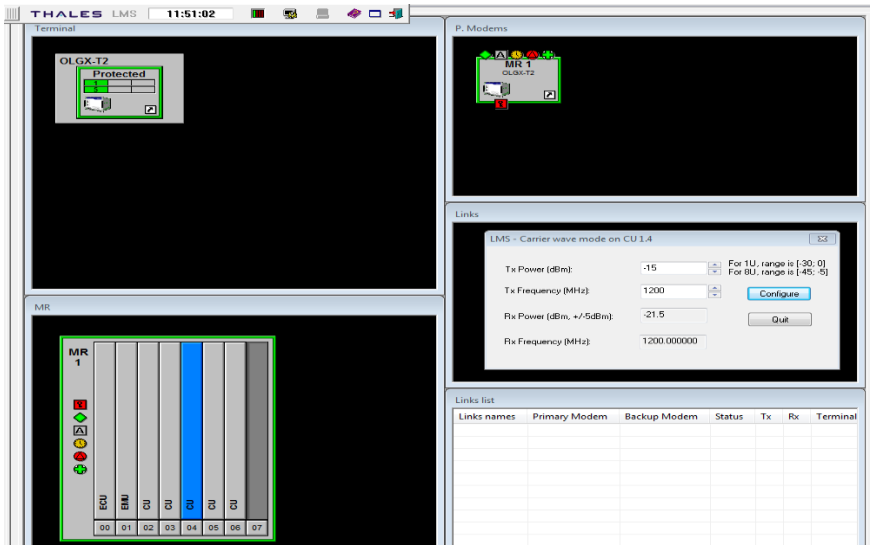
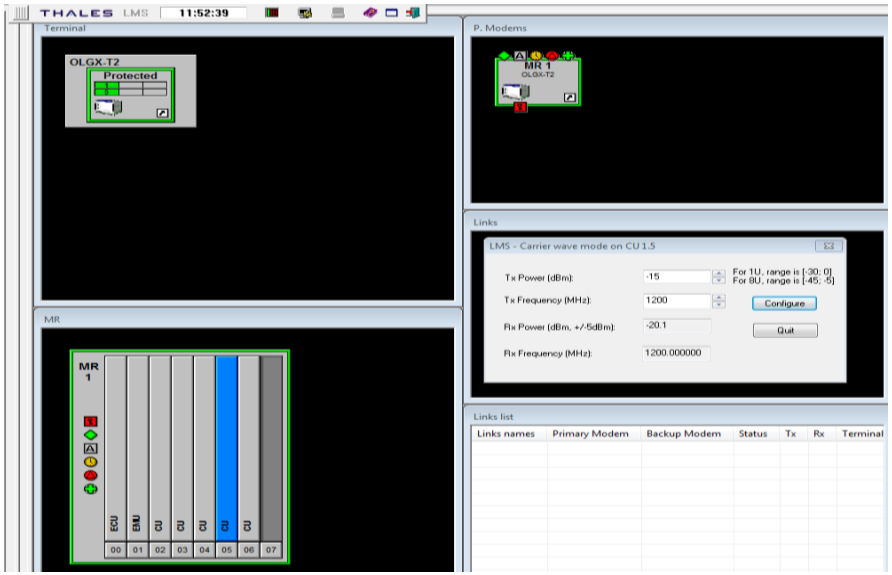
PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
15	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, CU2 as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
						

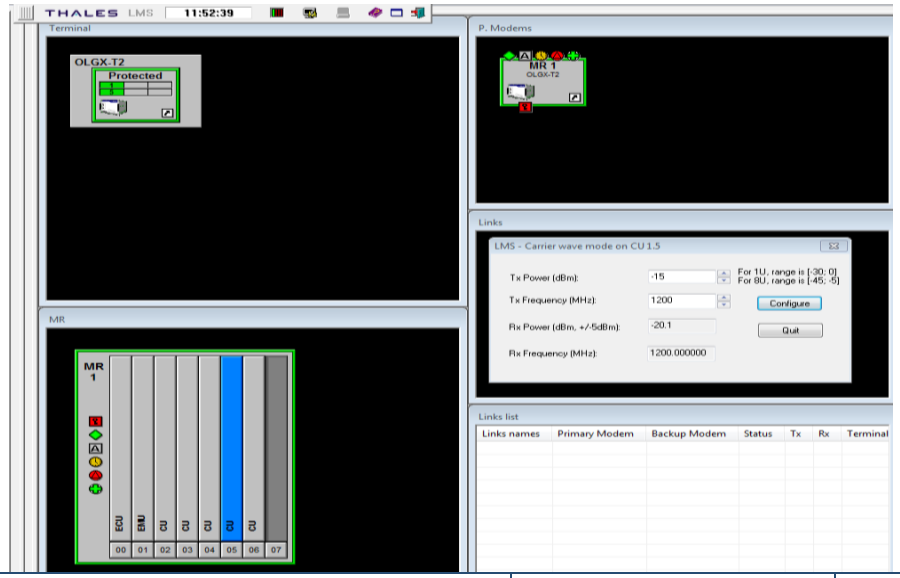
PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
16	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, CU3 as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
						

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
17	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, CU4 as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
						

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
18	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, CU5 as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
						
	Establish a test configuration and apply on-line test.				**N/R**	
5.	Check EMSe 1U Modems 1 is having latest Firmware/SWS installed and communicating			Version V1.2.1 with ETX upgrade to V4.3.23		
6.	Check EMSe 1U Modems 2 is having latest Firmware/SWS installed and communicating			Version V1.2.1 with ETX upgrade to V4.3.23		
7.	Check EMSe 1U Modems 3 is having latest Firmware/SWS installed and communicating			Version V1.2.1 with ETX upgrade to V4.3.23		

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
8.	Check EMSe 1U Modems 4 is having latest Firmware/SWS installed and communicating			Version V1.2.1 with ETX upgrade to V4.3.23		
	Apply 10 MHz reference calibration on 1U Modem#1				**OK**	
	Apply 10 MHz reference calibration on 1U Modem#2				**OK**	
	Apply 10 MHz reference calibration on 1U Modem#3				**OK**	
	Apply 10 MHz reference calibration on 1U Modem#4				**OK**	
14.	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, TU1, (EMSe #1) as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm. Install TX,RX RF Chain for CUs.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		**EMSe1**

<table>
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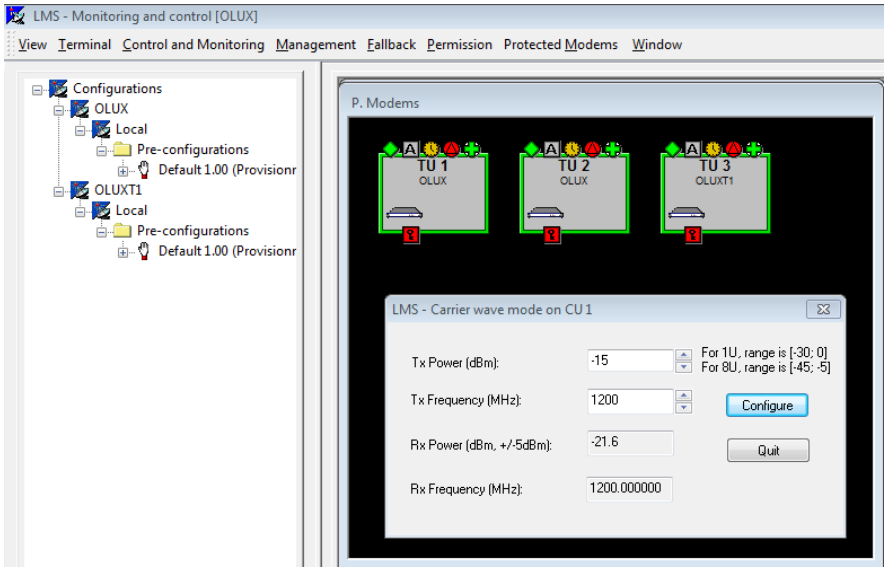
<tr><td colspan="7"> 
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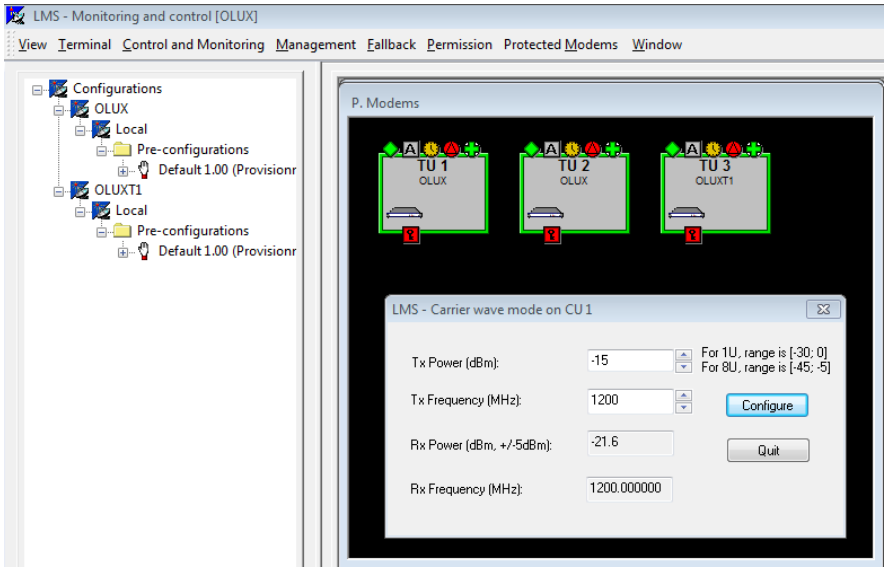
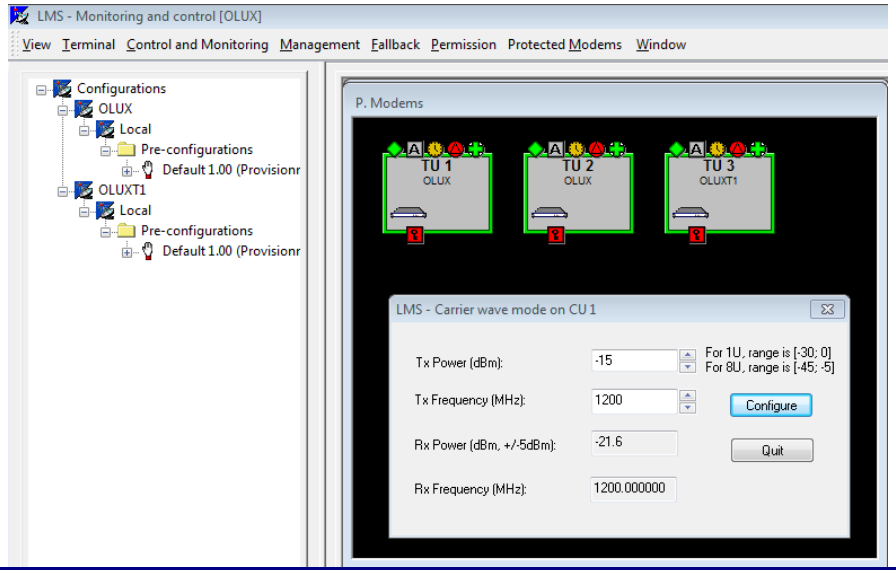
PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
14.	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, TU2, (EMSe #2) as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm. Install TX,RX RF Chain for CUs.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		**EMSe2**

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**



PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
14.	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, TU3, (EMSe #3) as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm. Install TX,RX RF Chain for CUs.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		**EMSe3**

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**



PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
14.	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, TU4, (EMSe #4) as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm. Install TX, RX RF Chain for CUs.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		**EMSe4**

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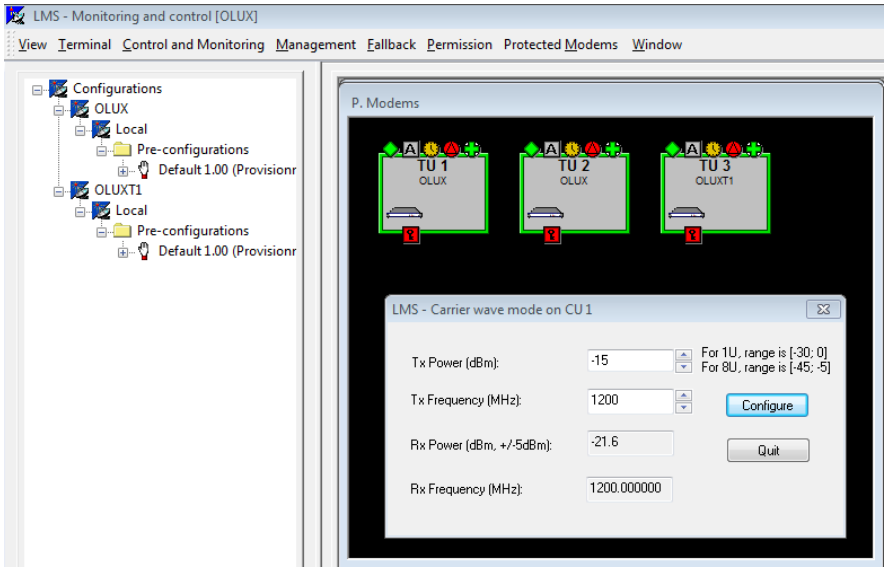
<tr><td colspan="7"> 
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8.2.2 EBEM BER Stability Test per ITU- G.821 Standard

This test requires testing each EBEM modem over a satellite link, using either the modem's internal BER test mode or an external BER test set. The first modem test will be run overnight, and the remaining four modems will be run for 20 minutes.

PROCEDURE / REPORT OF TEST Nº 8.2.2						
TEST NAME: BER stability Test		**ELEMENT UNDER TEST:** Satellite System			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Obtain satellite Access Authorization to link TSGT with other NATO Terminals and / or a NATO Hub Station over a Multilink. Configure system for T-1or T-2 configuration depends on the power requirements Select BUC A and SSPA A + B. Select LNA A and BDC A. Point the Antenna Subsystem at the Satellite.				**OK**	
2.	Configure EBEM1 per the SAA (SAT Loop) and verify the modem is locked.				**OK**	
3.	Using the BER Tester in the modem or an external BER test set, start a BER test and verify test is free of any errors. Inject 1 Error confirm that it is detected.				**OK**	
4.	Run the test overnight and paste both screen capture of the modem configuration and the test results below.				**OK**	
Paste EBEM1 configuration and BER test results here.						
5.	Configure EBEM2 per the SAA (SAT Loop) and verify the modem is locked.				**OK**	
6.	Using the BER Tester in the modem or an external BER test set, start a BER test and verify test is free of any errors. Inject 1 Error confirm that it is detected.				**OK**	

PROCEDURE / REPORT OF TEST Nº 8.2.2						
TEST NAME: BER stability Test		**ELEMENT UNDER TEST:** Satellite System			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
7.	Run the test for 20 minutes and paste both screen capture of the modem configuration and the test results below.				**OK**	
Paste EBEM2 configuration and BER test results here.						
8.	Configure EBEM3 per the SAA (SAT Loop) and verify the modem is locked.				**OK**	
9.	Using the BER Tester in the modem or an external BER test set, start a BER test and verify test is free of any errors. Inject 1 Error confirm that it is detected.				**OK**	
10	Run the test for 20 minutes and paste both screen capture of the modem configuration and the test results below.				**OK**	
Paste EBEM3 configuration and BER test results here.						
11.	Configure EBEM4 per the SAA (SAT Loop) and verify the modem is locked.				**OK**	
12.	Using the BER Tester in the modem or an external BER test set, start a BER test and verify test is free of any errors. Inject 1 Error confirm that it is detected.				**OK**	
13.	Run the test for 20 minutes and paste both screen capture of the modem configuration and the test results below.				**OK**	
Paste EBEM4 configuration and BER test results here.						
14.	Configure EBEM5 per the SAA (SAT Loop) and verify the modem is locked.				**OK**	
15.	Using the BER Tester in the modem or an external BER test set, start a BER test and verify test is free of any errors. Inject 1 Error confirm that it is detected.				**OK**	
16.	Run the test for 20 minutes and paste both screen capture of the modem configuration and the test results below.				**OK**	

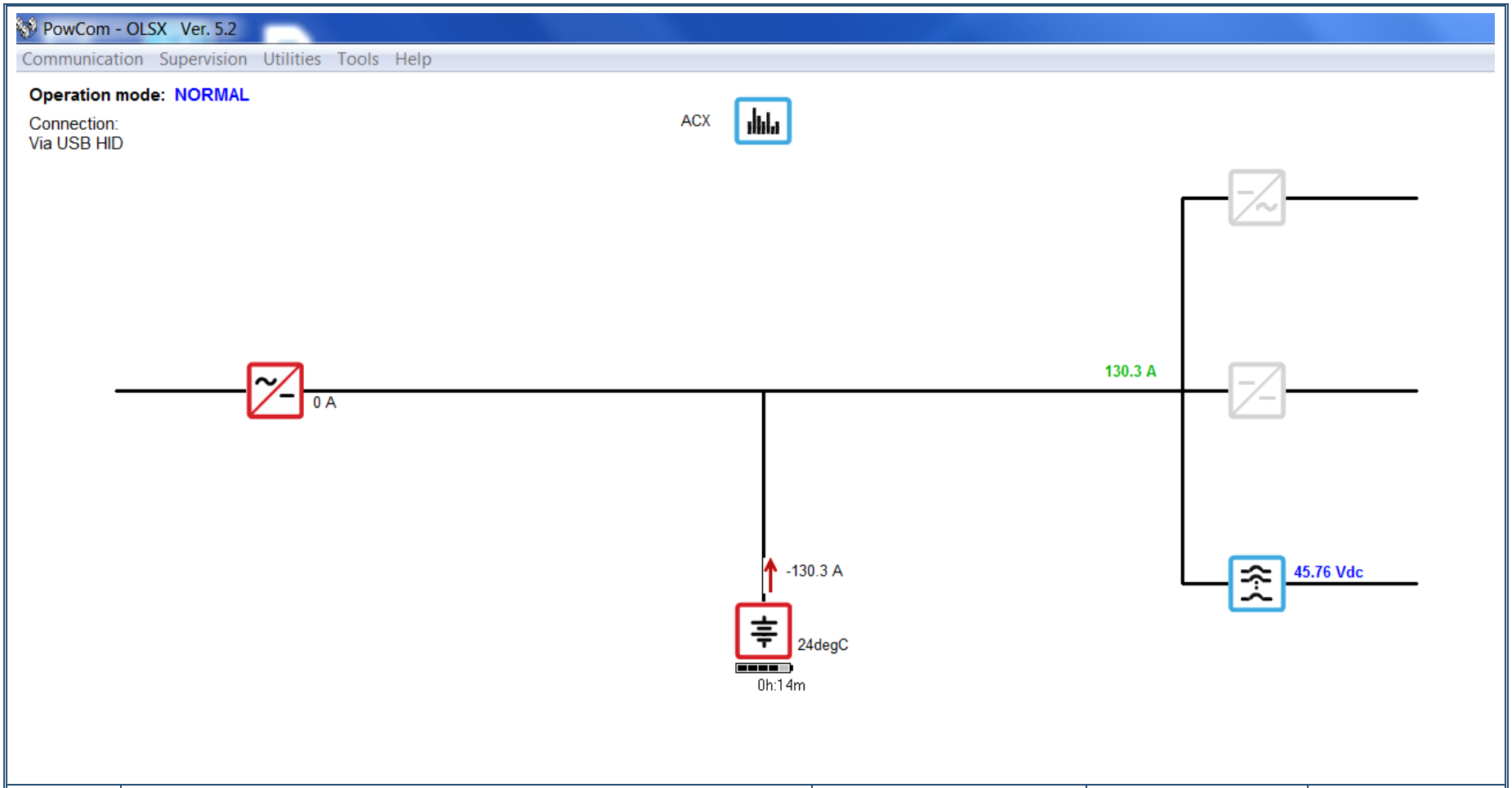
PROCEDURE / REPORT OF TEST Nº 8.2.2						
TEST NAME: BER stability Test		**ELEMENT UNDER TEST:** Satellite System			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
Paste EBEM5 configuration and BER test results here.						
17.	Re-enter the stored “home-location” mark angle recorded during Antenna Control Subsystem tests: • T-2 ACU (Section 6.1) • T-1 ACU (Section 6.2)			Home Location Mark Angle: T-2 _____ deg. T-1 _____ deg.	**OK** **OK**	

8.3 UPS Battery Check

PROCEDURE / REPORT OF TEST Nº 8.3						
TEST NAME: UPS Battery Check		**ELEMENT UNDER TEST:** UPS			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	The UPS runtime test will be performed with the TSGT configured for the 2.4m and 4.6m RF systems transmitting in phase combined mode and operating within the linear region.					
1.	Point both T-1 and T-2 antennas to cold sky and place both antenna ACU systems in Standby.			OK	**OK**	
2.	Verify the T-1 TWTAs are in Standby mode.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 8.3						
TEST NAME: UPS Battery Check		**ELEMENT UNDER TEST:** UPS			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
3.	Verify the T-2 SSPAs are in Mute mode.			OK	**OK**	
4.	Command both the T-2 and T-1 HPA subsystems to Combined Maintenance.			OK	**OK**	
5.	Turn on all ECUs, set target temperature to force two (2) ECUs to cooling mode.			OK	**OK**	
6.	Monitor the TSGT AC Power Meter and record kVA.			7.8 kVa	_____kVa	
7.	Monitor the Inverter SLI50 Controller System Power and record kVA.			2.8 kVa	_____kVa	
8.	Configure EBEM 1 to Inject -10 dBm, CW, 1200 MHz and patch to the T-2 Uplink.			OK	**OK**	
9.	Configure EBEM 2 to Inject -10 dBm, CW, 1200 MHz and patch to the T-1 Uplink.			OK	**OK**	
10.	Unmute (Enable) the T-2 SSPAs.			OK	**OK**	
11.	While monitoring the output power of the SSPAs by means a ASNMC increase the CW signal level of EBEM 1 until both SSPAs are operating at 50.0 dBm.			50.0 dBm	_____dBm	
12.	Monitor the TSGT AC Power Meter and record kVA.			11.6 kVa	_____kVa	
13.	Monitor the Inverter SLI50 Controller System Power and record kVA.			6.4 kVa	_____kVa	
14.	Command both T-1 TWTAs to Transmit.					
15.	While monitoring the output power of the TWTAs by means a ASNMC increase the CW signal level of EBEM 2 until both TWTAs are operating at 45.0 dBm.			45.0 dBm	_____dBm	
16.	Monitor the TSGT AC Power Meter and record kVA.			16.4 kVa	_____kVa	

PROCEDURE / REPORT OF TEST Nº 8.3						
TEST NAME: UPS Battery Check		**ELEMENT UNDER TEST:** UPS			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
17.	Monitor the Inverter SLI50 Controller System Power and record kVA.			11.0 kVa	_____kVa	
18.	<u>UPS Battery Runtime Test</u> 1. Open main circuit breaker CB1. 2. Note and record start time. 3. Check the current flow with PowCom. It should indicate that it is flowing <u>OUT</u> of the battery as shown in the screen capture below. 4. Monitor battery voltage on the Rectifier Controller and record the time when the battery voltage is reduced to 44.0 VDC. 5 minutes elapses before voltage drops, go to step 5. 5. Record UPS battery run time autonomy. ***Note**: The minimum capability on UPS power is 5 minutes*.			5 Minutes +	**OK** Time: _____:_____ **OK** _____ VDC _____ min	



19.	Close CB1 and verify Rectifiers assume load and battery recharge.	OK	**OK**	
20.	Command the SSPAs to Mute and TWTAs to Standby.	OK	**OK**	
21.	Set the ECUs to a 25°C target temperature and normalise the system.	OK	**OK**	

9 ARCHIVE REPORT

Archive this test report when it is complete.

DOCUMENT HISTORY

REV	DESCRIPTION	DATE	APPROVED
1	Preliminary Release	14-May-20	

ORIGINATOR M. Rekrut	DATE	***GLOBECOMM SYSTEMS, INC.*** 45 OSER AVENUE HAUPPAUGE, NY 11788 USA
ENGINEER M. Rekrut	DATE	
APPROVED	DATE	TITLE Level 3B TSGT Status Check, CSSC at FSP
DO NOT SCALE DRAWING WORK FROM DIMENSIONS		

CAGE CODE	DWG NO.	REV
02MQ7	11137-01610-032	1
	SCALE: NONE	SHEET: 1 OF 16

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Level 3B TSGT Status Check, CSSC at FSP

DSO TSGT

Revision 1

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ABOUT THIS DOCUMENT

This document describes the DSO TSGT preventive maintenance procedures to be performed by a Level 1 Operator.

CAUTION ICON

A Caution icon in the manual indicates a hazardous situation that if not avoided, may result in injury. A Caution icon may also be used to indicate other unsafe practices or risks of damage to the TSGT equipment.

Caution! 	60 VDC HIGH CURRENT

POTENTIAL HAZARDS AND SAFETY PRECAUTIONS

While all precautions have been taken by Globecomm Systems, Inc to eliminate and identify potential safety hazards in the TSGT System, personnel should exercise caution when installing, operating and servicing the equipment.

Care should be taken to prevent injury from electrical shock, pinch points and RF Radiation. Globecomm Systems, Inc is not liable for any damage or injury arising from a technician's failure to follow instructions contained in this document or his or her failure to exercise due care and caution in the installation, operation and service of the TSGT equipment. Globecomm Systems, Inc shall not be responsible for injury or damage resulting from improper procedures or from the use of improperly trained or inexperienced personnel performing such tasks.

This document is intended as a general guide for trained and qualified personnel who are aware of the dangers of handling potentially hazardous electrical and electronic circuits. This document is not intended to contain a complete statement of all safety precautions that should be observed by personnel in using this or other electronic equipment.

This system is integrated with high power amplifiers of traveling wave tubes and other high power amplifier technology and is capable of transmitting microwave energy at varying power levels. If transmitting microwave power, Globecomm Systems, Inc cautions the end-user to review all applicable local, federal and international regulations and to comply with all such regulations in the operation and maintenance of the integrated system.

The electrical currents and voltages associated with the equipment, whether supplied by Globecomm Systems, Inc or others, are dangerous. Personnel must, at all times, observe safety regulations.

SAFETY GUIDELINES

- Do not remove, short-circuit or tamper with interlock switches on access covers, doors, enclosures, gates, panels or shields.

- Keep away from live circuits.
- Know your equipment and do not take risks.
- Always remove all power to the system prior to working on the antenna, the reflector assembly, the reflector backup assembly or the feed assembly.

RF Radiation Lockout Perimeter

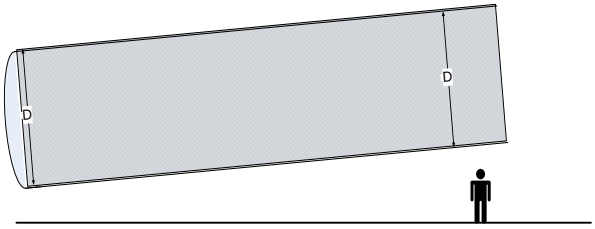
The TSGT antenna radiating surfaces can produce non-ionizing radiation levels more than maximum recommended exposure levels.

To determine the minimum 'safe' distance from the antenna requires calculating the Power Density in the direction of personnel or the object of concern. Minimum information required to calculate the Power Density is the distance to the object, angular offset of the antenna RF bore-sight to the object, and operating power levels. Formulae for calculating Power Density may be found in AECTP 250 Edition 1, Leaflet 258.

A simplified approach to determining safe area boundaries considers a baseline operating condition where only the lower limit of operational elevation angle is required. Baseline operating conditions are established for the T-1 and T-2 configurations as follows;

Configuration	**T-1**	**T-2**
Antenna	4.6m	2.4m
Antenna Centerline Height	3.1m	3.3m
HPA Configuration	1:1 Phase Combined	1:1 Phase Combined
Maximum TSGT EIRP	79 dBW	68 dBW
Near Field Length	148m	41m
Distance to Far Field	355m	97m
Max. Power Density Near Field	14 mW/cm²	19 mW/cm²
Max. Power Density Far Field	34 mW/cm²	3 mW/cm²

The baseline operating configurations result in radiation levels more than maximum recommended exposure levels when in line with the antenna main lobe. The antenna main lobe is a cone shaped projection assumed to have the same dimensions as the antenna main reflector.

