GAMMA-RAY LARGE AREA SPACE TELESCOPE (GLAST) PROJECT

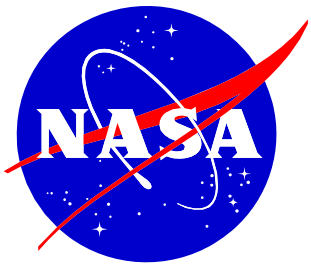
End-to-End Test 2 Test Procedure

Revision Date: 7/02/07

Run Number: _____

Run Date: _____

With 7-5-07 Red-Lines



GODDARD SPACE FLIGHT CENTER

GREENBELT, MARYLAND

PROCEDURE NO.	REV.
GLAST-PROC-000457	-

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This document is controlled by Gamma-ray Large Area Space Telescope (GLAST) Project.
Modification of this document requires approval of the GLAST Test Review Board.

Prepared By:

Michael Shaffer — Date
GPO Engineer

Reviewed By:

Norman Rioux — Date
Mission Systems Engineer

Doug Spiegel — Date
MOC Program Manager

Ken Lehtonen — Date
Ground System Manager

Jim Howe — Date
Spacecraft Systems Engineer

Jim Anderson — Date
Safety Engineer

Michael Estipona — Date
Quality Assurance Engineer

Peter Acosta — Date
GPO Communications Lead

Kenneth Fouts — Date
LAT I&T Manager

Alan Ames — Date
Spacecraft Communications Engineer

Robert Cameron — Date
LISOC Manager

Wendell Burk — Date
GD Operations REA

William Paciesas — Date
GBM Representative

Approved By:

Joy Henegar — Date
Mission Integration & Test Engineer

Kendall Nii — Date
GD Systems Engineer

Jack Leibee — Date
Mission Systems Manager

Ron Zitek — Date
Spacecraft Integration & Test Engineer

Albert Vernacchio — Date
Deputy Project Manager

Kevin Grady — Date
Project Manager

Revision Table

Revision	By &Date	Description	Check	Approved & Date
-		Initial Release		-

PROCEDURE NO.	REV.
GLAST-PROC-000457	-

Redline Table for Run #_____

Redline Number	Redlined Step(s)	Disposition
1	Step 16.13	Correct procedure arguments added.
2	Step 16.19	Corrected typo, GBMSETEACHPHADT
3	Step 16.4	Corrected typo, GBMSETONETRIGLVL
4	Step 16.5	Corrected typo, GBMSETALLTRIGLVL
5	Step 12.12a	Added to dump the GBM LUT
6	Steps 6.7 & 25.9	Add words to enable feeds, only if necessary
7	Steps 6.8 & 25.10	Change 0x0016 to 0x0010
8	Steps 13.11, 16.8 to 16.10	Added warning about burst triggers on umbilical telemetry.
9	Steps 11.1.3, 11.1.5, 11.2,3, 11.2.5	Added warning to check L_MCH_NY_VHP0_T before executing to avoid starting RTS0.
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Table of Contents

I. Objective and Scope

This test is designed as a test of the Mission System. The primary focus of this test is on exercising the data paths within the GLAST Observatory, including storage and playback of data, communication between the Mission Operations Center and the Observatory, and transfer of data products from the MOC to the instrument and science operations centers.

The GNC Subsystem will be in Idle Mode during this test. The space craft will be put into Mission Mode.

This test will use TDRS and the White Sands facilities. The RF paths will be through cables from the spacecraft to the General Dynamics Ku-Rack and the TURFTS Rack at the GD FOF. This test is designed use the GFEPs at White Sands. Data transfer of Level-0 products will be initiated automatically at the end of a TDRS contact/pass.

Since schedule uncertainty is a factor in when this test will actually be performed, TDRS time will have to be scheduled within the 3-week window for TDRS schedule requests. The contacts will need to be scheduled through TDRS Unused Time (TUT) and most likely adjusted on the day of the test using SWSI.

The objectives of this test are as follows:

- Initialize SRR
- Generate S/C C&DH &GNC Diagnostic telemetry
- Load and execute advanced stored command loads (ATS and RTS)
- Perform memory/FSW table uploads (s/c and instrument)
- Dump memory/FSW tables (s/c and instrument)
- Power on Instruments
- Flow RT instrument HK TLM packets to LISOC
- Power on components required during L&EO: ST, SADA, APA, GPS etc.
- Execute instrument nominal ops procs
- Initiate GBM Burst Alert and flow data to the BAPs
- Flight Software verifications outlined in MOR RFA 8 response
- GSSC receive products from the MOC and IOCs and place data in the archive

Test Outline

Day 1

- Power up spacecraft.
- MOC performs SSR initialization of the SSR.
- MOC Load any RTSs and ATSs needed for this day of test.
- MOC perform spacecraft flight software parameter modification tests.
- MOC power on spacecraft components:
    - Turn on PDU power feeds for the S-Band Transmitter.
    - Enable EDAC scrubbing
    - Turn on LAT VHCP Heaters, verify state, then turn heaters off.

    - Turn on Start Trackers
    - Set the Mission Mode flag
    - Turn on GPS and initialize the GPS.
    - Turn on, Pressure Transducers, verify state, then turn them off.
- MOC set the spacecraft time using GPS.
- MOC upload SAA tables.
- MOC upload ephemeris
- MOC upload TDRSS ephemeris
- MOC disable the SAA Trigger
- MOC switch to 40 Mbps downlink for instrument turn on.
- MOC power on GBM (including high voltage)
- MOC execute the GBM functional test (reset test and upload test)
- Execute GBM SAA testing (with detectors on)
- Disable SAA Trigger
- Manually command SAA with detectors on
- Execute Instrument nominal operations procedures
    - For GBM:
        - LUTs dump
        - Load Spec LUT
        - PHA Master start/stop
        - CSPEC on/off
        - CTIME on/off
        - Set CSPEC, CTIME accumulation times
        - Set PHA deadtimes (flexible, all detectors)
        - Enable burst triggers
        - Disable burst triggers
        - Set PHA Detmask
        - Command a trigger – test procedure
        - Perform PDU functional test (early orbit)
        - Set single LLT
- Playback SSR
- Power down GBM
- Power down spacecraft (I&T playback SSR).

Day 2

- SC I&T Power up the spacecraft – setup for instrument activation start.
- SC I&T Power up GBM in Science mode
- SCI&T Transfer commanding to MOC
- MOC power up LAT
- Execute Instrument nominal operations procedures
    - For LAT:
        - Exercise VCHP Heaters
        - Power On LAT
        - Turn on Main Feed & Initialize LTC

  - Activate All Towers
  - Power on All 12 ACD Boards
  - Set LAT Cal High Voltages
  - Set LAT Tracker High Voltages
  - Set Lat ACD Voltages
  - Set up LAT Science Data Taking Configuration
- Execute LAT Physics Observation 1 & File Upload Test
- Playback SSR
- Execute LAT Physics Observation 2 With Processor Dump Activities
- Playback SSR
- End test with instrument power off and spacecraft power off

II. Applicable Documents & Drawings

Documents

General Dynamics Integrated Space Systems Documents
Observatory Operations Description Manual, CDRL 5
Telemetry and Commanding Handbook, CDRL 6
GLAST Space Telescope Spacecraft Power On/Off Standard Operating Procedure, 1196 ET-W62606-000
Emergency Action Plan, 0000 EP-SA-23534-0000
Emergency Action Plan, Factory of the Future (FOF), Bldg. A3, 0000 EP-SA60893-000
Safety and Health Plan, 0000 EU-SA13160-000
Safety and Health Manual, 0000 EU-SA13160-000
Control of Electrostatic Discharge (ESD), 0000 WI-Q08193-000
GLAST Spacecraft EGSE Test for Configuration and Operating Procedure, 1196 ET-G65899-000
Quality Manual, 0000-EU-Q06753
Test Procedure Flag (TPF) Work Instruction, 0000 WI-I66674-000
System Safety Work Instruction, 0000 WI-E21599
GLAST Wiring List, 1196 EC-E62892-000
GLAST Integration and Test Ground Constraints, 1196 EP-I65378-000
GLAST Component Verification Specification (CVS), 1196 EW-R28333-000
LAT Flight Software Users Guide, LAT-TD-07665-02
LAT Functional Test Procedure 1196-ET-I74927-000C
GBM Functional Test Procedure, 1196 ET-I73633-000A
ICD for the Use of LICOS during Observatory I&T, LAT-MD-08434-01

Narrative Procedures

Narrative Procedures are not run during this test, but STOL procedures are used that are called from the following NPs:
Commanding Operations, SC-FSW-01
Stored Telemetry Playback from CPU SC-FSW-02

Upload Stored Command Sequence (ATS or RTS), SC-FSW-03
Upload/Download Table, SC-FSW-04
SSR Playback, SC-FSW-06
Change Flight Parameters, SC-FSW-07
Set TDRSS Uplink & Downlink Data Rate, SC-RF-02
Configure Telemetry Downlink for TDRSS Contact, SC-RF-05
Command Checkout, SC-OBS-04
Send LAT NOOP Commands, L-LAT-03
GBM No-op, G-GEN-011
GBM Power Up, G-GEN-002
GBM Load Spec LUT, G-DPU-002
GBM PHA Master Start/Stop, G-DPU-003
GBM CSPEC On/Off, G-DPU-004
GBM Set All LLT, G-DPU-005
GBM Set PHA Deadtimes, G-DPU-006
GBM Set PHA Detector Mask, G-DPU-007
GBM Commanded Trigger, G-DPU-011
GBM Set Single LLT, G-DPU-015
GBM Set PHA Deadtimes All Same, G-DPU-016
GBM Set CSPEC Accumulation Times, G-DPU-017
GBM CTIME On/Off, G-DPU-018
GBM Set CTIME Accumulation Times, G-DPU-019
Set PHA Deadtime One Detector, G-DPU-020
GBM LUT Checksum, G-DPU-021
GBM Load Time LUT, G-DPU-027
GBM Set Diagnostic Message Mode, G-FSW-003
GBM Dump Diagnostic Message Log, G-FSW-004
GBM Memory Dump, G-FSW-006
GBM Memory Scan, G-FSW-007
GBM Memory Upload, G-FSW-009
GBM Set Trigger Stage Duration, G-FSW-010
GBM Set All Trigger Levels, G-FSW-011
GBM Set One Trigger Mode, G-FSW-018
Set Reported Trigger Algorithm, G-FSW-034
GBM Set Reported Detector, G-FSW-035
GBM Set One Trigger Level, G-FSW-047
GBM Set All Trigger Modes, G-FSW-048
GBM Set High Voltages, G-PSB-002
GBM Set High Voltage One PMT, G-PSB-004
GBM Set Low Voltages On, G-PSB-006
Set Low Voltages Off, G-PSB-007
GBM Set All Low Voltages, G-PSB-008
SSR Power On & Initialization, SC-FSW-05
Enable/Disable EDAC Scrubbing, SC-FSW-08
SC-EPS-08
SC-TCS-01
Load Ephemeris Data, SC-GNC-01

Turn On Star Trackers, SC-GNC-02
Set Mission Mode, SC-SYC-08
LAT Power On, OBS-02
LAT Start Up, L-LEO-01
LAT SIU/EPU Hardware Functional, L-LEO-02
LAT HVBS Power On, L-LEO-03
File Upload, L-FIL-01
File Copy from SIU to EPU, L-FIL-02
File Load Cancel, L-FIL-03
Initiate Physics Observation, L-LPA-01
Terminate Physics Observation, L-LPA-02
Set Active Event Handler Configuration, L-LPA-04
Associate Event Handler Configuration, L-LPA-05
Set Event Data Output Stream, L-LPA-06

Electronic Test Procedures

STOL Procedures

GBM Procedures:
gbmsetonepmthvbt
gbmsetonelvon
gbmphastartstop
gbmsetallvoff
gbmsetallpmthvbt
gbmcmdtrigger
gbmsetonetrgmmode
gbmsetalltrgmode
~~gbmsetonetrglv~~
gbmsetonetriglv ***(MPS 7-7-07, MPS #3)***
~~gbmsetalltrglv~~
gbmsetalltriglv ***(MPS 7-7-07, MPS #4)***
gbmsettrigalg
gbmselectthkdet
gbmbursttrigena
gbmbursttrigdis
gbmloadspeclut
gbmlutchecksum
gbmlutloadtime
gbmcspeconoff
gbmctimeonoff
gbmcspecaccum
gbmctimeaccum
gbmmemorydump
gbmmemoryscan
gbmsetonephadt

gbmsetteachphadt
gbmsetallphadt
gbmphadetmask
gbmsetonellt
gbmsetallllt
gbmselectlvoff
gbmselectlvon
gbmsetonelvoff
gbmsetlvonoff
gbmsetdiagmsg
gbmdmpdiagmsglog
gbmsettrigdur
gbmsetdetector
gbmpowerup
gbmsetalllvon
gbmsetalllvoff
gbmlutdump ***(MPS 7-7-07 #5)***

LAT Procedures:
LATLIMITSET
LATSIUREADY
LATSIUBOOT
LATDAQREADY
LATMAINFEEDON
LATPOWERAEM
LATPOWERCAL
LATPOWERTKR
LATPOWERTEM
LATTCINIT
LATPOWEREPU
LATPOWERFREEBD
LATVERIFYCFG
LATCALHVBIAS
LATTKRHVBIAS
LATACDBIASCFG
LATCONFIGHV
LATSTOPLRSCNTR
LATACDHVOUTSAA
LATSETEVTHANDCFG
LATASCEVTHANDCFG
LATSETEVENTOUT
LATBEGINPHYSOB
LATLOADFILE
LATCANCELLOAD
LATCOMMITLOAD
LATCOPY2EPU
LATENDPHYSOB

LATDUMPMODLIST
LATDUMPTASKLIST
LATDUMPMEMPOOL
LATFILESYSSTAT
LATCHKFILESYS
LATDUMPMEM
LATCANCELMEMDUMP

MOC Ground Procedures:
ogfepaos.proc (GFEP AOS configuration)
otdrssaos.proc (TDRSS AOS configuration)
ospacecraft.proc (Spacecraft I&T command configuration)

Spacecraft Procedures:
scnoop.proc (Sends spacecraft NOOP command)
sfswatsstart.proc (Starts ATS commands)
sfswatsstop.proc (Stops ATS commands)
sfswatsswitch.proc (Switches from ATS table A to Table B)
sfswatsuplink.proc (Uploads an ATS load to the spacecraft)
sfswdlcommands.proc (Enable or disable command echo)
sfswdlevents.proc (Enable or disable the downlink of event messages)
sfswdlparams.proc (Enable or disable flight parameter download on change)
sfswrtsenable.proc (Enable an RTS)
sfswrtsstart.proc (Execute an RTS)
sfswrtsuplink.proc (Upload an RTS)
sfswssrpb.proc (Playback the SSR)
sfswtbldiag.proc (Dump diagnostic telemetry)
sfswtbldnload.proc (Dump tables from RAM)
srfulrate.proc (Set the S/C uplink rate for TDRSS SSA)
sfrxmtroff.proc (Turn off the transmitter)
srfxmtronku.proc (Set the S/C downlink rate for Ku-band and turn on the transmitter)
srfxmtronsa.proc (Set the S/C downlink rate for SSA and turn on the transmitter)
sepslatprudaq.proc (Turn on or off the PRU DAQ feed)
sepslatprusiu.proc (Turn on or off the PRU SIU feed)
sepslatpruvchp.proc (Turn on or off the PRU VCHP feeds)
sfswssrleoinit.proc (Initialize the Solid State Recorder)
sfswssrconfig.proc (Configure the Solid State Recorder)
sfswdacscrubena.proc (Enable EDAC memory scrub)
stcsenahtrs.proc (Enable Heaters)
sgncstarson (Turn on a Star Tracker)
ssysmissmode.proc (Set Mission Mode)
sgncgpson.proc (Power on GPS)
sgncupldephtofsw.proc (Update GLAST ephemeris)
sgnctdrssephemupdate.proc (Update TDRS ephemeris)

Astro RT Procedures
GLAST_SC_POWER_UP
GBM_Power_Up_and_Aliveness
LAT_Load_Shed

LISOC Procedures
No LISOC electronic scripts are needed. The LAT is controlled from the LAT Workstation at the GD FOF site

GIOC Procedures
No GIOC procedures are needed. The GBM is controlled from the GBM Workstation at the GD FOF site.

III. Requirements Verification

Refer to Appendix A for a list of requirements verified by this test.

IV. Required Pre-configuration

The following components must be integrated to the observatory to support this test:

Engineering Model (EM) or Flight Integrated Electronics Module (IEM)

Engineering Model (EM) or Flight Integrated Solid State Recorder (SSR)

Flight Power Distribution Unit (PDU)

Flight Power Regulator Unit (PRU)

Flight Oven Controlled Crystal Oscillators (OCXOs)

Flight Global Position System Electronics (GPS)

LAT Instrument

GBM Instrument

Flight Integrated S-Band Subsystem (MMTs, and associated diplexers, RF switches and hybrids. Antennas are not required.

Flight Integrated Ku-Band downlink components, except for the high gain antenna and its positioning mechanism.

The GLAST Spacecraft EGSE Test for Configuration and Operating Procedure, 1196 ET-G65899-000, must have been executed and the EGSE configuration verified to support testing with the Spacecraft.

V. Test Configuration

Configure the spacecraft and EGSE per Reference figure 8-1 in the GLAST Space Telescope Spacecraft Power On/Off Standard Operating Procedure (1196 ET-W62606-000) for Spacecraft EGSE configuration.

The interface between the GD FOF facility and the MOC is shown in Figure 1. The interfaces between the MOC, GIOC, and LISOC are shown in Figure 2.

The interfaces between the GLAST spacecraft, General Dynamics EGSE, and The TDRS Transportable Ground Terminal and Space Network are shown in Figure 3 and Figure 4.

