

Switchover from chain 2 to 1
File: H_COP_TTC_T21.xls
Author: E. Picallo



Procedure Summary

Objectives

This procedure describes the steps needed to perform a switchover from TTC chain 2 to chain 1.

Summary of Constraints

TTC units are managed through ASW TCs with function ID equal to 115, thus the status of the ASW function "TTC Management" has to be "running".

Note that:

- the value of the TM modulation index is always 1.2;
- the Coherent mode and Ranging modulator are set OFF because these parameters have to be commanded ON after confirmation of onboard lock;
- the value of the Output power level is always - 4dBm;
- the External reference and Internal bit pattern generator are always OFF.

The transponder needs a maximum warm-up of 20 minutes.

Before switching OFF the branch 2, through physical command, it is necessary to disable all EAT (Event-Action Table) entries.

Before switching ON the branch 1 through physical command it is necessary to mark as nominal, in the UIU table.

When the branch 1 has been switched ON it is necessary to reenable the entries in the EAT.

It is recommended to command ON the coherent and ranging mode parameters by Ground only after confirmation of onboard lock.

The procedure is now including a preliminary check on XPND1 RT behaviour before proceeding with the TTC chain s/o.

Moreover the procedure is addressing as well the updated TTC configuration keeping XPND2 LCL ON and disabling EAT entry relevant to XPND2 RT Invalid.

Spacecraft Configuration

Start of Procedure

CDMU in default configuration.
Downlink active via TX2 and TWTA2.
XPND1 LCL ON, XPND1 R/T declared OFF and INVALID on SDB
XPND2 LCL ON, XPND2 R/T declared ON and VALID on SDB
Rx2 TC rate = 4 Kbps, Rx1 TC rate = 125 bps
Chain 2 marked as "nominal" in UIU table.
Chain 1 marked as "redundant" in UIU table.

End of Procedure

CDMU in default configuration.
Downlink active via TX1 and TWTA1.
XPND1 LCL ON, XPND1 R/T declared ON and VALID on SDB
XPND2 LCL ON, XPND2 R/T declared OFF and INVALID on SDB
Rx1 TC rate = 4 Kbps, Rx2 TC rate = 125 bps
Chain 1 marked as "nominal" in UIU table.
Chain 2 marked as "redundant" in UIU table.

Reference File(s)