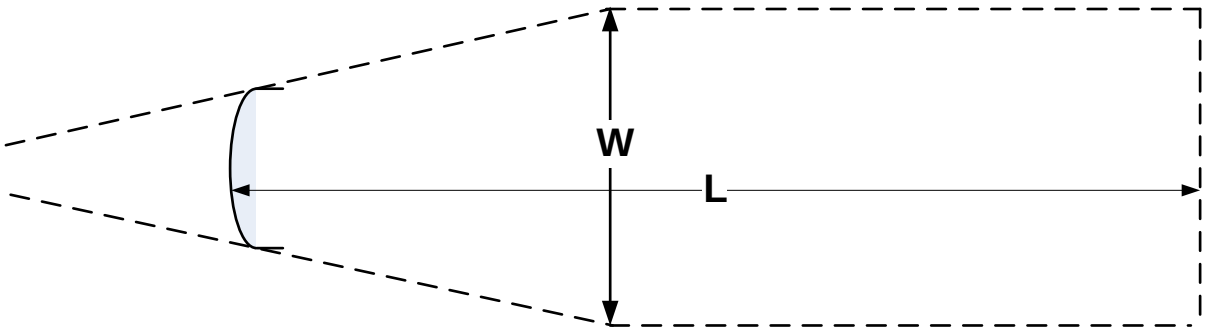


Antenna Main Lobe Projection

Due to the directivity of the radiated power a zone perimeter can be established by adhering to a few simple rules.

1. Never operate below a 5º antenna elevation angle

2. Always assume maximum transmitter power
3. Always verify the main lobe is not in line with personnel or buildings.
4. Always consider the main lobe to be twice the diameter of the antenna at distances of twice the antenna diameter
5. Always consider the radiation field extends a minimum of 500m
6. Always wear your personal Radiation Monitor when working on or around an operating TSGT



TSGT Radiation Zone Perimeter

Antenna Operational Elevation Angle (º)	T-1 Minimum Safe Area Dimension (m)		T-2 Minimum Safe Area Dimension (m)	
	Length (L)	Width (W)	Length (L)	Width (W)
5	38	9	14	5
10	19	9	7	5
15	12	9	5	5
20	9	9	4	3
25	7	5	3	3
30	6	5	2	3
35	5	5	2	3
40	4	5	2	3
45	3.5	5	2	3

TSGT Radiation Zone Perimeter Dimensions

The TSGT setup procedure calls for a “Lockout Perimeter” to be established around the terminal to protect personnel from RF radiation.

RF Radiation Monitor

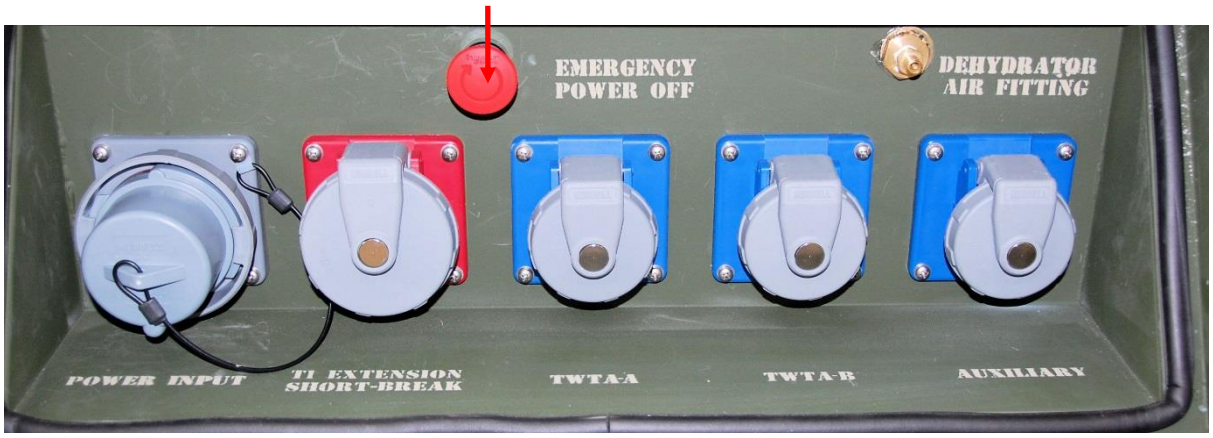
A personal RF Radiation Monitor is provided with the TSGT and should be worn at all times by any personnel working around a transmitting TSGT.

Emergency Power Off Controls

The TSGT is equipped with Power Emergency Off (EPO) switches at both the TSGT Container and the T-1 Extension Trailer.

One TSGT Container Emergency Power Off button is located on the Power ETB as illustrated below. Depressing this button cuts of all power to the TSGT terminal and should only be used in the event of an emergency.

TSGT Container
Emergency Power Off



TSGT Container Power ETB Emergency Power Off

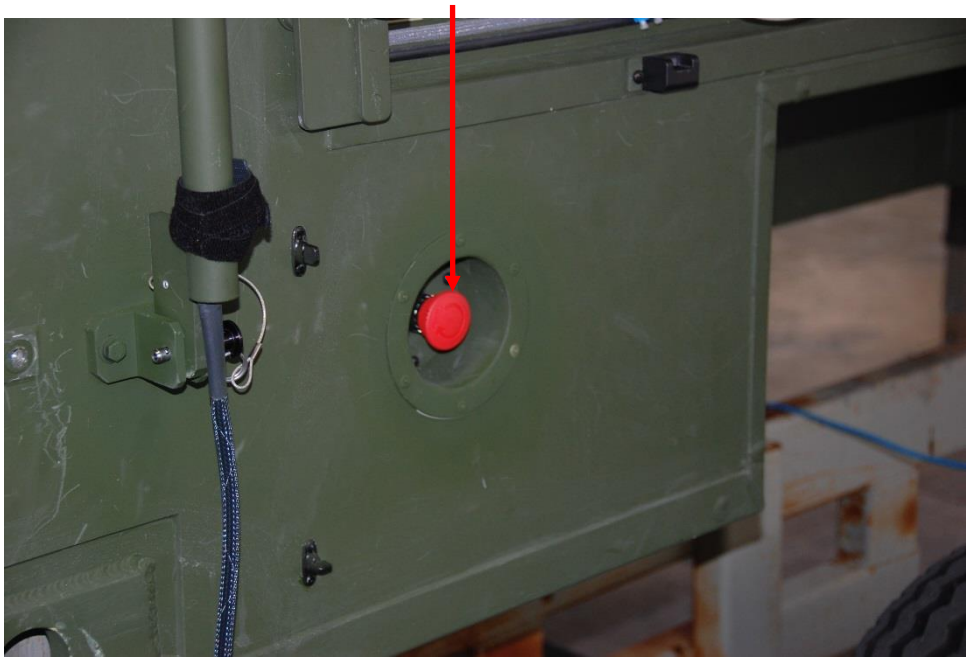
A second TSGT Container Emergency Power Off button is located the Left Side of the TSGT Container as illustrated below. Depressing this button cuts of all power to the TSGT terminal and should only be used in the event of an emergency.

TSGT Container Left Side
Emergency Power Off

TSGT Container Left Side Emergency Power Off

A third TSGT Container Emergency Power Off button is located the Right Side of the TSGT Container as illustrated below. Depressing this button cuts of all power to the TSGT terminal and should only be used in the event of an emergency.

TSGT Container Right Side Emergency Power Off



TSGT Container Right Side Emergency Power Off

The T-1 Extension Trailer is equipped with an Emergency Power Off button located at the front of the Trailer Power Panel and illustrated below. Depressing this button cuts of all power to the T-1 Extension Trailer and should only be used in the event of an emergency.

T-1 Trailer Emergency Power Off

T-1 Extension Trailer Power ETB Emergency Power Off Button

Emergency Power Off Protection Switches
The TSGT is equipped with Power Emergency Off (EPO) protection switches at the TSGT Container. If any of these switches are activated, all power to the TSGT is shut off.

- Dirty Power Panel Plate
- Clean Power Panel Plate
- Dirty Power Vault Access (TSGT Container center aisle)
- Clean Power Vault Access (TSGT Container center aisle)

Safety Procedures
The following safety procedures are listed to remind those performing any work on the antenna system that safety rules must be observed. Failure to observe safety rules may result in serious injury or death. Always work safely and in accordance with established procedures.

- Always wear the RF Radiation Monitor when working on or near a TSGT terminal.
- Care shall be taken in all operations to safeguard other people as well as property and to comply with all local safety procedures as established by the customer's site representative, as well as local building codes and fire protection standards.
- Never make internal adjustments or perform maintenance or service when alone or fatigued.
- Do not stand in the direct path of the feed system when the system is transmitting!
- Do not work on the feed system when the TSGT is transmitting!

WIND SPEED WARNINGS

T-1 4.6m Antenna

The T-1 4.6m antenna should not be deployed in wind speeds more than **10 m/s (36 km/h)**.

The T-1 4.6m antenna can survive in up to **30 m/s (108 km/h)** winds at any position. In winds above **30 m/s (108 km/h)**, the antenna must be stowed to ensure survival.

If wind speeds are below **10 m/s (36 km/h)**, the T-1 4.6m antenna can be stowed per the procedure described in Section **Error! Reference source not found.** of the DSO TSGT O&M manual.

To stow the T-1 4.6m antenna in winds speeds exceeding **10 m/s (36 km/h)**, the antenna must be stowed by an alternate method where the antenna wings are not folded and secured before the reflector is lowered to its stowed position, as described in Section **Error! Reference source not found.** of the DSO TSGT O&M manual.

T-2 2.4m Antenna

The T-2 2.4m antenna should not be deployed in wind speeds more than **33.5 m/s (120 km/h)**.

The T-2 2.4m antenna can survive in up to **33.5 m/s (120 km/h)** winds at any position. In winds above **33.5 m/s (120 km/h)**, the antenna must be stowed to ensure survival.

The T-2 4.6m antenna can be stowed per the procedure described on Section 3.4.2 of the DSO TSGT O&M manual.

TABLE OF CONTENTS

1 LEVEL 3B TSGT STATUS CHECK – CSSC AT FSP

The purpose of this procedure is to check the TSGT status and prepare it for Level 4 PMI at CSSC. The effort is expected to take 2 days and includes:

- Review of recent Level 1 and Level 2 PMI Reports
- TSGT Set-up, Power-on, and Initial Assessment/Status Checks
- Transmit and Receive Gain Checks
- Transmit and Receive Amplitude Response Checks
- T-1 and T-2 Antenna Control System Checks
- Available for packing and shipping and HOTO support, if applicable

1.1 TSGT Training Check

In the space below, please indicate the NCIAA training courses that the Technician(s) performing these procedures has received on the DSO TSGT. Include the name of the Technician(s) and the name and dates of the training course(s).

2 DSO TSGT SAFETY PRECAUTIONS

Before proceeding with this document, read the section on TSGT safety, beginning on page v at the begging of this document.

Personal RF Radiation Meter

The Personal RF Radiation Monitor should be worn at all times while working around a transmitting TSGT Antenna.

To configure the Personal RF Radiation Meter:

1. Configure the alarm for Vibrate, Alternating or Audio
2. Turn ON the RF Radiation Monitor

Note: *While using the RF Radiation Monitor, an operator should not allow their person to be between the monitor and the Antenna for extended periods of time as this could decrease the effectiveness of the monitor. The RF Radiation monitor should not be worn under clothing.*

3 LEVEL 3B TSGT STATUS CHECK PROCEDURES

This document lists various checks that should be performed on the TSGT terminal before it is returned to CSSC for Level 4 Maintenance.

Specific procedures are not called out for the various checks since the process is performed by a Level 3 technician from the CSSC. It is left to the CSSC technician to determine the test setup and the scope of the checks.

The purpose is to address any obvious problems with the TSGT terminal in advance of its return to CSSC for Level 4 Maintenance. The procedures for the Level 4 Maintenance at CSSC are very detailed.

***Note**: Reference PMI document 11137-01610-040 - "Level 4 TSGT Maintenance Procedures at CSSC" for more detail regarding specific procedures.*

3.1 Review of Maintenance Records

Review the most recent checklists submitted from Level 1 and Level 2.

Step	Item	Check (✓)
1.	Recent Level 1 Maintenance Records Reviewed	_____
2.	Recent Level 2 Maintenance Records Reviewed	_____
3.	Recent Level 3A Maintenance Records Reviewed	_____

3.2 Installation / Visual Inspection

Perform the following checks and note any issues in the box at the end of the procedure.

Step	Item	Check (✓)
1.	Inspect the T-1 Trailer for obvious problems or issues.	_____
2.	Inspect the T-1 Antenna and Feed for obvious problems or issues.	_____
3.	Position Trailer and prepare for deployment.	_____
4.	Position T-2 Container and prepare for deployment.	_____

RECORD ANY ISSUES HERE

3.3 System Power-On and Initial Assessment

Perform the following steps and note any issues in the box at the end of the procedure.

Step	Item	Check (✓)
1.	Perform Initial Power-On checks.	_____
2.	Perform EPO checks.	_____
3.	Position Trailer and prepare for deployment.	_____
4.	Position T-2 Container and prepare for deployment.	_____
5.	Power-up and check ECUs are functioning properly.	_____
6.	Leave all three ECUs powered on.	_____
7.	Power-up and check the UPS.	_____
8.	Power-up equipment racks at Clean Power Distribution Panel.	_____
9.	Power-on all independent units.	_____

RECORD ANY ISSUES HERE

3.4 T-2 System Checks

Perform the following checks and note any issues in the box at the end of the procedure.

Step	Item	Check (✓)
1.	Sweep both SSPAs and check gains.	_____
2.	Sweep both T-2 LNAs and check gains.	_____
3.	Sweep both T-2 BUCs and check BUC A and BUC B gain delta.	_____
4.	Sweep both T-2 BDCs and check BDC A and BDC B gain delta.	_____
5.	Check T-2 ACU and PDU operation.	_____
6.	Check T-2 gearbox and motor operation.	_____
7.	Check T-2 system with MACS via ASNMC and M&C laptop.	_____

RECORD ANY ISSUES HERE

3.5 T-1 System Checks

Perform the following checks and note any issues in the box at the end of the procedure.

Step	Item	Check (✓)
1.	Sweep both TWTAs and check gains.	_____
2.	Sweep both T-1 LNAs and check gains.	_____
3.	Sweep both T-1 BUCs and check BUC A and BUC B gain delta.	_____
4.	Sweep both T-1 BDCs and check BDC A and BDC B gain delta.	_____
5.	Check T-1 ACU and PDU Operation.	_____
6.	Check T-1 Gearbox, Azimuth Brake, and Motor Operation.	_____
7.	Check T-1 system with MACS via ASNMC and M&C Laptop.	_____

RECORD ANY ISSUES HERE

3.6 UPS Load Test

Perform a UPS load test and note any issues in the box below.

RECORD ANY ISSUES HERE

4 SIGN AND SUBMIT REPORT

Technicians from CSSC and FSP to sign and date this report.

_____ _____

CSSC Technician FSP Technician

Submit this report and any additional issues noted to CSSC.

DOCUMENT HISTORY

REV	DESCRIPTION	DATE	APPROVED
1	Preliminary Release	14-May-20	

ORIGINATOR M. Rekrut	DATE	**GLOBECOMM SYSTEMS, INC.** 45 OSER AVENUE HAUPPAUGE, NY 11788 USA
ENGINEER M. Rekrut	DATE	
APPROVED	DATE	TITLE Level 3C TSGT Handoff, CSSC at FSP/DCM
DO NOT SCALE DRAWING WORK FROM DIMENSIONS		

CAGE CODE	DWG NO.	REV
02MQ7	11137-01610-033	1
SCALE: NONE		SHEET: 1 OF 17

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Level 3C TSGT Handoff, CSSC at FSP/DSP

DSO TSGT

Revision 1

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ABOUT THIS DOCUMENT

This document describes the DSO TSGT preventive maintenance procedures to be performed by a Level 1 Operator.

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Caution! 	60 VDC HIGH CURRENT

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- Keep away from live circuits.
- Know your equipment and do not take risks.
- Always remove all power to the system prior to working on the antenna, the reflector assembly, the reflector backup assembly or the feed assembly.

RF Radiation Lockout Perimeter

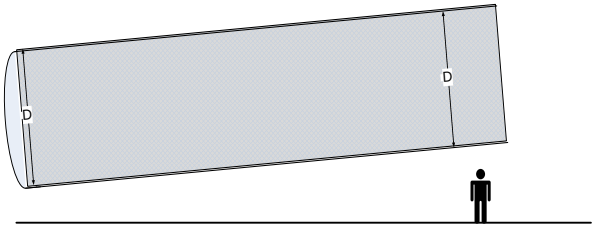
The TSGT antenna radiating surfaces can produce non-ionizing radiation levels more than maximum recommended exposure levels.

To determine the minimum 'safe' distance from the antenna requires calculating the Power Density in the direction of personnel or the object of concern. Minimum information required to calculate the Power Density is the distance to the object, angular offset of the antenna RF bore-sight to the object, and operating power levels. Formulae for calculating Power Density may be found in AECTP 250 Edition 1, Leaflet 258.

A simplified approach to determining safe area boundaries considers a baseline operating condition where only the lower limit of operational elevation angle is required. Baseline operating conditions are established for the T-1 and T-2 configurations as follows;

Configuration	**T-1**	**T-2**
Antenna	4.6m	2.4m
Antenna Centerline Height	3.1m	3.3m
HPA Configuration	1:1 Phase Combined	1:1 Phase Combined
Maximum TSGT EIRP	79 dBW	68 dBW
Near Field Length	148m	41m
Distance to Far Field	355m	97m
Max. Power Density Near Field	14 mW/cm²	19 mW/cm²
Max. Power Density Far Field	34 mW/cm²	3 mW/cm²

The baseline operating configurations result in radiation levels more than maximum recommended exposure levels when in line with the antenna main lobe. The antenna main lobe is a cone shaped projection assumed to have the same dimensions as the antenna main reflector.

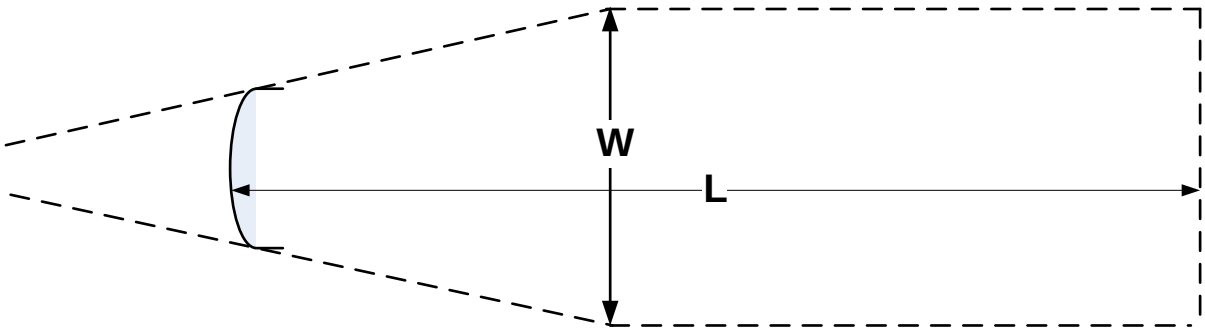


Antenna Main Lobe Projection

Due to the directivity of the radiated power a zone perimeter can be established by adhering to a few simple rules.

1. Never operate below a 5º antenna elevation angle

2. Always assume maximum transmitter power
3. Always verify the main lobe is not in line with personnel or buildings.
4. Always consider the main lobe to be twice the diameter of the antenna at distances of twice the antenna diameter
5. Always consider the radiation field extends a minimum of 500m
6. Always wear your personal Radiation Monitor when working on or around an operating TSGT



TSGT Radiation Zone Perimeter

Antenna Operational Elevation Angle (º)	T-1 Minimum Safe Area Dimension (m)		T-2 Minimum Safe Area Dimension (m)	
	Length (L)	Width (W)	Length (L)	Width (W)
5	38	9	14	5
10	19	9	7	5
15	12	9	5	5
20	9	9	4	3
25	7	5	3	3
30	6	5	2	3
35	5	5	2	3
40	4	5	2	3
45	3.5	5	2	3

TSGT Radiation Zone Perimeter Dimensions

The TSGT setup procedure calls for a “Lockout Perimeter” to be established around the terminal to protect personnel from RF radiation.

RF Radiation Monitor

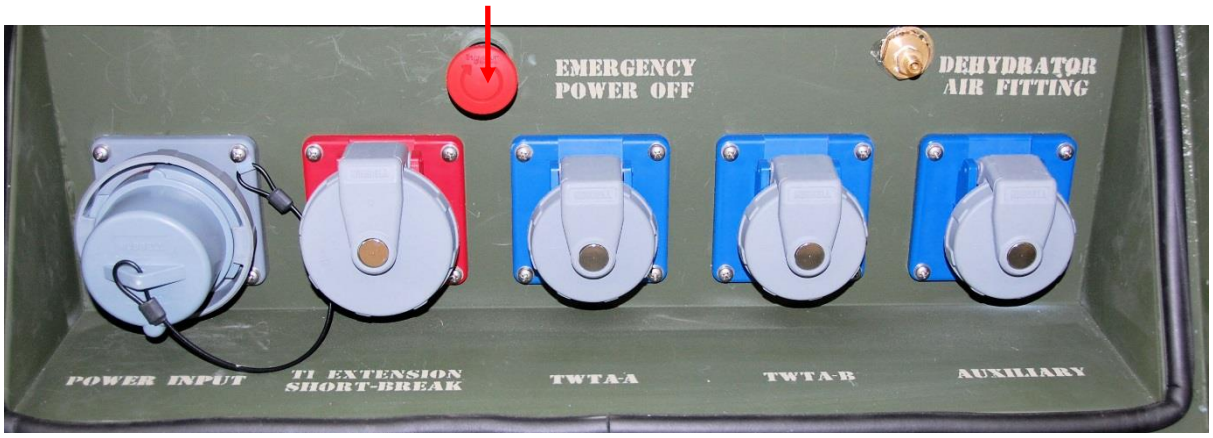
A personal RF Radiation Monitor is provided with the TSGT and should be worn at all times by any personnel working around a transmitting TSGT.

Emergency Power Off Controls

The TSGT is equipped with Power Emergency Off (EPO) switches at both the TSGT Container and the T-1 Extension Trailer.

One TSGT Container Emergency Power Off button is located on the Power ETB as illustrated below. Depressing this button cuts of all power to the TSGT terminal and should only be used in the event of an emergency.

TSGT Container
Emergency Power Off



TSGT Container Power ETB Emergency Power Off

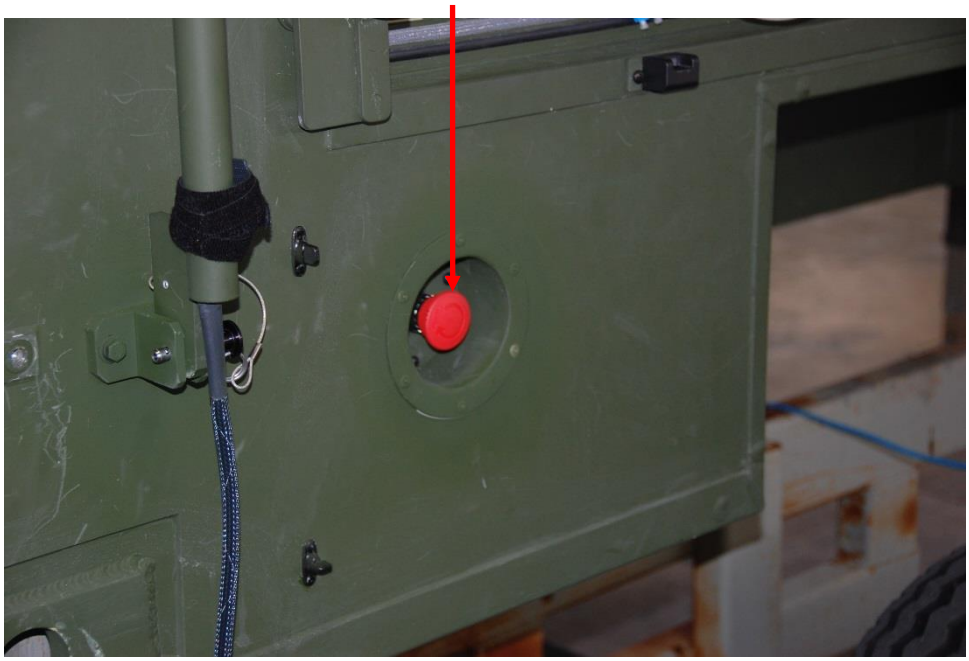
A second TSGT Container Emergency Power Off button is located the Left Side of the TSGT Container as illustrated below. Depressing this button cuts of all power to the TSGT terminal and should only be used in the event of an emergency.

TSGT Container Left Side
Emergency Power Off

TSGT Container Left Side Emergency Power Off

A third TSGT Container Emergency Power Off button is located the Right Side of the TSGT Container as illustrated below. Depressing this button cuts of all power to the TSGT terminal and should only be used in the event of an emergency.

TSGT Container Right Side Emergency Power Off



TSGT Container Right Side Emergency Power Off

The T-1 Extension Trailer is equipped with an Emergency Power Off button located at the front of the Trailer Power Panel and illustrated below. Depressing this button cuts of all power to the T-1 Extension Trailer and should only be used in the event of an emergency.

T-1 Trailer Emergency Power Off

T-1 Extension Trailer Power ETB Emergency Power Off Button

Emergency Power Off Protection Switches
The TSGT is equipped with Power Emergency Off (EPO) protection switches at the TSGT Container. If any of these switches are activated, all power to the TSGT is shut off.

- Dirty Power Panel Plate
- Clean Power Panel Plate
- Dirty Power Vault Access (TSGT Container center aisle)
- Clean Power Vault Access (TSGT Container center aisle)

Safety Procedures
The following safety procedures are listed to remind those performing any work on the antenna system that safety rules must be observed. Failure to observe safety rules may result in serious injury or death. Always work safely and in accordance with established procedures.

- Always wear the RF Radiation Monitor when working on or near a TSGT terminal.
- Care shall be taken in all operations to safeguard other people as well as property and to comply with all local safety procedures as established by the customer's site representative, as well as local building codes and fire protection standards.
- Never make internal adjustments or perform maintenance or service when alone or fatigued.
- Do not stand in the direct path of the feed system when the system is transmitting!
- Do not work on the feed system when the TSGT is transmitting!

WIND SPEED WARNINGS

T-1 4.6m Antenna
The T-1 4.6m antenna should not be deployed in wind speeds more than **10 m/s (36 km/h)**.

The T-1 4.6m antenna can survive in up to **30 m/s (108 km/h)** winds at any position. In winds above **30 m/s (108 km/h)**, the antenna must be stowed to ensure survival.

If wind speeds are below **10 m/s (36 km/h)**, the T-1 4.6m antenna can be stowed per the procedure described in Section **Error! Reference source not found.** of the DSO TSGT O&M manual.

To stow the T-1 4.6m antenna in winds speeds exceeding **10 m/s (36 km/h)**, the antenna must be stowed by an alternate method where the antenna wings are not folded and secured before the reflector is lowered to its stowed position, as described in Section **Error! Reference source not found.** of the DSO TSGT O&M manual.

T-2 2.4m Antenna

The T-2 2.4m antenna should not be deployed in wind speeds more than **33.5 m/s (120 km/h)**.

The T-2 2.4m antenna can survive in up to **33.5 m/s (120 km/h)** winds at any position. In winds above **33.5 m/s (120 km/h)**, the antenna must be stowed to ensure survival.