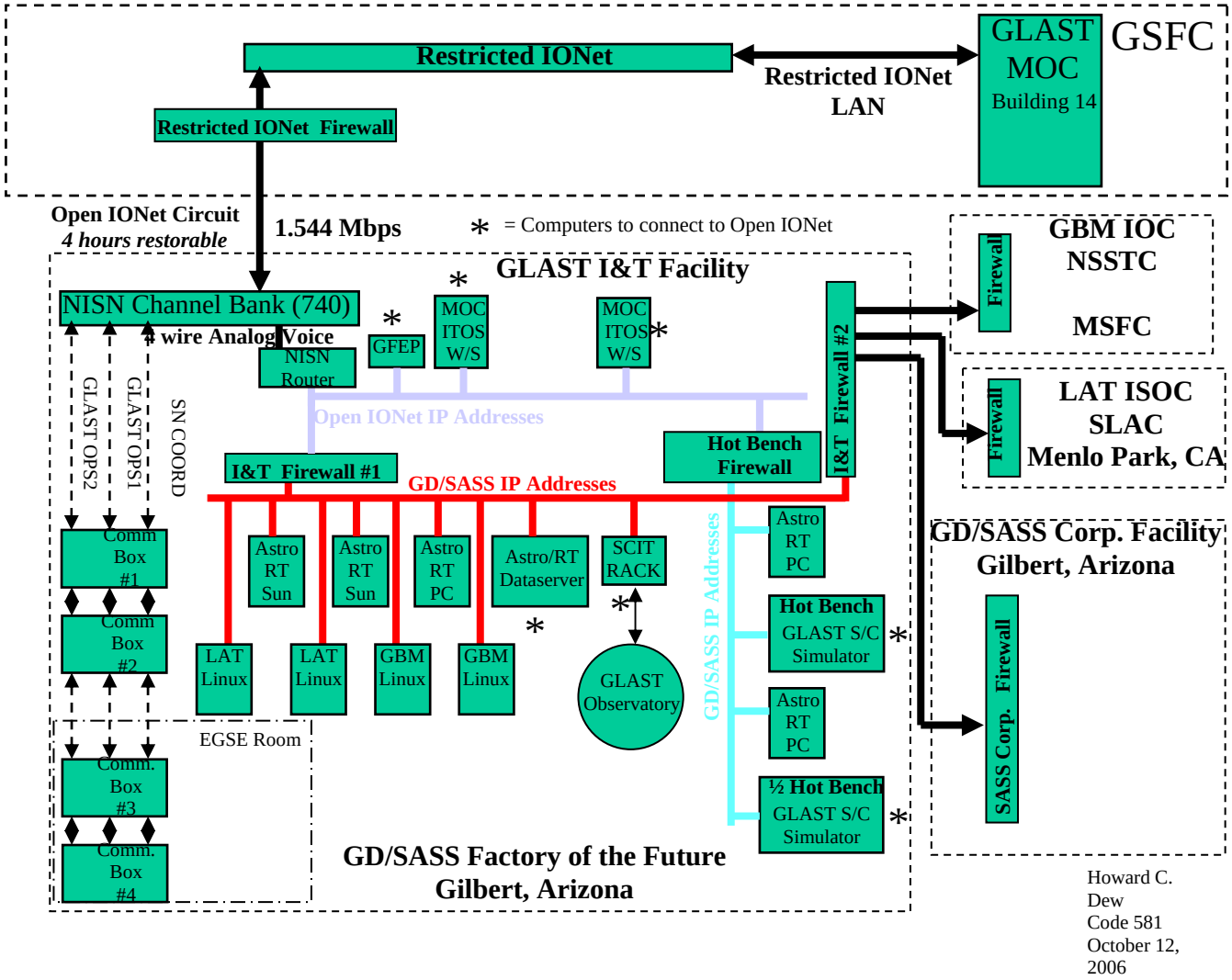
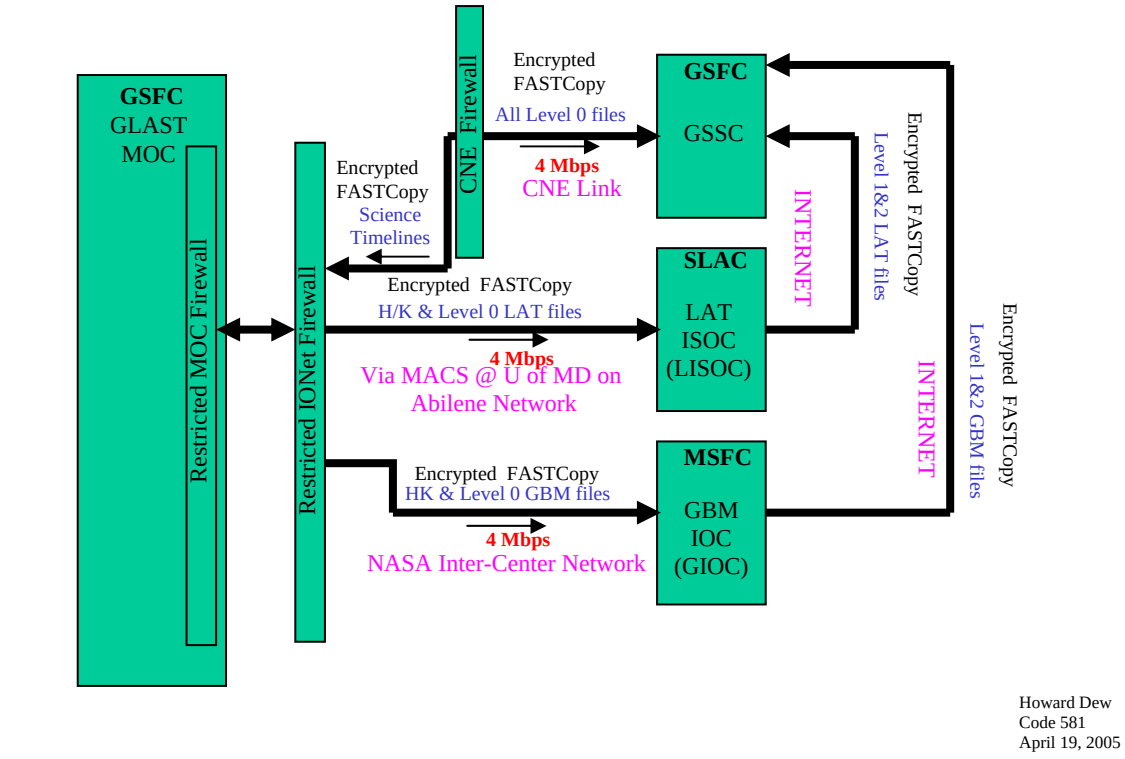


Figure 1 GLAST I&T Facility Network Diagram



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April 19, 2005

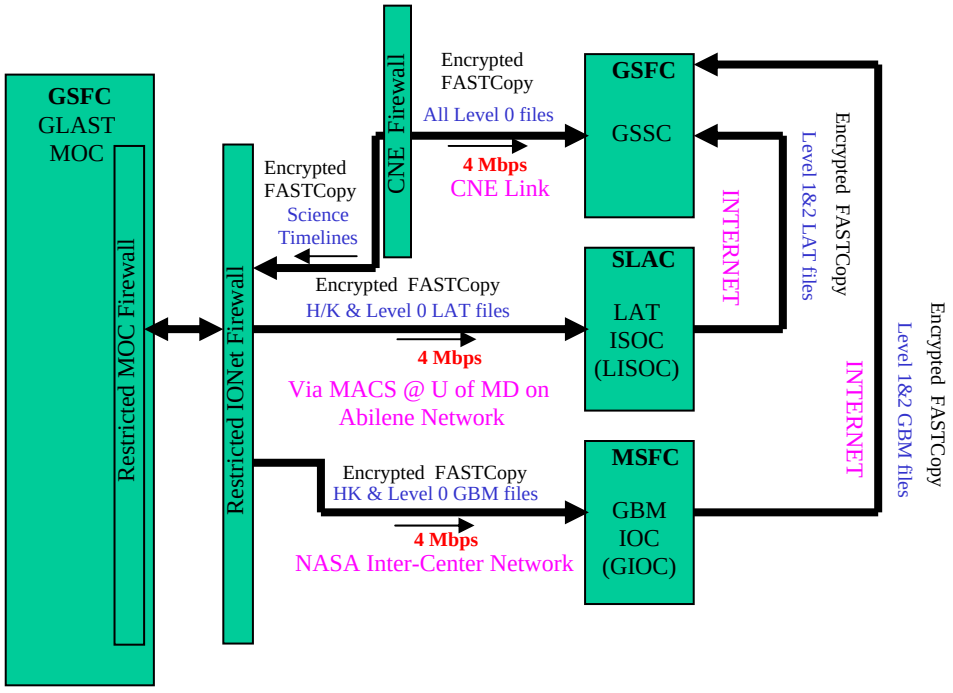

Figure 2 GLAST Indirectly-Connected Elements Diagram

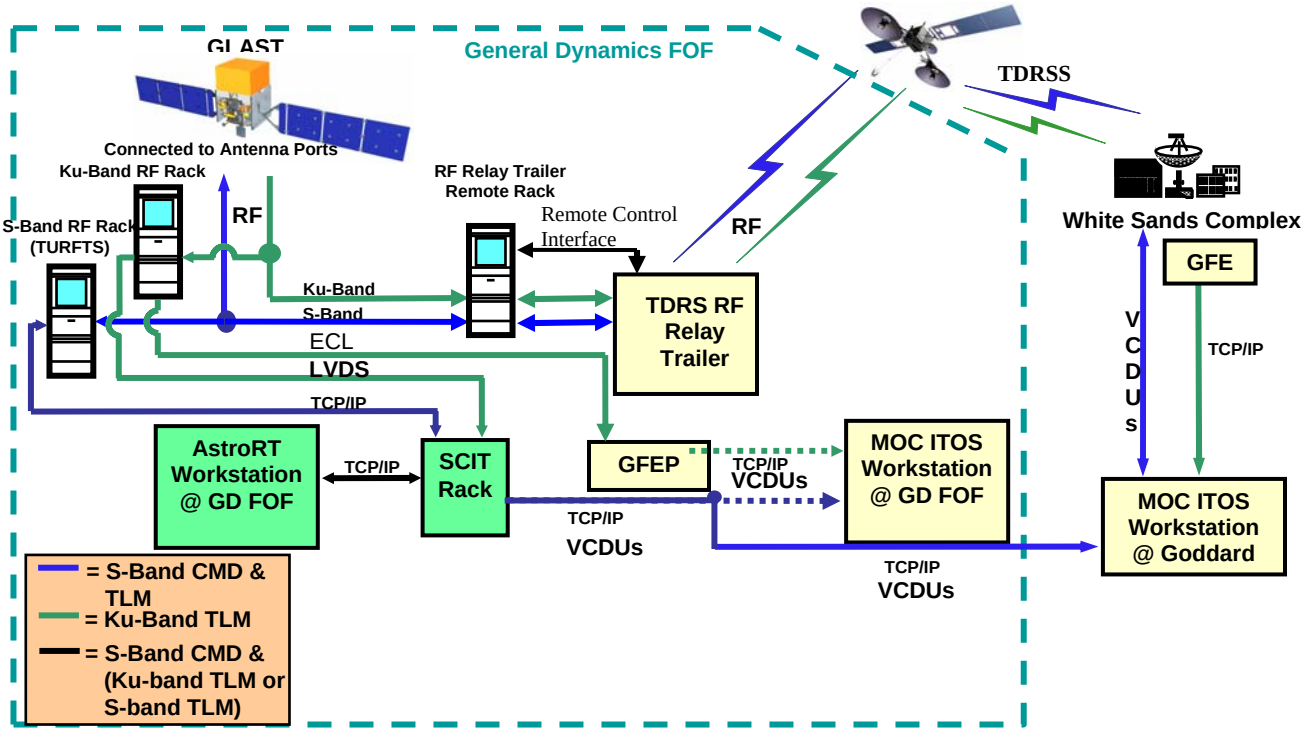

Figure 3 GLAST to SN Interface through TTGT Relay Trailer

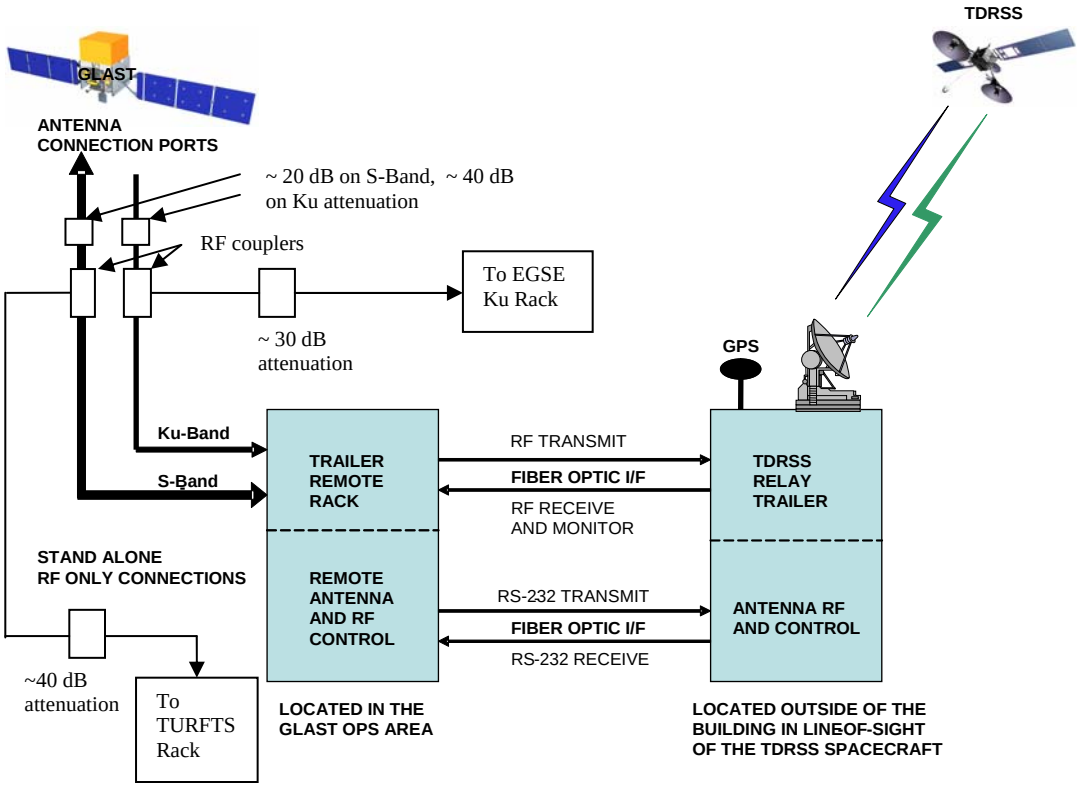

Figure 4 TDRS Relay Trailer (TTGT) GLAST Interface Diagram

VI. Required Resources

The following hardware resources are required to support this test.

TDRS

TDRS time must be scheduled prior to this test. The following list of events assumes one contact for each section in which TDRS is used (some of these could be merged into single larger events, depending on available time). The contacts should not be planned for less than 20 minutes.

Number of Contacts	Description of Contact and Services
2	Initial pointing contacts to adjust the offsets of the TTGT Relay Trailer, approximately 20 minutes each. One on TDRS W and one on TDRS 171. Only the CW service on the KSA forward link is needed.

EGSE at I&T Facility

Spacecraft Integration & Test (SCIT) Rack
Spacecraft Integrations & Test Ku-Band RF Rack
Archive Data Server
Astro RT Workstation
LAT Workstation (LICOS Script Engine, Astro RT Proxy)
NASA TURFTS Rack
Spacecraft Integration & Test Ku-Band Rack and GFEP
NASA TDRS Transportable Ground Terminal (TTGT) and Remote Control Rack

The following personnel are required to execute this test:

At the FOF
- Spacecraft Test Conductor
- EGSE Engineer/Tech
- Network Eng/Tech
- GD Operations Engineer
- LAT I&T Operator
- LAT Systems Engineer
- GBM I&T Engineer
- GFEP support
- Project Mission I&T
- TDRS Transportable Ground Terminal Operator (NASA engineering support on call)

At the MOC
- FOT Command Controller
- FOT Spacecraft Analyst

System Administrator
Ground System Operations Engineer
Project Instrument Operations
Project Mission I&T
GD Operations Engineer
LAT/LISOC Engineer (optional)
GBM/GIOC Engineer (optional)

At the LISOC
Test Conductor
Real-Time Operator
Pipeline Operator
Sys Admin (on call)
Network Eng (on call)

At the GIOC
Test Conductor
System Administration (on call)
Network Eng (on call)

At the GSSC
~~Test Conductor~~
System Administration (on call)
Network Eng (on call)

VII. Test and Measurement Equipment Operation

The operation of the test equipment is contained in the following procedures:

General Dynamics Documents

GLAST Space Telescope Spacecraft Power On/Off Standard Operating Procedure, 1196 ET-W62606-000

GLAST Spacecraft EGSE Test for Configuration and Operating Procedure, 1196 ET-G65899-000

VIII. Hazardous Operations and Required Precautions

Hazardous Operations

No hazardous operations are included in this test. All RF is transmitted through the TDRS Transportable Ground Terminal (TTGT), which has been installed and verified operational at the General Dynamics Factory Of the Future (FOF) Site. The TTGT is in a fenced location at the site. The installation of the TTGT has been verified to be safe by General Dynamics Safety Personnel. The RF path between the spacecraft and TTGT is through cables connected to antenna ports on the spacecraft.

Safety Precautions

The following precautions shall be observed for all testing performed at General Dynamics Integrated Space Systems, Gilbert, Arizona. Measures shall be taken to prevent, or reduce to a minimum, personnel exposure to hazardous conditions and environments (e.g., explosives, Voltage, sound levels, pressure, lifting, etc.). A safe testing area shall be observed:

a. A test director shall be designated and be responsible for the safety of personnel and equipment during conduct of the test.

b. Secure the area from unnecessary traffic (signs shall be posted and hazardous areas roped off as required.

c. Protective equipment shall be worn as required by testing procedures or established safety practices.

d. Prior to working with electrical circuits (e.g. battery box) personnel shall remove jewelry, watches, rings, and metal objects.

e. Personnel shall read and understand safety precautions outlined in reference documents and Material Safety Data Sheets (MSDS).

Handling Precautions

The equipment under test is ESD sensitive, and proper ESD handling procedures shall be used. Refer to Control of Electrostatic Discharge (ESD), 0000 WI-Q08193-000

IX. Test Abort Operations and Procedures

Abort Operations

In the event of a situation requiring an emergency power-off of the observatory execute Section 9 (Emergency Power Off) of the GLAST Space Telescope Spacecraft Power On/Off Standard Operating Procedure (1196 ET-W62606-000).

Emergency Procedures

If an accident occurs at the General Dynamics Integrated Space Systems, Factory of the Future and immediate medical treatment is required, dial **8888** or **9-911**. For non-critical emergencies, dial the operator (0) and ask for the Safety Manager or Security, if the Safety Manager is not available. If you call 9-911, notify Security immediately so they can direct the emergency vehicles to the proper location and assist in expediting the response. All accidents/injuries/mishaps must be reported to the General Dynamics Integrated Space Systems Safety Office. For Spacecraft-related safety issues contact the SASS Safety Manager at 480-892-8200

X. Procedural Steps

A. The following procedural steps must be completed in their entirety prior to closure of the test procedure.

B. Test steps require the initials of the Test Conductor. Blanks labeled with units are for data. Blanks with positions next to them require initials. If the Test Director and any lead is the same person, an alternate, appropriately skilled person should initial in the lead area as a crosscheck.