Input Command Sequences

Output Command Sequences

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HCRT21I
 HCRT213
 HCRT21F

Referenced Displays

ANDs	GRDs	SLDs
ZAZ7I999		(None)
ZAZ39999		
ZAZ7N999		
ZAD1L999		
ZAZ7J999		
ZAZ7M999		

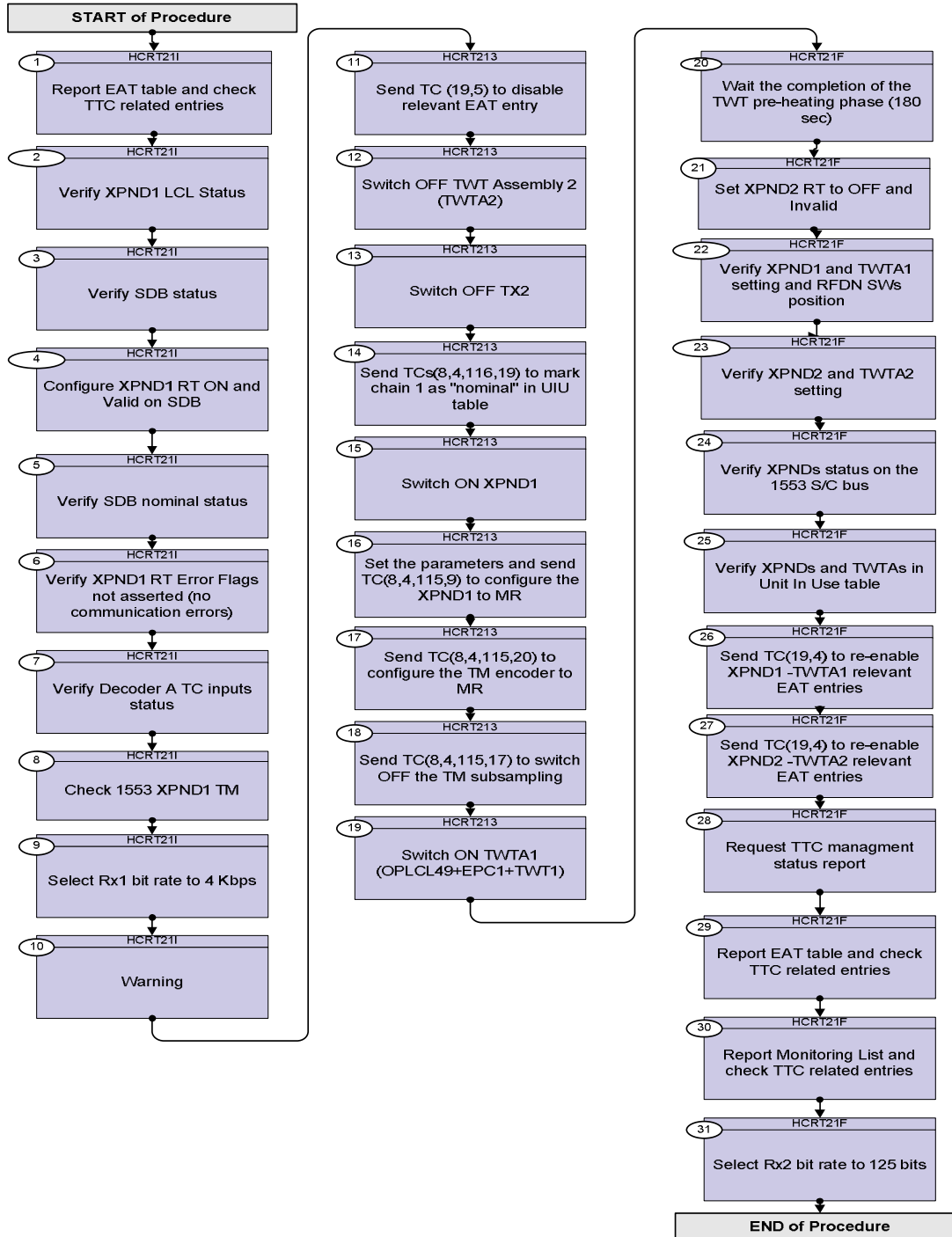
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
30/07/08		1	Created	E. Picallo	
31/07/08	1	2	Disable TTC EAT entries at the start and re-enable at the end deleted	E. Picallo	
06/01/09	2	3	TC DCT18170 Configure Xpnd mask update	E. Picallo	
14/03/09	2.2	4	Include encoder configuration and XPND bit rate configuration for LR1, LR2 and MBR Disable/re-enable EAT entries related to TTC added	E. Picallo	
07/04/09	2.3	5	Start config: Rx2 TC rate = 4 Kbps, Rx1 TC rate = 125 bps End config: Rx1 TC rate = 4 Kbps, Rx2 TC rate = 125 bps	E. Picallo	
15/06/09		6	Preliminary check on XPND1 RT behaviour before proceeding with the TTC chain s/o. Updated TTC configuration keeping XPND2 LCL ON and disabling EAT entry relevant to XPND2 RT Invalid.	E. Picallo	
17/06/09		6.01	Validation : Expected value XPND2_TX2_SUP_V corrected	E. Picallo	
17/06/09		7	TC DC22F170 (TtcConfTmEnclnUseMedium) set to manual dispatch	E. Picallo	
26/06/09	2.5	7.01	Validation : TM TC0 Decoder status set to Active (Step #7)	E. Picallo	

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Procedure Flowchart Overview

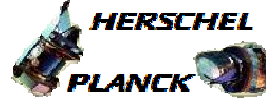


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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
Beginning of Procedure				
TC Seq. Name : HCRT21I (Switch TTC 2tol Init) Switchover from chain 2 to 1 Initial TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
1		Report EAT table and check TTC related entries		Next Step: 2
		Execute Telecommand <div style="text-align: right;">ReptEvtActTable</div> TC Control Flags : <div style="text-align: right;">GBM IL DSE --Y -- --</div> Subsch. ID : 10 Det. descr. : TEMPLATE Report The contents of the event/action table TC(19,6)	DCT86170	
		Check that the following EAT entries are enabled: EventID Event Description 0x00A1 XPND2_NOT_VIT_RT_INV 0x9218 EPC1_HelixCur_OutHi_Lim 0x9219 EPC2_HelixCur_OutHi_Lim 0x9228 EPC1_HelixCur_OutLo_Lim 0x9229 EPC2_HelixCur_OutLo_Lim 0x921A XPND1_RX Failure 0x921B XPND2_RX Failure		
		0x9200 RFDNSW1_Not_In_PosB_Fail 0x9201 RFDNSW1_Not_In_PosA_Fail 0x9202 RFDNSW2_Not_In_PosB_Fail 0x9203 RFDNSW2_Not_In_PosA_Fail 0x9204 RFDNSW3_Not_In_PosB_Fail 0x9205 RFDNSW3_Not_In_PosA_Fail 0x9206 RFDNSW4_Not_In_PosB_Fail 0x9207 RFDNSW4_Not_In_PosA_Fail		
		Check that the following EAT entries is disabled: EventID Event Description 0x00A0 XPND1_NOT_VIT_RT_INV		
2		Verify XPND1 LCL Status		Next Step: 3
		Verify Telemetry <div style="text-align: right;">Xpnd1Tx_L23_S WM12D565</div>	= ON	AND=ZAZ7I999
		Verify Telemetry <div style="text-align: right;">Xpnd1Tx_L23_I WM109565</div>	>= 0.3 A <= 0.4 A	AND=ZAZ7I999
3		Verify SDB status		Next Step: 4