The T-2 4.6m antenna can be stowed per the procedure described on Section 3.4.2 of the DSO TSGT O&M manual.

TABLE OF CONTENTS

1 LEVEL 3C TSGT HANDOFF – CSSC AT FSP/DCM

The purpose of this procedure is to check the status of a TSGT after its return from Level 4 PMI at CSSC. The effort is expected to take 2 days and includes:

- Review of recent Level 4 PMI Reports
- TSGT Set-up, Power-on, and Initial Assessment/Status Checks
- T-1 and T-2 System Checks

1.1 TSGT Training Check

In the space below, please indicate the NCIAA training courses that the Technician(s) performing these procedures has received on the DSO TSGT. Include the name of the Technician(s) and the name and dates of the training course(s).

2 DSO TSGT SAFETY PRECAUTIONS

Before proceeding with this document, read the section on TSGT safety, beginning on page v at the begging of this document.

Personal RF Radiation Meter

The Personal RF Radiation Monitor should be worn at all times while working around a transmitting TSGT Antenna.

To configure the Personal RF Radiation Meter:

1. Configure the alarm for Vibrate, Alternating or Audio
2. Turn ON the RF Radiation Monitor

Note: *While using the RF Radiation Monitor, an operator should not allow their person to be between the monitor and the Antenna for extended periods of time as this could decrease the effectiveness of the monitor. The RF Radiation monitor should not be worn under clothing.*

3 LEVEL 3C TSGT HANDOFF PROCEDURES

This document lists various checks that should be performed on the TSGT terminal after it is returned from Level 4 Maintenance at CSSC.

Specific procedures are not called out for the various checks since the process is performed by a Level 3 technician from the CSSC. It is left to the CSSC technician to determine the test setup and the scope of the checks.

The purpose is for the CSSC to demonstrate to the FSP that the Level 4 Maintenance procedures were performed at CSSC and the terminal is in excellent operating condition.

***Note**: Reference PMI document 11137-01610-040 - "Level 4 TSGT Maintenance Procedures at CSSC" for more detail regarding specific procedures.*

3.1 Review of Level 4 PMI Report

Review the most recent report from Level 4 Maintenance on the TSGT with the FSP technician.

Recent Level 4 Maintenance Report Reviewed _____ check (✓)

Record any known issues with the TSGT after its Level 4 PMI in the box below (known equipment faults, equipment needing special attention…).

RECORD KNOW ISSUES HERE

3.2 Installation / Visual Inspection

Perform the following checks and note any issues in the box at the end of the procedure.

Step	Item	Check (✓)
1.	Inspect the T-1 Trailer for obvious problems or issues.	_____
2.	Inspect the T-1 Antenna and Feed for obvious problems or issues.	_____
3.	Position Trailer and prepare for deployment.	_____
4.	Position T-2 Container and prepare for deployment.	_____

RECORD ANY ISSUES HERE

3.3 System Power-On and Initial Assessment

Perform the following steps and note any issues in the box at the end of the procedure.

Step	Item	Check (✓)
1.	Perform Initial Power-On checks.	_____
2.	Perform EPO checks.	_____
3.	Position Trailer and prepare for deployment.	_____
4.	Position T-2 Container and prepare for deployment.	_____
5.	Power-up and check ECUs are functioning properly.	_____
6.	Leave all three ECUs powered on.	_____
7.	Power-up and check the UPS.	_____
8.	Power-up equipment racks at Clean Power Distribution Panel.	_____
9.	Power-on all independent units.	_____

RECORD ANY ISSUES HERE

3.4 T-2 System Checks

Perform the following checks and note any issues in the box at the end of the procedure.

Step	Item	Check (✓)
1.	Check T-2 transmit gain for all 6 BUC/SSPA combinations.	_____
2.	Check T-2 receive gain for all 4 LNA/BDC combinations.	_____
3.	Check T-2 system with MACS via ASNMC and M&C laptop.	_____
4.	Deploy T-2 antenna.	_____
5.	Check T-2 antenna mark angle.	_____
6.	Check T-2 ACU and PDU operation.	_____
7.	Check T-2 gearbox and motor operation.	_____
8.	Acquire one or more satellites.	_____
9.	Stow T-2 antenna	_____

RECORD ANY ISSUES HERE

3.5 T-1 System Checks

Perform the following checks and note any issues in the box at the end of the procedure.

Step	Item	Check (✓)
1.	Check T-1 transmit gain for all 6 BUC/TWTA combinations.	_____
2.	Check T-1 receive gain for all 4 LNA/BDC combinations.	_____
3.	Check T-1 system with MACS via ASNMC and M&C laptop.	_____
4.	Deploy T-1 antenna.	_____
5.	Check T-1 ACU and PDU operation.	_____
6.	Check T-1 gearbox, azimuth brake, and motor operation.	_____
7.	Acquire one or more satellites.	_____
8.	Stow T-1 antenna.	_____

RECORD ANY ISSUES HERE

4 SIGN AND SUBMIT REPORT

Technicians from CSSC/FSP and DCM to sign and date this report.

_____	_____
CSSC/FSP Technician	DCM Technician

Submit this report and any additional issues to CSSC.

DOCUMENT HISTORY

REV	DESCRIPTION	DATE	APPROVED
1	Preliminary Release	14-May-20	

ORIGINATOR M. Rekrut	DATE	
ENGINEER M. Rekrut	DATE	
APPROVED	DATE	
DO NOT SCALE DRAWING WORK FROM DIMENSIONS		

GLOBECOMM SYSTEMS, INC.
45 OSER AVENUE
HAUPPAUGE, NY 11788 USA

TITLE
Level 4 Maintenance Procedures at CSSC, DSO TSGT

CAGE CODE	DWG NO.	REV
02MQ7	11137-01610-040	1

SCALE: NONE

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Level 4 Maintenance Procedures at CSSC

DSO TSGT

Revision 1

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ABOUT THIS DOCUMENT

This document describes the DSO TSGT preventive maintenance procedures to be performed by a Level 1 Operator.

CAUTION ICON

A Caution icon in the manual indicates a hazardous situation that if not avoided, may result in injury. A Caution icon may also be used to indicate other unsafe practices or risks of damage to the TSGT equipment.

Caution! 	60 VDC HIGH CURRENT

POTENTIAL HAZARDS AND SAFETY PRECAUTIONS

While all precautions have been taken by Globecomm Systems, Inc to eliminate and identify potential safety hazards in the TSGT System, personnel should exercise caution when installing, operating and servicing the equipment.

Care should be taken to prevent injury from electrical shock, pinch points and RF Radiation. Globecomm Systems, Inc is not liable for any damage or injury arising from a technician's failure to follow instructions contained in this document or his or her failure to exercise due care and caution in the installation, operation and service of the TSGT equipment. Globecomm Systems, Inc shall not be responsible for injury or damage resulting from improper procedures or from the use of improperly trained or inexperienced personnel performing such tasks.

This document is intended as a general guide for trained and qualified personnel who are aware of the dangers of handling potentially hazardous electrical and electronic circuits. This document is not intended to contain a complete statement of all safety precautions that should be observed by personnel in using this or other electronic equipment.

This system is integrated with high power amplifiers of traveling wave tubes and other high power amplifier technology and is capable of transmitting microwave energy at varying power levels. If transmitting microwave power, Globecomm Systems, Inc cautions the end-user to review all applicable local, federal and international regulations and to comply with all such regulations in the operation and maintenance of the integrated system.

The electrical currents and voltages associated with the equipment, whether supplied by Globecomm Systems, Inc or others, are dangerous. Personnel must, at all times, observe safety regulations.

SAFETY GUIDELINES

- Do not remove, short-circuit or tamper with interlock switches on access covers, doors, enclosures, gates, panels or shields.

- Keep away from live circuits.
- Know your equipment and do not take risks.
- Always remove all power to the system prior to working on the antenna, the reflector assembly, the reflector backup assembly or the feed assembly.

RF Radiation Lockout Perimeter

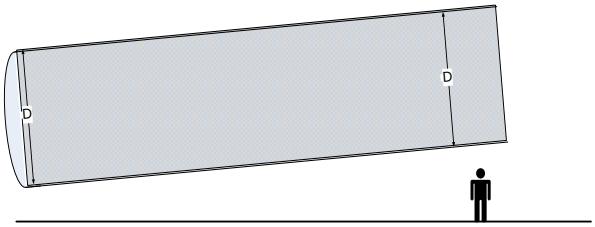
The TSGT antenna radiating surfaces can produce non-ionizing radiation levels more than maximum recommended exposure levels.

To determine the minimum 'safe' distance from the antenna requires calculating the Power Density in the direction of personnel or the object of concern. Minimum information required to calculate the Power Density is the distance to the object, angular offset of the antenna RF bore-sight to the object, and operating power levels. Formulae for calculating Power Density may be found in AECTP 250 Edition 1, Leaflet 258.

A simplified approach to determining safe area boundaries considers a baseline operating condition where only the lower limit of operational elevation angle is required. Baseline operating conditions are established for the T-1 and T-2 configurations as follows;

Configuration	**T-1**	**T-2**
Antenna	4.6m	2.4m
Antenna Centreline Height	3.1m	3.3m
HPA Configuration	1:1 Phase Combined	1:1 Phase Combined
Maximum TSGT EIRP	79 dBW	68 dBW
Near Field Length	148m	41m
Distance to Far Field	355m	97m
Max. Power Density Near Field	14 mW/cm²	19 mW/cm²
Max. Power Density Far Field	34 mW/cm²	3 mW/cm²

The baseline operating configurations result in radiation levels more than maximum recommended exposure levels when in line with the antenna main lobe. The antenna main lobe is a cone shaped projection assumed to have the same dimensions as the antenna main reflector.

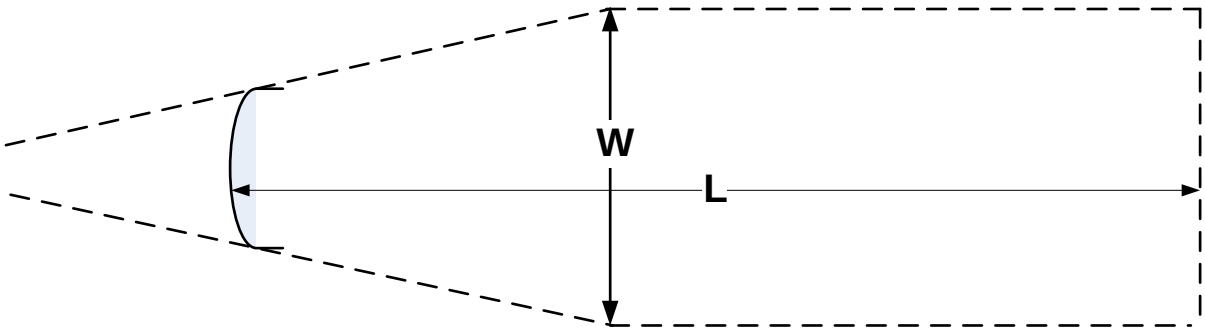


Antenna Main Lobe Projection

Due to the directivity of the radiated power a zone perimeter can be established by adhering to a few simple rules.

1. Never operate below a 5º antenna elevation angle

2. Always assume maximum transmitter power
3. Always verify the main lobe is not in line with personnel or buildings.
4. Always consider the main lobe to be twice the diameter of the antenna at distances of twice the antenna diameter
5. Always consider the radiation field extends a minimum of 500m
6. Always wear your personal Radiation Monitor when working on or around an operating TSGT



TSGT Radiation Zone Perimeter

Antenna Operational Elevation Angle (º)	T-1 Minimum Safe Area Dimension (m)		T-2 Minimum Safe Area Dimension (m)	
	Length (L)	Width (W)	Length (L)	Width (W)
5	38	9	14	5
10	19	9	7	5
15	12	9	5	5
20	9	9	4	3
25	7	5	3	3
30	6	5	2	3
35	5	5	2	3
40	4	5	2	3
45	3.5	5	2	3

TSGT Radiation Zone Perimeter Dimensions

The TSGT setup procedure calls for a “Lockout Perimeter” to be established around the terminal to protect personnel from RF radiation.

RF Radiation Monitor

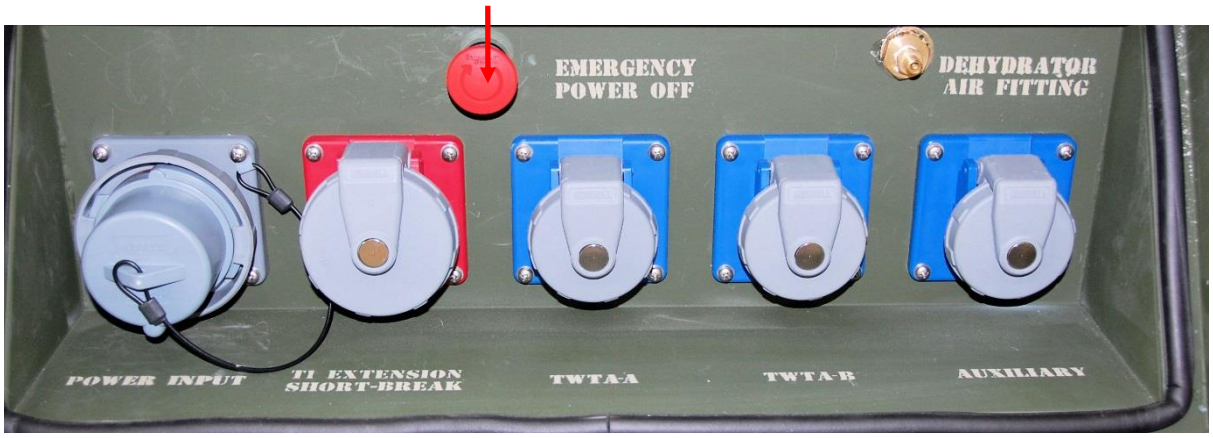
A personal RF Radiation Monitor is provided with the TSGT and should be worn at all times by any personnel working around a transmitting TSGT.

Emergency Power Off Controls

The TSGT is equipped with Power Emergency Off (EPO) switches at both the TSGT Container and the T-1 Extension Trailer.

One TSGT Container Emergency Power Off button is located on the Power ETB as illustrated below. Depressing this button cuts of all power to the TSGT terminal and should only be used in the event of an emergency.

TSGT Container
Emergency Power Off



TSGT Container Power ETB Emergency Power Off

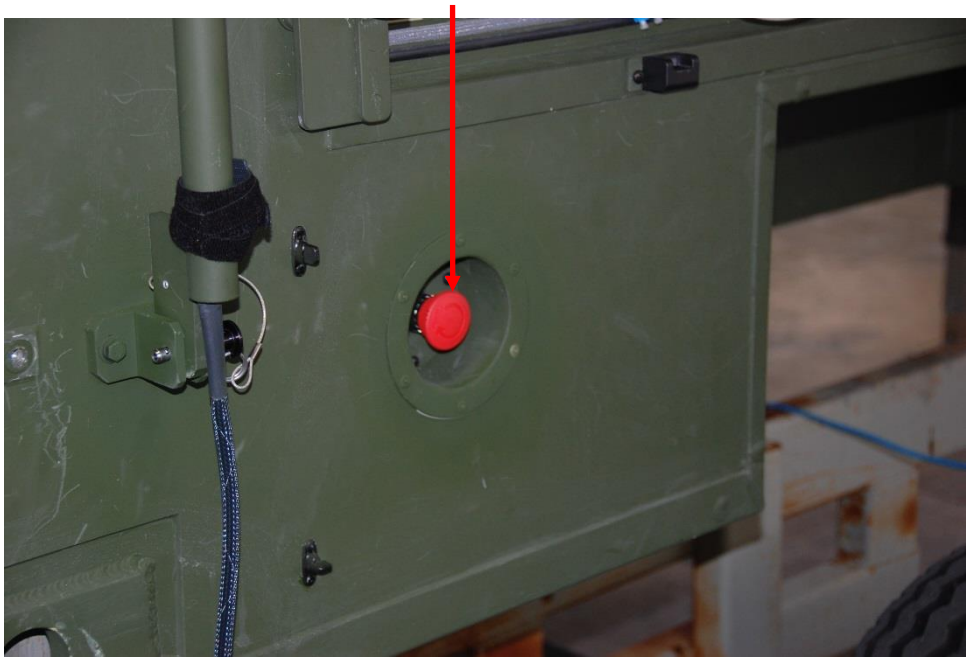
A second TSGT Container Emergency Power Off button is located the Left Side of the TSGT Container as illustrated below. Depressing this button cuts of all power to the TSGT terminal and should only be used in the event of an emergency.

TSGT Container Left Side
Emergency Power Off

TSGT Container Left Side Emergency Power Off

A third TSGT Container Emergency Power Off button is located the Right Side of the TSGT Container as illustrated below. Depressing this button cuts of all power to the TSGT terminal and should only be used in the event of an emergency.

TSGT Container Right Side Emergency Power Off



TSGT Container Right Side Emergency Power Off

The T-1 Extension Trailer is equipped with an Emergency Power Off button located at the front of the Trailer Power Panel and illustrated below. Depressing this button cuts of all power to the T-1 Extension Trailer and should only be used in the event of an emergency.

T-1 Trailer Emergency Power Off

T-1 Extension Trailer Power ETB Emergency Power Off Button

Emergency Power Off Protection Switches
The TSGT is equipped with Power Emergency Off (EPO) protection switches at the TSGT Container. If any of these switches are activated, all power to the TSGT is shut off.

- Dirty Power Panel Plate
- Clean Power Panel Plate
- Dirty Power Vault Access (TSGT Container centre aisle)
- Clean Power Vault Access (TSGT Container centre aisle)

Safety Procedures
The following safety procedures are listed to remind those performing any work on the antenna system that safety rules must be observed. Failure to observe safety rules may result in serious injury or death. Always work safely and in accordance with established procedures.

- Always wear the RF Radiation Monitor when working on or near a TSGT terminal.
- Care shall be taken in all operations to safeguard other people as well as property and to comply with all local safety procedures as established by the customer's site representative, as well as local building codes and fire protection standards.
- Never make internal adjustments or perform maintenance or service when alone or fatigued.
- Do not stand in the direct path of the feed system when the system is transmitting!
- Do not work on the feed system when the TSGT is transmitting!

WIND SPEED WARNINGS

T-1 4.6m Antenna
The T-1 4.6m antenna should not be deployed in wind speeds more than **10 m/s (36 km/h)**.

The T-1 4.6m antenna can survive in up to **30 m/s (108 km/h)** winds at any position. In winds above **30 m/s (108 km/h)**, the antenna must be stowed to ensure survival.

If wind speeds are below **10 m/s (36 km/h)**, the T-1 4.6m antenna can be stowed per the procedure described in Section **Error! Reference source not found.** of the DSO TSGT O&M manual.

To stow the T-1 4.6m antenna in winds speeds exceeding **10 m/s (36 km/h)**, the antenna must be stowed by an alternate method where the antenna wings are not folded and secured before the reflector is lowered to its stowed position, as described in Section **Error! Reference source not found.** of the DSO TSGT O&M manual.

T-2 2.4m Antenna

The T-2 2.4m antenna should not be deployed in wind speeds more than **33.5 m/s (120 km/h)**.

The T-2 2.4m antenna can survive in up to **33.5 m/s (120 km/h)** winds at any position. In winds above **33.5 m/s (120 km/h)**, the antenna must be stowed to ensure survival.

The T-2 4.6m antenna can be stowed per the procedure described on Section 3.4.2 of the DSO TSGT O&M manual.

VOLUME I - TABLE OF CONTENTS

VOLUME I - LIST OF FIGURES

No table of figures entries found.

1 LEVEL 4 TSGT MAINTENANCE AT CSSC

Level 4 TSGT Maintenance is the preventive maintenance to be performed every 2 years at the CSSC, including:

- Review of Level 1, 2, 3A, and 3B Maintenance Records
- System Set-Up and Power-Up
- Antenna Control Subsystem Tests
- Measurements and Calibrations
    - RF Monitor/Test Panel
    - Tx and Rx Frequency Accuracy
    - Tx Levels and Phase Alignment
    - Tx Amplitude Response and Slope Equalizer Adjustment
    - Rx Chain Level Alignment
    - Rx Amplitude Response
- Functionality Checks

1.1 TSGT Training Check

In the space below, please indicate the NCIAA training courses that the Technician(s) performing these procedures has received on the DSO TSGT. Include the name of the Technician(s) and the name and dates of the training course(s).

2 DSO TSGT SAFETY PRECAUTIONS

Before proceeding with this document, read the section on TSGT safety, beginning on page v at the begging of this document.

Personal RF Radiation Meter

Caution! CAUTION !	The Personal RF Radiation Monitor should be worn at all times while working around a transmitting TSGT Antenna.

To configure the Personal RF Radiation Meter:

1. Configure the alarm for Vibrate, Alternating or Audio
2. Turn ON the RF Radiation Monitor

Note: *While using the RF Radiation Monitor, an operator should not allow their person to be between the monitor and the Antenna for extended periods of time as this could decrease the effectiveness of the monitor. The RF Radiation monitor should not be worn under clothing.*

3 REFERENCED DOCUMENTS

The DSO TSGT O&M Manuals are good references to support the procedures in this document.

- 11137-01604-001, Operation and Maintenance (O&M) Manual, TSGT, DAC DSO, Volume 1, 2, and 3.
- 11137-01604-002, Operation and Maintenance (O&M) Manual, TSGT, DCIS DSO, Volume 1, 2, and 3.

4 REVIEW OF TSGT MAINTENANCE RECORDS

Maintenance records should have been submitted for TSGT Level 1, Level 2, and Level 3 maintenance during the past two years. Confirm that these records have been received and reviewed.

Confirm receipt and review of:

- Recent Level 1 Maintenance Records: _____check (✓)
- Recent Level 2 Maintenance Records: _____check (✓)
- Recent Level 3A at FSP Maintenance Records:_____check (✓)
- Recent Level 3B CSSC at FSP Maintenance Records : _____check (✓)

5 SYSTEM SET-UP AND POWER-UP

5.1 Installation / Visual Inspection

PROCEDURE / REPORT OF TEST Nº 5.1						
TEST NAME: Installation / Visual Inspection		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-1 Trailer Checks Before Disconnecting from AMV					
1.	Check Trailer Brakes and operation.			OK	**OK**	
2.	Check Trailer Lights.			OK	**OK**	
	T-1 Trailer and Antenna Inspection					
1.	Inspect Trailer for physical damage, punctures, bodywork. Inform metal workshop on action items if applicable			OK	**OK**	
2.	Check T-1 antenna for wear and tear, corrosion, and painting removal available.			OK	**OK**	
3.	Check Transport support Z braces and tie-down straps.			OK	**OK**	
4.	Check Air Suspension valve system and Air cushions operation.			OK	**OK**	
5.	Check Trailer feet and support pins are in place and working properly.			OK	**OK**	
6.	Check Antenna reflector EL Transport support bar and switch operation and lubrication.			OK	**OK**	
7.	Check EL Motor Transport support bar and switch operation.			OK	**OK**	
8.	Check Feedboom clamps and pads are in good condition.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.1						
TEST NAME: Installation / Visual Inspection		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
9.	Check antenna feed is placing on stow brackets properly.			OK	**OK**	
10.	Check antenna Stow Bracket is in good condition pins and joints are maintained, safe and lubricated properly. Switch is functional and locking mechanism working properly. Check in the Limit Switch Logic Box that the STOW BRACKET LED is OFF when switch actuated.			OK	**OK**	
11.	Check Antenna Stow bracket, Velocity Switch, pads and spring are in good condition and working properly.			OK	**OK** **OK**	
12.	Check Antenna Feed Waveguide Assembly connections are in good condition, tight and free of corrosion.			OK	**OK**	
	T-1 Trailer Positioning					
1.	Position Trailer.			OK	**OK**	
2.	Install support feet.			OK	**OK**	
3.	Level Trailer.			OK	**OK**	
4.	Inspect power and signal ETB.			OK	**OK**	
5.	Install and inspect grounding and lightning rod connectivity.			OK	**OK**	
	T-1 Trailer Prepare for Deployment					
1.	Deploy outriggers and level Trailer			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.1						
TEST NAME: Installation / Visual Inspection		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
2.	Remove AZ and EL stow bars			OK	**OK**	
3.	Unclamp feedboom			OK	**OK**	
4	Remove the stow bracket safety lanyards			OK	**OK**	
5.	Remove X/Z braces			OK	**OK**	
	T-2 Container Positioning					
1.	Position Container.			OK	**OK**	
2.	Remove top cover.			OK	**OK**	
3.	Unclamp feedboom.			OK	**OK**	
4.	Unlock all doors.			OK	**OK**	
5.	Remove and inspect lifting jacks.			OK	**OK**	
6.	Install lifting jacks and level Container.			OK	**OK**	
7.	Install grounding and inspect grounding and lightning rod connectivity.			OK	**OK**	
8.	GPFU Carbon and HEPA filters should be replaced every two years. Check them and replace if necessary.			OK	**OK**	
	T-2 Container Prepare for Deployment					
1.	Inspect power and signal ETB and T-1 power and signal wiring harnesses for damaged/loose/incomplete connectors, dust caps, water tightness etc			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.1						
TEST NAME: Installation / Visual Inspection		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
2.	Connect T-2 power and signal wiring harness to the Container and the Trailer.			OK	**OK**	
3.	Install and connect the weather mast assembly on the Container.			OK	**OK**	
4.	Inspect Container for physical damage, punctures, doors, handles, bodywork, weather seals, RF shielding. Inform metal workshop on action items if applicable			OK	**OK**	
5.	Check Fibre Patch Panel and fibre connectors			OK	**OK**	
6.	Remove and submit for calibration: • FO reels • Power meter and power sensor • Spectrum analyser • DVM • Attenuators (3, 6, 10 and 20 dB) • WAN Tester • Personal radiation meter			OK	**OK**	

5.2 System Power-On and Initial Assessment

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	Pre-Power on Checks					
1.	Confirm all EPO Switches are not engaged: • At Container Power ETB • At left side of Container • At right side of Container • At Trailer ETB			OK	**OK** **OK** **OK** **OK**	
2.	Confirm all CBs located in the Clean and Dirty Power Distribution Panels are in the OFF position.			OFF	**OK**	
3.	Confirm all Inverter Module CBs are ON.			ON	**OK**	
4.	Confirm all CBs on the Summing and Distribution Assembly are ON			ON	**OK**	
	System Initial Power-On Checks					
1.	Connect MAIN POWER from the PGS or Commercial Power socket to the Main Power Input on the Power ETB.			OK	**OK**	
2.	Close CB25 and CB32 at the Clean Power Distribution Panel.			OK	**OK**	
3.	Close CB1 at the Dirty Power Distribution Panel. Verify that that the voltage displayed at the AC Power Meter located in the Dirty Power Distribution Panel is within the range 360 – 440VAC (400VAC ± 10%)			400VAC ±10%	**OK**	