C. All data is to be recorded in the same units specified by the expected value.

1.0 Pre-installation Verifications

1.1 _____ Record serial numbers, calibration sticker Ids, and calibration due dates of GSE equipment to be used to perform this procedure in the following table or attach a listing of this information to the procedure annotated with the procedure number, run number, and current step number (1.1).

Description	Serial Number	Calibration ID	Cal. Due Date

1.2 _____ Record the version numbers of the flight software at the time that the procedure is run in the following table.

Flight Software Identification	Version Number
S/C Flight Software CPU-A	
S/C Flight Software CPU-B	
LAT Flight Software SIU-0	
LAT Flight Software SIU-1	
LAT Flight Software EPU-0	

Flight Software Identification	Version Number
LAT Flight Software EPU-1	
LAT Flight Software EPU-2	
GBM Flight Software DPU-1 (Primary)	
GBM Flight Software DPU-2 (Redundant)	

1.3 _____ In the following table, record the version numbers of the MOC ground system software and project database in use and supporting testing at the time that the procedure is run.

MOC Ground System Software Identification	Version Number
ITOS	
MPS Release	4
Project Database	
Red Hat El WS	3.0
Win XP Pro	V2002 with SP2
Fast Copy for Linux	

1.4 _____ In the following table, record the version numbers of the LAT ground system software and project database in use and supporting testing at the time that the procedure is run.

LISOC Ground System Software Identification	Version Number
LISOC Release	
Fast Copy	
Project Database	

1.5 _____ The LAT Auxiliary chiller should be connected to the LAT and configured to support testing. The chiller should be configured per Step 6.3.1 of the LAT Functional Test Procedure. The chiller should not be powered on until later in this procedure. This section is to manually configure the chiller so it is ready to be turned on.

1.6 _____ In the following table, record the version numbers of the GBM ground system software and project database in use and supporting testing at the time that the procedure is run.

GIOC Ground System Software Identification	Version Number
GIOC Software	
ITOS	
Fast Copy	
Project Database	
BAP Software	

1.7 _____ In the following table, record the version numbers of the General Dynamics I&T GSE software and database in use and supporting testing at the time that the procedure is run.

General Dynamics I&T GSE Software Identification	Version Number
Astro RT	
PTP	
LabVIEW	
Astro RT Database	

1.8 _____ Verify that the following General Dynamics I&T specific telemetry displays and Astro RT scripts, which are needed to support testing, are available on the I&T workstations and maintained within the I&T Configuration Management System.

Astro RT Scripts	Telemetry Displays
GLAST_SC_POWER_UP	DISPLAY_ARM
GBM_Power_Up_and_Aliveness	DISPLAY_UDL
LAT_Load_Shed	IEM_MAIN
	EPS_MAIN

1.9 _____ Verify that the following telemetry displays and STOL procs, which are needed to support testing, are available on the MOC workstations (in the Ops directory) and maintained within the MOC Configuration Management System (have been CCB approved for executions against the observatory).

STOL Procedures	
scnoop.proc	gbmsetonephadt
sepslatpruon	gbmsetallphadt
sfswdlcommands	gbmphadetmask

STOL Procedures	
sfswdlevents	gbmsetonellt
sfswssrpb	gbmsetallllt
sfswssrleoinit	gbmselectlvoff
sfswssesendtlm	gbmselectlvon
sfawssrconfig	gbmsetonelvoff
sfswedacscruben	gbmsetlvonoff
sgncgpson	LATLIMITSET
sgncstarson	LATSIUREADY
sgncstarsheat	LATSIUBOOT
sgncupldephemupdate	LATDAQREADY
sgncupldehphtofsw	LATMAINFEEDON
sgncgbmssa	LATPOWERAEM
sgbmpowerup	LATPOWERCAL
srfulrate.proc	LATPOWERTKR
sprodcpwr	LATPOWERTEM
stcenahtrs	LATTCINIT
gbmsetonepmthvbt	LATPOWEREPU
gbmsetonelvon	LATPOWERFREEBD
gbmphastartstop	LATVERIFYCFG
gbmsetallvoff	LATCALHVBIAS
gbmsetallpmthvbt	LATTKRHVBIAS
gbmcmdtrigger	LATACDHVBIAS
gbmsetonetrgmmode	LATCONFIGHV
gbmsetalltrgmode	LATSTOPLPRSCNTR
~~gbmsetonetrglv~~ gbmsetonetriglv ***(MPS 7-7-07 #3)***	LATCONFIGHV
~~gbmsetalltrglv~~ gbmsetalltrglv ***(MPS 7-7-07 #4***	LATACDHVOUTSAA
gbmsettrigalg	LATSETEVTHANDCFG
gbmselectttthkdet	LATSCEVENTOUT

STOL Procedures	
gbmbursttrigdis	LATBEGINPHYSOB
gbmbursttrigena	LATLOADFILE
gbmloadspeclut	LATCANCELLOAD
gbmcspeconoff	LATCOMMITLOAD
gbmctimeaccum	LATCOPY2EPU
gbmctimeonoff	LATENDPHYSOB
gbmcspecaccum	LATDUMPTAKSLIST
gbmmemorydump	LATDUMPMEMPOOL
gbmmemoryscan	LATFILESSYSTAT
gbmlutchecksum	LATCHKFILES
gbmlutloadtime	LATDUMPMEM
gbmsetalllvoff	LATCANCELMEMDUMP
gbmsetalllvon	gbmpowerup
gbmsetdetector	gbmsettrigdur
gbmsetdiagmsg	gbmdmpdiagmsglog

Telemetry Displays	
comm.page	stlmstatsall.page
eps_main.page	LAT_SIU_CMD_CTRS
display_udl.page	master.page
iem_main.page	mmstatus.page
kutransmit.page	sctablesdaig.page
LAT_BUS_CMD_PROCESSING	ssrmain.page
LAT_BUS_POWER	tblstatus.page
LAT_BUS_TEMPS	xmtrstattus.page
LAT_CPU_STATS	gfep6stats.page
LAT_DIR_DUMP_STATUS	ogtlmsetup.page
LAT_GEMLRS_LIM_STATUS	sallclcw.page

Telemetry Displays	
LAT_ITC_TELEM	spktstatgbm.page
LAT_LGIO_STATUS	spktstatlat.page
LAT_LPA_CONTROL	spktstat.page
LAT_PKT_SEQ_COUNT	

1.10 _____ Verify that the following telemetry displays, which are needed to support testing, are available on the MOC system for web access.

Telemetry Displays	
gbm_analog_hk.page	gbm_detectors.page
gbm_boot_config.page	gbm_fsw_error_log.page
gbm_cmd_confirm.page	gbm_telecom_log.page
gbm_detector_rates.page	gbm_topstat.page

1.11 _____ Verify that the referenced LAT procedures are available (printed) to the S/C I&T Operators: ***Note: may be able to delete this step if LAT will not be powered by I&T.***

LAT Functional Test Procedure 1196-ET-I74927-000C, from the beginning of the document through and including paragraph 6.3.2 (g through l).

LAT Functional Test Procedure 1196 ET-I74927-000C, Paragraph 6.3.3.1 L-OBS-001- LAT Config 1 Power On.

LAT Functional Test Procedure 1196 ET-I74927-000C paragraph 6.3.3.10, starting at step ‘g.’(L-OBS-101 – LAT Config 1 Load Shed).

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2.0 Record Start of Test & Configure TTGT.

2.1 _____ MOC / SC I&T: Record the start of this procedure below and in the Test Conductor Log

Time: _____ (UTC)
Date: _____

2.2 _____ SC I&T: Configure the TDRS Transportable Ground Terminal (TTGT) per Appendix B. Note that 2 scheduled TDRS contacts (one on TDRS 171, one on TDRS W) will be used to adjust the antenna offsets.

2.3 _____ MOC / SC I&T: Proceed with the rest of this procedure while the TTGT is being configured.

3.0 Element Communications Check-out

3.1 _____ MOC: Contact Goddard Voice, 301-286-5472 or 301-286-8737, and have Goddard Voice tie in the Meet-Me Number _____ to the OPS1 Channel (this is for elements that do not have SCAMA Boxes).

3.2 _____ S/C I&T and MOC: Verify voice communications between the GD/FOF I&T facility and the MOC over the OPS1 channel.

3.3 _____ MOC: Verify voice communications with LISOC and GIOC over the OPS1 Channel.

3.4 _____ MOC: Verify voice communications with SN (White Sands and NOM) over SN_COORD.

4.0 Mission Operations Center (MOC) Configuration

Note: In this section of the test the MOC connects to the SCIT Rack.

4.1 _____ MOC: Verify that the MOC workstations are powered on and all software is configured to support receipt of telemetry from the S/C I&T facility and commanding to the S/C I&T facility.

4.2 _____ MOC: Execute the procedure ospacecraftaos.proc to connect to the GD/FOF S/C I&T facility network.

4.3 _____ MOC: Verify proper connection with the GD/SASS S/C I&T facility network.

5.0 Observatory Power On and Configuration for Test

Note: In this section of the test the MOC is connected to the spacecraft through the SCIT Rack.

5.1 _____ MOC / S/C I&T: Record start time of spacecraft power up:

_____ UTC

5.2 _____ S/C I&T: Configure the spacecraft for side-A operations Spacecraft-bus Configuration per the LAT Functional Test Procedure 1196-ET-I74927-000C, from the beginning of the document through and including paragraph 6.3.2. At the conclusion of this procedure the spacecraft will be configured as follows:

- All essential-bus services powered, Side-A
  - PDU-A
  - IEM UDL Cards
  - IEM ARM Cards
  - A-side OCXO powered
- IEM A-side CPU bus and TLM bus powered
- IEM CPU-A executing flight software (Non-boot code)
- Primary 1553 Bus is A
- Spacecraft commanding on baseband (SCIT Rack)
- Return data-rate set to 1 Mbps (baseband, SCIT Rack)

5.3 _____ S/C I&T: If the spacecraft is already powered from prior testing, and not in the configuration specified in Step 5.2 above, configure the command and telemetry links to baseband and attach black-line steps to this procedure to configure the spacecraft as specified in Step 5.2

5.4 _____ S/C I&T: Set the Spacecraft time to UTC per the GLAST Spacecraft Power On/Off Standard Operating Procedure.

5.5 _____ S/C I&T: Verify/Configure ground system to provide telemetry data to the MOC.

5.6 _____ MOC: Execute the STOL procedure ospacecraftaos.proc to acquire telemetry from the GD SCIT Rack.

5.7 _____ MOC: Verify receipt and decommutation of real-time telemetry data (VC-0) from the Spacecraft-bus using the display tlmstats.

6.0 Additional Spacecraft Configuration.

Note: In this section of the test the MOC is connected to the spacecraft through the SCIT Rack.

6.1 _____ S/C I&T: If not already configured, enable Flight Parameters on Change with the following:

/SMFPUINT8 PARAMID=FPVSDLPARMSONCHG VALUE=1

Verify that VSDLPARMSONCHG = 1

6.2 _____ S/C I&T: If not already configured, enable command echo with the following:

/SMFPUINT8 PARAMID=FPVSDLTCLOGRT VALUE=1

Verify that VSDLTCLOGRT = 1

6.3 _____ S/C I&T: If not already configured, enable event messages with the following:

/SMFPUINT8 PARAMID=FPVDLEVTLOGRT VALUE=1

Verify that VSDLEVTLOGRT = 1

6.4 _____ S/C I&T: Configure the transmitter timeout to 5 hours by sending the following command:

/SMFPUNIT32 FPVSKUBANDONTO Value = 18000

6.5 _____ S/C I&T: Execute the following steps (disable SAA processing for GBM) prior to GBM power up:

At the ‘Command Selection’ Window at the AstroRT Workstation, select the ‘SMFPUNIT8’ command with the following:

PARAMID = FPVSGSAAOVRIDEGBM

VLAUE = 1

Click on the ‘OK’ Button, then the ‘SEND’ button.

Verify and record the following:

SACFLAGGBMINSSA = _____(0)

6.6 _____ S/C I&T: Execute the following steps (disable SAA processing for LAT) prior to LAT power up:

At the 'Command Selection' Window at the AstroRT Workstation, select the 'SMFPUNIT8' command with the following:

PARAMID = FPVSGSAAOVRIDELAT

VLAUE = 1

Click on the 'OK' Button, then the 'SEND' button.

Verify and record the following:

SACFLAGLATINSSA = _____(0)

6.7 _____ S/C I&T: Only if not already enabled, ~~S~~send the following command to turn on the PDUA power feed to the S-Band Transmitter: ***(MPS 7-5-07, #6)***

/SDIPDUSETLCBSWCH

Side=Both

Device=S_BND_XMT_1

ONOFF=S_ON

6.8 _____ S/C I&T: Configure SC to process science data from the GBM Redundant port. At the "Command Selection" window on the AstroRT Workstation, select the "SDILGIOCONFIG" command with the following parameters:

REGISTERID=CONTROL

BITMASK=~~0x0016~~0x0010 ***(MPS 7-5-07, #7)***

BITVALUES=~~0x0016~~0x0010

Click on the "OK" Button, then the "SEND" button.

6.9 _____ S/C I&T: Verify that the redundant GBM science interface port is set.

SLGIOGBMINMUX= _____(1)

7.0 MOC Configure the SSR, GNC Triggers, Upload an ATS.

Note: In this section of the test the MOC can be connected to the spacecraft through the SCIT Rack or the SN.

7.1 _____ MOC: Execute the following procedure to initialize the SSR (Part A, all boards):

sfswssrleoinit(A,1)

7.2 _____ MOC: 'Poll' SSR status telemetry during initialization by executing the following procedure:

sfswssrsendtlm

7.3 _____ MOC: While the SSR initialization is in progress, upload the ATS to control the spacecraft configuration for the scheduled TDRSS passes during this test. Load the RTSs needed to support the ATS:

7.4 _____ MOC: Disable the GNC fault triggers by executing the following procedures:

sgncfaulttrig(1,DIS)	***(ACS Problem)***
sgncfaulttrig(2,DIS)	***(SADA +Y Problem)***
sgncfaulttrig(3,DIS)	(***Reaction Wheel Problem)***
sgncfaulttrig(4,DIS)	***(Star Tracker Problem)***
sgncfaulttrig(5,DIS)	***(IRU Problem)***
sgncfaulttrig(6,DIS)	***(SADA –Y Problem)***
sgncfaulttrig(7,DIS)	***(Attitude Determination Problem)***
sgncfaulttrig(8,DIS)	***(Momentum Management Problem)***
sgncfaulttrig(9,DIS)	***(APA Problem)***
sgncfaulttrig(10,DIS)	***(ETR X Problem)***
sgncfaulttrig(11,DIS)	***(ETR Z Problem)***
sgncfaulttrig(12,DIS)	(**Propulsion Duty Cycle)**
sgncfaulttrig(13,DIS)	***(Propulsion Rate Limit)***
	(Spare – not used)
sgncfaulttrig(15,DIS)	***(IRU Engineering Mode)***
sgncfaulttrig(16,DIS)	***(Star Tracker Engineering Mode)***

7.5 _____ MOC: If the telemetry point SAC_MODE is not set to IDLE, set GNC Mode to Idle with the following commands:

GLAST,CMD,SACSETMODE,ALL,2,MODELIMIT,IDLE,MODEFORCE,IDLE

GLAST,CMD,SMFGPFLOAT,FPVSGIDLEENABLE

8.0 MOC Load RTS Files To Control Spacecraft/Instrument Configuration.

Note: In this section of the test the MOC can be connected to the spacecraft through the SCIT Rack or the SN.

8.1 _____ MOC: Upload MOC RTS file(s):

sfswrtsuplink(_____)

8.2 _____ MOC: upload MOC ATS file for scheduled TDRS Contacts:

sfswatsuplink(_____)

9.0 MOC Test Power On of Spacecraft Components Required During L&EO.

Note: In this section of the test the MOC can be connected to the spacecraft through the SCIT Rack or the SN.

9.1 _____ MOC: Execute the following procedure to enable EDAC scrubbing:

sfswedacscrubena.proc

9.2 _____ MOC: Enable GNC Diagnostic Telemetry by sending the following command:

GLAST,CMD,SUTDLGNCDIAG,ALL,1,NUMSAMPLES,157680000

9.3 _____ MOC: Execute the following procedure to turn on Star Tracker 1:

sgncstarson(1,BOTH)

9.4 _____ MOC: Verify that Star Tracker 1 has completed its power on process.

9.5 _____ MOC: Execute the following procedure to turn on Star Tracker 3:

sgncstarson(3,BOTH)

9.6 _____ MOC: Set the Mission Mode Flag by executing the following procedure:

ssysmissmode.proc

9.7 _____ MOC: Turn on the GPS and initialize GPS by executing the following procedure:

sgncgpson

(Need to make sure that we're configured properly for FDF, (if FDF has requirements for this test) and need directions about how to answer the prompts for the sgncgpson procedure))

9.8 _____ MOC: Turn the Pressure Transducers on, take a snapshot of the pressures:

sproxdcrpwr(BOTH, ON)

9.9 _____ MOC: Turn the pressure Transducers off:

sproxdcrpwr(BOTH, OFF)

9.10 _____ MOC: Record the current default ephemeris data:

Position;

VSGNAVPOSECI1 = _____

VSGNAVPOSECI2 = _____

VSGNAVPOSECI3 = _____

Velocity;

VSGNAVVELECI1 = _____

VSGNAVVELECI2 = _____

VSGNAVVELECI3 = _____

Time;

VSGNAVTIMUTC = _____

9.11 _____ MOC: Upload the spacecraft ephemeris:

sgncupldephtofsw(_____)

9.12 _____ MOC: Record the ephemeris data, verify that it was updated:

Position;

VSGNAVPOSECI1 = _____

VSGNAVPOSECI2 = _____

VSGNAVPOSECI3 = _____

Velocity;

VSGNAVVELECI1 = _____

VSGNAVVELECI2 = _____

VSGNAVVELECI3 = _____

Time;

VSGNAVTIMUTC = _____

9.13 _____ MOC Upload the TDRS ephemeris:

sgnctdrssephemupdate(_____, ____) ***(file , slot arguments provided on day of test)***

10.0 MOC Configure the Downlink to 40 Mbps KSA.

Note: In this section of the test the MOC can be connected to the spacecraft through the SCIT Rack or the SN.

