

PACS_Switch_On_Nominal
File: H_FCP_PAC_NSON.xls
Author: R. Biggins



Procedure Summary

Objectives

The objective of this procedure is to switch on the prime PACS units

- Switch to PACS bus profile
- Disable SDB FDIR for PACS RTA
- Enable RT interrogations for the PACS RTA
- Power on and boot redundant DPU
- Enable SDB FDIR for PACS RTA
- Switch on and connect DMC
- Switch on and connect BOLC
- Switch on and connect SPU
- Activate FPU temperature sensors
- Start autonomy functions

Based on procedure:
PACS_Switch_On_Nominal_28_07_2007_01

Summary of Constraints

PACS has been switched off for at least 4 minutes

ANY bus profile can be used

This procedure is valid for the DPU software version 9.03
This procedure is valid for the DPU software version 9.04

This procedure is valid for the SPU software version 13.96

Spacecraft Configuration

Start of Procedure

PACS is OFF

End of Procedure

PACS is in NO_PRIME (SAFE) mode

- DPU is on
- DMC is on and connected
- BOLC is on and connected
- SPU is on and connected

Reference File(s)

Input Command Sequences

Output Command Sequences

HFPNSON

Referenced Displays

ANDs	GRDs	SLDs
ZAZ8U999		
ZAZ97999		
ZAZA0999		

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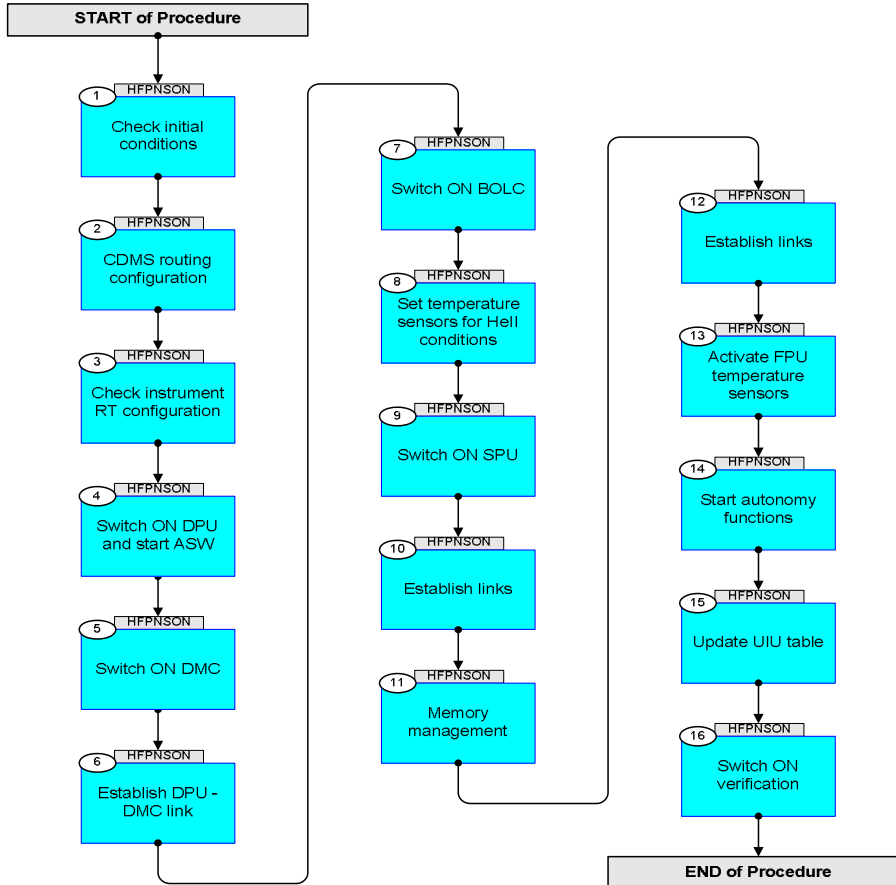
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
21/09/2007		1	Created	R. Biggins	
22/11/2007		1.01	Validation : - Time tags added to SVM commands - Editorial updates	R. Biggins	
03/12/2007		1.02	Validation : Checksums updated for DPU UM v2.7	R. Biggins	
03/12/2007		1.03	Validation : Editorial updates	R. Biggins	
18/01/2008		2	Update due to initial testing against the simulator: - TCs updated due to new DB - Checksums updated for DPU UM v2.8 - Execution times removed	R. Biggins	
03/03/2008		3	Update due to testing against MOC Simulator and comments by S. Pezzuto: - Telecommand flags updated - Telemetry checks in step 16 updated	R. Biggins	
27/05/2008	1	4	Updates due to SVT-1 testing: - TC to start RT interrogations updated (step 4.3) - TC to enable FDIR moved from step 4.7 to step 4.5 - Expected LCL currents updated - Comments added/updated - Flags updated - AND updated for all TM parameters	R. Biggins	
23/10/2008		5	Updates due to new procedures from industry - Step 4.2 and 4.3 combined - TC DC005161 database definition updated - New step (15) added to update UIU table	R. Biggins	
20/01/2009		5.01	Validation : Updates due to new DPU and DMC software versions: - DPU updated to version 9.01 (TM checks updated only) - DMC updated to version 6.028 (TM checks updated only)	R. Biggins	
22/01/2009	2	6	Update to disable SDB FDIR - step 4.2 and 4.5 updated	R. Biggins	
12/03/2009	2.2	7	Final updates before flight - Summary updated - TC flags updated - Procedure description/title updated	R. Biggins	
17/04/2009	2.3	8	Updates due to new DPU and SPU software versions: - DPU updated to version 9.03 - SPU updated to version 13.96	R. Biggins	
26/05/2009		9	Step 4.6 - Update to expected checksum and Memory Check TC parameters	R. Biggins	
24/07/2009	2.5	10	Updates due to new DPU software version: - DPU updated to version 9.04	R. Biggins	
15/03/2010	3	10.01	Validation : Step 9.1: TM corrected to show LCL values for SPU (previously for BOLC)	R. Biggins	
11/08/2011	3.1	11	Update to allow procedure to be executed without PACS bus profile	R. Biggins	