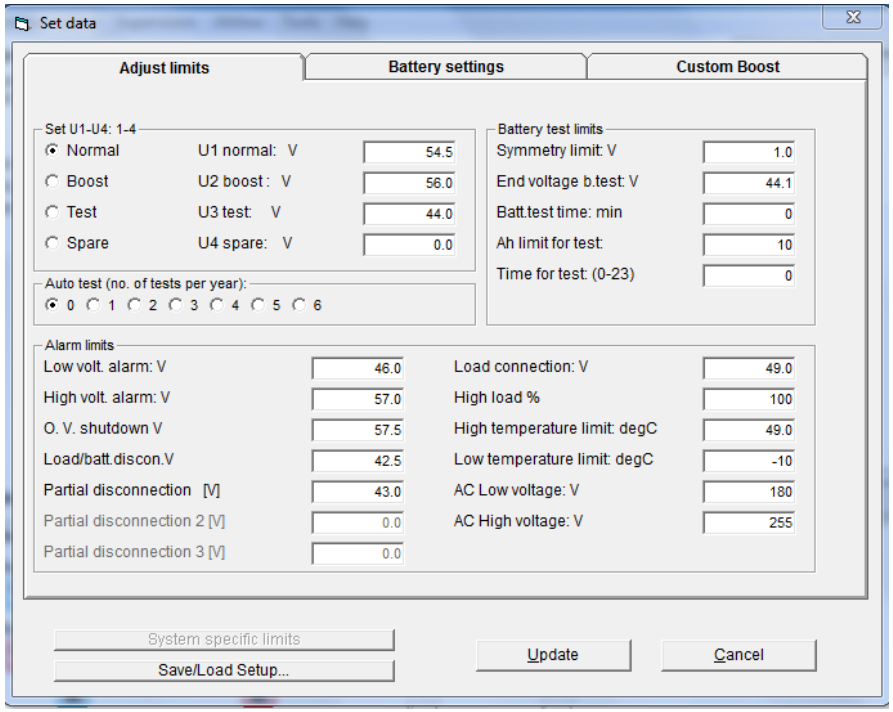
PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
4.	Record the readings at the AC Power Meter			3Phase Voltage: _____ V_{AVG} 3Phase Current: _____ I_{AVG} 3Phase Power: _____ kW 3Phase Frequency: _____ Hz.		
	EPO Checks					
1.	Engage the EPO Switch located on the PETB and confirm the following: • CB1 at Dirty Power Distribution Panel trips • 48VDC EPO Switch in LVDS assembly at rear of UPS opens			OK OK	**OK** **OK**	
2.	Disengage the EPO Switch at the Power ETB and restore CB1 to apply power to system.			OK	**OK**	
3.	Engage the EPO Switch located on the Container left side and confirm the following: • CB1 at Dirty Power Distribution Panel trips • 48VDC EPO Switch in LVDS assembly at rear of UPS opens			OK OK	**OK** **OK**	
4.	Disengage the EPO Switch on the left side of the Container and restore CB1 to apply power to system.			OK	**OK**	

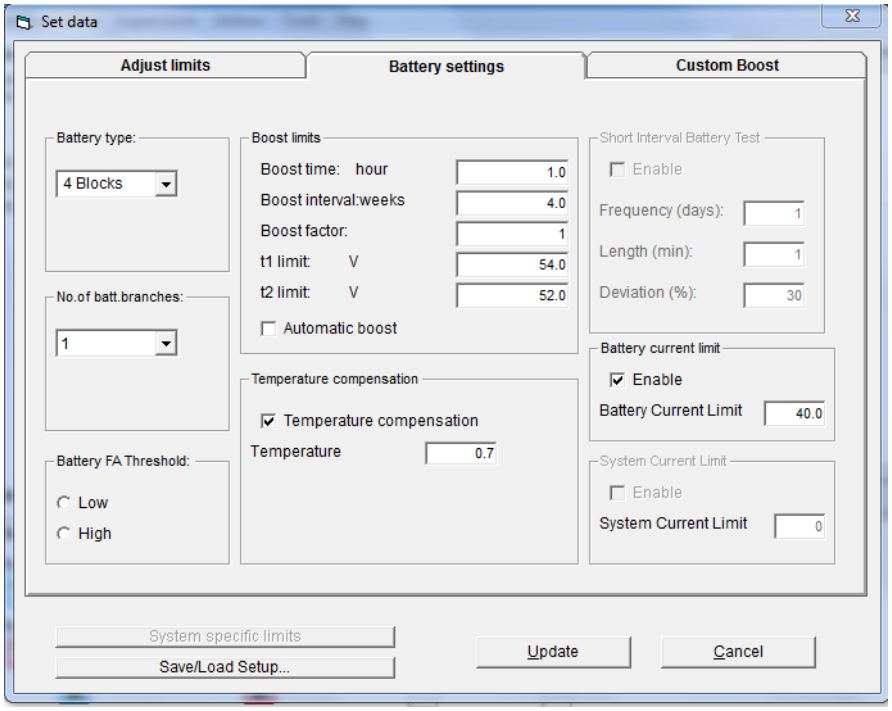
PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
5.	Engage the EPO Switch located on the Container right side and confirm the following: • CB1 at Dirty Power Distribution Panel trips • 48VDC EPO Switch in LVDS assembly at rear of UPS opens			OK OK	**OK** **OK**	
6.	Disengage the EPO Switch on the right side of the Container and restore CB1 to apply power to system.			OK	**OK**	
7.	Close CB9 on the Dirty Power Distribution Panel to apply mains power to the Trailer.			OK	**OK**	
8.	Engage the EPO Switch on the Trailer.			OK	**OK**	
9.	Confirm that CB1 at the Trailer trips			OK	**OK**	
10.	Disengage the EPO Switch at the Trailer and close CB1.			OK	**OK**	
	Power-Up and Check the ECUs					
1.	Power-up ECU A, set it to AUTO mode and set its temperature to a setting that will trigger heating (above ambient temperature by at least 4 degrees).			OK	**OK**	
2.	Confirm that ECU A starts heating and is functioning properly.			OK	**OK**	
3.	Set ECU A temperature to a setting that will trigger cooling (below ambient temperature by at least 4 degrees).			OK	**OK**	
4.	Confirm that ECU A starts cooling and is functioning properly.			OK	**OK**	
5.	Set ECU A temperature to +25 degrees.			OK	**OK**	
6.	Power-down ECU A.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
7.	Power-up ECU B, set it to AUTO mode and set its temperature to a setting that will trigger heating (above ambient temperature by at least 4 degrees).			OK	**OK**	
8.	Confirm that ECU B starts heating and is functioning properly.			OK	**OK**	
9.	Set ECU B temperature to a setting that will trigger cooling (below ambient temperature by at least 4 degrees).			OK	**OK**	
10.	Confirm that ECU B starts cooling and is functioning properly.			OK	**OK**	
11.	Set ECU B temperature to +25 degrees.			OK	**OK**	
12.	Power-down ECU B.			OK	**OK**	
13.	Power-up ECU C, set it to AUTO mode and set its temperature to a setting that will trigger heating (above ambient temperature by at least 4 degrees).			OK	**OK**	
14.	Confirm that ECU C starts heating and is functioning properly.			OK	**OK**	
15.	Set ECU C temperature to a setting that will trigger cooling (below ambient temperature by at least 4 degrees).			OK	**OK**	
16.	Confirm that ECU C starts cooling and is functioning properly.			OK	**OK**	
17.	Set ECU C temperature to +25 degrees.			OK	**OK**	
18.	Power-down ECU C.			OK	**OK**	
19.	Power-up any two ECUs.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	Power-Up and Check the UPS					
1.	At the Clean Power Distribution Panel, switch ON rectifiers 1-7 (at CB2-CB8) one-by-one while monitoring the output voltage at the Rectifier Controller (Faulty rectifiers tend to “pull down” the output voltage).			54.4 VDC	Voltage: _____VDC	
2.	Confirm Inverters are powered-on and are not displaying any faults.			OK	**OK**	
3.	With a (maintenance) laptop with PowCom installed, check if UPS is configured as shown in the PowCom screen captures below. Correct the settings as necessary.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**





PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	Power-Up Equipment Racks					
1.	Turn on Clean Power Distribution Panel circuit breakers to apply power to the equipment racks. Verify that power has been applied to all racks. • CB15 (Right R1/R2) • CB16 (Right R3/R4) • CB17 (Left R5/R6) • CB20 (Right R1) • CB21 (Right R2/R3) • CB22 (Right (R4) • CB23 (Left R5) • CB24 (Left R6/R7)			OK	**OK**	
2.	Power ON all independent units by switching them ON and check all having initial power ON status.					
3.	Boot T-1 ACU for T-1 Operation			Boot sequence for T-1	**OK**	
4.	Boot T-2 ACU for T-2 Operation			Boot sequence for T-2	**OK**	
5.	T-2 PDU			Initial power up	**OK**	
6.	EMS SERVER COMPUTER LMCa			EMS GUI operation Log GUI Revision. REV.2.1.12	**OK** **OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
7.	EMSe 1 MODEM			Booting Modems without any alarm	**OK**	
8.	EMSe 2 MODEM			Booting Modems without any alarm	**OK**	
9.	EMSe 3 MODEM			Booting Modems without any alarm	**OK**	
10.	EMSe 4 MODEM			Booting Modems without any alarm	**OK**	
11.	ASNMC LCAm SERVER COMPUTER			Windows Win7 prof. operating system starts ASNMC GUI Interface starts. ASNMC VER.1.2.1 iDirect GUI access	**OK** **OK** **OK**	
12.	ASNMC DWS CLIENT COMPUTER			Windows Win7 prof. operating system starts ASNMC GUI Interface starts. ASNMC VER.1.2.1 iDirect GUI access	**OK** **OK** **OK**	
13.	ASNMC VPN ROUTER&SWITCH			Initial power up	**OK**	
14.	ASNMC NU PHONE			Initial Power up	**OK**	
15.	ASNMC NR PHONE			Initial Power up	**OK**	
16.	ASNMC SWITCH			Initial Power up	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
17.	EBEM MODEM#1			Initial power up Check FW version Rev. 02.03.02	**OK**	
18.	EBEM MODEM#2			Initial Power up Check FW version Rev. 02.03.02	**OK**	
19.	EBEM MODEM#3			Initial Power up Check FW version Rev. 02.03.02	**OK**	
20.	EBEM MODEM#4			Initial Power up Check FW version Rev. 02.03.02	**OK**	
21.	EBEM MODEM#5			Initial Power up Check FW version Rev. 02.03.02	**OK**	
22.	LINE AMPLIFIERS			Initial Power up	**OK**	
23.	NETCLOCK TFRS #1			Initial Power up	**OK**	
24.	NETCLOCK TFRS #2			Initial Power up	**OK**	
25.	SPECTRA TFRS DISTRIBUTION AMPLIFIER1			Initial Power up	**OK**	
26.	SPECTRA TFRS DISTRIBUTION AMPLIFIER2			Initial Power up	**OK**	
27.	GPS ANTENNA			Initial Power up	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
28.	(On DAC 1-4) DXC #1 & FO-MICE EQUIPMENT			Initial Power up	**OK**	
29.	(On DAC 1-4) DXC #2 & FO-MICE EQUIPMENT			Initial Power up	**OK**	
30.	(On DCIS & DCAOC) FDMA ROUTER #1			Initial Power up	**OK**	
31.	(On DCIS & DCAOC) FDMA Switch #1			Initial Power up	**OK**	
32.	(On DCIS & DCAOC) EMS ROUTER #2			Initial Power up	**OK**	
33.	(On DCIS & DCAOC) EMS Switch #2			Initial Power up	**OK**	
34.	ORION SYSTEM MANAGEMNET SUBSYSTEM AMP#1 16 PORT			Initial Power up	**OK**	
35.	ORIONSYSTEM MANAGEMNET SUBSYSTEM DELL SWITCH			Initial Power up	**OK**	
36.	BUC A (BLOCK UP CONVERTER) for T-1			Initial Power up	**OK**	
37.	BUC SWITCHING UNIT for T-1			Initial Power up	**OK**	
38.	BUC B (BLOCK UP CONVERTER) for T-1			Initial Power up	**OK**	
39.	BUC A (BLOCK UP CONVERTER) for T-2			Initial Power up	**OK**	
40.	BUC SWITCHING UNIT for T-2			Initial Power up	**OK**	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
41.	BUC B (BLOCK UP CONVERTER) for T-2			Initial Power up	**OK**	
42.	BDC A (BOCK DOWN CONVERTER) for T-1			Initial Power up	**OK**	
43.	BDC SWITCHING UNIT for T-1			Initial Power up	**OK**	
44.	BDC B (BOCK DOWN CONVERTER) for T-1			Initial Power up	**OK**	
45.	BDC A (BOCK DOWN CONVERTER) for T-2			Initial Power up	**OK**	
46.	BDC SWITCHING UNIT for T-2			Initial Power up	**OK**	
47.	BDC B (BOCK DOWN CONVERTER) for T-2			Initial Power up	**OK**	
48.	UPLINK EQUALIZER T-1			Initial Power up	**OK**	
49.	UPLINK EQUALIZER T-2			Initial Power up	**OK**	
50.	SSPA SUBSYSTEM #			Initial Power up	**OK**	
51.	SSPA #A			Initial Power up	**OK**	
52.	SSPA #B			Initial Power up	**OK**	
53.	LNA SUBSYSTEM			Initial Power up	**OK**	
54.	LNA #A			Initial Power up	**OK**	
55.	LNA #B			Initial Power up	**OK**	
56.	ANTI_ICING SYSTEM			Initial Power up	**OK**	
57.	DEHYDRATOR Check duty cycle and operation of Dehydrator on ASNMC			<10%	_____ %	

PROCEDURE / REPORT OF TEST Nº 5.2						
TEST NAME: Power-On and Initial Assessment		**ELEMENT UNDER TEST:** COMPLETE SYSTEM			**Serial Nº and/or version:**	
PROJECT: TSGT-DSO	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
NUMBER	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
58.	CONTAINER AND BATTERY TEMP Check Container temperature operation on ASNMC.				Container: _____ °C Battery: _____ °C	
59.	Confirm that the weather information at the ASNMC is accurate.			Correct weather	**OK**	
60.	MISC. ALARMS T-2			Initial Power up	**OK**	
61.	PGS (POWER GENERATION SYSTEM) SUBSYSTEM			Initial Power up	**OK**	
62.	T-1 PDU			Initial Power up	**OK**	
63.	T-1 PMU			Initial Power up	**OK**	
64.	T-1 HPA SUBSYSTEM			Initial Power up	**OK**	
65.	HPA #A			Initial Power up	**OK**	
66.	HPA #B			Initial Power up	**OK**	
67.	T-1 LNA SUBSYSTEM			Initial Power up	**OK**	
68.	LNA #A			Initial Power up	**OK**	
69.	LNA #B			Initial Power up	**OK**	

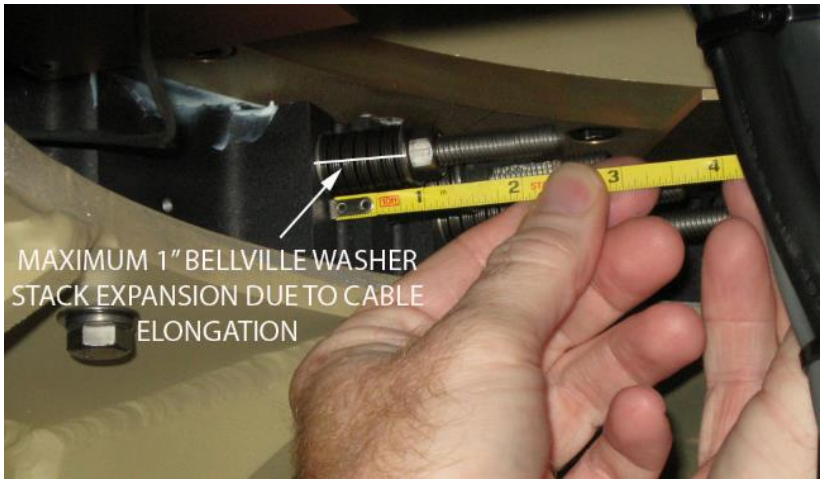
6 ANTENNA CONTROL SUBSYSTEM TESTS

6.1 T-2 Antenna and Antenna Control System

<table>
<tr><td colspan="6">PROCEDURE / REPORT OF TEST Nº 6.1</td></tr>
<tr><td colspan="2">TEST NAME: T-2 Antenna and Antenna Control System</td><td colspan="2">ELEMENT UNDER TEST: T-2 Antenna Subsystem</td><td colspan="2">Serial Nº and/or version:</td></tr>
<tr><td colspan="2" rowspan="2"></td><td>TEST CONDUCTOR:</td><td>QA ENG:</td><td>CUSTOMER:</td><td>DATE START:</td><td>DATE END:</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>STEP</td><td colspan="2">TEST SEQUENCE</td><td>EXPECTED RESULT</td><td>RESULT</td><td>REMARKS</td></tr>
<tr><td></td><td colspan="2">T-2 Antenna Inspection and Maintenance</td><td></td><td></td><td></td></tr>
<tr><td>1.</td><td colspan="2">Check PDU for label indicating that it has been ruggedized.

If not, then open PDU to check. See photo to the right.

If necessary, ruggedize it then place label on PDU.</td><td>  </td><td>OK</td><td></td></tr>
</table>

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
2.	Check antenna Feed Membrane and Air leakage			Less than 10% Duty Cycle on dehydrator	**OK**	
3.	Check Azimuth Steel Cables tension. 			(2.6 cm) (factory setup)	Check Cable #1 _____ Cable #2 _____ Cable #3 _____ Cable #4 _____	
4.	Check Elevation Steel Cables tension on the Right-hand side Not more than 1.00 +0.32''. See photo above.			2.6 cm (factory setup)	Check Cable #1 _____ Cable #2 _____ Cable #3 _____ Cable #4 _____ Cable #5 _____ Cable #6 _____	

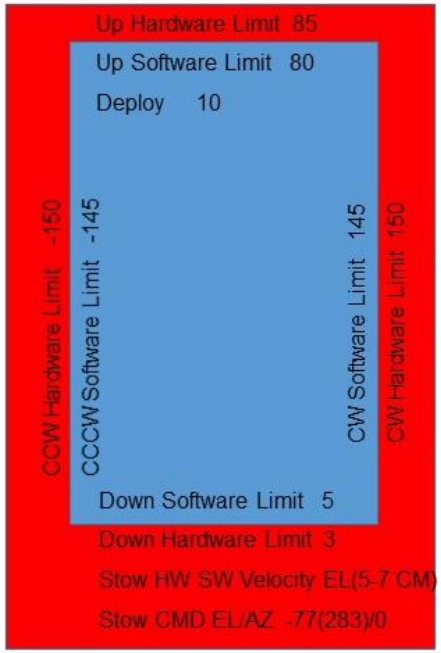
PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
5.	Check Elevation Steel Cables tension and on the Left-hand side. See photo above			(2.6 cm) (factory setup)	Check Cable #1 _____ Cable #2 _____ Cable #3 _____ Cable #4 _____ Cable #5 _____ Cable #6 _____	
6.	Inspect Azimuth and El gear boxes for leakage.			OK	**OK**	
7.	Check Elevation Hand Crank operation is smooth and quiet.			OK	**OK**	
8.	Check Azimuth Hand Crank operation is smooth and quiet.			OK	**OK**	
9.	Check Elevation pivot bearings.			OK	**OK**	
10.	Check Azimuth bearing operation.			OK	**OK**	
11.	Check: • All visible hardware • Cable harness • Feed boom struts • Feed pallet struts • Ferrous metal surfaces • Painting, cracks and rusting • Waveguide connections and support brackets • Antenna surface			OK	**OK** **OK** **OK** **OK** **OK** **OK** **OK** **OK**	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
12.	Apply recommended rust preventive re-coating on Ferrous parts and clean the dust and excessive oil			OK	**OK**	
13.	Apply De-icing system and blister check procedure. ***Notes**:* 1. *Only one SSPA (T-2) and one TWTA Beam (T-1) can be turned ON when antenna Anti-Icing is enabled.* 2. *Only one ECU can be in operation when Antenna Anti-Icing is enabled.*			OK	**OK**	
	T-2 ACU Deploy, Stow and Jog					
1.	DEPLOY the antenna and verify there are no fault messages present. Verify that the antenna elevation angle is 10 degrees.			OK	**OK**	
2.	Activate STOW Mode and check antenna stowing. And Check and record antenna STOW command.			Elevation Stow command -77	Command: _____	
3.	Check antenna is centred on AZ to 0 degree and fitting into the frame, Check AZ STOW Centre switch operation.			Check AZ centre Offset =0 Check Centre Switch	Offset=0.0 **OK**	
4.	Check antenna, slowing when antenna reaches 5-7cm to final stow position. If not, adjust the Velocity switch, located under the cover at the inner left-side of the elevation axle shaft.				**OK**	
5.	Check Antenna STOWED messages and actual STOW position			Elevation Stow actual value Stowed message	Actual Value: **OK**	
6.	DEPLOY the antenna again and check Manual ACU / Antenna JOG Commands.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
7.	Check Manual AZ Hand Cranking			OK	**OK**	
8.	Check Manual EL Hand Cranking			OK	**OK**	
	T-2 ACU Emergency Stop Check					
1.	Verify the Emergency Stop on T-2 ACU stops antenna movement.			OK	**OK**	
2.	Verify ACU Emergency Stop activation reports to ASNMC			OK	**OK**	
3.	Verify resetting the ACU Emergency Stop restores antenna drive capability.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-2 Antenna Travel Limits					

This figure summarizes the azimuth and elevation angle settings for the T-2 antenna and can be used a reference for the procedures in this section.



PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Connect the PMU Handheld Maintenance Unit to the T-2 PDU.			OK	**OK**	
2.	Manually move the antenna to be positioned over the Container centre line and record the azimuth and elevation angles.			OK	AZ: _____ EL: _____	
3	Calculate the approximate setting for the azimuth CW and CCW Pre-Limits. They are set at the factory to be approximately ±150 degrees from the centre line setting. • CW limit = Centre line azimuth +150 degrees. • CCW limit = Centre line azimuth -150 degrees.			OK	CW Pre-Limit: _____ CCW Pre-Limit: _____	
4.	Drive the antenna CW to a valid point, record the azimuth angle and verify that there are no alarms present in the ACU or ASNMC.			OK	AZ Angle: _____ **OK**	
5.	Drive the antenna in the CW direction. The ACU will alarm at the soft limit. Record the azimuth angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.			OK	Soft CW Limit: _____ **OK**	
6.	Continue driving the antenna in the CW direction. The antenna will stop near the Az CW Pre-Limit, calculated in step 3. Record the azimuth angle at the CW Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	CW Pre-Limit: _____ **OK**	
7.	Drive the antenna CCW to a valid point, record the azimuth angle and verify that there are no alarms present in the ACU or ASNMC.			OK	AZ Angle: _____ **OK**	
8.	Drive the antenna in the CCW direction. The ACU will alarm at the soft limit. Record the azimuth angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.			OK	Soft CCW Limit: _____ **OK**	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
9.	Continue driving the antenna in the CCW direction. The antenna will stop near the Az CCW Pre-Limit, calculated in step 3. Record the azimuth angle at the CCW Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	CCW Pre-Limit: _____ **OK**	
10.	Drive the antenna in the CW direction back to the centre.			OK	**OK**	
11.	Drive the antenna UP to a valid point, record the elevation angle and verify that there are no alarms present in the ACU or ASNMC.			OK	EL Angle: _____ **OK**	
12.	Drive the antenna in the UP direction. The ACU will alarm at the soft limit. Record the elevation angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.			OK	Soft UP Limit: _____ **OK**	
13.	Continue driving the antenna in the UP direction. The antenna will stop near the UP Pre-Limit, set at approximately 88 degrees. Record the elevation angle at the UP Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	UP Pre-Limit: _____ **OK**	
14.	Drive the antenna DOWN to a valid point off centre, record the elevation angle and verify that there are no alarms present in the ACU or ASNMC.			OK	EL Angle: _____ **OK**	
15.	Drive the antenna in the DOWN direction. The ACU will alarm at the soft limit. Record the elevation angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.			OK	Soft DN Limit: _____ **OK**	
16.	Continue driving the antenna in the DOWN direction. The antenna will stop near DOWN Pre-Limit, set at approximately -2 degrees. Record the elevation angle at the DOWN Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	DN Pre-Limit: _____ **OK**	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-2 Antenna Safe-to-Transmit Limits					
1.	Point the antenna to clear sky and record the azimuth and elevation angles. This will be the antenna "set" position.			OK	AZ: _____ EL: _____	
2.	Set up Modem and Spectrum Analyzer: 1. Confirm all modems are OFF. 2. At the L-Band Uplink Patch Panel, connect the output of EBEM #1 to T-2 antenna. 3. Set EBEM #1 transmit to 1200 MHz CW at -20 dBm. 4. Connect a Spectrum Analyzer on feed coupler DC1 directly or at the RF Monitor/Test Panel port 25 to view transmitted carrier at RF.			OK	**OK** **OK** **OK** **OK**	
3	Configure the T-2 for normal operating conditions with the SSPAs in "Combined Offline" mode and operating at 10 dB output back-off.			OK	**OK**	
4.	At the T-2 ACU, set the safe-to-transmit angular limits to: • Azimuth CW: +5 degrees from antenna set position • Azimuth CCW: -5 degrees from antenna set position • Elevation Up: +5 degrees from antenna set position • Elevation Down: -5 degrees from antenna set position			OK	**OK**	
5.	Drive the antenna in azimuth CW +3 degrees from the set position. Verify the SSPAs are not inhibited (mute).			OK	**OK**	
6.	Drive the antenna in azimuth CW another +3 degrees (-6 degrees from the set position). Verify the SSPAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
7.	Drive the azimuth CCW -6 degrees. Clear the ACU alarm and verify the SSPAs transmit.			OK	**OK**	
8.	Drive the antenna in azimuth CCW -3 degrees. Verify the SSPAs are not inhibited.			OK	**OK**	
9.	Drive the antenna in azimuth CCW another -3 degrees (-6 degrees from the antenna set position). Verify the SSPAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	
10.	Drive the azimuth CW +6 degrees. Clear the ACU alarm and verify the SSPAs transmit.			OK	**OK**	
11.	Drive the antenna elevation up +3 degrees. Verify the SSPAs are not inhibited.			OK	**OK**	
12.	Drive the antenna elevation up another +3 degrees (+6 degrees from the antenna set position). Verify the SSPAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	
13.	Drive the antenna elevation down -6 degrees. Clear the ACU alarm and verify the SSPAs transmit.			OK	**OK**	
14.	Drive the antenna elevation down -3 degrees. Verify the SSPAs are not inhibited.			OK	**OK**	
15.	Drive the antenna elevation down another -3 degrees (-6 degrees from the antenna set position). Verify the SSPAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	
16.	Drive the antenna elevation up +6 degrees (back to the antenna set position). Clear the ACU alarm and verify the SSPAs transmit.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-2 Satellite Acquisition					
1.	Verify that all the required preconditions are met: • GPS quality minimum of 8 • Compass heading available • Inclinometers feedback available (Tilt/Cross) • Feedboom clamps released			OK	**OK** **OK** **OK** **OK**	
2.	Check Satellite Preset list is configured for the 6 satellites as shown in the table below.			OK	**OK**	

Satellite Name	Satellite Inclination	Track mode	S/S Antenna pointed	Input signal level	Beacon Settings
GOVSAT	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SKY 5B	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SKY 5C	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SKY 5D	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SCRALL1B	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SYRACUSE3A	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:280Khz

PROCEDURE / REPORT OF TEST Nº 6.1						
TEST NAME: T-2 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-2 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
3.	T-2 ACU Mark Angle 1. Record the current stored compass mark angle, set by the owners of the terminal, at the home location of the terminal. 2. Remove Mark Angle by setting it to 0. 3. Calibrate compass.			OK	Home Location Mark Angle: _____ deg.	
4.	Acquire a Satellite 1. Make sure TSGT is level. 2. Configure ACU for a 10 degree box scan. 3. Using GEO mode, attempt to acquire a known satellite using its pointing angle. 4. Manually acquire the satellite if the auto-acquisition does not find it, then place the ACU in Optrack mode. 5. Once in Optrack, wait 5 – 10 minutes for the antenna to peak on the satellite. 6. Set Mark Angle for the offset and Save it. 7. Stow Antenna and re-deploy, confirm azimuth reading is correct. 8. Record the CSSC Mark Angle. 9. Record the ACU beacon signal input level in the table above.			OK	CSSC Mark Angle: _____ deg.	
5.	Choose another satellite from the Satellite Pre-Set list and confirm the satellite is acquired. Record in beacon signal input level in table above.			OK	**OK**	