10.1 _____ MOC: Set the command rate to 4 Kbps by executing STOL procedure srfulrate(4000).

10.2 _____ S/C I&T: Configure the TURFTS and PTP for a 4 Kbps uplink.

10.3 _____ MOC: Verify lock on Receivers.

10.4 _____ MOC: From the ITOS command line issue, the directive "**VC 1**" to ensure that the software telecommand virtual channel ID is set to VC-1 (Receiver-1 and UDL-A).

10.5 _____ MOC: From the ITOS command line, issue the following directive: RETRLIM 2, followed by the RESYNC directive.

10.6 _____ MOC: Execute the STOL procedure scnoop.proc and verify the command link to the spacecraft. Verify the scnoop.proc procedure executes without errors, and that the 'Cmd Proc' count on the Master Page increments by 1.

10.7 _____ MOC: If telemetry is not already configured to KSA, execute the STOL Procedure srfxmtronku to change the downlink rate to 40 Mbps KSA.

10.8 _____ MOC: If not already configured, execute the procedure ogfepaos.proc to receive KSA telemetry.

10.9 _____ S/C I&T and MOC: Verify receipt of KSA downlink telemetry.

10.10 _____ MOC: Verify receipt and processing of 40 Mbps real-time telemetry (VC-0, 51Kbps, & VC-1, gfep6stats page).

10.11 _____ MOC: Monitor telemetry data until all observatory APIDs that are being produced are received at least once.

10.12 _____ S/C I&T & MOC: Wait for the scheduled TDRS contact. Configure the forward and return links through the TDRS Relay Trailer per Appendix D.

10.13 _____ MOC: Verify receipt and decommutation of 40 Mbps telemetry data from the Observatory using the display gfepstats (using the GFEPs at White Sands at this point).

11.0 S/C FSW Parameter Testing (Ref MOR RFA 8)

Note: In this section of the test the MOC can be connected to the spacecraft through the SCIT Rack or the SN.

11.1 _____ S/C I&T & MOC: If we are still in the TDRS contact (4K SSA forward, 40 Mbps KSA) from the previous section, or executing this section through the SCIT Rack, skip the next step and proceed to Step 11.1.1.

11.2 _____ S/C I&T & MOC: If a 4 Kbps SSA uplink, 40 Mbps KSA return TDRS pass is not already in progress, configure for the next scheduled pass per Appendix B.

11.1 Upload Individual Flight Parameters To RAM

Note: SMFPINT16 and SMFPINT32 are not tested because they are not currently in use.

11.1.1 _____ MOC: Change the Flight Parameter FPVSGNAVPOSECI3 by executing the following procedure:
sfswparamchg(SMFPDOUBLE, FPVSGNAVPOSECI3, 1)

11.1.2 _____ MOC: Verify that the parameter was changed by checking the following telemetry point:

VSGNAVPOSECCI3 = 1

11.1.3 _____ MOC: Change the Flight Parameter FPVSLMTCK001LO by executing the following procedure:

Note: Verify with GD engineer that L_MCH_NY_VHP0_T is above its lower limit before executing this – avoid initiating RT0
(MPS 7-5-07, #9)

sfswparamchg(SMFPFLOAT, FPVSLMTCK001LO, 1)

11.1.4 _____ MOC: Verify that the parameter was changed by checking the following telemetry point:

VSLMTCK001LO = 1

11.1.5 _____ MOC: Change the Flight Parameter FPVSLMTCK001RTS by executing the following procedure:

Note: Verify with GD engineer that L_MCH_NY_VHP0_T is above its lower limit before executing this – avoid initiating RT0
(MPS 7-5-07, #9)

sfswparamchg(SMFPINT8, FPVSLMTCK001RTS, 0)

11.1.6 _____ MOC: Verify that the parameter was changed by checking the following telemetry point:

VSLMTCK001RTS = 0

11.1.7 _____ MOC: Change the Flight Parameter FPVSA2ECVT001_AID by executing the following procedure:

sfswparamchg(SMFPUINT16, FPVSA2ECVT001_AID, 444)

11.1.8 _____ MOC: Verify that the parameter was changed by checking the following telemetry point:

VSA2ECVT001_AID = 444

11.1.9 _____ MOC: Change the Flight Parameter FPVSKUBANDONTO by executing the following procedure:

sfswparamchg(SMFPUINT32, FPVSKUBANDONTO, 555)

11.1.10 _____ MOC: Verify that the parameter was changed by checking the following telemetry point:

VSKUBANDONTO = 555

11.1.11 _____ MOC: Change the Flight Parameter FPVSXMITSIDEMMT by executing the following procedure:

sfswparamchg(SMFPUINT8, FPVSXMITSIDEMMT, 1)

11.1.12 _____ MOC: Verify that the parameter was changed by checking the following telemetry point:

VSXMITSIDEMMT = 1

11.2 Change All Modified Flight Parameters Back to Default Values.

11.2.1 _____ MOC: Change the Flight Parameter FPVSGNAVPOSECI3 back to its default value by executing the following procedure:
sfswparamchg(SMFPDOUBLE, FPVSGNAVPOSECI3, 0)

11.2.2 _____ MOC: Verify that the parameter was changed by checking the following telemetry point:
VSGNAVPOSECCI3 = 0

11.2.3 _____ MOC: Change the Flight Parameter FPVSLMTCK001LO back to its default value by executing the following procedure:
Note: Verify with GD engineer that L_MCH_NY_VHP0_T is above its lower limit before executing this – avoid initiating RT0
(MPS 7-5-07, #9)
sfswparamchg(SMFPFLOAT, FPVSLMTCK001LO, 0)

11.2.4 _____ MOC: Verify that the parameter was changed by checking the following telemetry point:
VSLMTCK001LO = 0

11.2.5 _____ MOC: Change the Flight Parameter FPVSLMTCK001RTS back to its default value by executing the following procedure:
Note: Verify with GD engineer that L_MCH_NY_VHP0_T is above its lower limit before executing this – avoid initiating RT0
(MPS 7-5-07, #9)
sfswparamchg(SMFPINT8, FPVSLMTCK001RTS, -1)

11.2.6 _____ MOC: Verify that the parameter was changed by checking the following telemetry point:
VSLMTCK001RTS = -1

11.2.7 _____ MOC: Change the Flight Parameter FPVSA2ECVT001_AID back to its default value by executing the following procedure:
sfswparamchg(SMFPUINT16, FPVSA2ECVT001_AID, 430)

11.2.8 _____ MOC: Verify that the parameter was changed by checking the following telemetry point:
VSA2ECVT001_AID = 430

11.2.9 _____ MOC: Change the Flight Parameter FPVSKUBANDONTO back to its default value by executing the following procedure:
sfswparamchg(SMFPUINT32, FPVSKUBANDONTO, 900)

11.2.10 _____ MOC: Verify that the parameter was changed by checking the following telemetry point:
VSKUBANDONTO = 900

11.2.11 _____ MOC: Change the Flight Parameter FPVSXMITSIDEMMT back to its default value by executing the following procedure:
sfswparamchg(SMFPUINT8, FPVSXMITSIDEMMT, 0)

11.2.12 _____ MOC: Verify that the parameter was changed by checking the following telemetry point:
VSXMITSIDEMMT = 0

12.0 MOC Power On GBM.

Note: In this section of the test the MOC can be connected to the spacecraft through the SCIT Rack or the SN.

GMB DPU Power Up (Day 11)

12.1 _____ GIOC: Connect to the MOC Web Interface.

12.2 _____ S/C I&T & MOC: If we are still in the TDRS contact (4K SSA forward, 40 Mbps KSA) from the previous section, or executing this section through the SCIT Rack, skip the next step and proceed to Step 12.4.

12.3 _____ S/C I&T & MOC: If a 4 Kbps SSA uplink, 40 Mbps KSA return TDRS pass is not already in progress, configure for the next scheduled pass per Appendix B.

12.4 _____ MOC: Toggle the SAA bit by executing the following procedure:
sgncgbmssa(OUT)

12.5 _____ MOC: Power up GBM by executing the following procedure:
gbmpowerup(r, limited, a)

12.6 _____ MOC/GIOC: Verify GBM housekeeping data.

12.7 _____ MOC/GIOC: Verify that the SAA Identifier is as expected:
GHK_GBM_IN_SAA=Not_in_SAA

12.8 _____ MOC: Disable GBM burst trigger.
gbmbursttrigdis

Note: Steps 12.9 through 12.12 perform a limited GBM DPU Functional Test)

12.9 _____ MOC: Set the GBM diagnostic message output mode to 'log':
gbmsetdiagmsg(log)

12.10 _____ MOC: Perform a GBM memory upload:
gbmmemoryupload(gbm_upload_data_3)

12.11 _____ MOC: Set the GBM diagnostic message output mode to 'prompt':
gbmsetdiagmsg(prompt)

12.12 _____ MOC: Dump the GBM diagnostic message log:
gbmdmpdiagmsglog

12.12a _____ MOC: Dump the GBM Look-up Table by executing the following procedure:
_____ gbmlutdump ***(MPS 7-7-07, #5)***

Verify FSW control of a single LV, HV, and PHA in response to commanded SAA flag during an orbit with no SAA passages.

12.13 _____ MOC/GBM: Set GBM PMT #0 High Voltage by exe cutting the following procedure:
gbmsetonepmthvbt(0, 89)

12.14 _____ MOC/GBM: Set one Low Voltage by executing the following procedure:
gbmsetonelvon(0)

12.15 _____ MOC/GBM: Start the GBM Master PHA by executing the following:
gbmphastartstop(start)

12.16 _____ MOC: Toggle the SAA bit with the following procedure:
sgncgbmsaa(INN)

12.17 _____ MOC/GIOC: Verify that GBM responds correctly for the entry into the SAA:

GPSB_HIGHVLT_00 = 0

GPSB_HV_SAA_00 = 89

GDAQ_MASTER_ENA = Off

12.18 _____ MOC: Toggle the SAA bit with the following procedure:

sgncgbmsaa(OUT)

12.19 _____ MOC:/GIOC: Verify that GBM responds correctly to the exit from the SAA.

GPSB_HIGHVLT_00 = 89

GPSB_HV_SAA_00 = 0

GDAQ_MASTER_ENA = On

12.20 _____ MOC: Turn off GBM PMT #0

gbmsetonepmthvbt(0, 0)

12.21 _____ MOC: Set all GBM Low Voltages to off:

gbmsetalllvoff

12.22 _____ MOC: Stop the Master PHA by executing the following procedure:

gbmphastartstop(stop)

12.23 _____ MOC: Configure the SAA bit for control by S/C FSW:

sgncgbmsaa(DEF)

13.0 SAA Testing, Verify FSW Control of All LV, HV, and Master PHA in SAA

Note: In this section of the test the MOC can be connected to the spacecraft through the SCIT Rack or the SN.

13.1 _____ S/C I&T & MOC: If we are still in the TDRS contact (4K SSA forward, 40 Mbps KSA) from the previous section, or executing this section through the SCIT Rack, skip the next step and proceed to Step 13.3.

13.2 _____ S/C I&T & MOC: If a 4 Kbps SSA uplink, 40 Mbps KSA return TDRS pass is not already in progress, configure for the next scheduled pass per Appendix B.

13.3 _____ MOC: Turn on high voltage on all GBM detectors by executing procedure:

gbmsetallpmthvbt(set_pmt_hv_nom)

13.4 _____ MOC: Set all GBM low voltages by executing the procedure:

gbmsetalllvon

13.5 _____ MOC: Start GBM Master PHA:

gbmphastartstop(start)

13.6 _____ MOC: Set the SAA bit to indicate 'IN' SAA:

sgncgbmsaa(INN)

13.7 _____ MOC/GMB: Verify the correct response for GBM:

GPSB_HIGHVLT_00 = 0	GPSB_HV_SAA_00 = 89
GPSB_HIGHVLT_01 = 0	GPSB_HV_SAA_01 = 95
GPSB_HIGHVLT_02 = 0	GPSB_HV_SAA_02 = 77
GPSB_HIGHVLT_03 = 0	GPSB_HV_SAA_03 = 68
GPSB_HIGHVLT_04 = 0	GPSB_HV_SAA_04 = 69
GPSB_HIGHVLT_05 = 0	GPSB_HV_SAA_05 = 89
GPSB_HIGHVLT_06 = 0	GPSB_HV_SAA_06 = 98
GPSB_HIGHVLT_07 = 0	GPSB_HV_SAA_07 = 77
GPSB_HIGHVLT_08 = 0	GPSB_HV_SAA_08 = 91
GPSB_HIGHVLT_09 = 0	GPSB_HV_SAA_09 = 91
GPSB_HIGHVLT_10 = 0	GPSB_HV_SAA_10 = 95
GPSB_HIGHVLT_11 = 0	GPSB_HV_SAA_11 = 89
GPSB_HIGHVLT_12 = 0	GPSB_HV_SAA_12 = 60
GPSB_HIGHVLT_13 = 0	GPSB_HV_SAA_13 = 58
GPSB_HIGHVLT_14 = 0	GPSB_HV_SAA_14 = 67
GPSB_HIGHVLT_15 = 0	GPSB_HV_SAA_15 = 77

GDAQ_MASTER_ENA = Off

13.8 _____ MOC: Set the SAA bit to indicate 'OUT' of SAA:

sgncgbmsaa(OUT)

13.9 _____ MOC/GMB: Verify the correct response for GBM:

GPSB_HIGHVLT_00 = 89 GPSB_HV_SAA_00 = 0
GPSB_HIGHVLT_01 = 95 GPSB_HV_SAA_01 = 0
GPSB_HIGHVLT_02 = 77 GPSB_HV_SAA_02 = 0
GPSB_HIGHVLT_03 = 68 GPSB_HV_SAA_03 = 0
GPSB_HIGHVLT_04 = 69 GPSB_HV_SAA_04 = 0
GPSB_HIGHVLT_05 = 89 GPSB_HV_SAA_05 = 0
GPSB_HIGHVLT_06 = 98 GPSB_HV_SAA_06 = 0
GPSB_HIGHVLT_07 = 77 GPSB_HV_SAA_07 = 0
GPSB_HIGHVLT_08 = 91 GPSB_HV_SAA_08 = 0
GPSB_HIGHVLT_09 = 91 GPSB_HV_SAA_09 = 0
GPSB_HIGHVLT_10 = 95 GPSB_HV_SAA_10 = 0
GPSB_HIGHVLT_11 = 89 GPSB_HV_SAA_11 = 0
GPSB_HIGHVLT_12 = 60 GPSB_HV_SAA_12 = 0
GPSB_HIGHVLT_13 = 58 GPSB_HV_SAA_13 = 0
GPSB_HIGHVLT_14 = 67 GPSB_HV_SAA_14 = 0
GPSB_HIGHVLT_15 = 77 GPSB_HV_SAA_15 = 0

GDAQ_MASTER_ENA = On

13.10 _____ MOC: Configure the SAA bit bit for control by S/C FSW:

sgncgbmsaa(DEF)

Note: Steps 13.11 should not be executed if the telemetry link is through the umbilical (a burst will initiate an MA link).
(MPS 7-5-07, #8)

13.11 _____ MOC: Execute the procedure to enable the burst trigger:

gbmbursttrigena(gfn)

14.0 DAS Burst Testing During a KSA Return Contact

Note: In this section of the test the MOC should be connected to the spacecraft through the SN.

Modify this section to generate bursts during Ku-Band contacts. Disable SAA processing.

14.1 _____ GIOC: Configure (remotely) the BAP (Burst Alert Processor) at the GSSC (GLAST Science Support Center) for burst alert data.

14.2 _____ GCN: Configure the GCN Front End (GRB Coordinate Network) for burst alert data.

14.3 _____ S/C I&T & MOC: If we are still in the TDRS contact (4K SSA forward, 40 Mbps KSA) from the previous section, skip the next step and proceed to Step 14.5.

14.4 _____ S/C I&T & MOC: If a 4 Kbps SSA uplink, 40 Mbps KSA return TDRS pass is not already in progress, configure for the next scheduled pass per Appendix B.

14.5 _____ MOC: Send command to stop APID 157, SSR Status:

START SFSWSSRCMDRESP(DIS)

14.6 _____ MOC: Execute the following procedure to disable downlink of events:
sfswdlevents(dis)

14.7 _____ MOC: Execute the following procedure to disable downlink of commands:
sfswdlcommands(dis)

14.8 _____ MOC: Execute the following procedure to disable downlink of parameters on change:
sfswdlparams(dis)

Note: the next series of 7 steps (14.8 through 14.14) is to be repeated up to 5 times, to generate 5 burst alerts. The GBM instrument sends burst packets for approximately 10 minutes following the initiation of the burst alert.

14.9 _____ MOC: Execute the procedure gbmcmdtrigger(NEGATIVE) to generate a burst alert without commanding a repoint. Record the time from the Astro RT Log (UTC) that each command is sent.

Burst 1	
Burst 2	
Burst 3	
Burst 4	
Burst 5	

14.10 _____ SN: If possible, monitor to detect burst alert (first VC1 Packet) (Packet IDs 1345-1349 and 1353 [x541-x545 and x549]). If possible, obtain UTC time of alert detection (e.g. first APID).

Burst 1	
Burst 2	
Burst 3	
Burst 4	
Burst 5	

14.11 _____ MOC: detect burst and forward to prime and back-up BAPs (note this happens automatically). The MOC may not be able to detect the time of this event, record UTC if possible (Packet IDs 1345-1349 and 1353 [x541-x545 and x549]).

Burst 1	
Burst 2	
Burst 3	
Burst 4	
Burst 5	

14.12 _____ GIOC: Record the time when the BAPs receive the burst message from the MOC and the prime BAP should process the burst alert from MOC.

14.13 _____ GCN: receive burst locations from the BAP. The UTC time of this event is the end time of the alert process.

Burst 1	
Burst 2	
Burst 3	
Burst 4	
Burst 5	

14.14 _____ S/C I&T / GBM I&T: Verify that the GBM has finished sending burst alert data by monitoring GFSW_STATE_MODE until it returns to 'Normal' and then monitor GFSW_TRGD_PKT until it goes to zero for at least two consecutive readouts.. Record the values (UTC) of the trigger time, GFSW_STATE_TRTIM, (from GBM burst telemetry) that the GBM indicates the Burst Command was executed.

Burst 1	
Burst 2	
Burst 3	
Burst 4	
Burst 5	

14.15 _____ GIOC: Reset BAPs. Take snapshot of BAP directory. Offload and archive BAP files for test evidence.