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Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
Beginning of Procedure				
TC Seq. Name : HFPNSON (Switch ON PACS (Nom)) TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
1		Check initial conditions		Next Step: 2
		Verify: PACS has been switched off for at least 4 minutes		
		Verify: Check whether the PACS MTL needs to be disabled (if so, procedure H_FCP_DHS_1017 can be used to disable it)		
1.1		PACS input		<input type="checkbox"/>
		Verify that the PACS ICC has indicated whether the DPU is to be booted from the primary or secondary partition (step 4.6) DPU_PRTN = 1 or 2		
		Verify that the correct information has been supplied by the ICC: DPU Software Version/Subversion number SPU Software Version/Subversion number		
1.2		Spacecraft mode		<input type="checkbox"/>
		Verify Telemetry CurrentMode DEL34170 = Nominal		AND=ZAZ8U999
		Verify Telemetry ACC_A_MODE AEE8G050 = Nominal		AND=ZAZ8U999
1.3		Bus status		<input type="checkbox"/>
		Verify Bus configuration		
		Verify: Active 1553 bus Active_Bus_A_B DEFJ1160 = BUS_A		AND=ZAZ97999
		Verify: 1553 bus FDIR status SDB_FDIR DEFJ4160 = ENABLED		AND=ZAZ97999
		Verify bus health status		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify: Bus (side A) health status BusA_HealthySts DEFJ2160	= Healthy	AND=ZAZ97999
		Verify: Bus (side B) health status BusB_HealthySts DEFJ3160	= Healthy	AND=ZAZ97999
1.4		<i>Nominal instrument LCLs</i>		☐
		Verify: DPU LCL status PacsD_N_L41_S WM72B565	= OFF	AND=ZAZ97999
		Verify: SPU LCL status PacsS_N_L35_S WM52A565	= OFF	AND=ZAZ97999
		Verify: BOLC LCL status PacsB_N_L27_1S WM82D565	= OFF	AND=ZAZ97999
		Verify: Dec/Mec1 LCL status PacsMec1_L65_1S WM52E565	= OFF	AND=ZAZ97999
1.5		<i>Redundant instrument LCLs</i>		☐
		Verify: DPU LCL status PacsD_R_L42_S WM42B565	= OFF	AND=ZAZ97999
		Verify: SPU LCL status PacsS_R_L36_S WM62A565	= OFF	AND=ZAZ97999
		Verify: BOLC LCL status PacsB_R_L28_1S WM32D565	= OFF	AND=ZAZ97999
		Verify: Dec/Mec2 LCL status PacsMec2_L69_1S WM62E565	= OFF	AND=ZAZ97999
2		<i>CDMS routing configuration</i>		Next Step: 3
	ET=+ UT=+00.00.00	Execute Telecommand RepDownlinkTMStorage TC Control Flags : Subsch. ID : 10 Det. descr. : Report Telemetry Packets Down-linking/ Storage Status GBM IL DSE --Y -- ---	DC141160	
		It should be verified that telemetry packets for ALL PACS APIDs should be transmitted to ground (Transmit_Flag = ENABLED) EXCEPT for TM(21,x) which should be stored in the SSMM (Storage_Flag = ENABLED, Transmit_Flag = DISABLED). This should be verified on the VPD		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Packet Reception Telemetry Packets DownLinking-Storage Status Report Packet Details: APID: 16 Type: 14 Subtype: 7 PI1: PI2:	(14,7)-1400	
3		Check instrument RT configuration		Next Step: 4
3.1		Remote Terminal configuration		<input type="checkbox"/>
		Verify Telemetry PACS_VitalNonV DED5G161 = NonVital		AND=ZAZ97999
		Verify Telemetry PACS_TmRetry DED5Z161 = ON		AND=ZAZ97999
3.2		Remote Terminal Status		<input type="checkbox"/>
		Nominal units		
		Verify Telemetry PACSA_OnOff DED2G161 = OFF		AND=ZAZ8U999
		Verify Telemetry PACSA_DeadAliv DED2H161 = Alive		AND=ZAZ8U999
		Verify Telemetry PACSA_WellsiTC DED2Z161 = Well		AND=ZAZ8U999
		Verify Telemetry PACSA_WellsiTM DED2J161 = Well		AND=ZAZ8U999
		Verify Telemetry PACSA_ValidInv DED2K161 = Invalid		AND=ZAZ8U999
		Redundant units		
		Verify Telemetry PACSB_OnOff DED31161 = OFF		AND=ZAZ8U999
		Verify Telemetry PACSB_DeadAliv DED32161 = Alive		AND=ZAZ8U999
		Verify Telemetry PACSB_WellsiTC DED33161 = Well		AND=ZAZ8U999
		Verify Telemetry PACSB_WellsiTM DED34161 = Well		AND=ZAZ8U999
		Verify Telemetry PACSB_ValidInv DED35161 = Invalid		AND=ZAZ8U999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch																																																																																													
4		Switch ON DPU and start ASW		Next Step: 5																																																																																													
4.1		Disable FDIR and enable RT interrogations		<input type="checkbox"/>																																																																																													
		NOTE: The following TC acts in the following order: - disables the SDB FDIR for the whole spacecraft - updates the RTA status																																																																																															
	ET=+ UT=+00.00.00	Execute Telecommand ConfigureSDBFDIR Command Parameter(s) : <table border="0"> <tr><td>RTA</td><td>DH011161</td><td>PACS A</td></tr> <tr><td>M0</td><td>DH030161</td><td>Update status</td></tr> <tr><td>M1</td><td>DH031161</td><td>Ignore Flag</td></tr> <tr><td>M2</td><td>DH032161</td><td>Ignore Flag</td></tr> <tr><td>M3</td><td>DH033161</td><td>Ignore Flag</td></tr> <tr><td>M4</td><td>DH034161</td><td>Update status</td></tr> <tr><td>M5</td><td>DH035161</td><td>Ignore Flag</td></tr> <tr><td>M6</td><td>DH036161</td><td>Update status</td></tr> <tr><td>M7</td><td>DH037161</td><td>Ignore Flag</td></tr> <tr><td>F0</td><td>DH018161</td><td>ON</td></tr> <tr><td>F1</td><td>DH019161</td><td>Alive</td></tr> <tr><td colspan="3"> </td></tr> <tr><td>F2</td><td>DH020161</td><td>Well TC</td></tr> <tr><td>F3</td><td>DH021161</td><td>Well TM</td></tr> <tr><td>F4</td><td>DH022161</td><td>Valid</td></tr> <tr><td>F5</td><td>DH023161</td><td>Non-vital</td></tr> <tr><td>F6</td><td>DH024161</td><td>NOMINAL</td></tr> <tr><td>F7</td><td>DH025161</td><td>ON</td></tr> <tr><td>M12</td><td>DH051161</td><td>Ignore Flag</td></tr> <tr><td>M_C</td><td>DH043161</td><td>Ignore CNT</td></tr> <tr><td>M8</td><td>DH038161</td><td>Ignore Flag</td></tr> <tr><td>M9</td><td>DH039161</td><td>Ignore Flag</td></tr> <tr><td>M10</td><td>DH040161</td><td>Ignore Flag</td></tr> <tr><td>M11</td><td>DH041161</td><td>Update status</td></tr> <tr><td>F12</td><td>DH050161</td><td>ENABLED</td></tr> <tr><td>CNT</td><td>DH042161</td><td>LoopCnt1</td></tr> <tr><td>F8</td><td>DH026161</td><td>Bus A</td></tr> <tr><td colspan="3"> </td></tr> <tr><td>F9</td><td>DH027161</td><td>Healthy</td></tr> <tr><td>F10</td><td>DH028161</td><td>Healthy</td></tr> <tr><td>F11</td><td>DH029161</td><td>DISABLED</td></tr> </table> TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Configure SDB FDIR	RTA	DH011161	PACS A	M0	DH030161	Update status	M1	DH031161	Ignore Flag	M2	DH032161	Ignore Flag	M3	DH033161	Ignore Flag	M4	DH034161	Update status	M5	DH035161	Ignore Flag	M6	DH036161	Update status	M7	DH037161	Ignore Flag	F0	DH018161	ON	F1	DH019161	Alive				F2	DH020161	Well TC	F3	DH021161	Well TM	F4	DH022161	Valid	F5	DH023161	Non-vital	F6	DH024161	NOMINAL	F7	DH025161	ON	M12	DH051161	Ignore Flag	M_C	DH043161	Ignore CNT	M8	DH038161	Ignore Flag	M9	DH039161	Ignore Flag	M10	DH040161	Ignore Flag	M11	DH041161	Update status	F12	DH050161	ENABLED	CNT	DH042161	LoopCnt1	F8	DH026161	Bus A				F9	DH027161	Healthy	F10	DH028161	Healthy	F11	DH029161	DISABLED	DC005161	
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CNT	DH042161	LoopCnt1																																																																																															
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F10	DH028161	Healthy																																																																																															
F11	DH029161	DISABLED																																																																																															
		Wait up to 1 minute for the generation of the D_H_Hk_P64 packet from the CDMU (APID = 18)																																																																																															
		Verify: 1553 bus FDIR status <table border="0"> <tr><td>SDB_FDIR</td><td>DEFJ4160</td><td>= DISABLED</td></tr> </table>	SDB_FDIR	DEFJ4160	= DISABLED		AND=ZAZ97999																																																																																										
SDB_FDIR	DEFJ4160	= DISABLED																																																																																															
		Verify Telemetry <table border="0"> <tr><td>PACS_NomRed</td><td>DED5H161</td><td>= NOMINAL</td></tr> </table>	PACS_NomRed	DED5H161	= NOMINAL		AND=ZAZ97999																																																																																										
PACS_NomRed	DED5H161	= NOMINAL																																																																																															