6.2 T-1 Antenna and Antenna Control System

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-1 Antenna Maintenance					
1.	Check antenna motors/brakes and lubrication and perform cleaning and lubrication.			OK	**OK**	
2.	Lubricate EL Drive Shaft and check motor operations for any abnormal noise.			OK	**OK**	
3.	Lubricate AZ Drive Sector and check motor operations for any abnormal noise.			OK	**OK**	
4.	Open, clean and check AZ Brake and clutch system functioning properly.			OK	**OK**	
5.	Check antenna Feed Membrane and Air leakage.			OK	**OK**	

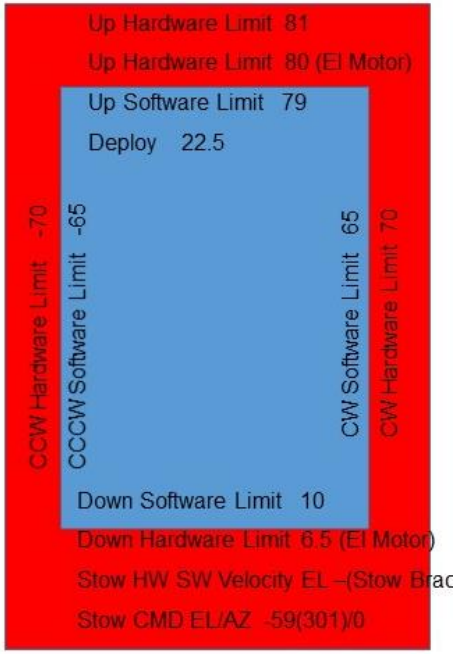
PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-1 ACU Deploy, Stow and Jog					
1.	Check PDU for label indicating that it has been ruggedized. If not, then open PDU to check. If necessary, ruggedize it then place label on PDU.				**OK**	
2.	Check that antenna drives in slow speed until the velocity switch is released.			OK	**OK**	
3.	Check that antenna stops for the stow bracket to be lowered.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
4.	DEPLOY the antenna and verify there are no fault messages present. Verify that the antenna elevation angle is 22.5 degrees.			OK	**OK**	
5.	Engage ‘’HANDLE LATCH” Check in the Limit Switch Logic Box that the HANDLE LATCH LED is OFF when switch actuated			OK	**OK** **OK**	
6.	DEPLOY Antenna Wings Check in the ‘Limit Switch Logic Box that the L WING DEPLOYED LED is OFF when switch actuated Check in the Limit Switch Logic Box that the R WING DEPLOYED LED is OFF when switch actuated			OK	**OK** **OK** **OK**	
7.	Activate STOW Mode and check antenna stowing and record antenna STOW command.			Elevation Stow command -58	Command:	
8.	Check antenna is centred on AZ properly to 0 degree and fitting into the frame, Check AZ STOW Centre switch operation. Check in the Limit Switch Logic Box that the AZ CENT LED is OFF when switch actuated			Check AZ centre Offset =0 Check Centre Switch	Offset= 0.0 **OK**	
9.	STOW Antenna Wings Check in the Limit Switch Logic Box that the L WING STOWED LED is OFF when switch actuated Check in the Limit Switch Logic Box that the R WING STOWED LED is OFF when switch actuated			OK	**OK** **OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
10.	Check antenna Stow Velocity switch activates and stops Antenna Elevation Drive and unit creates STOWED message. Check in the Limit Switch Logic Box that the EL VELOCITY LED is OFF when switch actuated			Check Antenna stops when velocity switch is actuated	**OK** **OK**	
11.	Check Antenna STOWED messages and actual STOW position Check in the Limit Switch Logic Box that the STOWED LED is OFF when switch actuated			Elevation Stow actual value Stowed message	Actual Value: _____ **OK**	
12.	Activate Emergency STOW mode with Wings open			HW Bypass ON	**OK**	
13.	DEPLOY the antenna again and check Manual ACU / Antenna JOG Commands.			OK	**OK**	
14.	Release the Azimuth Brake and check Manual AZ Hand Cranking Check in the Limit Switch Logic Box that the AZ HANDCRANK LED is OFF when switch actuated Engage the Azimuth Brake.			OK	**OK** **OK**	
15.	Check Manual EL Hand Cranking Check in the Limit Switch Logic Box that the EL HANDCRANK LED is OFF when switch actuated			OK	**OK**	
16.	Check Feed Assembly is in good condition.			OK	**OK**	
	T-1 ACU Emergency Stop Checks					
1.	Verify the Emergency Stop on T-1 ACU stops antenna movement.			OK	**OK**	
2.	Verify ACU Emergency Stop activation reports to ASNMC			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
3.	Verify resetting the ACU Emergency Stop restores antenna drive capability.			OK	**OK**	
4.	Verify the Emergency Stop on T-1 PDU stops antenna movement.			OK	**OK**	
5.	Verify PDU Emergency Stop activation reports to ASNMC			OK	**OK**	
6.	Verify resetting the ACU Emergency Stop restores antenna drive capability.			OK	**OK**	
	T-1 AC Safe-to-Rotate Checks					
1.	Verify the Safe-to-Rotate activation at T-1 trailer stops antenna movement.			OK	**OK**	
2.	Verify Safe-to-Rotate activation reports to ASNMC			OK	**OK**	
3.	Verify resetting the Safe-to-Rotate restores antenna drive capability.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-1 Antenna Travel Limits					

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
This figure summarizes the azimuth and elevation angle settings for the T-1 antenna and can be used a reference for the procedures in this section. 						
1.	Connect the PMU Handheld Maintenance Unit to the T-1 PDU.				**OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
2.	Manually move the antenna to be positioned over the Container centre line and record the azimuth and elevation angles.				AZ: _____ EL: _____	
3	Calculate the approximate setting for the azimuth CW and CCW Pre-Limits. They are set at the factory to be approximately ±65 degrees from the centre line setting. • CW limit = Centre line azimuth +65 degrees. • CCW limit = Centre line azimuth -65 degrees.				CW Pre-Limit: _____ CCW Pre-Limit: _____	
4.	Record the azimuth angle and verify that there are no alarms present in the ACU or ASNMC.				AZ Angle: _____ **OK**	
5.	Drive the antenna in the CW direction. The ACU will alarm at the soft limit. Record the azimuth angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.				Soft CW Limit: _____ **OK**	
6.	Continue driving the antenna in the CW direction. The antenna will stop near the Az CW Pre-Limit, calculated in step 3. Record the azimuth angle at the CW Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.				CW Pre-Limit: _____ **OK**	
7.	Confirm at the Limit Switch Logic Box that the AZ CW LED is OFF.				**OK**	
8.	Drive the antenna CCW to a valid point, record the azimuth angle and verify that there are no alarms present in the ACU or ASNMC and that the Limit Switch Logic Box that the AZ CW LED is ON.				AZ Angle: _____ **OK**	
9.	Drive the antenna in the CCW direction. The ACU will alarm at the soft limit. Record the azimuth angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.				Soft CCW Limit: _____ **OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
10.	Continue driving the antenna in the CCW direction. The antenna will stop near the Az CCW Pre-Limit, calculated in step 3. Record the azimuth angle at the CCW Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	CCW Pre-Limit: _____ **OK**	
11.	Confirm at the Limit Switch Logic Box that the AZ CCW LED is OFF.			OK	**OK**	
12.	Drive the antenna in the CW direction back to the centre and verify that there are no alarms present in the ACU or ASNMC and that the Limit Switch Logic Box AZ CCW LED is ON.			OK	**OK** **OK**	
13.	Drive the antenna UP to a valid point, record the elevation angle and verify that there are no alarms present in the ACU or ASNMC and that the Limit Switch Logic Box AZ CCW LED is ON.			OK	EL Angle: _____ **OK** **OK**	
14.	Drive the antenna in the UP direction. The ACU will alarm at the soft limit. Record the elevation angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.			OK	Soft UP Limit: _____ **OK**	
15.	Continue driving the antenna UP. The antenna will stop near the UP Pre-Limit, set at approximately 85 degrees. Record the elevation angle at the UP Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	UP Pre-Limit: _____ **OK**	
16.	Confirm at the Limit Switch Logic Box that the EL UP and EL UP-BACKUP LEDs are OFF.			OK	**OK** **OK**	
17.	Drive the antenna DOWN to a valid point, record the elevation angle and verify that there are no alarms present in the ACU or ASNMC and that the Limit Switch Logic Box that the EL UP and EL UP-BACKUP LEDs are OFF.			OK	EL Angle: _____ **OK** **OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
18.	Drive the antenna DOWN. The ACU will alarm at the soft limit. Record the elevation angle of the soft limit, verify the soft limit alarm is reported on the ACU and ASNMC.			OK	Soft DN Limit: _____ **OK**	
19.	Continue driving the antenna DOWN. The antenna will stop near DOWN Pre-Limit, set at approximately 0 degrees. Record the elevation angle at the DOWN Pre-Limit and verify the Pre-Limit is reported on the ACU and ASNMC.			OK	DN Pre-Limit: _____ **OK**	
	T-1 Antenna Safe-to-Transmit Limits					
1.	Point the antenna to clear sky and record the azimuth and elevation angles. This will be the antenna "set" position.			OK	AZ: _____ EL: _____	
2.	Set up Modem and Spectrum Analyzer: 1. Confirm all modems are OFF. 2. At the L-Band Uplink Patch Panel, connect the output of EBEM #1 to T-1 antenna. 3. Set EBEM #1 transmit to 1200 MHz CW at -20 dBm. 4. Connect a Spectrum Analyzer on feed coupler DC1 directly or at the RF Monitor/Test Panel port 1 to view transmitted carrier at RF.			OK	**OK** **OK** **OK** **OK**	
3	Configure the T-1 for normal operating conditions with the TWTAs in "Combined Offline" mode and operating at 10 dB output back-off.			OK		

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
4.	At the T-1 ACU, set the safe-to-transmit angular limits to: • Azimuth CW: +5 degrees from antenna set position • Azimuth CCW: -5 degrees from antenna set position • Elevation Up: +5 degrees from antenna set position • Elevation Down: -5 degrees from antenna set position			OK	**OK**	
5.	Drive the antenna in azimuth CW +3 degrees from the set position. Verify the TWTAs are not inhibited (mute).			OK	**OK**	
6.	Drive the antenna in azimuth CW another +3 degrees (-6 degrees from the set position). Verify the TWTAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	
7.	Drive the azimuth CCW -6 degrees. Clear the ACU alarm and verify the TWTAs transmit.			OK	**OK**	
8.	Drive the antenna in azimuth CCW -3 degrees. Verify the TWTAs are not inhibited.			OK	**OK**	
9.	Drive the antenna in azimuth CCW another -3 degrees (-6 degrees from the antenna set position). Verify the TWTAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	
10.	Drive the azimuth CW +6 degrees. Clear the ACU alarm and verify the TWTAs transmit.			OK	**OK**	
11.	Drive the antenna elevation up +3 degrees. Verify the TWTAs are not inhibited.			OK	**OK**	
12.	Drive the antenna elevation up another +3 degrees (+6 degrees from the antenna set position). Verify the TWTAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
13.	Drive the antenna elevation down -6 degrees. Clear the ACU alarm and verify the TWTAs transmit.			OK	**OK**	
14.	Drive the antenna elevation down -3 degrees. Verify the TWTAs are not inhibited.			OK	**OK**	
15.	Drive the antenna elevation down another -3 degrees (-6 degrees from the antenna set position). Verify the TWTAs are inhibited (RF mute On, no carrier at DC1 and the ACU indicates alarms).			OK	**OK**	
16.	Drive the antenna elevation up +6 degrees (back to the antenna set position). Clear the ACU alarm and verify the TWTAs transmit.			OK	**OK**	
	T-1 Satellite Acquisition					
1.	Verify that all the required preconditions are met: • GPS quality minimum of 8 • Compass heading available • Inclinometers feedback available (Tilt/Cross) • Feedboom clamps released			OK	**OK** **OK** **OK** **OK**	
2.	Check Satellite Preset list is configured for the 6 satellites as shown in the table below.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**

Satellite Name	Satellite Inclination	Track mode	S/S Antenna pointed	Input signal level	Observations
GOVSAT	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SKY 5B	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SKY 5C	**0**	**optrack**	**N/R**		Offset -45/low sig thr -80 /Bw:4Khz
SKY 5D	**0**	**optrack**	**OK**		Offset -45/low sig thr -80 /Bw:4Khz
SCRALL1B	**0**	**optrack**	**N/R**		Offset -45/low sig thr -80 /Bw:4Khz
SYRACUSE3A	**0**	**optrack**	**N/R**		Offset -45/low sig thr -80 /Bw:280Khz

3.	<u>T-1 ACU Mark Angle</u> 1. Record the current stored compass mark angle, set by the owners of the terminal, at the home location of the terminal. 2. Remove Mark Angle by setting it to 0. 3. Calibrate compass.	OK	Home Location Mark Angle: _____ deg.	

PROCEDURE / REPORT OF TEST Nº 6.2						
TEST NAME: T-1 Antenna and Antenna Control System		**ELEMENT UNDER TEST:** T-1 Antenna Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
4.	Acquire a Satellite 1. Make sure Trailer is level. 2. Configure ACU for a 10 degree box scan. 3. Using GEO mode, attempt to acquire a known satellite using its pointing angle. 4. Manually acquire the satellite if the auto-acquisition does not find it, then place the ACU in Optrack mode. 5. Once in Optrack, wait 5 – 10 minutes for the antenna to peak on the satellite. 6. Set Mark Angle for the offset and Save it. 7. Calibrate the compass and confirm azimuth reading is correct. 8. Record the CSSC Mark Angle. 9. Record the ACU beacon signal input level in the table above.			OK	CSSC Mark Angle: _____ deg.	
5.	Choose another satellite from the Satellite Pre-Set list and confirm the satellite is acquired. Record in beacon signal input level in table above.			OK	**OK**	

7 MEASUREMENTS AND CALIBRATIONS

7.1 RF Monitor/Test Panel Calibrations

PROCEDURE / REPORT OF TEST Nº 7.1						
TEST NAME: RF Monitor/Test Panel Calibrations		**ELEMENT UNDER TEST:** RF Monitor/Test Panel			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-2 Monitor Points					
1.	Record the coupling value at 8150 MHz for SSPA output coupler DC1 at T-2 Antenna.			OK	_____ dB	
2.	Measure the loss from cable #W325 at DC1 to T-2 HPA OUT port 25 of the RF Monitor/Test Panel.			OK	_____ dB	
3.	Calculate the total loss (Coupling Value + Cable Loss)			OK	_____ dB	
4.	Place a label on T-2 HPA OUT port 25 of the RF Monitor/Test Panel indicating the total calculated coupling and cable loss.			OK	**OK**	
5.	Record the coupling value at 7500 MHz for LNA inject coupler DC3 at T-2 Antenna.			OK	_____ dB	
6.	Measure the loss from cable #W327 at DC3 to T-2 LNA ON-LINE IN port 17 of the RF Monitor/Test Panel.			OK	_____ dB	
7	Calculate the total loss (Coupling Value + Cable Loss)			OK	_____ dB	
8.	Place a label on T-2 LNA ON-LINE IN port 17 of the RF Monitor/Test Panel indicating the total calculated coupling and cable loss.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.1						
TEST NAME: RF Monitor/Test Panel Calibrations		**ELEMENT UNDER TEST:** RF Monitor/Test Panel			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	T-1 Monitor Points					
1.	Record the coupling value at 8150 MHz for TWTA output coupler DC1 at T-1 Antenna.			OK	_____ dB	
2.	Measure the loss from cable #W308 at DC1 to T-1 HPA OUT port 2 of the RF Monitor/Test Panel.			OK	_____ dB	
3.	Calculate the total loss (Coupling Value + Cable Loss)			OK	_____ dB	
4.	Place a label on T-1 HPA OUT port 2 of the RF Monitor/Test Panel indicating the total calculated coupling and cable loss.			OK	**OK**	
5.	Record the coupling value at 7500 MHz for LNA inject coupler DC3 at T-1 Antenna.			OK	_____ dB	
6.	Measure the loss from cable #W309 at DC3 to T-1 LNA ON-LINE IN port 6 of the RF Monitor/Test Panel.			OK	_____ dB	
7	Calculate the total loss (Coupling Value + Cable Loss)			OK	_____ dB	
8.	Place a label on T-1 LNA ON-LINE IN port 6 of the RF Monitor/Test Panel indicating the total calculated coupling and cable loss.			OK	**OK**	

7.2 TX RF Output Frequency Accuracy

PROCEDURE / REPORT OF TEST Nº 7.2						
TEST NAME: Tx RF Output Frequency Accuracy		**ELEMENT UNDER TEST:** Transmission Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Shut down or place in Standby Mode (Mute) all SSPAs and TWTAs.			OK	**OK**	
2.	Verify the Signal Generator and the Frequency Counter are locked to the 10 MHz TFRS Distribution.			OK	**OK**	
	Check Net Clock 10 MHz Power and Frequency					
1.	Connect Frequency Counter to the Net Clock (A), RF out BNC port, and measure the 10 MHz Output Frequency.			10.000.000Hz ±3 Hz	_____ Hz	
3.	Connect Power Meter or Spectrum Analyzer to the Spectracom Distribution Amplifier (A), RF out BNC port, and measure the 10 MHz Output Level.			NET CLOCK 9383 +0dBm, ±1dBm NET CLOCK 9400 +4dBm, ±1dBm)	_____ dBm _____ dBm	
4.	Connect Frequency Counter to the Net Cock (B), RF out BNC port, and measure the 10 MHz Output Frequency.			10.000.000Hz ±3 Hz	_____ Hz	
5.	Connect Power Meter or Spectrum Analyzer to the Net Clock (B), RF out BNC port, and measure the 10 MHz Output Level.			NET CLOCK 9383 +10dBm, ±1dBm NET CLOCK 9400 +13dBm, ±1dBm)	_____ dBm _____ dBm	

PROCEDURE / REPORT OF TEST Nº 7.2						
TEST NAME: Tx RF Output Frequency Accuracy		**ELEMENT UNDER TEST:** Transmission Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
6.	Connect Power Meter or Spectrum Analyzer to the Spectracom Distribution Amplifier (B), RF out BNC port, and measure the 10 MHz Output Level.			NET CLOCK 9383 +0dBm, ±1dBm NET CLOCK 9400 +4dBm, ±1dBm)	_____ dBm _____ dBm	
	T-1 BUC Output Frequency Accuracy					
1.	Switch T-1 BUC A Off-line.			OK	**OK**	
2.	Inject a -20 dBm, 1200 MHz CW signal into Uplink Patch Panel where U-link connects EBEM #1 to Combiner B.			OK	**OK**	
3.	Connect the Frequency Counter to the T-1 BUC OFF-LINE OUT port 5 of the RF Monitor/Test Panel.			OK	**OK**	
4.	Measure and record the T-1 BUC A output frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
5.	Remove the External Reference Input from T-1 BUC A. Measure the T-1 BUC A output frequency and adjust the BUC oscillator to achieve 8,150,000,000 ± 100 Hz. Record the frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
6.	Reconnect the External Reference input to BUC A.			OK	**OK**	
7.	Switch T-1 BUC B Off-line. Measure and record the T-1 BUC B output frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	

PROCEDURE / REPORT OF TEST Nº 7.2						
TEST NAME: Tx RF Output Frequency Accuracy		**ELEMENT UNDER TEST:** Transmission Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
8.	Remove the External Reference Input from T-1 BUC B. Measure the T-1 BUC B output frequency and adjust the BUC oscillator to achieve 8,150,000,000 ± 100 Hz. Record the frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
9.	Reconnect the External Reference input to BUC B.			OK	**OK**	
	T-2 BUC Output Frequency Accuracy					
1.	Switch T-2 BUC A Off-line.			OK	**OK**	
2.	Inject a -20 dBm, 1200 MHz CW signal into Uplink Patch Panel where U-link connects EBEM #1 to Combiner A.			OK	**OK**	
3.	Connect the Frequency Counter to the T-2 BUC OFF-LINE OUT port 23 of the RF Monitor/Test Panel.			OK	**OK**	
4.	Measure and record the T-2 BUC A output frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
5.	Remove the External Reference Input from T-2 BUC A. Measure the T-2 BUC A output frequency and adjust the BUC oscillator to achieve 8,150,000,000 ± 100 Hz. Record the frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
6.	Reconnect the External Reference input to BUC A.			OK	**OK**	
7.	Switch T-2 BUC B Off-line. Measure and record the T-2 BUC B output frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	
8.	Remove the External Reference Input from T-2 BUC B. Measure the T-2 BUC B output frequency and adjust the BUC oscillator to achieve 8,150,000,000 ± 100 Hz. Record the frequency.			$8.15*10^9$ ± 100 Hz	_____ Hz	

PROCEDURE / REPORT OF TEST Nº 7.2						
TEST NAME: Tx RF Output Frequency Accuracy		**ELEMENT UNDER TEST:** Transmission Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
9.	Reconnect the External Reference input to BUC B.			OK	**OK**	
10.	Remove the Signal Generator and Frequency Counter and restore the U-Link to the L-Band Uplink Patch Panel.			OK	**OK**	

7.3 RX L-Band Frequency Output Accuracy

PROCEDURE / REPORT OF TEST Nº 7.3						
TEST NAME: Rx L-Band Output accuracy		**ELEMENT UNDER TEST:** Receive Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Verify the Signal Generator and the Frequency Counter are locked to the 10 MHz TFRS Distribution.			OK	**OK**	
	T-1 BDC Output Frequency Accuracy					
1.	Inject a -15 dBm, 7500 MHz CW signal to the T-1 BDC IN port 10 of the RF Monitor/Test Panel.			OK	**OK**	
2.	Connect the Frequency Counter to Downlink Patch Panel where U-link connects EBEM #1 to Divider B.			OK	**OK**	
3.	Switch BDC A on-line. Measure and record the T-1 BDC A output frequency.			1200 MHz ± 100 Hz	_____ Hz	

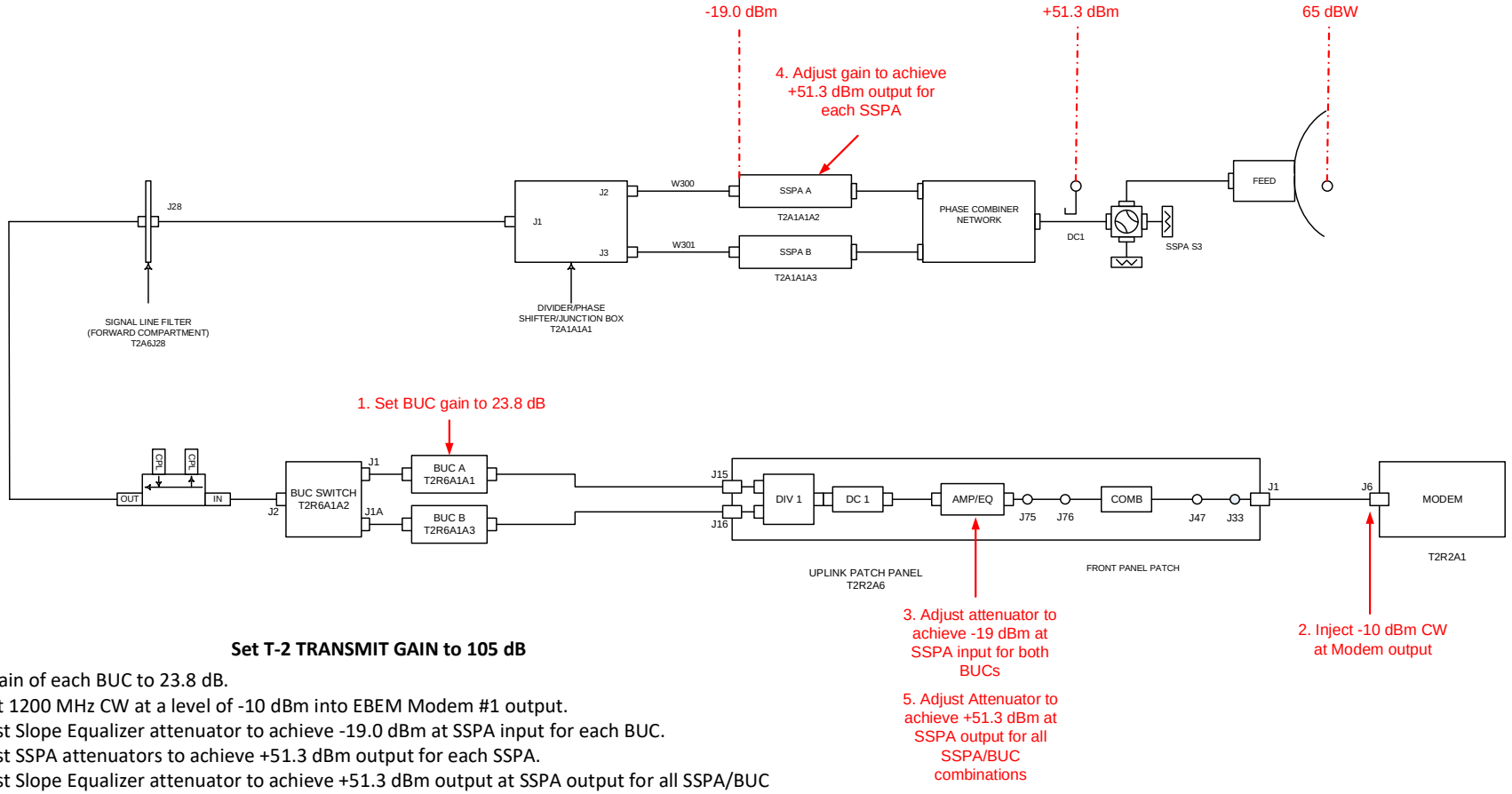
PROCEDURE / REPORT OF TEST Nº 7.3						
TEST NAME: Rx L-Band Output accuracy		**ELEMENT UNDER TEST:** Receive Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
4.	Remove the External Reference Input from T-1 BDC A. Measure the T-1 BDC A output frequency and adjust the BDC oscillator to achieve 1,200,000,000 ± 100 Hz. Record the frequency.			1200 MHz ± 100 Hz	_____ Hz	
5.	Reconnect the External Reference input to BDC A.			OK	**OK**	
6.	Switch T-2 BDC B on-line. Measure and record the T-1 BDC B output frequency.			1200 MHz ± 100 Hz	_____ Hz	
7.	Remove the External Reference Input from T-1 BDC B. Measure the T-1 BDC B output frequency and adjust the BDC oscillator to achieve 1,200,000,000 ± 100 Hz. Record the frequency.			1200 MHz ± 100 Hz	_____ Hz	
8.	Reconnect the External Reference input to BDC B.			OK	**OK**	
	T-2 BDC Output Frequency Accuracy					
1.	Inject a -15 dBm, 7500 MHz CW signal to the T-1 BDC IN port 10 of the RF Monitor/Test Panel.			OK	**OK**	
2.	Connect the Frequency Counter to Downlink Patch Panel where U-link connects EBEM #1 to Divider A.			OK	**OK**	
3.	Switch BDC A on-line. Measure and record the T-1 BDC A output frequency.			1200 MHz ± 100 Hz	_____ Hz	
4.	Remove the External Reference Input from T-1 BDC A. Measure the T-1 BDC A output frequency and adjust the BDC oscillator to achieve 1,200,000,000 ± 100 Hz. Record the frequency.			1200 MHz ± 100 Hz	_____ Hz	
5.	Reconnect the External Reference input to BDC A.			OK	**OK**	
6.	Switch T-2 BDC B on-line. Measure and record the T-1 BDC B output frequency.			1200 MHz ± 100 Hz	_____ Hz	

PROCEDURE / REPORT OF TEST Nº 7.3						
TEST NAME: Rx L-Band Output accuracy		**ELEMENT UNDER TEST:** Receive Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
7.	Remove the External Reference Input from T-1 BDC B. Measure the T-1 BDC B output frequency and adjust the BDC oscillator to achieve 1,200,000,000 ± 100 Hz. Record the frequency.			1200 MHz ± 100 Hz	_____ Hz	
8.	Reconnect the External Reference input to BDC B.			OK	**OK**	
9.	Remove the Signal Generator and Frequency Counter and restore the U-Link to the L-Band Uplink Patch Panel.			OK	**OK**	

7.4 TX Levels and Phase Alignment

7.4.1 T-2 TX Levels and Phase Alignment

The procedures in this section are summarized in the T-2 Transmit System figure below.