End of Burst Alert Sequence (Repeat Steps 14.8 through 14.14 as necessary)

14.16 _____ MOC: Execute the following procedure to enable downlink of events:
sfswdlevents(ena)

14.17 _____ MOC: Execute the following procedure to enable downlink of commands:
sfswdlcommands(ena)

14.18 _____ MOC: Execute the following procedure to enable downlink of parameters on change:
sfswdlparams(ena)

15.0 DAS Burst Testing During a SSA Return Contact

Note: In this section of the test the MOC should be connected to the spacecraft through the SN. This test is designed to be run with a 1Kbps SSA return link.

15.1 _____ GIOC: Configure (remotely) the BAP (Burst Alert Processor) at the GSSC (GLAST Science Support Center) for burst alert data.

15.2 _____ GCN: Configure the GCN Front End (GRB Coordinate Network) for burst alert data.

15.3 _____ S/C I&T & MOC: If we are still in the TDRS contact (4K SSA forward, 1Kbps return) from a previous section, skip the next step and proceed to Step 15.5.

15.4 _____ S/C I&T & MOC: If a 4 Kbps SSA uplink, 1 Kbps SSA return TDRS pass is not already in progress, configure for the next scheduled pass per Appendix B.

15.5 _____ MOC: If necessary, execute the following procedure to disable downlink of events:
sfswdlevents(dis)

15.6 _____ MOC: If necessary, execute the following procedure to disable downlink of commands:
sfswdlcommands(dis)

15.7 _____ MOC: If necessary, execute the following procedure to disable downlink of parameters on change:
sfswdlparams(dis)

Note: the next series of 7 steps (15.5 through 15.11) is to be repeated up to 5 times, to generate 5 burst alerts. The GBM instrument sends burst packets for approximately 10 minutes following the initiation of the burst alert.

15.8 _____ MOC: Execute the procedure gbmcmdtrigger(NEGATIVE) to generate a burst alert without commanding a repoint. Record the time from the Astro RT Log (UTC) that each command is sent.

Burst 1	
Burst 2	
Burst 3	
Burst 4	
Burst 5	

15.9 _____ USN: If possible, monitor to detect burst alert (first VC1 Packet) (Packet IDs 1345-1349 and 1353 [x541-x545 and x549]). If possible, obtain UTC time of alert detection (e.g. first APID).

Burst 1	
Burst 2	
Burst 3	
Burst 4	
Burst 5	

15.10 _____ MOC: detect burst and forward to prime and back-up BAPs (note this happens automatically). The MOC may not be able to detect the time of this event, record UTC if possible (Packet IDs 1345-1349 and 1353 [x541-x545 and x549]).

Burst 1	
Burst 2	
Burst 3	
Burst 4	
Burst 5	

15.11 _____ GIOC: Record the time when the BAPs receive the burst message from the MOC and the prime BAP should process the burst alert from MOC.

15.12 _____ GCN: receive burst locations from the BAP. The UTC time of this event is the end time of the alert process.

Burst 1	
Burst 2	
Burst 3	
Burst 4	
Burst 5	

15.13 _____ S/C I&T / GBM I&T: Verify that the GBM has finished sending burst alert data by monitoring GFSW_STATE_MODE until it returns to 'Normal' and then monitor GFSW_TRGD_PKT until it goes to zero for at least two consecutive readouts. Record the values (UTC) of the trigger time, GFSW_STATE_TRTIM,(from GBM burst telemetry) that the GBM indicates the Burst Command was executed.

Burst 1	
Burst 2	
Burst 3	
Burst 4	
Burst 5	

15.14 _____ GIOC: Reset BAPs. Take snapshot of BAP directory. Offload and archive BAP files for test evidence.

End of Burst Alert Sequence (Repeat Steps 15.8 through 15.14 as necessary)

15.15 _____ S/C I&T: Send the following three spacecraft commands to enable Command Echo, Event Messages, and Flight Parameters on Change (this is to stop VC1 packets, to better detect the burst alert packets:

15.16 _____ MOC: Execute the following procedure to enable downlink of events:

sfswdlevents(ena)

15.17 _____ MOC: Execute the following procedure to enable downlink of commands:
sfswdlcommands(ena)

15.18 _____ MOC: Execute the following procedure to enable downlink of parameters on change:
sfswdlparams(ena)

15.19 _____ MOC: Verify the following telemetry:
Verify that VSDLPARMSONCHG = 1 (Enabled)

Verify that VSDLTCLOGRT = 1 (Enabled)

Verify that VSDLEVTLOGRT = 1 (Enabled)

16.0 Additional GBM Tests

16.1 _____ MOC: Execute the following GBM procedure:
gbmsettrigdur(280, 320)

16.2 _____ MOC: Execute the following GBM procedure:
gbmsetonetrgmode(3, COMPUTE)

16.3 _____ MOC: Execute the following GBM procedure:
gbmsetalltrgmode(all_trg_mode_v5)

16.4 _____ MOC: Execute the following GBM procedure:
~~gbmsetonetrglvl(4, 10)~~
gbmsetonetrglvl(4, 10) ***(MPS 7/5/07, #3)***

16.5 _____ MOC: Execute the following GBM procedure:
~~gbmsetalltrglvl(all_trg_lvl_v1)~~
gbmsetalltrglvl(all_trg_lvl_v1) ***(MPS 7/5/07, #4)***

16.6 _____ MOC: Execute the following GBM procedure:
gbmsettrigalg(4)

16.7 _____ MOC: Execute the following GBM procedure:
gbmsetdetector(2)

Note: Steps 16.8 – 16.10 should not be executed if the telemetry link is through the umbilical (a burst will initiate an MA link).
(MPS 7-5-07, #8)

16.8 _____ MOC: Execute the following GBM procedure to disable the burst triggers:
gbmbursttrigdis

16.9 _____ MOC: Execute the following GBM procedure to re-enable the burst triggers:
gbmbursttrigena(gfn)

16.10 _____ MOC: Execute the following GBM procedure to disable the burst triggers:
gbmbursttrigdis

16.11 _____ MOC: Execute the following GBM procedure to load spec look-up table:
gbmloadspeclut(loadspeclut0961_bgo2)

16.12 _____ MOC: Execute the following GBM procedure:
gbmlutchecksum

16.13 _____ MOC: Execute the following GBM procedure:
~~gbmlutloadtime(NAI, tbd, tbd) *(GIOC must provide parameters)*~~
gbmlutloadtime(BGO,512,1024,1536,2048,2560,3072,3584,0xf816)
(MPS 7/5/07 #1)

16.14 _____ MOC: Execute the following GBM procedures to turn off cspec and ctime:
gbmcspeconoff(Off)
gbmctimeonoff(Off)

16.15 _____ MOC: Execute the following GBM procedures to adjust cspec and ctime:
gbmcspecaccum(5,3)
gbmctimeaccum(4,2)

16.16 _____ MOC: Execute the following GBM procedures to turn on cspec and ctime:
gbmcspeconoff(On)
gbmctimeonoff(On)

16.17 _____ MOC: Execute the following GBM procedure to perform a memory dump:
gbmmemorydump(EEPROM, 0x0106E000, 0x0107FFFF)

16.18 _____ MOC: Execute the following GBM procedure:
gbmmemoryscan

16.19 _____ MOC: Execute the following GBM procedures to set one PHA Dead Time:
gbmsetonephadt(8,100)
~~gbmsetteachphadt(setphafile1)~~
gbmseteachphadt(setphafile1) *(MPS 7/5/07, #2)*

16.20 _____ MOC: Execute the following GBM procedures to set all PHA Dead Times:
gbmsetallphadt(21)
gbmphadetmask(phadetmask1)

16.21 _____ MOC: Execute the following GBM procedure to set one lower level thresholds:
gbmsetonellt(11,100)

16.22 _____ MOC: Execute the following GBM procedure to set all lower level thresholds:
gbmsetallllt(50)

16.23 _____ MOC: Execute the following GBM procedure to set the low voltage off:
gbmselectlvoff(gbm_set_pmt_lv4)

16.24 _____ MOC: Execute the following GBM procedure to set the low voltage on:
gbmselectlvon(gbm_set_pmt_lv_all)

16.25 _____ MOC: Execute the following GBM procedure:
gbmsetonelvoff(3)

16.26 _____ MOC: Execute the following GBM procedure:
gbmsetlvonoff(set_all_lv)

17.0 Playback all Data Recorded on the SSR

Note: In this Section, the MOC is connected to the spacecraft through TDRS during a scheduled 4 Kbps SSA Forward, 40 Kbps KSA Return contact.

17.1 _____ S/C I&T & MOC: Configure for the next scheduled 4 Kbps SSA uplink, 40 Mbps KSA return TDRS pass per Appendix D.

17.2 _____ S/C I&T and MOC: Verify receipt of KSA telemetry

17.3 _____ MOC: From the ITOS command line issue, the directive "**VC 1**" to ensure that the software telecommand virtual channel ID is set to VC-1 (Receiver-1 and UDL-A).

17.4 _____ MOC: From the ITOS command line, issue the following directive: RETRLIM 2, followed by the RESYNC directive.

17.5 _____ MOC: Execute the STOL procedure scnoop.proc and verify the command link to the spacecraft. Verify the scnoop.proc procedure executes without errors, and that the 'Cmd Proc' count on the Master Page increments by 1.

17.6 _____ MOC: Initiate SSR playback by executing the STOL procedure sfswssrpb.proc, answer '2' at the prompt to playback the housekeeping data partition. Answer 'NO' at the prompt to disable data storage. Record the start time of this playback below:

_____ UTC

17.7 _____ MOC: Verify receipt and processing of Housekeeping data by the GFEP (VC-3, gfep6stats page).

17.8 _____ MOC: Verify that the playback takes place by monitoring the SSR telemetry page (ssrmain page):

Science Partition:

STLSTRD_SSRSCI is incrementing.

STLSTRWR_SSRSCI is incrementing.

STDLLEFT_SSRSCI is not changing

SWHWUDLSCIGPSB1 = 0 or Not Playback

SD_SNTR_PB_P01 = 0 or Playback not in Progress

Housekeeping Partition:

STLSTRD_SSRTLM is incrementing.

STLSTRWRZ_SSRTLM is incrementing

STDLLEFT_SSRTLM is decrementing

SWHWUDLSSRHKPB = 1 or Playback

SD_SNTR_PB_P1 = 1 or Playback in Progress.

17.9 _____ MOC: Wait for the science playback to complete.

17.10 _____ MOC: Initiate SSR playback by executing the STOL procedure sfswssrpb.proc, answer “1” to play back the science partition and answer “N” to the prompt to stop recording.

17.11 _____ S/C I&T: Verify receipt and processing of Housekeeping and Science data by the GFEP (VC-8, & VC-9).

17.12 _____ MOC: Verify that the playback takes place by monitoring the SSR telemetry page:

Science Partition:

STLSTRD_SSRSCI is incrementing.

STLSTRWR_SSRSCI is incrementing.

STDLLEFT_SSRSCI is decrementing

SWHWUDLSCIGPSB1 = 1 or Playback

SD_SNTR_PB_P01 = 1 or Playback in Progress

Housekeeping Partition:

STLSTRD_SSRTLM is incrementing.

STLSTRWRZ_SSRTLM is incrementing

STDLLEFT_SSRTLM is not changing

SWHWUDLSSRHKPB = 0 or Not Playback

SD_SNTR_PB_P1 = 0 or Playback is not in Progress.

17.13 _____ MOC: After SSR playback has completed, wait for the end of a the TDRS pass. Data transfer will begin automatically following the end of the pass. Record the completion time of the playback:

_____ UTC

17.14 _____ MOC: After the end of the TDRS pass, verify that Level 0 processing starts and completes.

17.15 _____ S/C I&T and MOC: After the end of the TDRS pass, configure per Appendix D.

18.0 Turn off GBM Instrument

Note: This section should be executed if the test is to be interrupted, or GBM is unable to support powered testing through the rest of this procedure. This section should be done with baseband command and telemetry links.

18.1 _____ MOC: Hand command control back to S/C I&T (I&T switch back to high rate baseband command & telemetry if necessary). Record start time of instrument turn off:

_____ UTC

18.2 _____ S/C I&T / GBM I&T: Send the following command to initiate GBM shutdown:
/GSHUTDOWN

18.3 _____ S/C I&T / GBM I&T: Verify GBM Shutdown. GBM Status is available on GBM Display 'Boot_Configuration&Status.vi'.

GBM Mode (GFSW_STATE_MODE) = Shutdown
No APIDs in GBM range (1024 to 1439) are present in 1553 telemetry.

18.4 _____ S/C I&T/ GBM I&T: Turn off the GBM. At the 'Command Selection' Window at the AstroRT Workstation, select the 'SHW_UDL_PDU_A_CMD' command with the following parameters:

VCID = VC0
COMMAND=GBM_B_OFF

18.5 _____ MOC: Record UTC time:
_____ UTC

19.0 Power Down Spacecraft & TTGT

Note: This section should be executed if the test must be interrupted at this point, and the spacecraft cannot remain powered.

19.1 _____ MOC: Hand control of the spacecraft back to S/C I&T

19.2 _____ S/C I&T: Configure the EGSE for command and control of the Observatory and if there is no powered spacecraft testing to follow this test, power the spacecraft off by executing the GLAST Spacecraft Power On/Off Standard Operating Procedure (1196 ET-W62606-000).

19.3 _____ If the TTGT was used during this test, shut down the Remote Rack and Trailer per Appendix C.

20.0 Spacecraft-bus Configuration

If the spacecraft was not powered off at the end of the test, S/C I&T note that FOT commanding has made the following configuration changes to the Spacecraft-bus from the initial configuration.

- The forward/uplink data rate is set to 4 Kbps
- The return/downlink is 40 Mbps.
- Downlink of flight parameters on-change has been enabled (APID 0294)
- Generation and downlink of command echo in real-time has been enabled
- Generation and downlink of event messages in real-time has been enabled
- SSR is not recording data.
- ATS loads have been made to Tables A & B, ATS is stopped.
- RTS loads have been made to TBS.

End of Day 1 Testing

DAY 2 Testing

21.0 Record Start of Test & Configure TTGT, Day 2.

Note: if this test is being executed continuously, this section can be skipped.

21.1 _____ MOC / SC I&T: Record the start of this procedure below and in the Test Conductor Log

Time: _____ (UTC)
Date: _____

21.2 _____ SC I&T: Configure the TDRS Transportable Ground Terminal (TTGT) per Appendix B. Note that 2 scheduled TDRS contacts (one on TDRS 171, one on TDRS W) will be used to adjust the antenna offsets.

21.3 _____ MOC / SC I&T: Proceed with the rest of this procedure while the TTGT is being configured.

22.0 Element Communications Check-out, Day 2.

Note: if this test is being executed continuously, this section can be skipped.

22.1 _____ MOC: Contact Goddard Voice, 301-286-5472 or 301-286-8737, and have Goddard Voice tie in the Meet-Me Number _____ to the OPS1 Channel (SCAMA 313) (this is for elements that do not have SCAMA Boxes).

22.2 _____ S/C I&T and MOC: Verify voice communications between the GD/FOF I&T facility and the MOC over the OPS1 channel.

22.3 _____ MOC: Verify voice communications with LISOC and GIOC over the OPS1 Channel.

22.4 _____ MOC: Verify voice communications with SN (White Sands and NOM) over SN_COORD.

23.0 Mission Operations Center (MOC) Configuration

Note: if this test is being executed continuously, this section can be skipped.

In this section of the test the MOC connects to the SCIT Rack.

23.1 _____ MOC: Verify that the MOC workstations are powered on and all software is configured to support receipt of telemetry from the S/C I&T facility and commanding to the S/C I&T facility.

23.2 _____ MOC: Execute the procedure ospacecraftaos.proc to connect to the GD/FOF S/C I&T facility network.

23.3 _____ MOC: Verify proper connection with the GD/SASS S/C I&T facility network.

23.4 _____ GIOC: Connect to the MOC Web Interface.

23.5 _____ MOC: Verify that the GFEP at the General Dynamics FOF is configured to acquire data.

24.0 Observatory Power On and Configuration for Test

Note: If this test is being executed continuously, this section can be skipped. In this section of the test the MOC is connected to the spacecraft through the SCIT Rack.

24.1 _____ MOC / S/C I&T: Record start time of spacecraft power up:

_____ UTC

24.2 _____ S/C I&T: Configure the spacecraft for side-A operations Spacecraft-bus Configuration per the LAT Functional Test Procedure 1196-ET-I74927-000C, from the beginning of the document through and including paragraph 6.3.2. At the conclusion of this procedure the spacecraft will be configured as follows:

- All essential-bus services powered, Side-A
  - PDU-A
  - IEM UDL Cards
  - IEM ARM Cards
  - A-side OCXO powered
- IEM A-side CPU bus and TLM bus powered
- IEM CPU-A executing flight software (Non-boot code)
- Primary 1553 Bus is A

- Spacecraft commanding on baseband (SCIT Rack)
- Return data-rate set to 1 Mbps (baseband, SCIT Rack)

24.3 _____ S/C I&T: If the spacecraft is already powered from prior testing, and not in the configuration specified in Step 3.1 above, configure the command and telemetry links to baseband and attach black-line steps to this procedure to configure the spacecraft as specified in Step 5.1

24.4 _____ S/C I&T: Set the Spacecraft time to UTC per the GLAST Spacecraft Power On/Off Standard Operating Procedure. If GPS is available, configure to provide the GPS 1 PPS reference.

☐ GPS Not Utilized

☐ GPS Utilized

24.5 _____ S/C I&T: Verify/Configure ground system to provide telemetry data to the MOC.

24.6 _____ MOC: Execute the STOL procedure ospacecraftaos.proc to acquire telemetry from the GD SCIT Rack.

24.7 _____ MOC: Verify receipt and decommutation of real-time telemetry data (VC-0) from the Spacecraft-bus using the display tlmstats.

25.0 Additional Spacecraft Configuration.

Note: If this test is being executed continuously, this section can be skipped. In this section of the test the MOC is connected to the spacecraft through the SCIT Rack.

25.1 _____ S/C I&T: If not already configured, enable Flight Parameters on Change with the following:

/SMFPUINT8 PARAMID=FPVSDLPARMSONCHG VALUE=1

Verify that VSDLPARMSONCHG = 1

25.2 _____ S/C I&T: If not already configured, enable command echo with the following:

/SMFPUINT8 PARAMID=FPVSDLTCLOGRT VALUE=1

Verify that VSDLTCLOGRT = 1

25.3 _____ S/C I&T: If not already configured, enable event messages with the following:

/SMFPUINT8 PARAMID=FPVDLEVTLOGRT VALUE=1

Verify that VSDLEVTLOGRT = 1

25.4 _____ S/C I&T: Verify that the SSR is recording data by checking the following telemetry.