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		Verify Telemetry PACSA_OnOff DED2G161	= ON	AND=ZAZ97999
		Verify Telemetry PACSA_ValidInv DED2K161	= Valid	AND=ZAZ97999
4.2		Switch on DPU LCL		<input type="checkbox"/>
		Switching ON the DPU LCL will initialise BSW. This will initially execute memory checks (failures will generate TM(5,4) packets) and then generate TM(5,1) [EVENT_REPORT_3_32776] packets every 10 seconds.		
	ET=+ UT=+00.00.00	Execute Telecommand SwOn_PacsD_N_L41 TC Control Flags : Subsch. ID : 10 Det. descr. : PCDU: TC(8,4,112,5) PACS DPU Nom - switch LCL_41 on	DC41D170	
		Verify: DPU LCL status PacsD_N_L41_S WM72B565	= ON	AND=ZAZ97999
		Verify: DPU LCL current (+/- 0.1A) PacsD_N_L41_I WM707565	= 0.49 A	AND=ZAZ97999
4.3		DPU Force Boot		<input type="checkbox"/>
		Sending the FORCE_BOOT TC will generate a TM(5,1) [EVENT_REPORT_3_33041] packet from the BSW.		
	ET=+ UT=+00.00.15	DPU_LLSW_FORCE_BOOT DPU_LLSW_FORCE_BOOT Command Parameter(s) : DPU_STRUCTURE_ID PP002380 DPU_PARTITION PP267380 Subsch. ID : 90 Det. descr. : FORCE THE BOOT OF THE DPU LLSW FROM EEPROM	PC032380 1 <dec> (Def) DPU_PRTN	
		Verify: The following TM(3,25) packets should be produced: PACS_essential_HK (APID 1152) PACS_NO_PRIME_HK (APID 1154)		
		The following version check should ensure that the expected software version is running.		
		Verify Telemetry DP_SW_VERS_ID PM050380	Version	AND=ZAZ97999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry DP_SW_SUBVERS_ID	PM051380 Subversion	AND=ZAZ97999
4.4		Re-enable SDB FDIR		<input type="checkbox"/>
	ET=+ UT=+00.00.00	Execute Telecommand ConfigureSDBFDIR Command Parameter(s) : RTA DH011161 PACS A M0 DH030161 Ignore Flag M1 DH031161 Ignore Flag M2 DH032161 Ignore Flag M3 DH033161 Ignore Flag M4 DH034161 Ignore Flag M5 DH035161 Ignore Flag M6 DH036161 Ignore Flag M7 DH037161 Ignore Flag F0 DH018161 ON F1 DH019161 Alive F2 DH020161 Well TC F3 DH021161 Well TM F4 DH022161 Valid F5 DH023161 Non-vital F6 DH024161 NOMINAL F7 DH025161 ON M12 DH051161 Ignore Flag M_C DH043161 Ignore CNT M8 DH038161 Ignore Flag M9 DH039161 Ignore Flag M10 DH040161 Ignore Flag M11 DH041161 Update status F12 DH050161 ENABLED CNT DH042161 LoopCnt1 F8 DH026161 Bus A F9 DH027161 Healthy F10 DH028161 Healthy F11 DH029161 ENABLED TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Configure SDB FDIR	DC005161	
4.5		Self check of the DPU		<input type="checkbox"/>
		The following checks will verify the contents of the DPU Program Memory (RAM)		
		For PACS DPU OBSW v9.03: CHECKSUM1 = 26D3 CHECKSUM2 = 23A2		