Set T-2 TRANSMIT GAIN to 105 dB

1. Set gain of each BUC to 23.8 dB.
2. Inject 1200 MHz CW at a level of -10 dBm into EBEM Modem #1 output.
3. Adjust Slope Equalizer attenuator to achieve -19.0 dBm at SSPA input for each BUC.
4. Adjust SSPA attenuators to achieve +51.3 dBm output for each SSPA.
5. Adjust Slope Equalizer attenuator to achieve +51.3 dBm output at SSPA output for all SSPA/BUC combinations.

PROCEDURE / REPORT OF TEST Nº 7.4.1						
TEST NAME: T-2 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Point Antenna to cold sky.			OK	**OK**	
2.	Set BUC A to 23.8 dB gain. 1. Inject a 1200 MHz CW at -29.9 dB into BUC A RF In 2. Adjust BUC A gain to -5.7 dBm at 8150 MHz RF Out			OK	**OK**	
3.	Match BUC B to BUC A 1. Inject L-Band at J75 of Uplink L-Band Patch Panel (1200 MHz, -21 dBm). 2. Measure at RF Monitor/Test Panel Test Point 22 (T-2 On-line BUC Out). 3. Switch BUC B on-line. 4. Adjust BUC B gain to match level of BUC A at RF Monitor/Test Panel Test Point 22.			OK	**OK**	
4.	Set the T-2 Slope Equalizer to -0.6 dB and 19.0 dB and confirm in the table below:			OK	**OK**	
5.	Remove T-2 PIM Shield.			OK	**OK**	
6.	Inject -10 dBm, 1200 MHz at cable W212 (EBEM 1 Tx, J6) and patch EBEM 1 for T-2 transmit operations.			OK	**OK**	
7.	Monitor input to SSPA A with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 8150 MHz.			OK	**OK**	
8.	Switch to BUC A.			OK	**OK**	
9.	Adjust Slope Equalizer attenuator to achieve -19 dBm at SSPA A input. Record attenuator setting in the SSPA and Slope Equalizer Settings table below.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.1						
TEST NAME: T-2 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**

***Note**: This table will be filled in during the remainder of this procedure with SSPA and Slope Attenuator settings.*

2.4m Tx Levels SSPA Input Settings			
Step (BUC)	**Slope Setting**	**Attenuator Setting**	**SSPA Input Level**
9 (BUC A)	-0.6	_____ (dB)	19.0 dB _____ (Check)
11 (BUC B)	-0.6	_____ (dB)	19.0 dB _____ (Check)
2.4m Tx Levels SSPA Attenuator Linear Setting			
Step (SSPA)	**Slope Setting**	**Attenuator Setting**	**SSPA Attenuator**
20 (SSPA A)	-0.6	_____ (dB)	_____ (dB)
24 (SSPA B)	-0.6	_____ (dB)	_____ (dB)
32 (Combined SSPA)	-0.6	_____ (dB)	51.3 dBm _____ (Check)

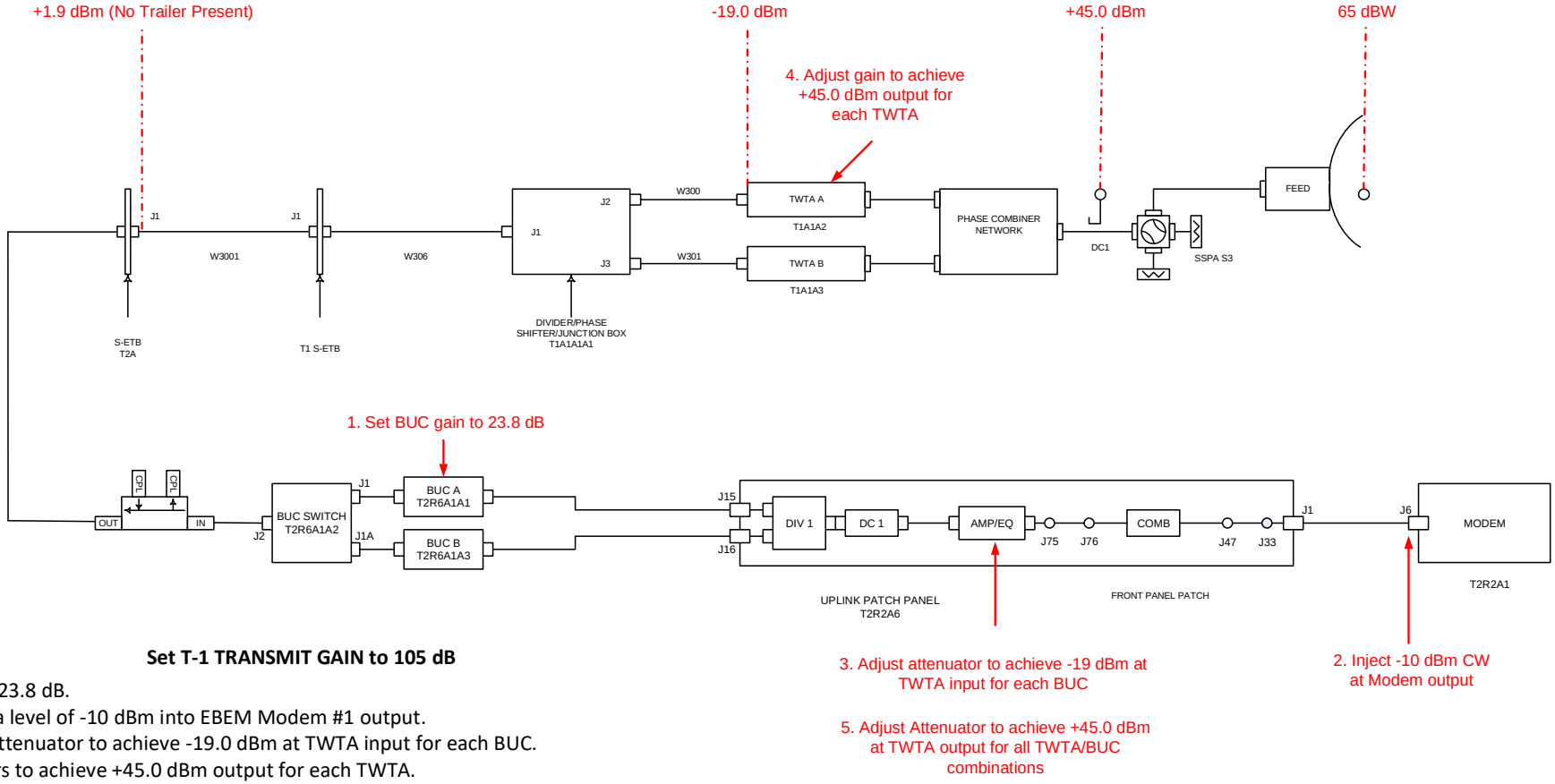
10.	Switch to BUC B.	OK	**OK**	
11.	Adjust Slope equalizer attenuator to achieve -19 dBm at SSPA A input. Record attenuator setting in the SSPA and Slope Equalizer Settings table.	OK	**OK**	
12.	Switch to BUC A.	OK	**OK**	
13.	Set Slope equalizer attenuator to figure recorded in step 9.	OK	**OK**	
14.	Remove the Spectrum Analyzer and normalise the input to SSPA A.	OK	**OK**	
15.	Ensure the SSPAs are set to Combine Off-Line.	OK	**OK**	
16.	Monitor DC1 with a Power Meter. Ensure that the coupling factor is accounted for at 8150 MHz	OK	**OK**	
17.	Apply power to both SSPAs and set both SSPA A and B attenuators to 10 dB.	OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.1						
TEST NAME: T-2 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
18.	Set SSPA A to Maintenance.			OK	**OK**	
19.	Command SSPA A to transmit and allow it to warm until the temperature settles out.			OK	**OK**	
20	Adjust SSPA A's attenuator to achieve 51.3 dBm at DC1 and record the attenuator setting in the SSPA and Slope Equalizer Settings table.			OK	**OK**	
21.	Command SSPA A to Standby.			OK	**OK**	
22.	Set SSPA B to Maintenance.			OK	**OK**	
23.	Command SSPA B to transmit and allow it to warm until the temperature settles out.			OK	**OK**	
24.	Adjust SSPA B's attenuator to achieve 51.3 dBm at DC1 and record the attenuator setting in the SSPA and Slope Equalizer Settings table.			OK	**OK**	
25.	Command SSPA B to Standby.			OK	**OK**	
26.	Set SSPAs to Combine Off-Line.			OK	**OK**	
27.	Set the Slope equalizer attenuator to 3 dB lower that the figure recorded in step 9.			OK	**OK**	
28.	Monitor DC 2 with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 8150 MHz.			OK	**OK**	
29.	Command both SSPAs to transmit.			OK	**OK**	
30.	While monitoring DC2 via the Spectrum Analyzer optimize the Phase Shifter for minimum reflected level at DC2.			OK	**OK**	
31.	Remove the Spectrum Analyzer from DC2.			OK	**OK**	
32.	Using the Power Meter at DC1 adjust the Slope Equalizer attenuator to achieve 51.3 dBm at DC1 and record the attenuator setting in the SSPA and Slope Equalizer Settings table.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.1						
TEST NAME: T-2 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
33.	Set Backup Slope Equalizer to -0.6 and 19.0 dB.			OK	**OK**	

7.4.2 T-1 TX Levels and Phase Alignment

The procedures in this section are summarized in the T-1 Transmit System figure below.



Set T-1 TRANSMIT GAIN to 105 dB

1. Set gain of each BUC to 23.8 dB.
2. Inject 1200 MHz CW at a level of -10 dBm into EBEM Modem #1 output.
3 Adjust Slope Equalizer attenuator to achieve -19.0 dBm at TWTA input for each BUC.
4. Adjust TWTA attenuators to achieve +45.0 dBm output for each TWTA.
5. Adjust Slope Equalizer attenuator to achieve +45.0 dBm output at TWTA output for all TWTA/BUC combinations.

PROCEDURE / REPORT OF TEST Nº 7.4.2						
TEST NAME: T-1 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Point Antenna to cold sky.			OK	**OK**	
2.	<u>Set BUC A to 23.8 dB gain.</u> 1. Inject a 1200 MHz CW at -29.9 dB into BUC A RF In 2. Adjust BUC A gain to -5.7 dBm at 8150 MHz RF Out.			OK	**OK**	
3.	<u>Match BUC B to BUC A</u> 1. Inject L-Band at J79 Uplink L-Band Patch Panel (1200 MHz, -21 dBm). 2. Measure at RF Monitor/Test Panel Test Point 4 (T-1 On-line BUC Out). 3. Switch BUC B on-line. 4. Adjust BUC B gain to match level of BUC A RF Monitor/Test Panel Test Point 4.			OK	**OK**	
4.	Set the T-1 Slope Equalizer to -0.6 dB and 19.0 dB.			OK	**OK**	
5.	Remove T-1 weather cover.			OK	**OK**	
6.	Inject -10 dBm, 1200 MHz at cable W212 (EBEM 1 Tx, J6) and patch EBEM 1 for T-1 transmit operations.			OK	**OK**	
7.	Monitor input to TWTA A with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 8150 MHz.			OK	**OK**	
8.	Switch to BUC A.			OK	**OK**	
9.	Adjust Slope Equalizer attenuator to achieve -19 dBm at TWTA A input. Record attenuator setting in the TWTA and Slope Equalizer Settings table below.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.2						
TEST NAME: T-1 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**

***Note**: This table will be filled in during the remainder of this procedure with TWTA and Slope Attenuator settings.*

4.6m Tx Levels TWTA Input Settings			
Step (BUC)	**Slope Setting**	**Attenuator Setting**	**TWTA Input Level**
9 (BUC A)	-0.6	_____ (dB)	19.0 dB _____ (Check)
11 (BUC B)	-0.6	_____ (dB)	19.0 dB _____ (Check)
4.6m Tx Levels TWTA Attenuator Linear Setting			
Step (TWTA)	**Slope Setting**	**Attenuator Setting**	**TWTA Attenuator**
20 (TWTA A)	-0.6	_____ (dB)	_____ (dB)
24 (TWTA B)	-0.6	_____ (dB)	_____ (dB)
32 (Combined TWTA)	-0.6	_____ (dB)	45.0 dBm _____ (Check)

10.	Switch to BUC B.	OK	**OK**	
11.	Adjust Slope equalizer attenuator to achieve -19 dBm at TWTA A input. Record attenuator setting in the TWTA and Slope Equalizer Settings table.	OK	**OK**	
12.	Switch to BUC A.	OK	**OK**	
13.	Set Slope equalizer attenuator to figure recorded in step 9.	OK	**OK**	
14.	Remove the Spectrum Analyzer and normalise the input to TWTA A.	OK	**OK**	
15.	Ensure the TWTAs are set to Combine Off-Line.	OK	**OK**	
16.	Monitor DC1 with a Power Meter. Ensure that the coupling factor is accounted for at 8150 MHz	OK	**OK**	
17.	Apply power to both TWTAs and set both TWTA A and B attenuators to 15 dB.	OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.2						
TEST NAME: T-1 Tx Levels and Phase Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
18.	Set TWTA A to Maintenance.			OK	**OK**	
19.	Command TWTA A to transmit and allow it to warm until the temperature settles out.			OK	**OK**	
20	Adjust TWTA A's attenuator to achieve 45.0 dBm at DC1 and record the attenuator setting in the TWTA and Slope Equalizer Settings table.			OK	**OK**	
21.	Command TWTA A to Standby.			OK	**OK**	
22.	Set TWTA B to Maintenance.			OK	**OK**	
23.	Command TWTA B to transmit and allow it to warm until the temperature settles out.			OK	**OK**	
24.	Adjust TWTA B's attenuator to achieve 45.0 dBm at DC1 and record the attenuator setting in the TWTA and Slope Equalizer Settings table.			OK	**OK**	
25.	Command TWTA B to Standby.			OK	**OK**	
26.	Set TWTAs to Combine Off-Line.			OK	**OK**	
27.	Set the Slope equalizer attenuator to 3 dB lower that the figure recorded in step 9.			OK	**OK**	
28.	Monitor DC 2 with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 8150 MHz.			OK	**OK**	
29.	Command both TWTAs to transmit.			OK	**OK**	
30.	While monitoring DC2 via the Spectrum Analyzer optimize the Phase Shifter for minimum reflected level at DC2.			OK	**OK**	
31.	Remove the Spectrum Analyzer from DC2.			OK	**OK**	
32.	Using the Power Meter at DC1 adjust the Slope Equalizer attenuator to achieve 45.0 dBm at DC1 and record the attenuator setting in the TWTA and Slope Equalizer Settings table.			OK	**OK**	

7.4.3 T-2 Amplitude Response and Slope Equalizer Adjustment

PROCEDURE / REPORT OF TEST Nº 7.4.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Configure and calibrate Network Analyzer for -10 dBm input of a swept 1200 MHz ± 250 MHz, measuring an upconverted frequency of 8150 MHz ± 250 MHz and measurements of 502 points, 0.996 MHz.			OK	**OK**	
2.	Adjust Network Analyzer settings to: 1. Averaging = 10 2. Smoothing = 2 3. IF BW = 30K 4. Scale Per Div = 1 5. Coupler Factor Offset			OK	**OK**	
3.	Ensure the SSPAs are set to Combine Off-Line.			OK	**OK**	
4.	Apply power to both SSPAs and ensure both are commanded to Standby.			OK	**OK**	
5.	Set the Slope Equalizer slope and attenuator to the “Combined SSPA” values in the table on page 55.			OK	**OK**	
6.	Confirm that the SSPA attenuators are set as per table on page 55.			OK	**OK**	
7.	Connect the Network Analyzer port 1 inject J47 of the Uplink L-Band Patch Panel and patch EBEM 1 for T-2 transmit operations.			OK	**OK**	
8.	Connect the Network Analyzer port 2 receive cable to T-2 DC1.			OK	**OK**	
9.	Switch to BUC A.			OK	**OK**	
10.	Command the SSPAs to transmit and allow them to warm until the temperature settles out.			OK	**OK**	
11.	On the Network Analyzer, activate markers, low-mid-high band. (7900, 8150 and 8400 MHz).			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
12.	Record the measured level for the mid-band marker.			_____ dBm		
13.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in table below for BUC A / Comb. SSPAs.			OK	**OK**	

T-2 Amplitude Response and Slope Equalizer Alignment					
Slope Equalizer	**Initial Slope (dB)**	**On-Line BUC**	**On-Line SSPA**	**Slope Preset (dB)**	**Attenuation (dB)**
2.4m		A	A+B		
2.4m		B	A+B		
2.4m		A	A		
2.4m		B	B		
2.4m		A	B		
2.4m		B	A		
Back Up		A	A+B	-0.6	19.0
Back Up		B	A+B	-0.6	19.0
Back Up		A	A	-0.6	19.0
Back Up		B	B	-0.6	19.0
Back Up		A	B	-0.6	19.0

PROCEDURE / REPORT OF TEST Nº 7.4.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
14.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 12. 4. Record the final BUC A / Comb. SSPAs Slope Equalizer settings in table above. **Caution**: The slope and gain settings of the equalizer are interactive. Changing slope compensation will change gain. The output level of the SSPA must be carefully monitored while adjusting the slope equalizer. Overdrive of the SSPAs can result in an SSPA failure.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
15.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC A / COMB SSPA Amplitude Response JPG here.						
16.	Switch to BUC B.			OK	**OK**	
17.	Set the Slope Equalizer slope and attenuator to the “Combined SSPA” values in the table on page 55.			OK	**OK**	
18.	Record the measured level for the mid-band marker.			_____ dBm		
19.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC B / Comb. SSPAs.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
20.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 18. 4. Record the final BUC B / Comb. SSPAs Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
21.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC B / COMB SSPA Amplitude Response JPG here.						
22.	Switch to SSPAs to SSPA A Maintenance mode.			OK	**OK**	
23.	Set the Slope Equalizer slope and attenuator to the “SSPA A” values in the table on page 55.			OK	**OK**	
24.	Record the measured level for the mid-band marker.			_____ dBm		
25.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC B / SSPA A.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
26.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 24. 4. Record the final BUC B / SSPA A Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
27.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC B / SSPA A Amplitude Response JPG here.						
28.	Switch to BUC A.			OK	**OK**	
29.	Set the Slope Equalizer slope and attenuator to the “SSPA A” values in the table on page 55.			OK	**OK**	
30.	Record the measured level for the mid-band marker.			_____ dBm		
31.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC A / SSPA A.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
32.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 30. 4. Record the final BUC A / SSPA A Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).		
33.	Capture the Network Analyzer Trace and paste it below.					
Paste BUC A / SSPA A Amplitude Response JPG here.						
34.	Switch to SSPAs to SSPA B Maintenance mode.			OK	**OK**	
35.	Set the Slope Equalizer slope and attenuator to the “SSPA B” values in the table on page 55.			OK	**OK**	
36.	Record the measured level for the mid-band marker.			_____ dBm		
37.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC A / SSPA B.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
38.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 36. 4. Record the final BUC A / SSPA B Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
39.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC A / SSPA B Amplitude Response JPG here.						
40.	Switch BUC B.			OK	**OK**	
41.	Set the Slope Equalizer slope and attenuator to the “SSPA B” values in the table on page 55.			OK	**OK**	
42.	Record the measured level for the mid-band marker.			_____ dBm		
43.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC B / SSPA B.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.3						
TEST NAME: T-2 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
44.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 42. 4. Record the final BUC B / SSPA B Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
45.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC B / SSPA B Amplitude Response JPG here.						
46	Set both SSPAs to Standby and switch the SSPAs to Combined Off-line mode.			OK	**OK**	

7.4.4 T-1 Amplitude Response and Slope Equalizer Adjustment

PROCEDURE / REPORT OF TEST Nº 7.4.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Configure and calibrate Network Analyzer for -10 dBm input of a swept 1200 MHz ± 250 MHz, measuring an upconverted frequency of 8150 MHz ± 250 MHz and measurements of 502 points, 0.996 MHz.			OK	**OK**	
2.	Adjust Network Analyzer settings to: 1. Averaging = 10 2. Smoothing = 2 3. IF BW = 30K 4. Scale Per Div = 1 5. Coupler Factor Offset			OK	**OK**	
3.	Ensure the TWTAs are set to Combine Off-Line.			OK	**OK**	
4.	Apply power to both TWTAs and ensure both are commanded to Standby.			OK	**OK**	
5.	Set the Slope Equalizer slope and attenuator to the “Combined TWTA” values in the table on page 60.			OK	**OK**	
6.	Confirm that the TWTA attenuators are set as per table on page 60.			OK	**OK**	
7.	Connect the Network Analyzer port 1 inject at J61 of the Uplink L-Band Patch Panel and patch EBEM 1 for T-1 transmit operations.			OK	**OK**	
8.	Connect the Network Analyzer port 2 receive cable to T-1 DC1.			OK	**OK**	
9.	Switch to BUC A.			OK	**OK**	
10.	Command the TWTAs to transmit and allow them to warm until the temperature settles out.			OK	**OK**	
11.	On the Network Analyzer, activate markers, low-mid-high band. (7900, 8150 and 8400 MHz).			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
12.	Record the measured level for the mid-band marker.			_____ dBm		
13.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in table below for BUC A / Comb. TWTAs.			OK	**OK**	

T-1 Amplitude Response and Slope Equalizer Alignment					
Slope Equalizer	**Initial Slope (dB)**	**On-Line BUC**	**On-Line TWTA**	**Slope Preset (dB)**	**Attenuation (dB)**
4.6m		A	A+B		
4.6m		B	A+B		
4.6m		A	A		
4.6m		B	B		
4.6m		A	B		
4.6m		B	A		

PROCEDURE / REPORT OF TEST Nº 7.4.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
14.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 12. 4. Record the final BUC A / Comb. TWTAs Slope Equalizer settings in table above. **Caution**: The slope and gain settings of the equalizer are interactive. Changing slope compensation will change gain. The output level of the TWTA must be carefully monitored while adjusting the slope equalizer. Overdrive of the TWTAs can result in an TWTA failure.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
15.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC A / COMB TWTA Amplitude Response JPG here.						
16.	Switch to BUC B.			OK	**OK**	
17.	Set the Slope Equalizer slope and attenuator to the “Combined TWTA” values in the table on page 60.			OK	**OK**	
18.	Record the measured level for the mid-band marker.			_____ dBm		
19.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC B / Comb. TWTAs.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
20.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 18. 4. Record the final BUC B / Comb. TWTAs Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
21.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC B / COMB TWTA Amplitude Response JPG here.						
22.	Switch to TWTAs to TWTA A Maintenance mode.			OK	**OK**	
23.	Set the Slope Equalizer slope and attenuator to the “TWTA A” values in the table on page 60.			OK	**OK**	
24.	Record the measured level for the mid-band marker.			_____ dBm		
25.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC B / TWTA A.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
26.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 24. 4. Record the final BUC B / TWTA A Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
27.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC B / TWTA A Amplitude Response JPG here.						
28.	Switch to BUC A.			OK	**OK**	
29.	Set the Slope Equalizer slope and attenuator to the “TWTA A” values in the table on page 60.			OK	**OK**	
30.	Record the measured level for the mid-band marker.			_____ dBm		
31.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC A / TWTA A.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
32.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 30. 4. Record the final BUC A / TWTA A Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).		
33.	Capture the Network Analyzer Trace and paste it below.					
Paste BUC A / TWTA A Amplitude Response JPG here.						
34.	Switch to TWTAs to TWTA B Maintenance mode.			OK	**OK**	
35.	Set the Slope Equalizer slope and attenuator to the “TWTA B” values in the table on page 60.			OK	**OK**	
36.	Record the measured level for the mid-band marker.			_____ dBm		
37.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC A / TWTA B.			OK	**OK**	

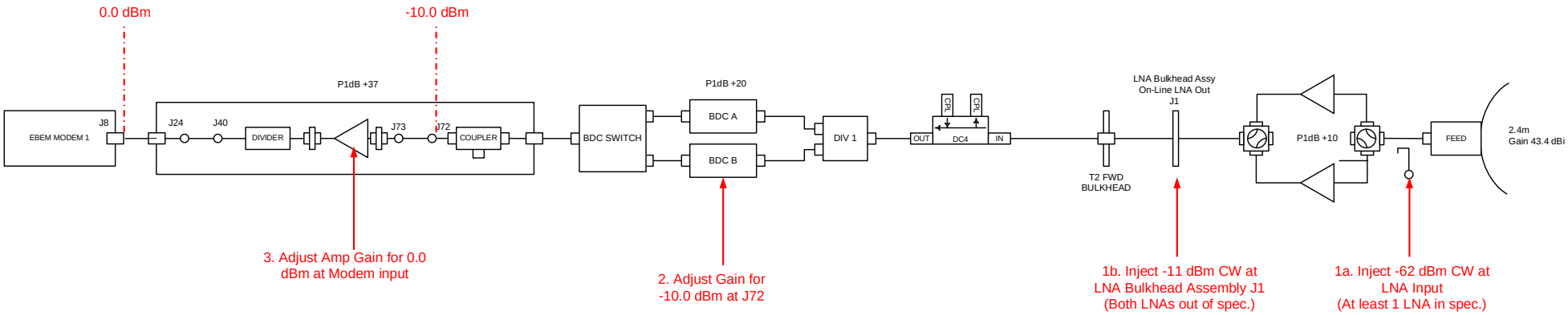
PROCEDURE / REPORT OF TEST Nº 7.4.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
38.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 36. 4. Record the final BUC A / TWTA B Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
39.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC A / TWTA B Amplitude Response JPG here.						
40.	Switch BUC B.			OK	**OK**	
41.	Set the Slope Equalizer slope and attenuator to the “TWTA B” values in the table on page 60.			OK	**OK**	
42.	Record the measured level for the mid-band marker.			_____ dBm		
43.	Record the initial slope (dB p-p) as determined by the difference in level measured at 7900 MHz and 8400 MHz in the table above for BUC B / TWTA B.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.4.4						
TEST NAME: T-1 Amplitude Response and Slope Equalizer Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
44.	Slope Equalizer Setting 1. Determine the optimum slope equalization to compensate for the slope. 2. Adjust the slope value for optimum path slope compensation. 3. Adjust the Slope Equalizer attenuator setting to achieve the recorded mid-band level in step 42. 4. Record the final BUC B / TWTA B Slope Equalizer settings in table above.			Max P-P variation is 2 dB (+/- 1 dB).	**OK**	
45.	Capture the Network Analyzer Trace and paste it below.			OK	**OK**	
Paste BUC B / TWTA B Amplitude Response JPG here.						
46	Set both TWTAs to Standby and switch the TWTAs to Combined Off-line mode.			OK	**OK**	

7.5 RX Receive Chain Level Alignment

7.5.1 T-2 LNA Gain and Receive Chain Level Alignment

The procedures in this section are summarized in the T-2 Receive System figure below.



Set T-2 RECEIVE GAIN to 105 dB

1a. If at least 1 LNA is found to be in specification during testing, inject 7500 MHz CW at a level of -62 dBm into LNA input.
1b. If both LNAs are found to be in specification during testing, inject 7500 MHz CW at a level of -11 dBm into J1 of LNA Bulkhead Assembly.
2. Adjust the gain of each BDC to achieve a level of -10 dBm at J72 of Downlink L-Band Patch Panel.
3. Adjust the gain of the L-Band Amplifier in the Downlink L-Band Patch Panel to achieve a level of 0 dBm at the input to EBEM Modem #1.