STWRENBL_SSRTLM = 1 (SSR HSK partition storage status)

STWRENBL_SSRSCI = 1 (SSR science partition storage status)

STLSTWR_SSRTLM is incrementing (SSR HSK partition write counter)

25.5 _____ S/C I&T: Verify that data is being written to CPU RAM by checking the following telemetry.

STWRENBL_RAMTLM = 1 (CPU RAM partition storage status)

25.6 _____ S/C I&T: Configure the transmitter timeout to 5 hours by sending the following command:

/SMFPUNIT32 FPVSKUBANDONTO Value = 18000

25.7 _____ S/C I&T: Execute the following steps (disable SAA processing for GBM) prior to GBM power up:

At the ‘Command Selection’ Window at the AstroRT Workstation, select the ‘SMFPUNIT8’ command with the following:

PARAMID = FPVSGSAAOVRIDEGBM

VLAUE = 1

Click on the ‘OK’ Button, then the ‘SEND’ button.

Verify and record the following:

SACFLAGGBMINSSA = _____(0)

25.8 _____ S/C I&T: Execute the following steps (disable SAA processing for LAT) prior to LAT power up:

At the 'Command Selection' Window at the AstroRT Workstation, select the 'SMFPUNIT8' command with the following:

PARAMID = FPVSGSAAOVRIDELAT

VLAUE = 1

Click on the 'OK' Button, then the 'SEND' button.

Verify and record the following:

SACFLAGLATINSSA = _____(0)

25.9 _____ S/C I&T: Only if necessary, ~~S~~send the following command to turn on the PDUA power feed to the S-Band Transmitter: ***(MPS 7-5-07, #6)***

/SDIPDUSETLCBSWCH

Side=Both

Device=S_BND_XMT_1

ONOFF=S_ON

25.10 _____ S/C I&T: Configure SC to process science data from the GBM Redundant port. At the "Command Selection" window on the AstroRT Workstation, select the "SDILGIOCONFIG" command with the following parameters:

REGISTERID=CONTROL

BITMASK=~~0x0016~~0x0010 ***(MPS 7-5-07 #7)***

BITVALUES=~~0x0016~~0x0010

Click on the "OK" Button, then the "SEND" button.

25.11 _____ S/C I&T: Verify that the redundant GBM science interface port is set.

SLGIOGBMINMUX= _____(1)

26.0 GBM I&T Instrument Operations and Ground Configuration

Note: If GBM is still powered, this section can be skipped. In this section of the test the MOC is connected to the spacecraft through the SCIT Rack.

26.1 _____ MOC / S/C I&T: Record approximate time of GBM configuration:

_____ UTC

26.2 _____ S/C I&T: Execute the script GNC_EPHEM_FLAG103_565_ALT_26_INCL.pl.

26.3 _____ S/C I&T: Execute the script GBM_Power_Up_and_Aliveness.pl to power up the GBM, selecting the following options:

IEM Side = A

PDU Side = A

Primary 1553 Bus = A

GBM Side = R

GBM SW Version = 2

Turn-on PMT Voltages = YES

26.4 _____ S/C I&T/GBM: Verify that after GBM power up, the GBM is configured as follows:

Major Version (GFSW_MAJ_VERSION) = 2

GBM Mode (GFSW_STATE_MODE) = Normal

Auto-Config Mode (GFSW_AUTONMODE) = Done

26.5 _____ S/C I&T: Send command GDPUMSGTOLOG.

26.6 _____ S/C I&T / GBM I&T: Verify that diagnostic messages are being directed to an internal GBM log.

GFSW_MSG_PROMPT = Log

26.7 _____ S/C I&T / GBM I&T: Send the command GDAQMASTERSTOP. Record the value of GDPU_TR_RG_SUCC.

GDPU_TR_RG_SUCC = _____

26.8 _____ S/C I&T / GBM I&T: Verify that master PHA is disabled:

PHA Master Status (GDAQ_WANT_PHA_ON) = Disabled

26.9 _____ S/C I&T / GBM I&T: Send command GDAQLUTSDUMP.

26.10 _____ S/C I&T / GBM I&T: Verify that LUTS dump has started:

Memory Task: TC Action (GHK_MEM_TC_ACT) = LUTS_Dump

GDPU_TR_RG_SUCC = _____

26.11 _____ S/C I&T: Send command GDPUTRIGSOFF.

26.12 _____ S/C I&T / GBM I&T: Verify that GDPU_TR_RG_SUCC increments by 1 and that GBM burst triggering is disabled:

GDAQ_TRG_0_7 = 0

GDAQ_TRG_8_15 = 0

GDAQ_TRG_16_23 = 0

GDAQ_TRG_24_31 = 0

GDAQ_TRG_32_39 = 0

GDAQ_TRG_40_47 = 0

GDAQ_TRG_48_55 = 0

GDAQ_TRG_56_63 = 0

GDAQ_TRG_64_71 = 0

GDAQ_TRG_72_79 = 0

GDAQ_TRG_80_87 = 0

GDAQ_TRG_88_95 = 0

GDAQ_TRG_96_103 = 0

GDAQ_TRG_104_111 = 0

GDAQ_TRG_112_119 = 0

GDPU_TR_RG_SUCC = _____ (Record value)

26.13 _____ S/C I&T / GBM I&T: Send the command GDAQMASTERSTART. Record the value of GDPU_TR_RG_SUCC.

GDPU_TR_RG_SUCC = _____

26.14 _____ S/C I&T / GBM I&T: Verify that Master PHA is enabled:

PHA Master Status (GDAQ_WANT_PHA_ON) = Enabled

GDPU_TR_RG_SUCC = _____

26.15 _____ S/C I&T / GBM I&T: Verify that science data is being recorded:

STLSTWR_SSRSCI is incrementing (SSR science partition write counter)

27.0 MOC Load RTS Files To Control Spacecraft/Instrument Configuration.

Note: In this section of the test the MOC can be connected to the spacecraft through the SCIT Rack or the SN.

27.1 _____ MOC: Execute the following procedure to enable the LAT VCHP Heaters:

sepslatpruvchp(BOTH, ON)

27.2 _____ Verify that the A-side heaters heaters are enabled (the B-side heaters have an overtemp thermostat that will be open).

27.3 _____ MOC: Upload LISOC RTS file(s):

sfswrtsuplink( )–***Note: this section can be removed for 24 hour test.***

28.0 MOC Power On LAT SIU through EPUs

Note: In this section of the test the MOC can be connected to the spacecraft through the SCIT Rack or the SN.

LAT SIU Power ON

28.1 _____ MOC: Set up Ground System Limits prior to LAT activation

LATLIMITSET(100,DIS)

LATLIMITSET(76,ENA)

LATMIMITSET(77,ENA)

28.2 _____ MOC: Execute the LAT procedure LATSIUREADY (ref. OBS-02) to verify the spacecraft is ready for LAT power on.

LATSIUREADY(A, PRI, GASU)

28.3 _____ MOC: Execute the following procedure to disable the redundant VCHP feed if two are enabled.

SEPSLATPRUVCHP(B, OFF)

28.4 _____ MOC: Execute the LAT procedure (LATSIUREADY (ref. OBS-02) to verify the spacecraft is ready for LAT power on.

LATSIURAEDY(A,PRI_GASU)

28.5 _____ MOC: Execute the following procedure to power the LAT primary SIU feed.

SEPSLATPRUSIU(A,ON)

28.6 _____ MOC: Execute the procedure LATSIUBOOT:

LATSIUBOOT(PRI_SIU, PRI-VCHP, 0x5400, 0xC000)

28.7 _____ MOC: Set LAT limit checking for the current state:

LATLIMITSET(3, ENA)

LATLIMITSET(4, ENA)

LAT Main Feed ON

28.8 _____ MOC: Execute LAT procedure to verify that LAT is ready to enable the DAQ feed.

LATDAQREADY

28.9 _____ MOC: Execute the following procedure to enable the primary LAT DAQ feed.

SEPSLATPRUDAQ(A,ON)

28.10 _____ MOC: Execute the procedure to turn on the LAT PRU and GASU:

LATMAINFEEDON(PRI-DAQ, PRI_SIU, PDU0, PRI_GASU, PRI_FEED, PRI_SSR, GBM_RED, PRI_PPS,0, 0)

28.11 _____ MOC: Execute the LAT procedures to set the ground limits for the current state:

LATLIMITSET(5, ENA)

LATLIMITSET(7, ENA)

28.12 _____ MOC: Execute the procedure to turn on the LAT AEM:

LATPOWERAEM(PDU0, PRI_CVTR, PRI_GASU)

LAT_Initialize_LTC(v2)

28.13 _____ MOC: Initialize the LTC Task with a new configuration file (ref L-LEO-01):

LATLTCINIT(0x61C00E70)

LAT_Activate_EPU1s(v2)

28.14 _____ MOC: Execute the following procedure to activate LAT EPU0:

LATPOWEREPU(PDU0, EPU0, 0X5400, 0XC000) ***(estimated 4 min execution)***

28.15 _____ MOC: Execute the following LAT procedures to set the ground limits for the current configuration:

LATLIMITSET(10, ENA)

LATLIMITSET(12, ENA)

28.16 _____ MOC: Execute the following procedure to activate LAT EPU1:

LATPOWEREPU(PDU0, EPU1, 0X5400, 0XC000) ***(estimated 4 min execution)***

28.17 _____ MOC: Execute the following LAT procedures to set the ground limits for the current configuration:

LATLIMITSET(13, ENA)

LATLIMITSET(15, ENA)

29.0 MOC Activate LAT Towers

Note: In this section of the test the MOC can be connected to the spacecraft through the SCIT Rack or the SN. An attempt should be made to activate at least one tower through the SN path.

LAT_Activate_TWR0(v2)

29.1 _____ MOC: Power on the TEM for Tower 0 by executing the following procedure:

LATPOWERTEM(PDU0, 0)

29.2 _____ MOC: Power on the CAL for Tower 0 by executing the following procedure:

LATPOWERCAL(PDU0, 0)

29.3 _____ MOC: Power on and boot Tower 0 by executing the following procedure:

LATPOWERTKR(PDU0, 0)

29.4 _____ MOC: Set the ground limits for the current configuration:

LATLIMITSET(19, ENA)

LATLIMITSET(51, ENA)

LAT_Activate_TWR3(v2)

29.5 _____ MOC: Power on the TEM for Tower 3 by executing the following procedure:

LATPOWERTEM(PDU0, 3)

29.6 _____ MOC: Power on the CAL for Tower 3 by executing the following procedure:

LATPOWERCAL(PDU0, 3)

29.7 _____ MOC: Power on and boot Tower 3 by executing the following procedure:

LATPOWERTKR(PDU0, 3)

29.8 _____ MOC: Set the ground limits for the current configuration:

LATLIMITSET(22, ENA)

LATLIMITSET(54, ENA)

LAT_Activate_TWR12(v2)

29.9 _____ MOC: Power on the TEM for Tower 12 by executing the following procedure:

LATPOWERTEM(PDU0, 12)

29.10 _____ MOC: Power on the CAL for Tower 12 by executing the following procedure:

LATPOWERCAL(PDU0, 12)

29.11 _____ MOC: Power on and boot Tower 12 by executing the following procedure:

LATPOWERTKR(PDU0, 12)

29.12 _____ MOC: Set the ground limits for the current configuration:

LATLIMITSET(31, ENA)

LATLIMITSET(63, ENA)

LAT_Activate_TWR15(v2)

29.13 _____ MOC: Power on the TEM for Tower 15 by executing the following procedure:
LATPOWERTEM(PDU0, 15)

29.14 _____ MOC: Power on the CAL for Tower 15 by executing the following procedure:
LATPOWERCAL(PDU0, 15)

29.15 _____ MOC: Power on and boot Tower 15 by executing the following procedure:
LATPOWERTKR(PDU0, 15)

29.16 _____ MOC: Set the ground limits for the current configuration:
LATLIMITSET(34, ENA)
LATLIMITSET(66, ENA)

LAT_Activate_TWR1(v2)

29.17 _____ MOC: Power on the TEM for Tower 1 by executing the following procedure:
LATPOWERTEM(PDU0, 1)

29.18 _____ MOC: Power on the CAL for Tower 1 by executing the following procedure:
LATPOWERCAL(PDU0, 1)

29.19 _____ MOC: Power on and boot Tower 1 by executing the following procedure:
LATPOWERTKR(PDU0, 1)

29.20 _____ MOC: Set the ground limits for the current configuration:
LATLIMITSET(20, ENA)
LATLIMITSET(52, ENA)

LAT_Activate_TWR2(v2)

29.21 _____ MOC: Power on the TEM for Tower 2 by executing the following procedure:
LATPOWERTEM(PDU0, 2)

29.22 _____ MOC: Power on the CAL for Tower 2 by executing the following procedure:
LATPOWERCAL(PDU0, 2)

29.23 _____ MOC: Power on and boot Tower 2 by executing the following procedure:
LATPOWERTKR(PDU0, 2)

29.24 _____ MOC: Set the ground limits for the current configuration:
LATLIMITSET(21, ENA)
LATLIMITSET(53, ENA)

LAT_Activate_TWR13(v2)

29.25 _____ MOC: Power on the TEM for Tower 13 by executing the following procedure:
LATPOWERTEM(PDU0, 13)

29.26 _____ MOC: Power on the CAL for Tower 13 by executing the following procedure:
LATPOWERCAL(PDU0, 13)

29.27 _____ MOC: Power on and boot Tower 13 by executing the following procedure:
LATPOWERTKR(PDU0, 13)

29.28 _____ MOC: Set the ground limits for the current configuration:
LATLIMITSET(32, ENA)
LATLIMITSET(64, ENA)

LAT_Activate_TWR14(v2)

29.29 _____ MOC: Power on the TEM for Tower 14 by executing the following procedure:
LATPOWERTEM(PDU0, 14)

29.30 _____ MOC: Power on the CAL for Tower 14 by executing the following procedure:
LATPOWERCAL(PDU0, 14)

29.31 _____ MOC: Power on and boot Tower 14 by executing the following procedure:
LATPOWERTKR(PDU0, 14)

29.32 _____ MOC: Set the ground limits for the current configuration:

LATLIMITSET(33, ENA)
LATLIMITSET(65, ENA)

LAT_Activate_TWR4(v2)

29.33 _____ MOC: Power on the TEM for Tower 4 by executing the following procedure:
LATPOWERTEM(PDU0, 4)

29.34 _____ MOC: Power on the CAL for Tower 4 by executing the following procedure:
LATPOWERCAL(PDU0, 4)

29.35 _____ MOC: Power on and boot Tower 4 by executing the following procedure:
LATPOWERTKR(PDU0, 4)

29.36 _____ MOC: Set the ground limits for the current configuration:
LATLIMITSET(23, ENA)
LATLIMITSET(55, ENA)

LAT_Activate_TWR8(v2)

29.37 _____ MOC: Power on the TEM for Tower 8 by executing the following procedure:
LATPOWERTEM(PDU0, 8)

29.38 _____ MOC: Power on the CAL for Tower 8 by executing the following procedure:
LATPOWERCAL(PDU0, 8)

29.39 _____ MOC: Power on and boot Tower 8 by executing the following procedure:
LATPOWERTKR(PDU0, 8)

29.40 _____ MOC: Set the ground limits for the current configuration:
LATLIMITSET(27, ENA)
LATLIMITSET(59, ENA)

LAT_Activate_TWR7(v2)

29.41 _____ MOC: Power on the TEM for Tower 7 by executing the following procedure:
LATPOWERTEM(PDU0, 7)

29.42 _____ MOC: Power on the CAL for Tower 7 by executing the following procedure:
LATPOWERCAL(PDU0, 7)

29.43 _____ MOC: Power on and boot Tower 7 by executing the following procedure:
LATPOWERTKR(PDU0, 7)

29.44 _____ MOC: Set the ground limits for the current configuration:
LATLIMITSET(26, ENA)
LATLIMITSET(58, ENA)

LAT_Activate_TWR11(v2)

29.45 _____ MOC: Power on the TEM for Tower 11 by executing the following procedure:
LATPOWERTEM(PDU0, 11)

29.46 _____ MOC: Power on the CAL for Tower 11 by executing the following procedure:
LATPOWERCAL(PDU0, 11)

29.47 _____ MOC: Power on and boot Tower 11 by executing the following procedure:
LATPOWERTKR(PDU0, 11)

29.48 _____ MOC: Set the ground limits for the current configuration:
LATLIMITSET(30, ENA)
LATLIMITSET(62, ENA)

LAT_Activate_TWR5(v2)

29.49 _____ MOC: Power on the TEM for Tower 5 by executing the following procedure:
LATPOWERTEM(PDU0, 5)

29.50 _____ MOC: Power on the CAL for Tower 5 by executing the following procedure:
LATPOWERCAL(PDU0, 5)

29.51 _____ MOC: Power on and boot Tower 5 by executing the following procedure:
LATPOWERTKR(PDU0, 5)

29.52 _____ MOC: Set the ground limits for the current configuration:
LATLIMITSET(24, ENA)
LATLIMITSET(56, ENA)

LAT_Activate_TWR6(v2)

29.53 _____ MOC: Power on the TEM for Tower 6 by executing the following procedure:
LATPOWERTEM(PDU0, 6)

29.54 _____ MOC: Power on the CAL for Tower 6 by executing the following procedure:
LATPOWERCAL(PDU0, 6)

29.55 _____ MOC: Power on and boot Tower 6 by executing the following procedure:
LATPOWERTKR(PDU0, 6)

29.56 _____ MOC: Set the ground limits for the current configuration:
LATLIMITSET(25, ENA)
LATLIMITSET(57, ENA)

LAT_Activate_TWR9(v2)

29.57 _____ MOC: Power on the TEM for Tower 9 by executing the following procedure:
LATPOWERTEM(PDU0, 9)

29.58 _____ MOC: Power on the CAL for Tower 9 by executing the following procedure:
LATPOWERCAL(PDU0, 9)

29.59 _____ MOC: Power on and boot Tower 9 by executing the following procedure:
LATPOWERTKR(PDU0, 9)

29.60 _____ MOC: Set the ground limits for the current configuration:

LATLIMITSET(28, ENA)
LATLIMITSET(60, ENA)

LAT_Activate_TWR10(v2)

29.61 _____ MOC: Power on the TEM for Tower 10 by executing the following procedure:
LATPOWERTEM(PDU0, 10)

29.62 _____ MOC: Power on the CAL for Tower 10 by executing the following procedure:
LATPOWERCAL(PDU0, 10)

29.63 _____ MOC: Power on and boot Tower 10 by executing the following procedure:
LATPOWERTKR(PDU0, 10)

29.64 _____ MOC: Set the ground limits for the current configuration:
LATLIMITSET(29, ENA)
LATLIMITSET(61, ENA)

30.0 MOC Power on all 12 ACD Free Boards

30.1 _____ MOC: Power on ACD Free Board 0 by executing the following procedure:
LATPOWERFREEBD(PDU0, PRI_GASU, 0)

30.2 _____ MOC: Power on ACD Free Board 1 by executing the following procedure:
LATPOWERFREEBD(PDU0, PRI_GASU, 1)

30.3 _____ MOC: Power on ACD Free Board 2 by executing the following procedure:
LATPOWERFREEBD(PDU0, PRI_GASU, 2)

30.4 _____ MOC: Power on ACD Free Board 3 by executing the following procedure:
LATPOWERFREEBD(PDU0, PRI_GASU, 3)

30.5 _____ MOC: Power on ACD Free Board 4 by executing the following procedure:

LATPOWERFREEBD(PDU0, PRI_GASU, 4)

30.6 _____ MOC: Power on ACD Free Board 5 by executing the following procedure:
LATPOWERFREEBD(PDU0, PRI_GASU, 5)

30.7 _____ MOC: Power on ACD Free Board 6 by executing the following procedure:
LATPOWERFREEBD(PDU0, PRI_GASU, 6)

30.8 _____ MOC: Power on ACD Free Board 7 by executing the following procedure:
LATPOWERFREEBD(PDU0, PRI_GASU, 7)

30.9 _____ MOC: Power on ACD Free Board 8 by executing the following procedure:
LATPOWERFREEBD(PDU0, PRI_GASU, 8)

30.10 _____ MOC: Power on ACD Free Board 9 by executing the following procedure:
LATPOWERFREEBD(PDU0, PRI_GASU, 9)

30.11 _____ MOC: Power on ACD Free Board 10 by executing the following procedure:
LATPOWERFREEBD(PDU0, PRI_GASU, 10)

30.12 _____ MOC: Power on ACD Free Board 11 by executing the following procedure:
LATPOWERFREEBD(PDU0, PRI_GASU, 11)

.