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		For PACS DPU OBSW v9.04: CHECKSUM1 = 302C CHECKSUM2 = 69E1		
	ET=+ UT=+00.00.03	DPU_MEMORY_CHECK DPU_MEMORY_CHECK Command Parameter(s) : DPU_MEMORY_BLOCK_ID PP009380 DPU_MEMORY_ADDR PP003380 DPU_DATA_LENGTH PP008380 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 90 Det. descr. : REQUEST FOR A CHECKSUM OF A SPECIFIED MEMORY AREA	PC029380 100 <hex> 4000 <hex> 1551 <hex>	
		Verify: DPU memory checksum CHECKSUM PM132380	CHECKSUM1	AND=ZAZ97999
	ET=+ UT=+00.00.01	DPU_MEMORY_CHECK DPU_MEMORY_CHECK Command Parameter(s) : DPU_MEMORY_BLOCK_ID PP009380 DPU_MEMORY_ADDR PP003380 DPU_DATA_LENGTH PP008380 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 90 Det. descr. : REQUEST FOR A CHECKSUM OF A SPECIFIED MEMORY AREA	PC029380 100 <hex> 5551 <hex> FFFF <hex>	
		Verify: DPU memory checksum CHECKSUM PM132380	CHECKSUM2	AND=ZAZ97999
5		Switch ON DMC		Next Step: 6
5.1		Switch on DMC LCL		<input type="checkbox"/>
	ET=+ UT=+00.00.00	Execute Telecommand SwOn_PacsDecMec1_L65 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : PCDU: TC(8,4,112,5) PACS DEC/MEC1 - switch LCL_65 on	DC65D170	
		Verify: DMC LCL current PacsMec1_L65_1S WM52E565	= ON	AND=ZAZ97999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify: The following TM(6,6) packet should be produced: PACS_MEMORY_DUMP (APID 1152)		
		Verify that the contests are as follows: 0x 0000 0001 0x 0007 FFFF 0x 0000 55D0 0x 0000 55D0 Although the rest of the dump should be 0x0000 0000, it is not unexpected if it is not. This should be analysed by PACS offline.		
5.5		Copy DMC SW from EEPROM to RAM		<input type="checkbox"/>
	ET=+ UT=+00.00.01	DMC_LLSW_LOAD_EEPROM Command Parameter(s) : DMC_EEPROM_MEMORY_ID PP087420 DMC_EEPROM_START_ADDR PP089420 DMC_RAM_MEMORY_ID PP088420 DMC_RAM_START_ADDR PP090420 DMC_DATA_LENGTH_HLSW PP091420 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 90 Det. descr. : LOAD THE DMC HLSW FROM EEPROM	PC198420	
	ET=+ UT=+00.00.02	DMC_LLSW_LOAD_EEPROM Command Parameter(s) : DMC_EEPROM_MEMORY_ID PP087420 DMC_EEPROM_START_ADDR PP089420 DMC_RAM_MEMORY_ID PP088420 DMC_RAM_START_ADDR PP090420 DMC_DATA_LENGTH_HLSW PP091420 Subsch. ID : 90 Det. descr. : LOAD THE DMC HLSW FROM EEPROM	PC198420	
5.6		Start DMC HLSW		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.06	DPU_START_OBCP_RAW DPU_START_OBCP Command Parameter(s) : PROCEDURE_ID PP012380 NUMBER_OF_TIMES PP010380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 Subsch. ID : 90 Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS	PC012380 START_HLSW 3 <dec> 1 <dec> 0 <dec> 2 <dec> 1 <dec> 3 <dec> 32818 <dec>	
6		Establish DPU - DMC link		Next Step: 7
	ET=+ UT=+00.00.10	DPU_START_OBCP_RAW DPU_START_OBCP Command Parameter(s) : PROCEDURE_ID PP012380 NUMBER_OF_TIMES PP010380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 Subsch. ID : 90 Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS	PC012380 START_1355_LINK 2 <dec> (Def) 1 <dec> 0 <dec> 2 <dec> 2 <dec>	
7		Switch ON BOLC		Next Step: 8
7.1		Switch on BOLC LCL		<input type="checkbox"/>
	ET=+ UT=+00.00.00	Execute Telecommand SwOn_PacsB_N_L27 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : PCDU: TC(8,4,112,5) PACS BOLC Nom - switch LCL_27 on	DC27D170	
		Verify: BOLC LCL status PacsB_N_L27_1S WM82D565	= ON	AND=ZAZ97999
		Verify: BOLC LCL current (+/- 0.1A) PacsB_N_L27_I WM809565	= 0.2 A	AND=ZAZ97999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
7.2		Reset DMC SMCS chip		<input type="checkbox"/>
	ET=+ UT=+00.00.16	DMC_RESET_SMCS_CHIP_2 Subsch. ID : 90 Det. descr. : RESET THE 1355 SMCS CHIP 2	PC202420	
8		Set temperature sensors for HeII conditions		Next Step: 9
	ET=+ UT=+00.00.04	DMC_SEND_COMMAND_BOLC Command Parameter(s) : BOLOMETER_COMMAND PP071420 Subsch. ID : 90 Det. descr. : SEND COMMAND TO BOL CONTROLLER	PC103420 70000ff <hex>	
9		Switch ON SPU		Next Step: 10
9.1		Switch on SPU LCL		<input type="checkbox"/>
	ET=+ UT=+00.00.00	Execute Telecommand TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : PCDU: TC(8,4,112,5) PACS SPU Nom - switch LCL_35 on	SwOn_PacsS_N_L35 DC35D170	
		Verify: SPU LCL Status PacsS_N_L35_S WM52A565	= ON	AND=ZAZ97999
		Verify: SPU LCL current (+/- 0.1A) PacsS_N_L35_I WM506565	= 0.4 A	AND=ZAZ97999
9.2		DPU reset of 1355		<input type="checkbox"/>
	ET=+ UT=+00.00.24	DPU_RESET_1355 Subsch. ID : 90 Det. descr. : DPU RESET THE 1355 CHIP	DPU_RESET_1355 PC025380	
10		Establish links		Next Step: 11