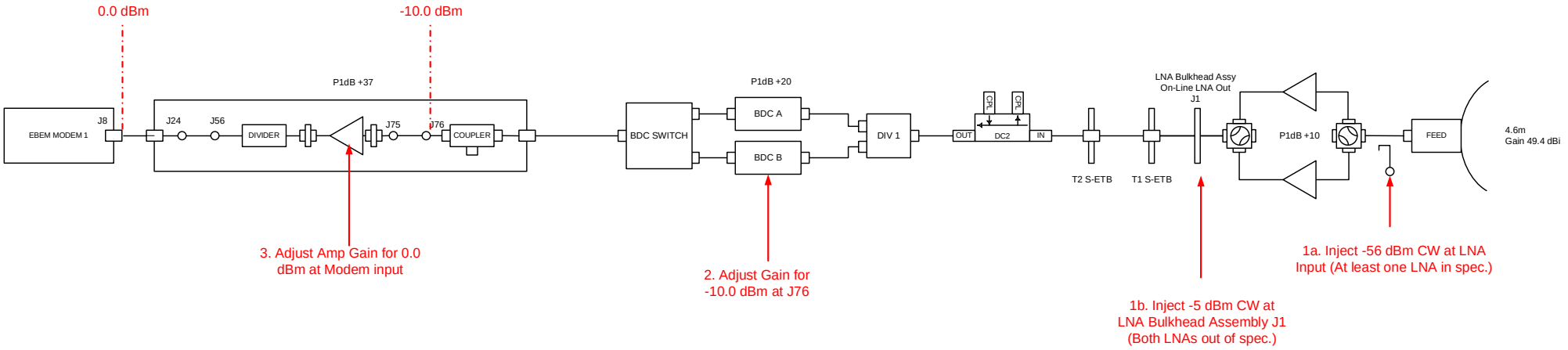
PROCEDURE / REPORT OF TEST Nº 7.5.1						
TEST NAME: T-2 LNA Gain and Receive Chain Level Alignment		**ELEMENT UNDER TEST:** RX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Point the T-2 antenna to cold sky.			OK	**OK**	
2.	Command LNA A on-line			OK	**OK**	
3.	Configure and calibrate Network Analyzer to inject a swept 7500 MHz ± 250 MHz at -62 dBm with measurements of 502 points, 0.996 MHz at DC3. (Set input level to account for DC3 Coupling Factor)			OK	**OK**	
4.	Adjust Network Analyzer settings to: 1. Averaging = 10 2. Smoothing = 2 3. IF BW = 30K 4. Scale Per Div = 1 5. Coupler Factor Offset			OK	**OK**	
5.	Connect the Network Analyzer port 1 inject cable to DC3.			OK	**OK**	
6.	Connect the Network Analyzer port 2 receive cable to J1 at the LNA Plate.			OK	**OK**	
7.	On the Network Analyzer, activate markers, low-mid-high band. (7250, 7500 and 7750 MHz)			OK	**OK**	
8.	Record LNA A gain at 7500 MHz.			>50 dB	_____ dB	
9.	Capture Network Analyzer Trace for the LNA A and paste it below.			OK	**OK**	
Paste LNA-A > Amplitude Response JPG here.						
10.	Command LNA B on-line			OK	**OK**	
11.	Record LNA B gain at 7500 MHz.			>50 dB	_____ dB	
12.	Capture Network Analyzer Trace for the LNA B and paste it below.			OK	**OK**	
Paste LNA-B > Amplitude Response JPG here.						

PROCEDURE / REPORT OF TEST Nº 7.5.1						
TEST NAME: T-2 LNA Gain and Receive Chain Level Alignment		**ELEMENT UNDER TEST:** RX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	***Note**: If practical, as the test setup is still configured for sweeping single LNAs, consider sweeping the T-1 LNAs now (in Section 7.5.2), and then continuing with the full Rx-chain calibration of the T-2.*					
13.	Inject a CW of 7500 MHz ± 250 MHz at -62 dBm (Set input level to account for DC3 Coupling Factor). ***Note**: If both LNAs are below specification and not replaced, the next part of this procedure should be completed injecting a CW of 7500 MHz at -11 dB in to J1.*			OK	**OK**	
14.	Command the LNA on-line that is closest to normal specification (51 dB). Record which LNA is selected.			LNA A or LNA B	**LNA A**	
15.	Command BDC A on-line.			OK	**OK**	
16.	Monitor J72 at the Downlink Patch Panel with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 1200 MHz.			OK	**OK**	
17.	Adjust the gain of BDC A until -10 dBm is measured at J72.			OK	**OK**	
18.	Command BDC B on-line.			OK	**OK**	
19.	Adjust the gain of BDC B until -10 dBm is measured at J72.			OK	**OK**	
20.	Slide out the Downlink Patch Panel and remove the top cover.			OK	**OK**	
21.	Monitor J40 at the Downlink Patch Panel with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 1200 MHz.			OK	**OK**	
22.	Adjust the gain of the T-2 Downlink Amplifier until 0 dBm is measured at cable W231 J8 on EBEM 1 (Patch Modem 1 for T-2 receive operation).			OK	**OK**	
23.	Command BDC A online.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.5.1						
TEST NAME: T-2 LNA Gain and Receive Chain Level Alignment		**ELEMENT UNDER TEST:** RX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
24.	Adjust the gain of the T-2 Downlink Amplifier until 0 dBm is measured at cable W231 J8 on EBEM 1.			OK	**OK**	
25.	Remove test equipment and normalise the T-2 downlink.			OK	**OK**	
26.	Connect a Multimeter to the T-2 LNA A test point on top of the LNA Controller, Check and Adjust POT as required. Record the result.			6.5 VDC	_____ VDC	
27.	Connect a Multimeter to the T-2 LNA B test point on top of the LNA Controller, Check and Adjust POT as required. Record the result.			6.5 VDC	_____ VDC	

7.5.2 T-1 LNA Gain and Receive Chain Level Alignment

The procedures in this section are summarized in the T-1 Receive System figure below.



Set T-1 RECEIVE GAIN to 105 dB

1a. If at least one LNA is found to be in specification during testing, inject 7500 MHz CW at a level of -56 dBm into LNA input and use that LNA for the rest of the procedure.
1b. If both LNAs are found to be out of specification during testing, inject 7500 MHz CW at a level of -5 dBm into J1 of LNA Bulkhead Assembly.
2. Adjust the gain of each BDC to achieve a level of -10 dBm at J76 of Downlink L-Band Patch Panel.
3. Adjust the gain of the L-Band Amplifer in the Downlink L-Band Patch Panel to achieve a level of 0 dBm at the input to EBEM Modem #1.

PROCEDURE / REPORT OF TEST Nº 7.5.2						
TEST NAME: T-1 LNA Gain and Receive Chain Level Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Point the T-1 antenna to cold sky.			OK	**OK**	
2.	Command LNA A on-line			OK	**OK**	
3.	Configure and calibrate Network Analyzer to inject a swept 7500 MHz ± 250 MHz at -62 dBm with measurements of 502 points, 0.996 MHz at DC3. (Set input level to account for DC3 Coupling Factor)			OK	**OK**	
4.	Adjust Network Analyzer settings to: 1. Averaging = 10 2. Smoothing = 2 3. IF BW = 30K 4. Scale Per Div = 1 5. Coupler Factor Offset			OK	**OK**	
5.	Connect the Network Analyzer port 1 inject cable to DC3.			OK	**OK**	
6.	Connect the Network Analyzer port 2 receive cable to J1 at the LNA Plate.			OK	**OK**	
7.	On the Network Analyzer, activate markers, low-mid-high band. (7250, 7500 and 7750 MHz)			OK	**OK**	
8.	Record LNA A gain at 7500 MHz.			>50 dB	_____ dB	
9.	Capture Network Analyzer Trace for the LNA A and paste it below.			OK	**OK**	
Paste LNA-A > Amplitude Response JPG here.						
10.	Command LNA B on-line			OK	**OK**	
11.	Record LNA B gain at 7500 MHz.			>50 dB	_____ dB	
12.	Capture Network Analyzer Trace for the LNA B and paste it below.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.5.2						
TEST NAME: T-1 LNA Gain and Receive Chain Level Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
Paste LNA-B > Amplitude Response JPG here.						
13.	Inject a CW of 7500 MHz ± 250 MHz at -62 dBm (Set input level to account for DC3 Coupling Factor). ***Note**: If both LNAs are below specification and not replaced, the next part of this procedure should be completed injecting a CW of 7500 MHz at -5 dB in to J1.*			OK	**OK**	
14.	Command the LNA on-line that is closest to normal specification (51 dB). Record which LNA is selected.			LNA A or LNA B	**LNA A**	
15.	Command BDC A on-line.			OK	**OK**	
16.	Monitor J76 at the Downlink Patch Panel with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 1200 MHz.			OK	**OK**	
17.	Adjust the gain of BDC A until -10 dBm is measured at J76.			OK	**OK**	
18.	Command BDC B on-line.			OK	**OK**	
19.	Adjust the gain of BDC B until -10 dBm is measured at J76.			OK	**OK**	
20.	Slide out the Downlink Patch Panel and remove the top cover.			OK	**OK**	
21.	Monitor J56 at the Downlink Patch Panel with a Spectrum Analyzer. Ensure that the cable loss is accounted for at 1200 MHz.			OK	**OK**	
22.	Adjust the gain of the T-1 Downlink Amplifier until 0 dBm is measured at cable W231 J8 on EBEM 1 (Patch Modem 1 for T-1 receive operation).			OK	**OK**	
23.	Command BDC A online.			OK	**OK**	
24.	Adjust the gain of the T-1 Downlink Amplifier until 0 dBm is measured at cable WXXX J8 on EBEM 1.			OK	**OK**	

PROCEDURE / REPORT OF TEST Nº 7.5.2						
TEST NAME: T-1 LNA Gain and Receive Chain Level Alignment		**ELEMENT UNDER TEST:** TX Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
25.	Remove test equipment and normalise the T-2 downlink.			OK	**OK**	
26.	Connect a Multimeter to the T-1 LNA A test point on top of the LNA Controller, Check and Adjust POT as required. Record the result.			6.5 VDC	_____ VDC	
27.	Connect a Multimeter to the T-1 LNA B test point on top of the LNA Controller, Check and Adjust POT as required. Record the result.			6.5 VDC	_____ VDC	

7.6 RX Amplitude Response

7.6.1 T-2 Rx Amplitude Response

PROCEDURE / REPORT OF TEST Nº 7.6.1						
TEST NAME: T-2 Rx Amplitude Response		**ELEMENT UNDER TEST:** T-2 Rx Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Point the T-2 the antenna to cold sky.					
2.	Configure and calibrate Network Analyzer to inject a swept 7500 MHz ± 250 MHz at -62 dBm with measurements of 502 points, 0.996 MHz at DC3. (Set input level to account for DC3 Coupling Factor)			OK	**OK**	
3.	Adjust Network Analyzer settings to: 1. Averaging = 10 2. Smoothing = 2 3. IF BW = 30K 4. Scale Per Div = 1 5. Coupler Factor Offset			OK	**OK**	
4.	Connect the Network Analyzer port 1 inject cable to DC3.			OK	**OK**	
5.	Connect the Network Analyzer port 2 receive cable to J40 of the Downlink L-Band Patch Panel and patch Modem 1 for T-2 receive operation.			OK	**OK**	
6.	Command LNA A on-line and BDC A on-line			OK	**OK**	
7.	Command BDC A on-line			OK	**OK**	
8.	On the Network Analyzer, activate markers, low-mid-high band. (950, 1200 and 1450 MHz)			OK	**OK**	
9.	T-2 LNA A - BDC A, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA A - BDC A Amplitude Response JPEG Here						

PROCEDURE / REPORT OF TEST Nº 7.6.1						
TEST NAME: T-2 Rx Amplitude Response		**ELEMENT UNDER TEST:** T-2 Rx Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
10.	Command BDC B on-line			OK	**OK**	
11.	T-2 LNA A - BDC B, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA A - BDC B Amplitude Response JPEG Here						
12.	Command LNA B on-line			OK	**OK**	
13.	T-2 LNA B - BDC B, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA B - BDC B Amplitude Response JPEG Here						
14.	Command BDC A on-line			OK	**OK**	
15.	T-2 LNA B - BDC A, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA B - BDC A Amplitude Response JPEG Here						
16.	Command LNA A on-line.			OK	**OK**	

7.6.2 T-1 Rx Amplitude Response

PROCEDURE / REPORT OF TEST Nº 7.6.2						
TEST NAME: T-1 Rx Amplitude Response		**ELEMENT UNDER TEST:** T-1 Rx Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Point the T-1 the antenna to cold sky.					
2.	Configure and calibrate Network Analyzer to inject a swept 7500 MHz ± 250 MHz at -56 dBm with measurements of 502 points, 0.996 MHz at DC3. (Set input level to account for DC3 Coupling Factor)			OK	**OK**	
3.	Adjust Network Analyzer settings to: 1. Averaging = 10 2. Smoothing = 2 3. IF BW = 30K 4. Scale Per Div = 1 5. Coupler Factor Offset			OK	**OK**	
4.	Connect the Network Analyzer port 1 inject cable to DC3.			OK	**OK**	
5.	Connect the Network Analyzer port 2 receive cable to J56 of the Downlink L-Band Patch Panel and patch Modem 1 for T-1 receive operation.			OK	**OK**	
6.	Command LNA A on-line and BDC A on-line			OK	**OK**	
7.	Command BDC A on-line			OK	**OK**	
8.	On the Network Analyzer, activate markers, low-mid-high band. (950, 1200 and 1450 MHz)			OK	**OK**	
9.	T-1 LNA A - BDC A, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA A - BDC A Amplitude Response JPEG Here						
10.	Command BDC B on-line			OK	**OK**	

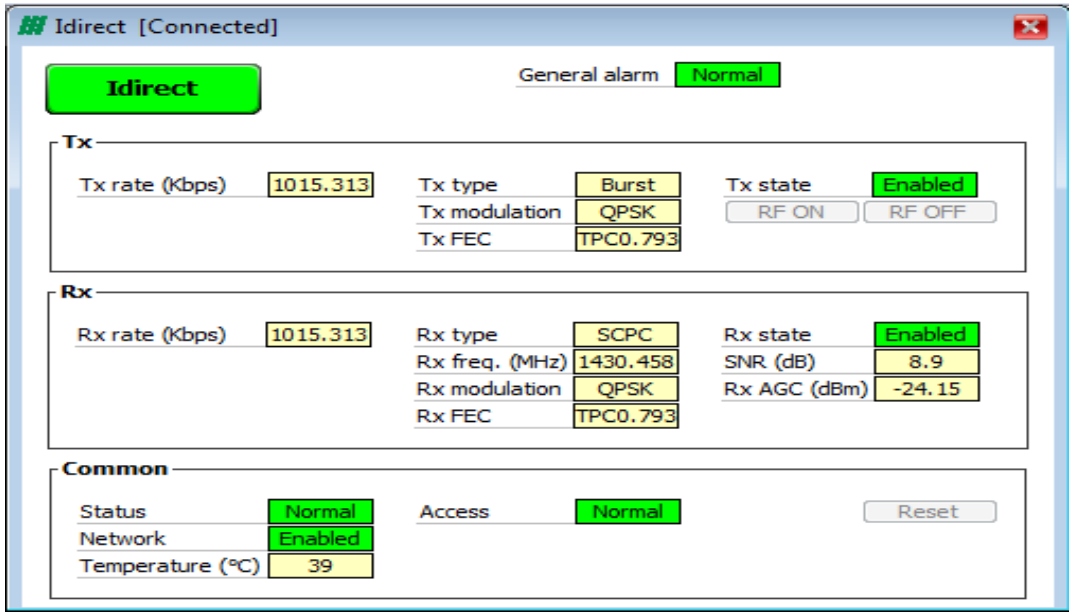
PROCEDURE / REPORT OF TEST Nº 7.6.2						
TEST NAME: T-1 Rx Amplitude Response		**ELEMENT UNDER TEST:** T-1 Rx Subsystem			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
11.	T-1 LNA A - BDC B, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA A - BDC B Amplitude Response JPEG Here						
12.	Command LNA B on-line			OK	**OK**	
13.	T-1 LNA B - BDC B, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA B - BDC B Amplitude Response JPEG Here						
14.	Command BDC A on-line			OK	**OK**	
15.	T-1 LNA B - BDC A, save the trace as a JPEG and paste below.			Max P-P variation is 5 dB (+/- 2.5 dB).	**OK**	
Paste the LNA B - BDC A Amplitude Response JPEG Here						
16.	Command LNA A on-line.			OK	**OK**	

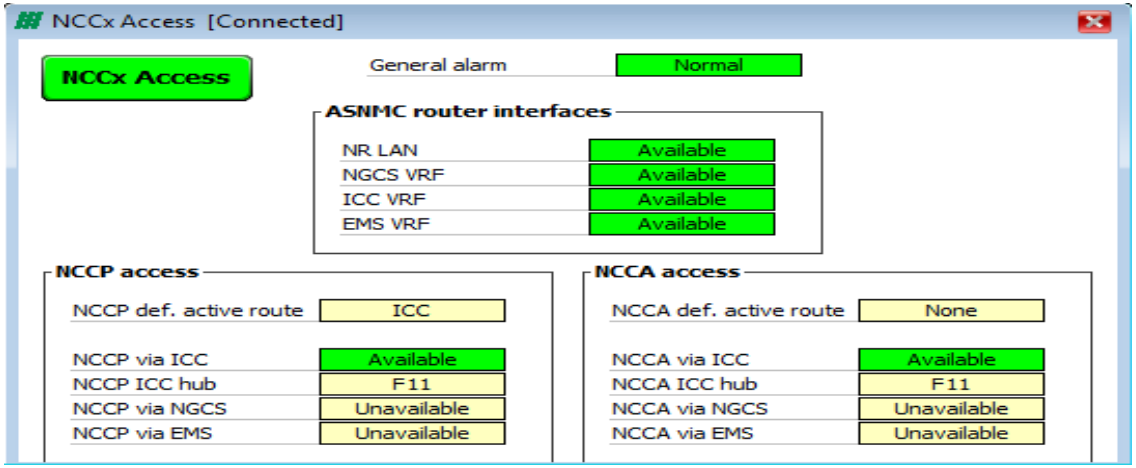
8 FUNCTIONALITY CHECKS

8.1 ASNMC Functionality Test

PROCEDURE / REPORT OF TEST Nº 8.1						
TEST NAME: ASNMC Functionality		**ELEMENT UNDER TEST:** ASNMC			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	1.6.1_20150127_NU_ASNMC_Functionalty_Test_Procedure Open Computer and check Fan operations clean inlet and outlets				**OK**	
2.	Check available Backup batteries and replace if needed				**OK**	
3.	Check ASNMC Computer is having latest version installed and functioning properly			**Win7 prof.** **ASNMC Ver.1.2.1**	**OK**	
4.	Check ASNMC Computer is having latest desktop NCIA BG Info logo installed and functioning properly				**OK**	
5.	Check the IP configuration recording to be sure the MACS has the proper IP address.				**OK**	
6.	Check RDP (Remote Desk Top operation) Functioning properly				**OK**	
7.	Check SMS kit Installation performed and Ports are configured.				**N/A**	
8.	Check iDirect EOW modem is reachable via ASNMC Computer. Download modem configuration to desktop and check modem is having latest operational option file loaded. (desired for dedicated Network)				**OK**	
9.	Configure EOW iDirect modem of the ASNMC or signal generator as follow; CW, CF 950 MHz, Output power -15 dBm.				**OK**	

PROCEDURE / REPORT OF TEST Nº 8.1						
TEST NAME: ASNMC Functionality		**ELEMENT UNDER TEST:** ASNMC			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
10.	Configure setup for T-1, measure the CW signal at the TX Power out port of the T-1 Antenna. CF 950 MHz CF 1200 MHz CF 1450 MHz			LBAND /XBAND -23.5 dBm /33.0 dBm -23.5 dBm /33.0 dBm -23.5 dBm /33.0 dBm		
11.	Configure setup for T-2, measure on “RF TX OUT”, apply measurements for /Read, and record the value measured. CF 950 MHz CF 1200 MHz CF 1450 MHz			LBAND /XBAND -23.5 dBm /39.0 dBm -23.5 dBm /39.0 dBm -23.5 dBm /39.0 dBm		
12.	Go to the right satellite (depending on the option file) and make sure that the IDirect modem gets Rx lock. The most left LED will be steady green. Switch the HPAs combined to antenna and wait till all LEDs on the modem are steady green Capture print screen of iDirect on ASNMC GUI.			Sync/ All LEDs green	**OK**	

PROCEDURE / REPORT OF TEST Nº 8.1						
TEST NAME: ASNMC Functionality		**ELEMENT UNDER TEST:** ASNMC			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
						
13.	Logon to the LCA and start the ASNMC software. Double click on the **NCCx Access** field and make sure that, in the resulting window, NCCA and NCCP access is available over ICC. Capture print screen of NCCx Access on ASNMC GUI.				**OK**	

PROCEDURE / REPORT OF TEST Nº 8.1						
TEST NAME: ASNMC Functionality		**ELEMENT UNDER TEST:** ASNMC			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
						
14.	Connect the SNOM NR IP phone to the dedicated port on the EIoW channel on the extended iDirect modem port perform a functionality test			**OK**		
15.	Establish connectivity between the ASNMC VPN router and the remote post connect SNOM NU IP phone to the dedicated port on the remote port SW and perform a functionality test			**OK**		
16.	Establish connectivity between the ASNMC VPN router and connect the remote ASNMC computer to the dedicated port on the Remote port SW and perform a functionality test			**OK**		
17.	Establish connectivity between the ORION M&C switch and the remote M&C computer and perform a functionality test			**OK**		

PROCEDURE / REPORT OF TEST Nº 8.1						
TEST NAME: ASNMC Functionality		**ELEMENT UNDER TEST:** ASNMC			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
18.	Log on to ASNMC DWS computer and check current ASNMC GUI version for Ver. ASNMC Ver.1.2.1			**Win7 prof. ASNMC Ver.1.2.1**	**OK**	
19.	Check ASNMC DWS Computer is having latest desktop NCIA BG. Info logo installed and functioning properly				**OK**	
20.	Log on VPN ROUTER/SWITCH and Check Configured Properly. Cooling Fans and Backup battery is keeping configuration.				**OK**	

8.2 Modem Tests

8.2.1 EMS CW Carrier Transmission

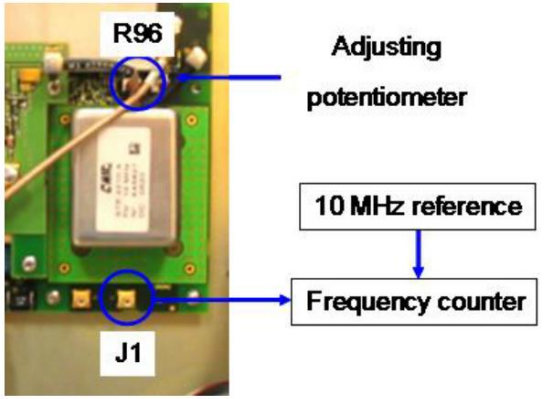
PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	1.7.1_20150127_NU_EMS_Functionalty_Test_Procedure Open Computer and check Fan operations clean inlet and outlets				**OK**	
2.	Check EMS Computer and VM is having latest Firmware/SW installed and communicating			**V.02.01.12**	**OK**	**.**

<table>
<tr><td colspan="7">PROCEDURE / REPORT OF TEST Nº 8.2.1</td></tr>
<tr><td colspan="2">TEST NAME: T-1 only EMS CW carrier transmission.</td><td colspan="3">ELEMENT UNDER TEST: EMS</td><td colspan="2">Serial Nº and/or version:</td></tr>
<tr><td rowspan="2">PROJECT:
TSGT</td><td rowspan="2">TEST MATRIX:
4.5 (FAT)</td><td>TEST CONDUCTOR:</td><td>QA ENG:</td><td>CUSTOMER:</td><td>DATE START:</td><td>DATE END:</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>STEP</td><td colspan="3">TEST SEQUENCE</td><td>EXPECTED RESULT</td><td>RESULT</td><td>REMARKS</td></tr>
<tr><td>3.</td><td colspan="3">Check EMS 8U Modem Rack is having latest Firmware/SW installed and communicating
logging-on to LMC, launch LMS. > Display MR autotest:</td><td></td><td></td><td></td></tr>
<tr><td></td><td colspan="3"><table>
<tr><th>Component</th><th>Version</th><th>Sub-component</th><th>Version</th></tr>
<tr><td rowspan="5">EMU</td><td rowspan="5">V9.6</td><td>LIA</td><td>V3.01</td></tr>
<tr><td>BOOTPP</td><td>V4.09</td></tr>
<tr><td>TESTCAGE</td><td>V5.28</td></tr>
<tr><td>GESTCARMIN</td><td>V1.15</td></tr>
<tr><td>LCTL-EMU</td><td>V9.6</td></tr>
<tr><td rowspan="2">ECU</td><td rowspan="2">V1.1</td><td>SMS</td><td>V1.1</td></tr>
<tr><td>STS</td><td>V1.1</td></tr>
<tr><td rowspan="9">UC G2.0</td><td rowspan="9">Ed2
V3.05</td><td>FPGATEST</td><td>01.01</td></tr>
<tr><td>FPGAMFC2[1]</td><td>02.10</td></tr>
<tr><td>BOOTPP</td><td>05.03</td></tr>
<tr><td>DSP_LPP</td><td>03.03</td></tr>
<tr><td>DSP_NEMS[2]</td><td>03.22</td></tr>
<tr><td>DSP_TEST</td><td>03.02</td></tr>
<tr><td>LOG_OPE</td><td>12K20</td></tr>
<tr><td>LIA</td><td>04.04</td></tr>
</table></td><td></td><td></td></tr>
<tr><td>11.</td><td colspan="3">Check all CU cards working Properly</td><td>Only 8U Modem Rack</td><td>OK</td><td></td></tr>
<tr><td>12.</td><td colspan="3">Check all PSUs are working Properly</td><td>Only 8U Modem Rack</td><td>OK</td><td></td></tr>
<tr><td>13.</td><td colspan="3">Check cooling fan Try cooling Properly</td><td>Only 8U Modem Rack</td><td>OK</td><td></td></tr>
<tr><td>9.</td><td colspan="3">Replace the back-up battery. Apply a battery replacement label on the board.</td><td>Only 8U Modem Rack</td><td>OK</td><td></td></tr>
<tr><td>10.</td><td colspan="3">Apply 10 MHz reference calibration on 8U Modem Rack</td><td></td><td>OK</td><td></td></tr>
</table>

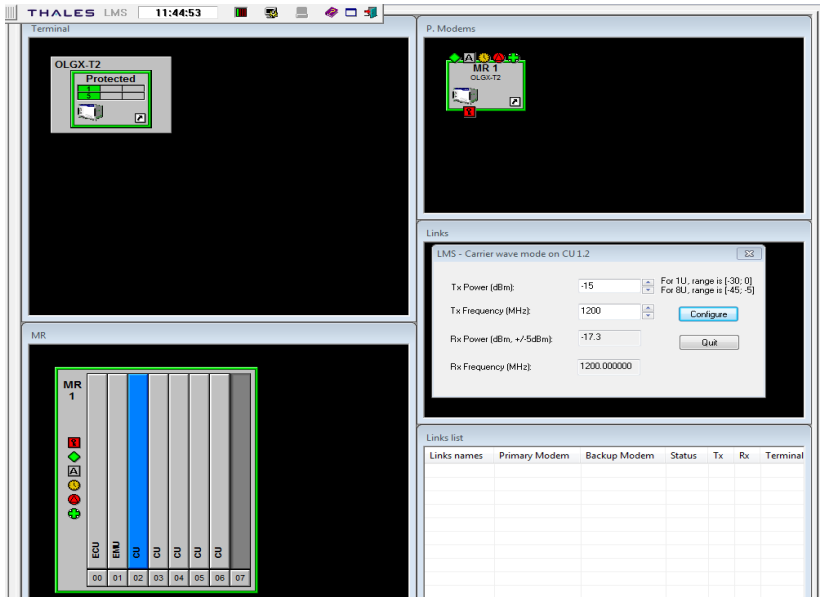
PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**

SET THE FREQUENCY COUNTER

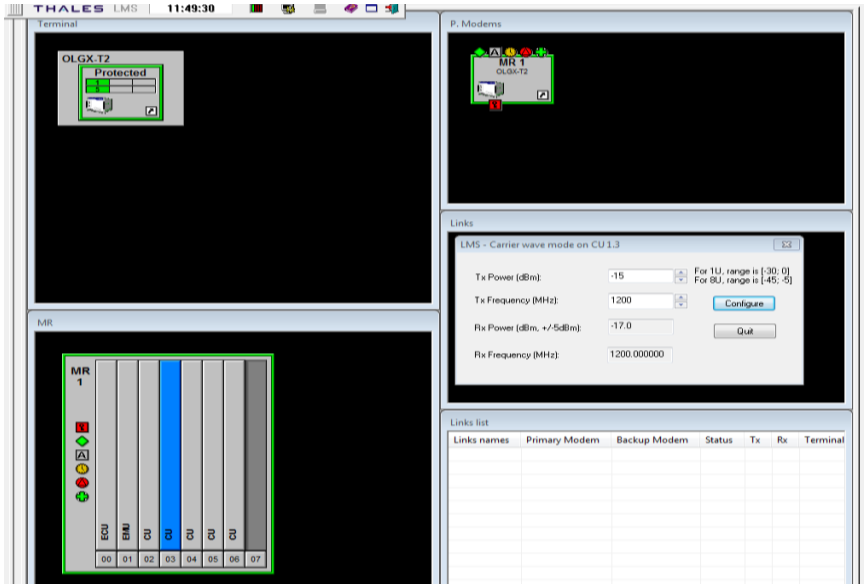
- Connect the frequency counter to the J1 connector (SMB connector).