30.13 _____ MOC: Set ground limit checking for the current configuration:
LATLIMITSET(67, ENA)

30.14 _____ MOC: Verify that LAT is powered on in a valid configuration by executing the following procedure:
LATVERIFYCFG

31.0 MOC Set LAT CAL High Voltages

31.1 _____ MOC: Set up the LAT CAL High Voltage 0 by executing the following procedure:

LATCALHVBIAS(0, PDU0, 0x5800)

31.2 _____ MOC: Set up the LAT CAL High Voltage 1 by executing the following procedure:
LATCALHVBIAS(1, PDU0, 0x5800)

31.3 _____ MOC: Set up the LAT CAL High Voltage 2 by executing the following procedure:
LATCALHVBIAS(2, PDU0, 0x5800)

31.4 _____ MOC: Set up the LAT CAL High Voltage 3 by executing the following procedure:
LATCALHVBIAS(3, PDU0, 0x5800)

31.5 _____ MOC: Set up the LAT CAL High Voltage 4 by executing the following procedure:
LATCALHVBIAS(4, PDU0, 0x5800)

31.6 _____ MOC: Set up the LAT CAL High Voltage 5 by executing the following procedure:
LATCALHVBIAS(5, PDU0, 0x5800)

31.7 _____ MOC: Set up the LAT CAL High Voltage 6 by executing the following procedure:
LATCALHVBIAS(6, PDU0, 0x5800)

31.8 _____ MOC: Set up the LAT CAL High Voltage 7 by executing the following procedure:
LATCALHVBIAS(7, PDU0, 0x5800)

31.9 _____ MOC: Set up the LAT CAL High Voltage 8 by executing the following procedure:
LATCALHVBIAS(8, PDU0, 0x5800)

31.10 _____ MOC: Set up the LAT CAL High Voltage 9 by executing the following procedure:
LATCALHVBIAS(9, PDU0, 0x5800)

31.11 _____ MOC: Set up the LAT CAL High Voltage 10 by executing the following procedure:
LATCALHVBIAS(10, PDU0, 0x5800)

31.12 _____ MOC: Set up the LAT CAL High Voltage 11 by executing the following procedure:

LATCALHVBIAS(11, PDU0, 0x5800)

31.13 _____ MOC: Set up the LAT CAL High Voltage 12 by executing the following procedure:
LATCALHVBIAS(12, PDU0, 0x5800)

31.14 _____ MOC: Set up the LAT CAL High Voltage 13 by executing the following procedure:
LATCALHVBIAS(13, PDU0, 0x5800)

31.15 _____ MOC: Set up the LAT CAL High Voltage 14 by executing the following procedure:
LATCALHVBIAS(14, PDU0, 0x5800)

31.16 _____ MOC: Set up the LAT CAL High Voltage 15 by executing the following procedure:
LATCALHVBIAS(15, PDU0, 0x5800)

32.0 MOC Set LAT TKR High Voltages

32.1 _____ MOC: Set up the LAT TKR High Voltage 0 by executing the following procedure:
LATTKRHVBIAS(0, PDU0, 0x54FE)

32.2 _____ MOC: Set up the LAT TKR High Voltage 1 by executing the following procedure:
LATTKRHVBIAS(1, PDU0, 0x54FE)

32.3 _____ MOC: Set up the LAT TKR High Voltage 2 by executing the following procedure:
LATTKRHVBIAS(2, PDU0, 0x54FE)

32.4 _____ MOC: Set up the LAT TKR High Voltage 3 by executing the following procedure:
LATTKRHVBIAS(3, PDU0, 0x54FE)

32.5 _____ MOC: Set up the LAT TKR High Voltage 4 by executing the following procedure:
LATTKRHVBIAS(4, PDU0, 0x54FE)

32.6 _____ MOC: Set up the LAT TKR High Voltage 5 by executing the following procedure:

LATTKRHVBIAS(5, PDU0, 0x54FE)

32.7 _____ MOC: Set up the LAT TKR High Voltage 6 by executing the following procedure:
LATTKRHVBIAS(6, PDU0, 0x54FE)

32.8 _____ MOC: Set up the LAT TKR High Voltage 7 by executing the following procedure:
LATTKRHVBIAS(7, PDU0, 0x54FE)

32.9 _____ MOC: Set up the LAT TKR High Voltage 8 by executing the following procedure:
LATTKRHVBIAS(8, PDU0, 0x54FE)

32.10 _____ MOC: Set up the LAT TKR High Voltage 9 by executing the following procedure:
LATTKRHVBIAS(9, PDU0, 0x54FE)

32.11 _____ MOC: Set up the LAT TKR High Voltage 10 by executing the following procedure:
LATTKRHVBIAS(10, PDU0, 0x54FE)

32.12 _____ MOC: Set up the LAT TKR High Voltage 11 by executing the following procedure:
LATTKRHVBIAS(11, PDU0, 0x54FE)

32.13 _____ MOC: Set up the LAT TKR High Voltage 12 by executing the following procedure:
LATTKRHVBIAS(12, PDU0, 0x54FE)

32.14 _____ MOC: Set up the LAT TKR High Voltage 13 by executing the following procedure:
LATTKRHVBIAS(13, PDU0, 0x54FE)

32.15 _____ MOC: Set up the LAT TKR High Voltage 14 by executing the following procedure:
LATTKRHVBIAS(14, PDU0, 0x54FE)

32.16 _____ MOC: Set up the LAT TKR High Voltage 1 by executing the following procedure:
LATTKRHVBIAS(15, PDU0, 0x54FE)

32.17 _____ MOC: Set the ground limits for the current configuration:

LATLIMITSET(69, ENA)

33.0 MOC Sdet LAT ACD High Voltages

33.1 _____ MOC: Set up LAT ACD high voltage bias for SAA and transition levels:

LATACDHVBIASCFG(TBS)

33.2 _____ MOC: Configure LAT high voltage for SAA level:

LATCONFIGHV(PDU0, PRI_GASU, SAA)

33.3 _____ MOC: Stop LAT ACD Tile Counter:

LATSTOPLRSCNTR(ACDALL)

33.4 _____ MOC: Configure LAT high voltage bias for Transition level:

LATCONFIGHV(PDU0, PRIGASU_HV)

33.5 _____ MOC: Stop LAT ACD Tile Counter:

LATSTOPLRSCNTR(ACDALL)

33.6 _____ MOC: Adjust LAT ACD high voltage bias for SAA and Operational levels:

LATACDHVBIASCFG(TBS)

33.7 _____ MOC: Configure LAT high voltage for Operational level:

LATCONFIGHV(PDU0, PRI_GASU, HV)

33.8 _____ MOC: Stop LAT ACD Tile Counter:

LATSTOPLRSCNTR(ACDALL)

33.9 _____ MOC: Chack that LAT is in appropriate state for OUTSIDE of SAA.

LATACDHVOUTSAA

33.10 _____ MOC: Verify that LAT is powered on in the proper configuration by executing the following procedure:

LATVERIFYCFG

33.11 _____ LAT I&T: Turn the chiller on, or verify is it already operational, per "LAT Auxiliary Cooling Setup and Operating" procedure (Appendix B of the LAT Functional Test Procedure).

33.12 _____ Verify the chiller is operational and working correctly.

34.0 Set Up LAT Science Data-Taking Configuration

34.1 _____ MOC: Set up the LAT Event Handler configuration:

LATSETEVTHANDCFG(0,6,3,0,0,0,0,0,0,0)

34.2 _____ MOC: Associate the LAT Event Handler configuration

LATASCEVTHANDCFG(0,0,6,0,0,0,0,0,0,0,0)

34.3 _____ MOC Set up the LAT Event output stream

LATSETEVENTOUT(0,6,0,0)

35.0 LAT Physics Observation 1 and File Upload Test

35.1 _____ MOC: Start a Lat Physics Observation by executing the following procedure:

LATBEGINPHYSOB(0x41C00E04,0x41800D99,TBS,0,DUMP,6)

35.2 _____ MOC: Start the upload of a file to LAT, and then cancel the upload:

LATLOADFILE("L038_2007179LOAD_siu1000e6c-01-01.00")

LATCANCELLOAD(SIU)

35.3 _____ MOC: Upload a file to LAT:

LATLOADFILE("L038_2007179LOAD_siu1000e6c-01-01.00")

35.4 _____ MOC: Verify the file just uploaded to LAT:

LATCOMMITLOAD(SIU,VALIDATE, 0x42C00000)

35.5 _____ MOC: Commit the file that was just validated:

LATCOMMITLOAD(SIU,COMMIT, 0x42C00000)

35.6 _____ MOC: Copy the committed LAT file to the EPU:

LATCOPY2EPU(EPU0,##, 0x42C00000)

LATCOMMITLOAD(EPU0,COMMIT, 0x42C00000)

35.7 _____ MOC: Stop the LAT Physics Observation by executing the following procedure (if needed):

LATENDPHYSOB

36.0 Playback all Data Recorded on the SSR

Note: In this Section, the MOC is connected to the spacecraft through TDRS during a scheduled 4 Kbps SSA Forward, 40 Kbps KSA Return contact.

36.1 _____ S/C I&T & MOC: Configure for the next scheduled 4 Kbps SSA uplink, 40 Mbps KSA return TDRS pass per Appendix D.

36.2 _____ S/C I&T and MOC: Verify receipt of KSA telemetry

36.3 _____ MOC: From the ITOS command line issue, the directive "**VC 1**" to ensure that the software telecommand virtual channel ID is set to VC-1 (Receiver-1 and UDL-A).

36.4 _____ MOC: From the ITOS command line, issue the following directive: RETRLIM 2, followed by the RESYNC directive.

36.5 _____ MOC: Execute the STOL procedure scnoop.proc and verify the command link to the spacecraft. Verify the scnoop.proc procedure executes without errors, and that the 'Cmd Proc' count on the Master Page increments by 1.

36.6 _____ MOC: Initiate SSR playback by executing the STOL procedure sfswssrpb.proc, answer '2' at the prompt to playback the housekeeping data partition. Answer 'NO' at the prompt to disable data storage. Record the start time of this playback below:

_____ UTC

36.7 _____ MOC: Verify receipt and processing of Housekeeping data by the GFEP (VC-3, gfep6stats page).

36.8 _____ MOC: Verify that the playback takes place by monitoring the SSR telemetry page (ssrmain page):

Science Partition:

STLSTRD_SSRSCI is incrementing.

STLSTRWR_SSRSCI is incrementing.

STDLLEFT_SSRSCI is not changing

SWHWUDLSCIGPSB1 = 0 or Not Playback

SD_SNTR_PB_P01 = 0 or Playback not in Progress

Housekeeping Partition:

STLSTRD_SSRTLM is incrementing.

STLSTRWRZ_SSRTLM is incrementing

STDLLEFT_SSRTLM is decrementing

SWHWUDLSSRHKPB = 1 or Playback

SD_SNTR_PB_P1 = 1 or Playback in Progress.

36.9 _____ MOC: Wait for the science playback to complete.

36.10 _____ MOC: Initiate SSR playback by executing the STOL procedure sfswssrpb.proc, answer “1” to play back the science partition and answer “N” to the prompt to stop recording.

36.11 _____ S/C I&T: Verify receipt and processing of Housekeeping and Science data by the GFEP (VC-8, & VC-9).

36.12 _____ MOC: Verify that the playback takes place by monitoring the SSR telemetry page:

Science Partition:

STLSTRD_SSRSCI is incrementing.

STLSTRWR_SSRSCI is incrementing.

STDLLEFT_SSRSCI is decrementing

SWHWUDLSCIGPSB1 = 1 or Playback

SD_SNTR_PB_P01 = 1 or Playback in Progress

Housekeeping Partition:

STLSTRD_SSRTLM is incrementing.

STLSTRWRZ_SSRTLM is incrementing

STDLLEFT_SSRTLM is not changing

SWHWUDLSSRHKPB = 0 or Not Playback

SD_SNTR_PB_P1 = 0 or Playback is not in Progress.

36.13 _____ MOC: After SSR playback has completed, wait for the end of a the TDRS pass. Data transfer will begin automatically following the end of the pass. Record the completion time of the playback:

_____ UTC

36.14 _____ MOC: After the end of the TDRS pass, verify that Level 0 processing starts and completes.

36.15 _____ S/C I&T and MOC: After the end of the TDRS pass, configure per Appendix D.

37.0 LAT Physics Observation 2 With Processor Dump Activities.

37.1 _____ MOC: Start a Lat Physics Observation by executing the following procedure (if needed):

LATBEGINPHYSOB(0x41C00E04,0x41800D99,TBS,0,DUMP,6)

37.2 _____ MOC: Dump the active Module Listing from the LAT processors (Reference L-LEO-02):

LATDUMPMODLIST(SIU,##)

LATDUMPMODLIST(EPU0,##)

LATDUMPMODLIST(EPU1,##)

37.3 _____ MOC: Dump the active Task Listing from the LAT processors:

LATDUMPTASKLIST(SIU,##)

LATDUMPTASKLIST(EPU0,##)

LATDUMPTASKLIST(EPU1,##)

37.4 _____ MOC: Dump the LAT Memory Pool Statistics:

LATDUMPMEMPOOL(SIU,##,SYSTEM)

LATDUMPMEMPOOL(SIU,##,APPLICATION)

37.5 _____ MOC: Request a file system status from the LAT SIU:

LATFILESYSSTAT(SIU,##,0x60000000)

37.6 _____ MOC: Perform a chkdsk on the LAT file system:

LATCHKFILESYS(SIU,##)

LATCHKFILESYS(EPU0,##)

LATCHKFILESYS(EPU1,##)

37.7 _____ MOC: Dump an area of LAT memory:

LATDUMPMEM(SIU,##,1553,0xC000,0x0008,0,1)

LATDUMPMEM(EPU0,##,1553,0x07FF,0x52E0,0,0x8C80)

37.8 _____ MOC: Cancel the EPU memory dump:

LATCANCELMEMDUMP(EPU0,##)

37.9 _____

37.10 _____ MOC: Stop the LAT Physics Observation by executing the following procedure (if needed):

LATENDPHYSOB

38.0 Playback all Data Recorded on the SSR

Note: In this Section, the MOC is connected to the spacecraft through TDRS during a scheduled 4 Kbps SSA Forward, 40 Kbps KSA Return contact.

38.1 _____ S/C I&T & MOC: Configure for the next scheduled 4 Kbps SSA uplink, 40 Mbps KSA return TDRS pass per Appendix D.

38.2 _____ S/C I&T and MOC: Verify receipt of KSA telemetry

38.3 _____ MOC: From the ITOS command line issue, the directive "**VC 1**" to ensure that the software telecommand virtual channel ID is set to VC-1 (Receiver-1 and UDL-A).

38.4 _____ MOC: From the ITOS command line, issue the following directive: RETRLIM 2, followed by the RESYNC directive.

38.5 _____ MOC: Execute the STOL procedure scnoop.proc and verify the command link to the spacecraft. Verify the scnoop.proc procedure executes without errors, and that the 'Cmd Proc' count on the Master Page increments by 1.

38.6 _____ MOC: Initiate SSR playback by executing the STOL procedure sfswssrpb.proc, answer '2' at the prompt to playback the housekeeping data partition. Answer 'NO' at the prompt to disable data storage. Record the start time of this playback below:

_____ UTC

38.7 _____ MOC: Verify receipt and processing of Housekeeping data by the GFEP (VC-3, gfep6stats page).

38.8 _____ MOC: Verify that the playback takes place by monitoring the SSR telemetry page (ssrmain page):

Science Partition:

STLSTRD_SSRSCI is incrementing.

STLSTRWR_SSRSCI is incrementing.

STDLLEFT_SSRSCI is not changing

SWHWUDLSCIGPSB1 = 0 or Not Playback

SD_SNTR_PB_P01 = 0 or Playback not in Progress

Housekeeping Partition:

STLSTRD_SSRTLM is incrementing.

STLSTRWRZ_SSRTLM is incrementing

STDLLEFT_SSRTLM is decrementing

SWHWUDLSSRHKPB = 1 or Playback

SD_SNTR_PB_P1 = 1 or Playback in Progress.

38.9 _____ MOC: Wait for the science playback to complete.

38.10 _____ MOC: Initiate SSR playback by executing the STOL procedure sfswssrpb.proc, answer "1" to play back the science partition and answer "N" to the prompt to stop recording.

38.11 _____ S/C I&T: Verify receipt and processing of Housekeeping and Science data by the GFEP (VC-8, & VC-9).