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
10.1		DPU - DMC links with DPU as slave		<input type="checkbox"/>
	ET=+ UT=+00.00.04	DPU_START_OBCP_RAW DPU_START_OBCP Command Parameter(s) : PROCEDURE_ID PP012380 START_1355_LINK NUMBER_OF_TIMES PP010380 2 <dec> (Def) PAR_ID PP011380 1 <dec> PAR_VALUE PP017380 0 <dec> PAR_ID PP011380 2 <dec> PAR_VALUE PP017380 2 <dec> Subsch. ID : 90 Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS	PC012380	
10.2		DPU - SPU links		<input type="checkbox"/>
		WARNING: the following TCs must be sent with the exact time delay as defined		
		Sending this TC will generate the following TM(5,1) packets: EVENT_REPORT_5_28 - Unexp 1355 ACK EVENT_REPORT_0_14 - SPUS DEAD		
	ET=+ UT=+00.00.10	Initialise DPU - blue SPU links DPU_START_OBCP Command Parameter(s) : PROCEDURE_ID PP012380 START_1355_LINK NUMBER_OF_TIMES PP010380 2 <dec> (Def) PAR_ID PP011380 1 <dec> PAR_VALUE PP017380 1 <dec> PAR_ID PP011380 2 <dec> PAR_VALUE PP017380 1 <dec> TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 90 Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS	PC012380	
		Sending this TC will generate the following TM(5,1) packets: EVENT_REPORT_5_28 - Unexp 1355 ACK EVENT_REPORT_0_10 - SPUL DEAD		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.04	Initialise DPU - red SPU links <p style="text-align: right;">DPU_START_OBCP</p> Command Parameter(s) : PROCEDURE_ID PP012380 NUMBER_OF_TIMES PP010380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 Subsch. ID : 90 Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS	PC012380 START_1355_LINK 2 <dec> (Def) 1 <dec> 2 <dec> 2 <dec> 1 <dec>	
11		Memory management		Next Step: 12
11.1		SPU Memory self test: dump blue		<input type="checkbox"/>
		The following checks will verify the contents of the SPU (blue) Data Memory (RAM)		
	ET=+ UT=+00.00.04	DPU_MEMORY_DUMP <p style="text-align: right;">DPU_MEMORY_DUMP</p> Command Parameter(s) : DPU_MEMORY_BLOCK_ID PP009380 DPU_MEMORY_ADDR PP003380 DPU_DATA_LENGTH PP008380 TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 90 Det. descr. : DUMP OF A DPU MEMORY AREA	PC028380 5100 <hex> 0 <hex> 11 <hex>	
		Verify: The following TM(6,6) packet should be produced: PACS_MEMORY_DUMP (APID 1152)		
		For PACS SPU OBSW v13.96: 0x 0000 0001 0x 0007 FFFF 0x 0000 6823 0x 0000 6823 Although the rest of the dump should be 0x0000 0000, it is not unexpected if it is not. This should be analysed by PACS offline		
11.2		SPU Memory self test: dump red		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		The following checks will verify the contents of the SPU (red) Data Memory (RAM)		
	ET=+ UT=+00.00.01	<p>DPU_MEMORY_DUMP</p> <p style="text-align: right;">DPU_MEMORY_DUMP</p> <p>PC028380</p> <p>Command Parameter(s) :</p> <p style="padding-left: 40px;">DPU_MEMORY_BLOCK_ID PP009380 7100 <hex></p> <p style="padding-left: 40px;">DPU_MEMORY_ADDR PP003380 0 <hex></p> <p style="padding-left: 40px;">DPU_DATA_LENGTH PP008380 11 <hex></p> <p>TC Control Flags :</p> <p style="padding-left: 100px;">GBM IL DSE</p> <p style="padding-left: 100px;">--Y -- ---</p> <p>Subsch. ID : 90</p> <p>Det. descr. : DUMP OF A DPU MEMORY AREA</p>		
		<p>Verify: The following TM(6,6) packet should be produced:</p> <p>PACS_MEMORY_DUMP (APID 1152)</p>		
		<p>For PACS SPU OBSW v13.96:</p> <p>0x 0000 0001</p> <p>0x 0007 FFFF</p> <p>0x 0000 6823</p> <p>0x 0000 6823</p> <p>Although the rest of the dump should be 0x0000 0000, it is not unexpected if it is not. This should be analysed by PACS offline</p>		
11.3		Load SPU red HLSW		□
		Load SPU red high-level software from EEPROM to RAM		
	ET=+ UT=+00.00.01	<p>SPUL_LLSW_LOAD_EEPROM</p> <p style="text-align: right;">SPUL_LLSW_LOAD_EEPROM</p> <p>PC070390</p> <p>Command Parameter(s) :</p> <p style="padding-left: 40px;">SPUL_EEPROM_MEMORY_ID PP040390 3 <hex></p> <p style="padding-left: 40px;">SPUL_EEPROM_START_ADDR PP042390 100 <hex></p> <p style="padding-left: 40px;">SPUL_RAM_MEMORY_ID PP041390 1 <hex></p> <p style="padding-left: 40px;">SPUL_RAM_START_ADDR PP043390 100 <hex></p> <p style="padding-left: 40px;">SPUL_DATA_LENGTH_HLSW PP038390 1E0 <hex></p> <p>TC Control Flags :</p> <p style="padding-left: 100px;">GBM IL DSE</p> <p style="padding-left: 100px;">--Y -- ---</p> <p>Subsch. ID : 90</p> <p>Det. descr. : LOAD SPU HLSW FROM EEPROM FOR RED SPU</p>		