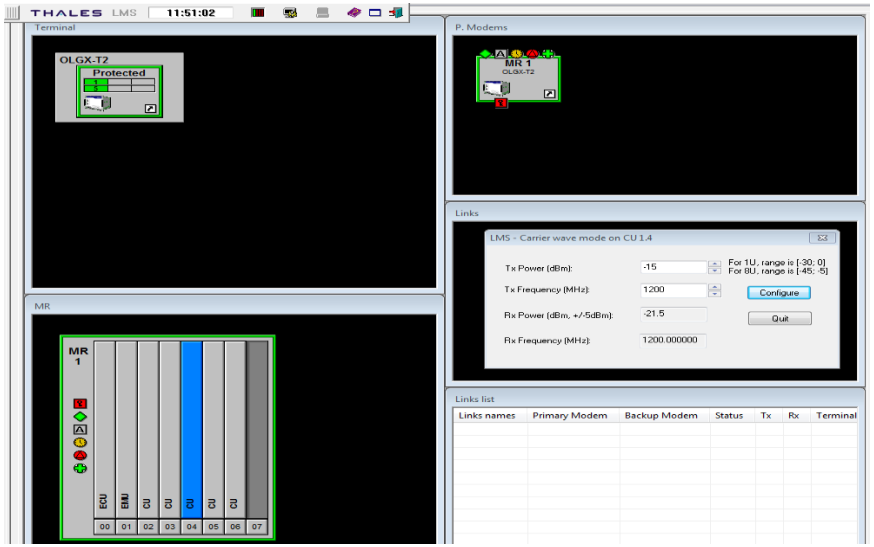
PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
14.	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, CU1 as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm. Install TX ,RX RF Chain for CUs.			**LBAND TX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
						

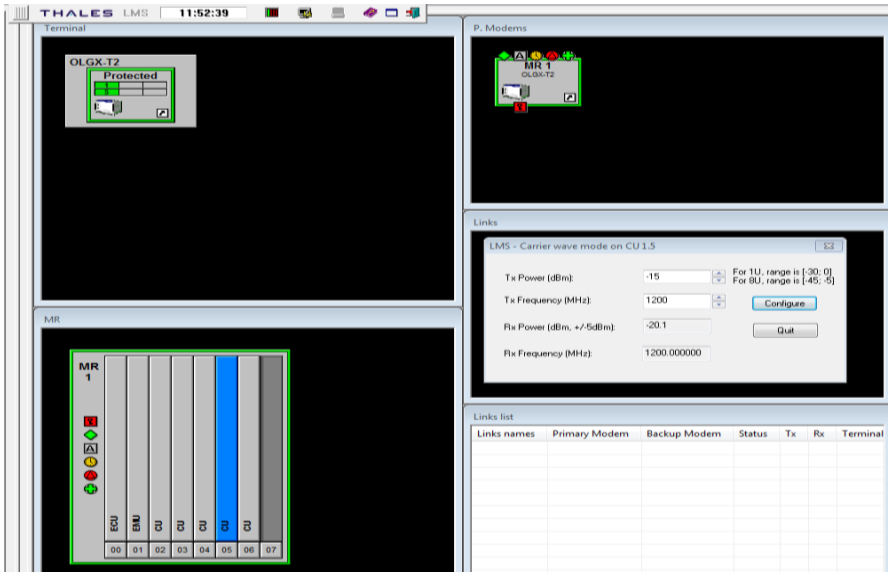
PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
15	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, CU2 as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
						

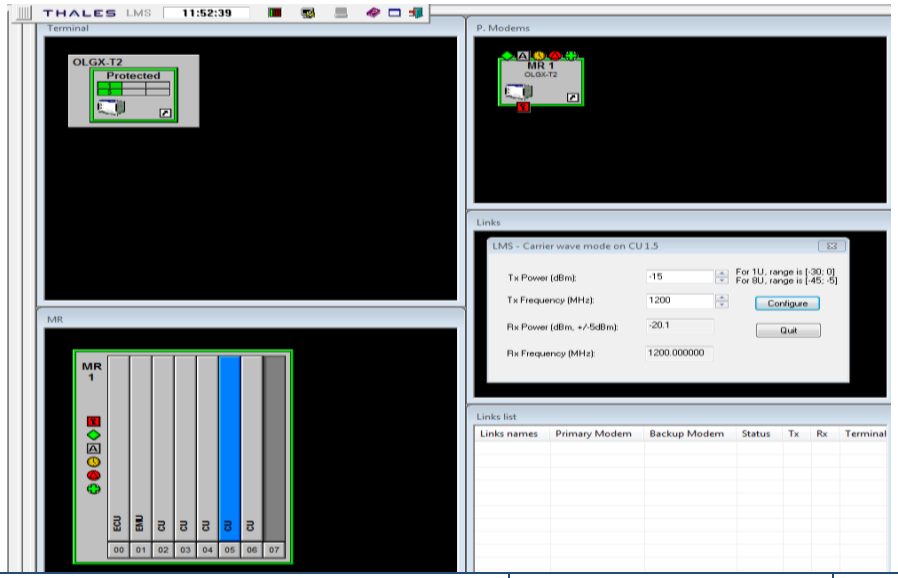
PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
16	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, CU3 as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
						

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
17	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, CU4 as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		

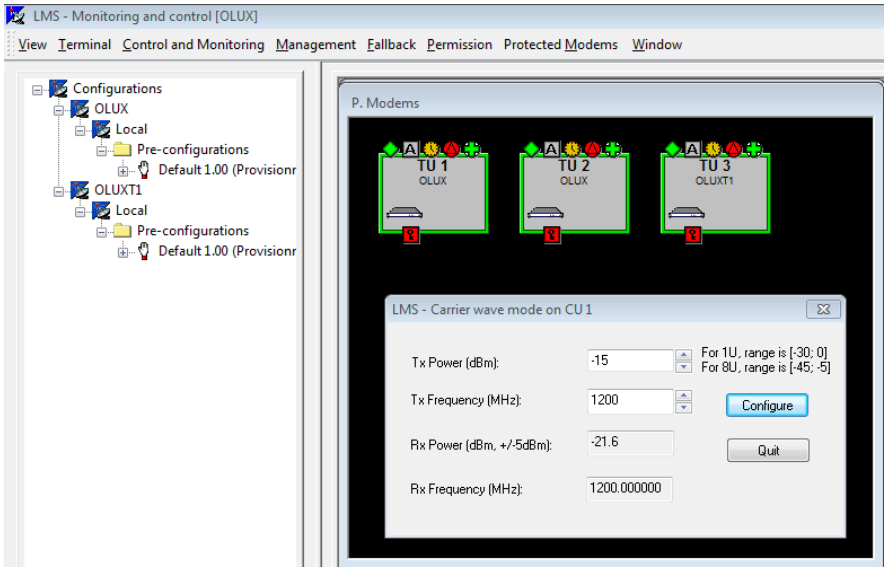
PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
						

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
18	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, CU5 as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
						
	Establish a test configuration and apply on-line test.				**N/R**	
5.	Check EMSe 1U Modems 1 is having latest Firmware/SWS installed and communicating			Version V1.2.1 with ETX upgrade to V4.3.23		
6.	Check EMSe 1U Modems 2 is having latest Firmware/SWS installed and communicating			Version V1.2.1 with ETX upgrade to V4.3.23		
7.	Check EMSe 1U Modems 3 is having latest Firmware/SWS installed and communicating			Version V1.2.1 with ETX upgrade to V4.3.23		

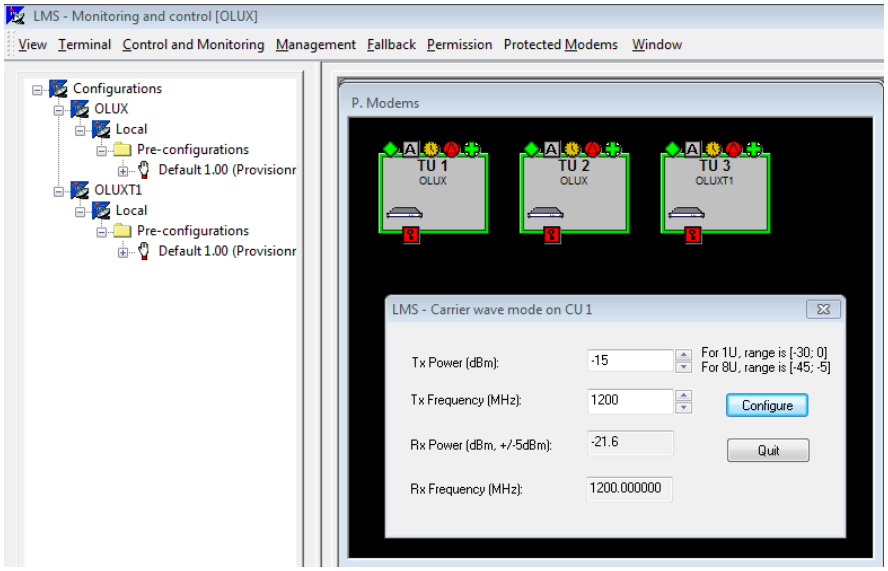
PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
8.	Check EMSe 1U Modems 4 is having latest Firmware/SWS installed and communicating			Version V1.2.1 with ETX upgrade to V4.3.23		
	Apply 10 MHz reference calibration on 1U Modem#1				**OK**	
	Apply 10 MHz reference calibration on 1U Modem#2				**OK**	
	Apply 10 MHz reference calibration on 1U Modem#3				**OK**	
	Apply 10 MHz reference calibration on 1U Modem#4				**OK**	
14.	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, TU1, (EMSe #1) as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm. Install TX,RX RF Chain for CUs.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		**EMSe1**

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**



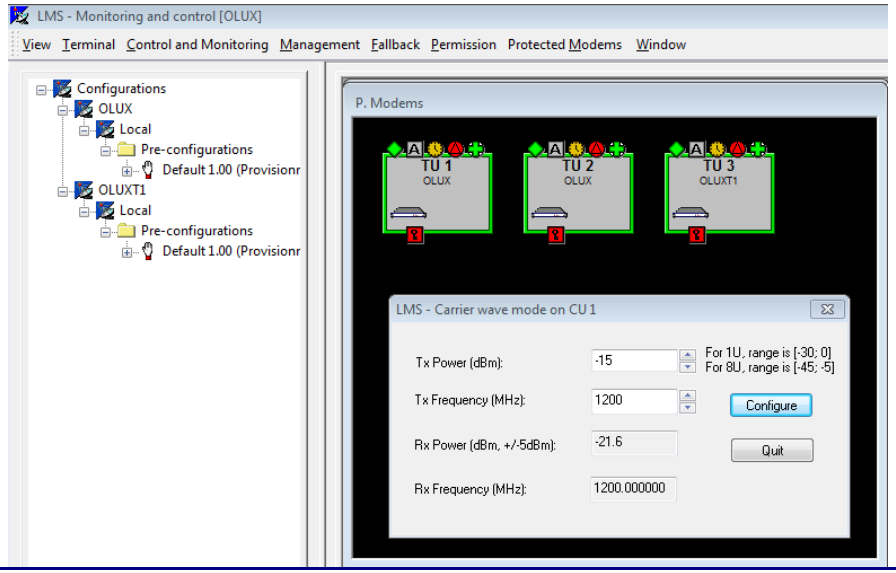
PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
14.	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, TU2, (EMSe #2) as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm. Install TX,RX RF Chain for CUs.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		**EMSe2**

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**



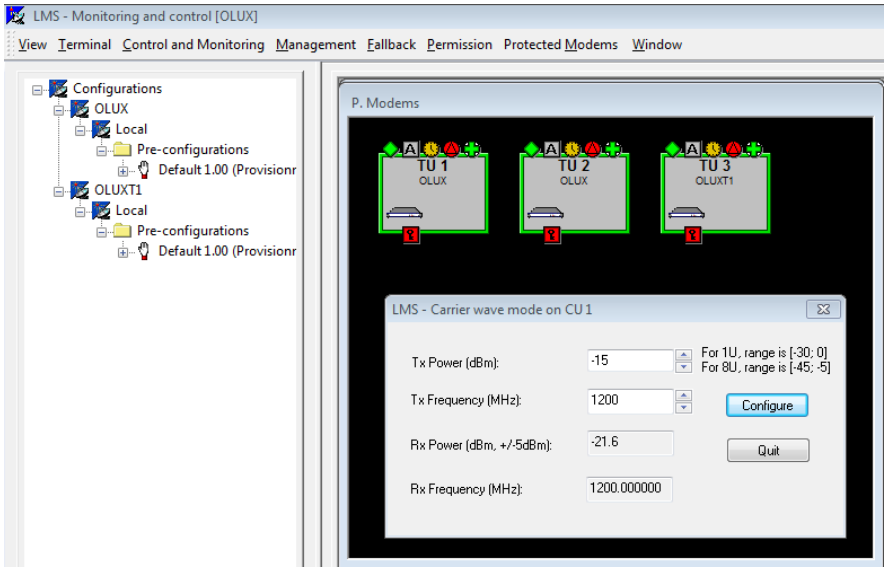
PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
14.	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, TU3, (EMSe #3) as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm. Install TX,RX RF Chain for CUs.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		**EMSe3**

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**



PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
14.	Select Up-converter A ON-LINE and SSPA A + B ON-LINE. Configure modem EPM, TU4, (EMSe #4) as follow; CW, CF 1200 MHz, Output power -15 dBm. Connect the power meter sensor to LBAND P/P EMSe1 and Enable CW and measure the level. Make a LBAND BNC loop from UPLINK to/DOWNLINK Patch Panel. Record the RX Power Level on the LMS as seen below. Connect the power sensor to X BAND RF test Panel and Enable CW and measure the level. (Coupler 57dbc) Record the measured value for CF 950 MHz -15 dBm. Record the measured value for CF 1450 MHz -15 dBm. Install TX, RX RF Chain for CUs.			**LBANDTX:-16.8 dBm** **LBAND RX:-17.5 dBm** **X -BAND TX** **T-1:+40.0 dBm** **X- BAND TX** **T-2:+46.0 dBm** **OK**		**EMSe4**

PROCEDURE / REPORT OF TEST Nº 8.2.1						
TEST NAME: T-1 only EMS CW carrier transmission.		**ELEMENT UNDER TEST:** EMS			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:** 4.5 (FAT)	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**



8.2.2 EBEM BER Stability Test per ITU- G.821 Standard

This test requires testing each EBEM modem over a satellite link, using either the modem's internal BER test mode or an external BER test set. The first modem test will be run overnight, and the remaining four modems will be run for 20 minutes.

PROCEDURE / REPORT OF TEST Nº 8.2.2						
TEST NAME: BER stability Test		**ELEMENT UNDER TEST:** Satellite System			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Obtain satellite Access Authorization to link TSGT with other NATO Terminals and / or a NATO Hub Station over a Multilink. Configure system for T-1or T-2 configuration depends on the power requirements Select BUC A and SSPA A + B. Select LNA A and BDC A. Point the Antenna Subsystem at the Satellite.				**OK**	
2.	Configure EBEM1 per the SAA (SAT Loop) and verify the modem is locked.				**OK**	
3.	Using the BER Tester in the modem or an external BER test set, start a BER test and verify test is free of any errors. Inject 1 Error confirm that it is detected.				**OK**	
4.	Run the test overnight and paste both screen capture of the modem configuration and the test results below.				**OK**	
Paste EBEM1 configuration and BER test results here.						
5.	Configure EBEM2 per the SAA (SAT Loop) and verify the modem is locked.				**OK**	
6.	Using the BER Tester in the modem or an external BER test set, start a BER test and verify test is free of any errors. Inject 1 Error confirm that it is detected.				**OK**	

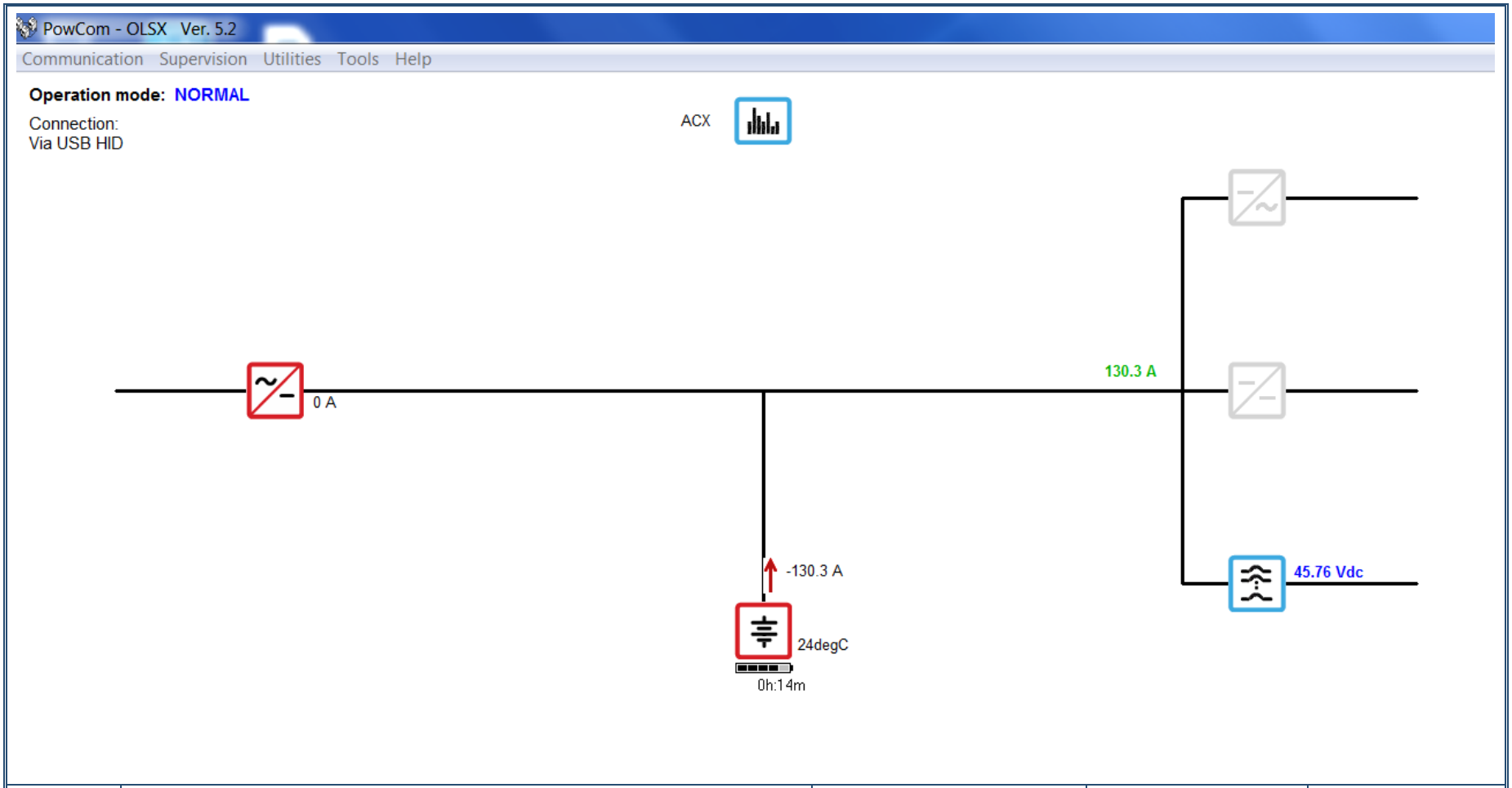
PROCEDURE / REPORT OF TEST Nº 8.2.2						
TEST NAME: BER stability Test		**ELEMENT UNDER TEST:** Satellite System			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
7.	Run the test for 20 minutes and paste both screen capture of the modem configuration and the test results below.				**OK**	
Paste EBEM2 configuration and BER test results here.						
8.	Configure EBEM3 per the SAA (SAT Loop) and verify the modem is locked.				**OK**	
9.	Using the BER Tester in the modem or an external BER test set, start a BER test and verify test is free of any errors. Inject 1 Error confirm that it is detected.				**OK**	
10	Run the test for 20 minutes and paste both screen capture of the modem configuration and the test results below.				**OK**	
Paste EBEM3 configuration and BER test results here.						
11.	Configure EBEM4 per the SAA (SAT Loop) and verify the modem is locked.				**OK**	
12.	Using the BER Tester in the modem or an external BER test set, start a BER test and verify test is free of any errors. Inject 1 Error confirm that it is detected.				**OK**	
13.	Run the test for 20 minutes and paste both screen capture of the modem configuration and the test results below.				**OK**	
Paste EBEM4 configuration and BER test results here.						
14.	Configure EBEM5 per the SAA (SAT Loop) and verify the modem is locked.				**OK**	
15.	Using the BER Tester in the modem or an external BER test set, start a BER test and verify test is free of any errors. Inject 1 Error confirm that it is detected.				**OK**	
16.	Run the test for 20 minutes and paste both screen capture of the modem configuration and the test results below.				**OK**	

PROCEDURE / REPORT OF TEST Nº 8.2.2						
TEST NAME: BER stability Test		**ELEMENT UNDER TEST:** Satellite System			**Serial Nº and/or version:**	
PROJECT: TSGT	**TEST MATRIX:**	**TEST CONDUCTOR:**	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
Paste EBEM5 configuration and BER test results here.						
17.	Re-enter the stored “home-location” mark angle recorded during Antenna Control Subsystem tests: • T-2 ACU (Section 6.1) • T-1 ACU (Section 6.2)			Home Location Mark Angle: T-2 _____ deg. T-1 _____ deg.	**OK** **OK**	

8.3 UPS Battery Check

PROCEDURE / REPORT OF TEST Nº 8.3						
TEST NAME: UPS Battery Check		**ELEMENT UNDER TEST:** UPS			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
	The UPS runtime test will be performed with the TSGT configured for the 2.4m and 4.6m RF systems transmitting in phase combined mode and operating within the linear region.					
1.	Point both T-1 and T-2 antennas to cold sky and place both antenna ACU systems in Standby.			OK	**OK**	
2.	Verify the T-1 TWTAs are in Standby mode.			OK	**OK**	
3.	Verify the T-2 SSPAs are in Mute mode.			OK	**OK**	
4.	Command both the T-2 and T-1 HPA subsystems to Combined Maintenance.			OK	**OK**	
5.	Turn on all ECUs, set target temperature to force two (2) ECUs to cooling mode.			OK	**OK**	
6.	Monitor the TSGT AC Power Meter and record kVA.			7.8 kVa	_____kVa	
7.	Monitor the Inverter SLI50 Controller System Power and record kVA.			2.8 kVa	_____kVa	
8.	Configure EBEM 1 to Inject -10 dBm, CW, 1200 MHz and patch to the T-2 Uplink.			OK	**OK**	
9.	Configure EBEM 2 to Inject -10 dBm, CW, 1200 MHz and patch to the T-1 Uplink.			OK	**OK**	
10.	Unmute (Enable) the T-2 SSPAs.			OK	**OK**	
11.	While monitoring the output power of the SSPAs by means a ASNMC increase the CW signal level of EBEM 1 until both SSPAs are operating at 50.0 dBm.			50.0 dBm	_____dBm	
12.	Monitor the TSGT AC Power Meter and record kVA.			11.6 kVa	_____kVa	

PROCEDURE / REPORT OF TEST Nº 8.3						
TEST NAME: UPS Battery Check		**ELEMENT UNDER TEST:** UPS			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
13.	Monitor the Inverter SLI50 Controller System Power and record kVA.			6.4 kVa	_____kVa	
14.	Command both T-1 TWTAs to Transmit.					
15.	While monitoring the output power of the TWTAs by means a ASNMC increase the CW signal level of EBEM 2 until both TWTAs are operating at 45.0 dBm.			45.0 dBm	_____dBm	
16.	Monitor the TSGT AC Power Meter and record kVA.			16.4 kVa	_____kVa	
17.	Monitor the Inverter SLI50 Controller System Power and record kVA.			11.0 kVa	_____kVa	
18.	<u>UPS Battery Runtime Test</u> 1. Open main circuit breaker CB1. 2. Note and record start time. 3. Check the current flow with PowCom. It should indicate that it is flowing <u>OUT</u> of the battery as shown in the screen capture below. 4. Monitor battery voltage on the Rectifier Controller and record the time when the battery voltage is reduced to 44.0 VDC. 5 minutes elapses before voltage drops, go to step 5. 5. Record UPS battery run time autonomy. ***Note**: The minimum capability on UPS power is 5 minutes*.			5 Minutes +	**OK** Time: _____:_____ **OK** _____ VDC _____ min	



19.	Close CB1 and verify Rectifiers assume load and battery recharge.	OK	**OK**	
20.	Command the SSPAs to Mute and TWTAs to Standby.	OK	**OK**	
21.	Set the ECUs to a 25°C target temperature and normalise the system.	OK	**OK**	

9 REINSTALL CALIBRATED TEST EQUIPMENT

PROCEDURE / REPORT OF TEST Nº 9.0						
TEST NAME: Test Equipment Install		**ELEMENT UNDER TEST:** TEST EQUIPMENT			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
1.	Confirm SNs, check calibration stickers, and reinstall test equipment and FO reels.					
2.	WAN Tester			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
3.	Power Meter			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
4.	Power Sensor			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
5.	DVM			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
6.	Personal Radiation Monitor			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
7.	MCL Attenuator 3 db.			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	

PROCEDURE / REPORT OF TEST Nº 9.0						
TEST NAME: Test Equipment Install		**ELEMENT UNDER TEST:** TEST EQUIPMENT			**Serial Nº and/or version:**	
		TEST CONDUCTOR:	**QA ENG:**	**CUSTOMER:**	**DATE START:**	**DATE END:**
STEP	**TEST SEQUENCE**			**EXPECTED RESULT**	**RESULT**	**REMARKS**
8.	MCL Attenuator 6 db.			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
9.	MCL Attenuator 10 db.			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
10.	MCL Attenuator 20 db.			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
12.	Spectrum Analyzer			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
13.	F/O 250meter HMA 4CH.SM			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	
14.	F/O 250meter HMA 4CH.SM			SN OK Installed CAL Sticker OK	**OK** **OK** **OK**	

10 ARCHIVE REPORT

Archive this test report when it is complete.