38.12 _____ MOC: Verify that the playback takes place by monitoring the SSR telemetry page:

Science Partition:

STLSTRD_SSRSCI is incrementing.

STLSTRWR_SSRSCI is incrementing.

STDLLEFT_SSRSCI is decrementing

SWHWUDLSCIGPSB1 = 1 or Playback

SD_SNTR_PB_P01 = 1 or Playback in Progress

Housekeeping Partition:

STLSTRD_SSRTLM is incrementing.

STLSTRWRZ_SSRTLM is incrementing

STDLLEFT_SSRTLM is not changing

SWHWUDLSSRHKPB = 0 or Not Playback

SD_SNTR_PB_P1 = 0 or Playback is not in Progress.

38.13 _____ MOC: After SSR playback has completed, wait for the end of a the TDRS pass. Data transfer will begin automatically following the end of the pass. Record the completion time of the playback:

_____ UTC

38.14 _____ MOC: After the end of the TDRS pass, verify that Level 0 processing starts and completes.

38.15 _____ S/C I&T and MOC: After the end of the TDRS pass, configure per Appendix D.

39.0 Turn off Instruments

Note: This section should be done with baseband command and telemetry links.

39.1 _____ MOC: Hand command control back to S/C I&T (I&T switch back to high rate baseband command & telemetry if necessary). Record start time of instrument turn off:

_____ UTC

39.2 _____ S/C I&T / LAT I&T: Turn off LAT per LAT Functional Test Procedure 1196 ET-I74927-000C paragraph 6.3.3.10, starting at step 'g.'(L-OBS-101 – LAT Config 1 Load Shed).

39.3 _____ S/C I&T / GBM I&T: Send the following command to initiate GBM shutdown:
/GSHUTDOWN

39.4 _____ S/C I&T / GBM I&T: Verify GBM Shutdown. GBM Status is available on GBM Display 'Boot_Configuration&Status.vi'.

GBM Mode (GFSW_STATE_MODE) = Shutdown
No APIDs in GBM range (1024 to 1439) are present in 1553 telemetry.

39.5 _____ S/C I&T/ GBM I&T: Turn off the GBM. At the 'Command Selection' Window at the AstroRT Workstation, select the 'SHW_UDL_PDU_A_CMD' command with the following parameters:

VCID = VC0
COMMAND=GBM_B_OFF

39.6 _____ MOC: Record UTC time:

_____ UTC

40.0 Power Down Spacecraft & TTGT

40.1 _____ S/C I&T: Configure the EGSE for command and control of the Observatory and if there is no powered spacecraft testing to follow this test, power the spacecraft off by executing the GLAST Spacecraft Power On/Off Standard Operating Procedure (1196 ET-W62606-000).

40.2 _____ If the TTGT was used during this test, shut down the Remote Rack and Trailer per Appendix C.

XI.0 Spacecraft-bus Configuration

If the spacecraft was not powered off at the end of the test, S/C I&T note that FOT commanding has made the following configuration changes to the Spacecraft-bus from the initial configuration.

- The forward/uplink data rate is set to 4 Kbps
- The return/downlink is 40 Mbps.
- Downlink of flight parameters on-change has been enabled (APID 0294)
- Generation and downlink of command echo in real-time has been enabled
- Generation and downlink of event messages in real-time has been enabled
- SSR is not recording data.
- ATS loads have been made to Tables A & B, ATS is stopped.
- RTS loads have been made to RTS 50 and 51.

XII.0 Test Data Storage

XII.1 _____ S/C I&T: Save the Astro RT event log file to a directory supporting Mission Level Test data products.

XII.2 _____ S/C I&T: Record the directory path and filename of the Astro RT event log file.

Directory Path: _____

Filename: _____

XII.3 _____ S/C I&T: Extract the 1 Mbps data for this test from the Archive Server based on the recorded start and stop times within this procedure.

XII.4 _____ S/C I&T: Record the directory path and filename being used to store the 1 Mbps telemetry data.

Directory Path: _____

Filename: _____

XII.5 _____ S/C I&T: Extract the 4 Kbps data for this test from the Archive Server based on the recorded start and stop times with this procedure.

XII.6 _____ S/C I&T: Record the directory path and filename being used to store the 4 Kbps telemetry data.

Directory Path: _____

Filename: _____

XII.7 _____ MOC: Save the ITOS event log file to a directory supporting Mission Level Test data products.

XII.8 _____ MOC: Record the directory path and filename being used to store the ITOS event log.

Directory Path: _____

Filename: _____

XIII.0 Close Outs

XIII.1 _____ Put all test equipment away in appropriate storage facilities.

XIII.2 _____ Record completion of procedure and log in TC Log.

Time: _____ (UTC)
Date: _____

XIII.3 _____ Record the number of hours of testing performed and log in TC Log.

Hours of Testing _____ (estimate 4 hours)

XIII.4 _____ Attach to the procedure or record the location (below) of all media used to capture test data associated with this procedure.

Data File: _____

MOC Page Displays: _____

S/C I&T Page Displays: _____

Misc.: _____

_____

XIV.0 Test Evaluation

The following signatories certify that a test evaluation has been performed in regard to test objectives and that all required data has been obtained, the data has been evaluated in regard to adherence to limits and tolerances, and that all anomalies and procedure modifications have been documented in accordance with defined practices.

_____

Test Conductor Date

_____

Spacecraft I&T Engineer Date

_____

Mission I&T Engineer Date

Test Evaluation Comments:

XV.0 Test Procedure Closure

The following signatories certify that all procedural, evaluation, and analysis steps have been completed.

Test Conductor	Date
Quality Assurance Engineer	Date
Mission I&T Engineer	Date

Appendix A. Requirements Verification.

Ground Requirement ID	Mission System Specification Requirement	Verification Level (for this test)	Applicable Sections or Steps
	3.1.1.5.1 Space-Ground Communications The GLAST system shall use two paths for space-ground communications, a direct ground path, and a relay satellite path.	Partial Verification (full verification of SN)	
	3.1.2.4 Transient Event Response The GLAST system shall respond to gamma-ray bursts and other transient events that are detected on board.	Partial Verification (bursts inside Ku and SSA contacts)	Section 14.0 and Section 15.0
	3.1.2.4.1 Alert Transmission The GLAST system shall automatically transmit an alert message of a transient event to the appropriate ground networks.	Partial Verification for SN	Section 14.0 and Section 15.0
	3.1.4.1 Alert Response Time The alert response time shall be less than 7 seconds with a goal of less than 4 seconds from the time of spacecraft receipt of GRB notification from GBM or LAT to delivery to the Gamma-ray Coordinates Network (GCN) computer for 80% of all GRBs detected by the GBM or LAT.	Partial Verification (bursts inside Ku and SSA contacts)	Section 14.0 and Section 15.0
	3.1.4.1.1 Alert Acquisition and Initiation of Transmission The spacecraft shall initiate transmission of an alert message within 1 second of detection of a GRB by either science instrument.	Partial Verification	Section 14.0 and Section 15.0
	3.1.4.1.2 Alert Transmission The space-ground link shall transmit alert messages to its ground station in less than 5 seconds.	Partial Verification	Section 14.0 and Section 15.0
	3.1.4.1.3 Ground Interface to GCN The ground system shall transfer the alert message from the ground station to the GCN within 1 second.	Partial Verification	
SYS0010	**3.1.2.5.1.1 & 3.1.4.3.1.2 & 3.5.2.4.1** The ground system shall process observatory telemetry that is compliant with the CCSDS Packet Telemetry Recommendations as defined in the Series 100 Blue Books.	Full Verification for SN	

Ground Requirement ID	Mission System Specification Requirement	Verification Level (for this test)	Applicable Sections or Steps
SYS0030	**3.1.4.3.1.2** The ground system shall implement observatory commanding that is compliant with the CCSDS Telecommand recommendations as defined in the Series 200 Blue Books.	Full Verification for SN	
SYS0060	**3.5.2.2 & 3.5.2.3** The ground system shall generate and send commands to the observatory.	Partial Verification (Full Verification for SN)	
SYS0070	**3.5.2.1, 3.5.2.3, 3.5.2.4** The ground system shall process and archive all telemetry received from the observatory.	Partial Verification (Full Verification for SN)	
SYS0080	**3.1.1.5.1** The ground system shall provide RF communications for the transmission of commands and telemetry to/from the observatory vis the Ground Network (GN) and the Space Network (SN).	Partial Verification (Full Verification for SN)	
SYS0100	**3.5.2.2** The ground system shall perform health and safety monitoring of the observatory	Partial Verification (full verification for SN)	GBM Monitored in Sections 12 thru 16; LAT Monitored in Sections 27 thru 30
SYS0130	**3.5.2.8, 3.1.4.1.2, 3.1.4.1.3** The ground system shall relay burst alerts to the science community via the Gamma-ray Coordinates Network (GCN) within 6 seconds for at least 80% of all burst alerts.	Partial Verification	Section 14.0 (KSA) and Section 15.0 (SSA)
GCOM0050	Derived During the pre-launch, launch, and early orbit phases, the ground communications network shall provide secure dedicated Closed Circuit Loop (CCL) or Station Conferencing and Monitoring Assembly (SCAMA) voice communications between the MOC and Ground Stations, WSC,FDF, GSSC, GCN, LAT IOC, GBM IOC, Spacecraft I&T Facility, KSC	Partial Verification (no verification for KSC, FDF, CSSC)	Voice Loops set up in Section 3.0 (Day 1) and Section 22.0 (Day 2) used throughout this test.

Ground Requirement ID	Mission System Specification Requirement	Verification Level (for this test)	Applicable Sections or Steps
GCOM8000	Derived The ground communications network shall transmit burst alerts from the SN to the MOC within 5 seconds for at least 80% of the burst alerts.	Partial verification	Section 14.0 (KSA) and Section 15.0 (SSA)
SN2040	Derived The GFEP shall be able to send 10 hours of observatory HK data to the MOC within 5 hours of receipt.	??	Needs interpretation
SN8010	**3.1.4.1** The SN shall begin transmitting the burst data to the MOC from WSC within 5 seconds of receipt of the signal from the observatory for at least 80% of all burst alerts.	Partial Verification (burst during KSA and SSA contacts)	Section 14.0 (KSA) and Section 15.0 (SSA), need to verify with SN
MOC0270	**3.5.1.8 & 3.5.1.11** The MOC facility shall provide a voice communications system with the capability to connect to ground stations Kennedy Space center (KSC) launch site, the SN, the IOCs, the FDF, the Spacecraft I&T Facility, and the GSSC.	Partial Verification (KSA and FDF not included in this test)	Voice Loops set up in Section 3.0 (Day 1) and Section 22.0 (Day 2) used throughout this test.
MOC4050	**3.5.2.2 - derived** The MOC shall provide TDRSS ephemeris information to the S/C	Partial Verification (ephemeris loaded, but not used)	Section 7.0
MOC4060	**3.5.2.2 – derived** The MOC shall manage the Solid State Recorder to include dumping and re-dumping of science and engineering data.	Partial Verification (re-dumping is not part of this test)	Section 7.0, Section 17.0, Section 36.0
MOC4670	**3.5.3.2** The MOC shall provide that capability to uplink orbit ephemeris data to the observatory.	Full Verification	Section 7.0

Ground Requirement ID	Mission System Specification Requirement	Verification Level (for this test)	Applicable Sections or Steps
MOC5080	**3.5.2.4.3.1** The MOC shall receive and process S/C and instrument on-board processor memory dump and table dump data.	Partial Verification	Section 11.0, **Error! Reference source not found.**
MOC5400	**3.5.3.1.1** The MOC shall send commands to the observatory using ground stations, and the SN/TDRSS.	Partial Verification (only SN/TDRS)	Section 14.0, Section 15.0, Section 36.0, Section **Error! Reference source not found.**
MOC6100	**3.5.2.2, 3.5.2.2.1, derived** The MOC shall monitor the configuration of the observatory and detect deviations from expected states	Partial Verification (not all states tested)	Sections 7.0 through 17.0, and Sections 28.0 through **Error! Reference source not found.**
LIOC0010	**Derived** The LIOC shall adhere to mission specified data formats and standards. (produce Level 1 products)	Partial Verification	Level 1 data Verified Post Test
LIOC1500	**3.5.1.2** The LIOC shall interface with the GSSC for the exchange of mission planning and data products.	Partial Verification (mission planning not tested)	Level 1 data Verified Post Test.
LIOC2090	**Derived** The LIOC shall convert LAT housekeeping data to engineering units and monitor instrument limits and Configuration states.	Partial Verification	Confirm with LAT, post test
LIOC6000	**Derived** The LIOC shall receive and utilize command histories, as-flown timelines, observatory ephemerides, Integrated Observatory Timelines, and operations logs developed by the MOC	Partial Verification	Logs delivered post-test.

Ground Requirement ID	Mission System Specification Requirement	Verification Level (for this test)	Applicable Sections or Steps
LIOC6100	**3.5.2.2, 3.5.2.2.1** The LIOC shall monitor, assess, and record LAT health and status to verify proper operation of the instrument	Partial Verification (not all modes tested)	Section 28.0 through 39.0
LIOC6140	**Derived** The LIOC shall use pre-launch test and calibration data to aid in assessing the performance of the instrument and adjust the instrument tables, engineering calibrations, or software.	Partial Verification	Verify with LAT, post test
LIOC6150	**Derived** The LIOC shall maintain knowledge of the LAT configuration as determined from the telemetry, command history and operations logs.	Partial Verification	Section 28.0 through 39.0
GIOC0010	**Derived** The GIOC shall adhere to mission specified data formats and standards	Partial Verification	Verify with GBM, post test
GIOC6100	**3.5.2.2, 3.5.2.2.1** The GIOC shall monitor GBM health and status to verify proper operation of the instrument.	Full Verification	Sections 12.0 through 16.0, and 28.0 through 36.0
GIOC6150	**Derived** The GIOC shall maintain knowledge of the GBM configuration as determined from the telemetry, command history and operations logs.	Partial Verification	Verify with GBM/GIOC
SAI1520	**Derived** The Spacecraft I&T Facility shall provide the MOC with a validated Observatory T&C Database	Partial Verification (database not final)	Record Version Provided

Appendix B. Configuration Steps To Start or End a TDRS Contact

To Setup for A Scheduled TRDS Contact:

B.1 _____ S/C I&T: Verify that the TTGT Trailer RF path is set to 'LOAD' (not 'Antenna').

B.2 _____ S/C I&T: Point the antenna of the TTGT (TDRS Relay Trailer) at the TDRS spacecraft that will be used for this contact (TDRS W or 171).

B.3 _____ S/C I&T: Verify/establish baseband command and telemetry links to the spacecraft.

B.4 _____ S/C I&T: Just before, or at the start of the scheduled TDRS pass, turn off the transmitter, if it is not already off, and verify that it is off:

Command:
SUTXNITOFF
Verification:
SC_SBA_TX_ONOFF = OFF
SC_SBB_TX_ONOFF = OFF
SC_KBA_TX1_P10V = 0V
SC_KBA_TX1_P10V = 0V

B.5 _____ S/C I&T: Switch the TTGT Trailer RF path from 'LOAD' to 'Antenna'.

B.6 _____ S/C I&T Turn on the transmitter in the configuration needed for the scheduled pass, using the appropriate command and verification shown below:

For Ku-Band:
Set the flight parameter to select transmitter 1 with command:
/SMFPUNIT8, PARAMID=FPVSXMITSIDEKU, VALUE=0, RANGE_CHECK=ENABLE
Set flight parameter to lengthen transmitter timeout to 2 hours with command:
/SMFPUNIT32 FPVSKUBANDONTO Value = 7200, RANGE_CHECK=ENABLE
Apply power to Ku-Band Transmitter 1 with command:
/SUTXMITON, TRANSMITTER=KU
Verify power has been applied to the transmitter:
SC_KBA_TX1_P10V is approximately 10 Volts

For S-Band, 2 commands are sent, one for the rate, and the second to turn the transmitter on. For all SSA return links, command the data rate to 8 Kbps, the MOC will GCMR and command the data rate needed in the test.

i. 1Kbps rate command:

SMFPUINT8, PARAMID=FPVSXMITRATESA, VALUE=1,
RANGE_CHECK=ENABLE

ii. 2 Kbps rate command:
SMFPUINT8, PARAMID=FPVSXMITRATESA, VALUE=2,
RANGE_CHECK=ENABLE

iii. 4 Kbps rate command:
SMFPUINT8, PARAMID=FPVSXMITRATESA, VALUE=4,
RANGE_CHECK=ENABLE

iv. 8 Kbps rate command:
SMFPUINT8, PARAMID=FPVSXMITRATESA, VALUE=8,
RANGE_CHECK=ENABLE

The following command (second command) turns on the S-Band transmitter:
SUTXMITON, TRANSMITTER=SA

B.7 _____ MOC: Execute the procedure otdrssaaos.proc if the return link is SSA, or execute the procedure ogfepaos.proc if the return link is KSA.

B.8 _____ S/C I&T, SN and MOC: Verify receipt of telemetry.

B.9 _____ MOC: After the pass has started, verify that the command receivers lock on the forward link. Direct SN to sweep carrier if necessary.

B.10 _____ MOC: From the ITOS command line issue, the directive "**VC 1**" (software command; default initial configuration) to ensure that the software telecommand virtual channel ID is set to VC-0 (Receiver-1 and UDL-A).

B.11 _____ MOC: From the ITOS command line, issue the following directive: RETRLIM 2, followed by the RESYNC directive.

B.12 _____ MOC: Execute the STOL procedure scnoop.proc. Verify the scnoop.proc procedure executes without errors, and that the 'Cmd Proc' count on the Master Page increments by 1.

To Reconfigure After the End Of A TDRS Contact:

B.13 _____ S/C I&T: Establish a baseband command & telemetry links to the spacecraft.

B.14 _____ S/C I&T: Turn off the transmitter:
Command:

SUTXMITOFF

Verification:

SC_SBA_TX_ONOFF = OFF
SC_SBB_TX_ONOFF = OFF
SC_KBA_TX1_P10V = 0V
SC_KBA_TX1_P10V = 0V

B.15 _____ S/C I&T: Switch the TTGT Trailer RF path from ‘Antenna’ to ‘LOAD’.

B.16 _____ S/C I&T: Turn on the transmitter, with the downlink rate the same as was used in the TDRS pass that just ended.

B.17 _____ S/C I&T Configure the TURFTS, Ku Rack and PTP as needed for the command and telemetry rates.

B.18 _____ MOC: To get telemetry from the SCIT Rack, execute the procedure ospacecraftaos.proc if the return link is SSA, or execute the procedure ogfep7aos.proc if the return link is KSA.