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	ET=+ UT=+00.00.02	SPUL_LLSW_LOAD_EEPROM SPUL_LLSW_LOAD_EEPROM Command Parameter(s) : SPUL_EEPROM_MEMORY_ID PP040390 SPUL_EEPROM_START_ADDR PP042390 SPUL_RAM_MEMORY_ID PP041390 SPUL_RAM_START_ADDR PP043390 SPUL_DATA_LENGTH_HLSW PP038390 Subsch. ID : 90 Det. descr. : LOAD SPU HLSW FROM EEPROM FOR RED SPU	PC070390 3 <hex> 300 <hex> 1 <hex> 300 <hex> 700 <hex>	
	ET=+ UT=+00.00.02	SPUL_LLSW_LOAD_EEPROM SPUL_LLSW_LOAD_EEPROM Command Parameter(s) : SPUL_EEPROM_MEMORY_ID PP040390 SPUL_EEPROM_START_ADDR PP042390 SPUL_RAM_MEMORY_ID PP041390 SPUL_RAM_START_ADDR PP043390 SPUL_DATA_LENGTH_HLSW PP038390 Subsch. ID : 90 Det. descr. : LOAD SPU HLSW FROM EEPROM FOR RED SPU	PC070390 3 <hex> a00 <hex> 1 <hex> a00 <hex> a600 <hex>	
11.4		Load SPU blue HLSW		<input type="checkbox"/>
		Load SPU blue high-level software from EEPROM to RAM		
	ET=+ UT=+00.00.02	SPUS_LLSW_LOAD_EEPROM SPUS_LLSW_LOAD_EEPROM Command Parameter(s) : SPUS_EEPROM_MEMORY_ID PP058400 SPUS_EEPROM_START_ADDR PP060400 SPUS_RAM_MEMORY_ID PP059400 SPUS_RAM_START_ADDR PP061400 SPUS_DATA_LENGTH_HLSW PP056400 Subsch. ID : 90 Det. descr. : LOAD SPU HLSW FROM EEPROM FOR BLUE SPU	PC069400 3 <hex> 100 <hex> 1 <hex> 100 <hex> 1e0 <hex>	
	ET=+ UT=+00.00.02	SPUS_LLSW_LOAD_EEPROM SPUS_LLSW_LOAD_EEPROM Command Parameter(s) : SPUS_EEPROM_MEMORY_ID PP058400 SPUS_EEPROM_START_ADDR PP060400 SPUS_RAM_MEMORY_ID PP059400 SPUS_RAM_START_ADDR PP061400 SPUS_DATA_LENGTH_HLSW PP056400 Subsch. ID : 90 Det. descr. : LOAD SPU HLSW FROM EEPROM FOR BLUE SPU	PC069400 3 <hex> 300 <hex> 1 <hex> 300 <hex> 700 <hex>	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.02	SPUS_LLSW_LOAD_EEPROM Command Parameter(s) : SPUS_EEPROM_MEMORY_ID PP058400 SPUS_EEPROM_START_ADDR PP060400 SPUS_RAM_MEMORY_ID PP059400 SPUS_RAM_START_ADDR PP061400 SPUS_DATA_LENGTH_HLSW PP056400 Subsch. ID : 90 Det. descr. : LOAD SPU HLSW FROM EEPROM FOR BLUE SPU	PC069400	
12		Establish links		Next Step: 13
12.1		Start SPU-S HLSW		<input type="checkbox"/>
	ET=+ UT=+00.00.04	DPU_START_OBCP_RAW Command Parameter(s) : PROCEDURE_ID PP012380 NUMBER_OF_TIMES PP010380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 90 Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS	DPU_START_OBCP PC012380	START_HLSW 3 <dec> 1 <dec> 1 <dec> 2 <dec> 1 <dec> 3 <dec> 2562 <dec>
12.2		DPU - blue SPU links		<input type="checkbox"/>
		Sending this TC will generate a TM(5,1) [EVENT_REPORT_5_28 - Unexp 1355 ACK] packet.		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.04	DPU_START_OBCP_RAW DPU_START_OBCP Command Parameter(s) : PROCEDURE_ID PP012380 NUMBER_OF_TIMES PP010380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 Subsch. ID : 90 Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS	PC012380 START_1355_LINK 2 <dec> (Def) 1 <dec> 1 <dec> 2 <dec> 2 <dec>	
12.3		Start SPU-L HLSW		<input type="checkbox"/>
	ET=+ UT=+00.00.04	DPU_START_OBCP_RAW DPU_START_OBCP Command Parameter(s) : PROCEDURE_ID PP012380 NUMBER_OF_TIMES PP010380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 Subsch. ID : 90 Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS	PC012380 START_HLSW 3 <dec> 1 <dec> 2 <dec> 2 <dec> 1 <dec> 3 <dec> 2562 <dec>	
12.4		DPU - red SPU links		<input type="checkbox"/>
		Sending this TC will generate a TM(5,1) [EVENT_REPORT_5_28 - Unexp 1355 ACK] packet.		
	ET=+ UT=+00.00.03	DPU_START_OBCP_RAW DPU_START_OBCP Command Parameter(s) : PROCEDURE_ID PP012380 NUMBER_OF_TIMES PP010380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 Subsch. ID : 90 Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS	PC012380 START_1355_LINK 2 <dec> (Def) 1 <dec> 2 <dec> 2 <dec> 2 <dec>	
12.5		SPU-L - DMC links with DMC as master		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.05	SPUL_CONNECT_DMC SPUL_CONNECT_DMC Command Parameter(s) : SPUL_MASTER_OR_SLAVE PP084390 Subsch. ID : 90 Det. descr. : START THE SPUL LINK TO DMC AS SLAVE OR MASTER	PC195390 SLAVE	
12.6		SPU-S - DMC links with DMC as master		<input type="checkbox"/>
	ET=+ UT=+00.00.01	SPUS_CONNECT_DMC SPUS_CONNECT_DMC Command Parameter(s) : SPUS_MASTER_OR_SLAVE PP085400 Subsch. ID : 90 Det. descr. : START THE SPUS LINK TO DMC AS SLAVE OR MASTER	PC194400 SLAVE	
12.7		DMC - SPUR-S links with DMC as master		<input type="checkbox"/>
	ET=+ UT=+00.00.02	DMC_START_BLUE_SPU_LINK DMC_START_BLUE_SPU_LINK Command Parameter(s) : DMC_MASTER_OR_SLAVE PP086420 Subsch. ID : 90 Det. descr. : START THE DMC TO SPU BLUE LINK	PC197420 MASTER	
12.8		DMC - SPUR-L links with DMC as master		<input type="checkbox"/>
	ET=+ UT=+00.00.01	DMC_START_RED_SPU_LINK DMC_START_RED_SPU_LINK Command Parameter(s) : DMC_MASTER_OR_SLAVE PP086420 Subsch. ID : 90 Det. descr. : START THE DMC TO SPU RED LINK	PC196420 MASTER	
13		Activate FPU temperature sensors		Next Step: 14

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.02	DMC_SWON_TEMP_SENSORS DMC_SWON_TEMP_SENSORS TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 90 Det. descr. : SWITCH ON THE TEMPERATURE SENSOR IN FPU	PC210420	
14		Start autonomy functions		Next Step: 15
	ET=+ UT=+00.00.00	Function 1: monitor SPU temperatures and voltages DPU_SET_FUNC Command Parameter(s) : DPU_INT_FUNC_ID PP007380 ENABLE_DISABLE PP006380 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 EVENT_SPU ENABLE	
	ET=+ UT=+00.00.01	Function 2: monitor DMC temperatures DPU_SET_FUNC Command Parameter(s) : DPU_INT_FUNC_ID PP007380 ENABLE_DISABLE PP006380 Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 EVENT_DEC ENABLE	
	ET=+ UT=+00.00.00	Function 3: monitor DMC counters on Last_Err and memory DPU_SET_FUNC Command Parameter(s) : DPU_INT_FUNC_ID PP007380 ENABLE_DISABLE PP006380 Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 STABLE_DEC ENABLE	
	ET=+ UT=+00.00.01	Function 6: Monitor DMC-BOLC comms (BOL_REC_PAC) DPU_SET_FUNC Command Parameter(s) : DPU_INT_FUNC_ID PP007380 ENABLE_DISABLE PP006380 Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 COUNTER_PHOT ENABLE	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.00	Function 7: monitor SPU-S alive counter CIB DPU_SET_FUNCT Command Parameter(s) : DPU_INT_FUNC_ID PP007380 ENABLE_DISABLE PP006380 Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 COUNTER_SPS ENABLE	
	ET=+ UT=+00.00.01	Function 8: monitor SPU-S memory counter DPU_SET_FUNCT Command Parameter(s) : DPU_INT_FUNC_ID PP007380 ENABLE_DISABLE PP006380 Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 STABLE_SPS ENABLE	
	ET=+ UT=+00.00.00	Function 9: monitor SPU-L alive counter CIR DPU_SET_FUNCT Command Parameter(s) : DPU_INT_FUNC_ID PP007380 ENABLE_DISABLE PP006380 Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 COUNTER_SPL ENABLE	
	ET=+ UT=+00.00.01	Function 10: monitor SPU-L memory counter DPU_SET_FUNCT Command Parameter(s) : DPU_INT_FUNC_ID PP007380 ENABLE_DISABLE PP006380 Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 STABLE_SPL ENABLE	
	ET=+ UT=+00.00.00	Function 11: monitor DPU HK DPU_SET_FUNCT Command Parameter(s) : DPU_INT_FUNC_ID PP007380 ENABLE_DISABLE PP006380 Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 EVENT_DPU ENABLE	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.01	Function 13: monitor BOLC WE temperatures DPU_SET_FUNCT Command Parameter(s) : DPU_INT_FUNCT_ID PP007380 ENABLE_DISABLE PP006380 Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 EVENT_BOL_T_WE ENABLE	
	ET=+ UT=+00.00.00	Function 16: monitor cooler heat switch temperatures DPU_SET_FUNCT Command Parameter(s) : DPU_INT_FUNCT_ID PP007380 ENABLE_DISABLE PP006380 Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 EVENT_BOL_I_HEAT ENABLE	
	ET=+ UT=+00.00.01	Function 19: monitor BOL FPU heater DPU_SET_FUNCT Command Parameter(s) : DPU_INT_FUNCT_ID PP007380 ENABLE_DISABLE PP006380 Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 EVENT_BOL_I_FPU ENABLE	
	ET=+ UT=+00.00.00	Function 21: monitor SP current DPU_SET_FUNCT Command Parameter(s) : DPU_INT_FUNCT_ID PP007380 ENABLE_DISABLE PP006380 Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 EVENT_BOL_I_SP1 ENABLE	
	ET=+ UT=+00.00.01	Function 23: monitor 1355 links DPU_SET_FUNCT Command Parameter(s) : DPU_INT_FUNCT_ID PP007380 ENABLE_DISABLE PP006380 Subsch. ID : 90 Det. descr. : ENABLE OR DISABLE A DPU INTERNAL FUNCTION	PC005380 23 <dec> ENABLE	
15		Update UIU table		Next Step: 16

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.00	Execute Telecommand H_FdirMarkUnitOn_Templ Command Parameter(s) : H_ConfStsUnitId DHZ00170 Subsch. ID : 10 Det. descr. : TEMPLATE FDIR: Mark Unit On, TC(8,4,116,26), Herschel Version	DC93H159 PacsBolc	
	ET=+ UT=+00.00.01	Execute Telecommand H_FdirMarkUnitOn_Templ Command Parameter(s) : H_ConfStsUnitId DHZ00170 Subsch. ID : 10 Det. descr. : TEMPLATE FDIR: Mark Unit On, TC(8,4,116,26), Herschel Version	DC93H159 PacsDec	
	ET=+ UT=+00.00.01	Execute Telecommand H_FdirMarkUnitOn_Templ Command Parameter(s) : H_ConfStsUnitId DHZ00170 Subsch. ID : 10 Det. descr. : TEMPLATE FDIR: Mark Unit On, TC(8,4,116,26), Herschel Version	DC93H159 PacsDpu	
		Verify Telemetry PacsBolc1FuncSt DEL54171	= On	AND=ZAZA0999
		Verify Telemetry PacsDec1FuncSts DEL44171	= On	AND=ZAZA0999
		Verify Telemetry PacsDpuFuncSts DEL50171	= On	AND=ZAZA0999
16		Switch ON verification		Next Step: END
16.1		Verify that all 1355 links are on and communicating		<input type="checkbox"/>
		Verify Telemetry DP_SPS_LINK PM020380	= ON	AND=ZAZ97999
		Verify Telemetry DP_SPL_LINK PM021380	= ON	AND=ZAZ97999
		Verify Telemetry DP_DMC_LINK PM022380	= ON	AND=ZAZ97999
		Verify Telemetry DP_SPUS_CMD PM023380	= SS ENABLED	AND=ZAZ97999
		Verify Telemetry DP_SPUL_CMD PM024380	= SS ENABLED	AND=ZAZ97999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry DP_SPUL_CMD PM024380	= SS ENABLED	AND=ZAZ97999
		Verify Telemetry DP_SPUS_HK PM026380	= NEW HK	AND=ZAZ97999
		Verify Telemetry DP_SPUL_HK PM027380	= NEW HK	AND=ZAZ97999
		Verify Telemetry DP_DMC_HK PM028380	= NEW HK	AND=ZAZ97999
		Verify Telemetry SPL_DMC_LINK PM189390	= LINK ON	AND=ZAZ97999
		Verify Telemetry SPS_DMC_LINK PM206400	= LINK ON	AND=ZAZ97999
		Verify that this parameter increments on each packet DM_BOL_REC_PAC PM038420	Incrementing	AND=ZAZ97999
16.2		Verify that no command reception problem has occurred		<input type="checkbox"/>
		Verify Telemetry DP_UNIT PM070380	= NOMINAL DPU	AND=ZAZ97999
		Verify Telemetry DP_1_8_REJECTED PM071380	= 0 <dec>	AND=ZAZ97999
		Verify Telemetry DP_1_2_REJECTED PM072380	= 0 <dec>	AND=ZAZ97999
		Verify Telemetry DP_COM_DMC_NACK PM073380	= 0 <dec>	AND=ZAZ97999
		Verify Telemetry DP_COM_SPL_NACK PM075380	= 0 <dec>	AND=ZAZ97999
		Verify Telemetry DP_COM_SPS_NACK PM077380	= 0 <dec>	AND=ZAZ97999
End of Procedure				