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry Active_Bus_A_B DEFJ1160	= BUS_A	AND=ZAZ39999
		Verify Telemetry BusA_HealthySts DEFJ2160	= Healthy	AND=ZAZ39999
		Verify Telemetry BusB_HealthySts DEFJ3160	= Healthy	AND=ZAZ39999
		Verify Telemetry SDB_FDIR DEFJ4160	= ENABLED	AND=ZAZ39999
4		Configure XPND1 RT ON and Valid on SDB		Next Step: 5
4.1		Set XPND1 RT ON and Valid		<input type="checkbox"/>
		Execute Telecommand ConfigureSDBFDIR Command Parameter(s) :	DC005161	
		RTA DH011161 XPND 1		
		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 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 Ignore Flag		
		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		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
4.2		Verify XPND1 status on the 1553 S/C bus		<input type="checkbox"/>
		Verify Telemetry XPND1On_Off DEFCEG160	= ON	AND=ZAZ7I999
		Verify Telemetry XPND1Val_Inval DEFCK160	= Valid	AND=ZAZ7I999
5		Verify SDB nominal status		Next Step: 6
		Verify Telemetry Active_Bus_A_B DEFJ1160	= BUS_A	AND=ZAZ39999
		Verify Telemetry BusA_HealthySts DEFJ2160	= Healthy	AND=ZAZ39999
		Verify Telemetry BusB_HealthySts DEFJ3160	= Healthy	AND=ZAZ39999
6		Verify XPND1 RT Error Flags not asserted (no communication errors)		Next Step: 7
6.1		Verify XPND1 Response Status Word		<input type="checkbox"/>
		<p>The XPND RT reports the following error flags in the Response Status Words via 1553 bus:</p> <ul style="list-style-type: none"> - RT message error bit: set by the RT upon detection of an error in the message or an illegal message identification. - RT busy bit: indicates that the RT or subsystem is unable to move data to or from the subsystem in compliance with the BC command. - RT terminal flag bit: indicates a RT fault condition. <p>These RT error bits are not supported by DLL FDIR mechanisms. Thus, if a permanent error is reported on one of these bits, this could indicate a failure in the XPND.</p> <p>Note: The XPND assert the subsystem error flag while TM acquisitions are being performed.</p>		
		<p>The following DIDs are available for XPND1:</p> <p>DID_XPND_1_SA11_RSP_STS_WORD DID_XPND_1_SA30_RSP_STS_WORD</p>		

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		<p>The value of the error bits is kept in all the above mentioned DIDs. In case of permanent failures this means that, for example, if DID_XPND_1_SA11_RSP_STS_WORD is indicating a RT message error condition, the same error will be reported in all the other DIDs for response status words.</p> <p>Then, it is enough to check only one of these Status Words. The parameters below correspond to: DID_XPND_1_SA11_RSP_STS_WORD</p>		
		Verify XPND1 RT message error bit status Telemetry MsgErr DEYR2161	= 0 <dec>	AND=ZAZ7N999
		Verify XPND1 RT busy bit status Telemetry Busy DEYR6161	= 0 <dec>	AND=ZAZ7N999
		Verify XPND1 subsystem error flag status Telemetry SubSys DEYR7161	= 1 <dec>	AND=ZAZ7N999
		Verify XPND1 RT terminal flag bit status Telemetry Term DEYR9161	= 0 <dec>	AND=ZAZ7N999
6.2		Verify XPND1 Local message Status Word		□
		Local message Status Word (MSW)		
		Verify Loopback command sync error Telemetry LoopCmdSync DE4VA161	= 0 <dec>	AND=ZAD1L999
		Verify Loopback data sync error Telemetry LoopDatSync DE4VB161	= 0 <dec>	AND=ZAD1L999
		Verify Loopback manchester error Telemetry LoopManch DE4VC161	= 0 <dec>	AND=ZAD1L999
		Verify Loopback parity error Telemetry LoopPar DE4VD161	= 0 <dec>	AND=ZAD1L999
		Verify Loopback word count error Telemetry LoopWdCnt DE4VE161	= 0 <dec>	AND=ZAD1L999
		Verify response 1 expected Telemetry Rsp1Expd DE4VF161	= 1 <dec>	AND=ZAD1L999
		Local message Status Word (LSW)		
		Verify Response 1 status sync error Telemetry Rsp1StsSync DE4VG161	= 0 <dec>	AND=ZAD1L999
		Verify Response 1 data sync error Telemetry Rsp1DatSync DE4VH161	= 0 <dec>	AND=ZAD1L999
		Verify Response 1 Manchester error Telemetry Rsp1Manch DE4VJ161	= 0 <dec>	AND=ZAD1L999
		Verify Response 1 parity error Telemetry Rsp1Par DE4VK161	= 0 <dec>	AND=ZAD1L999

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		Verify Response 1 word count error Telemetry Rsp1WdCnt DE4VL161	= 0 <dec>	AND=ZAD1L999
		Verify Response 1 store Data word Telemetry Rsp1Words DE4VM161	= 4 <dec>	AND=ZAD1L999
		Verify Response 2 expected Telemetry Rsp2Expd DE4VN161	= 0 <dec>	AND=ZAD1L999
		Verify Response 2 status sync error Telemetry Rsp2StsSync DE4VP161	= 0 <dec>	AND=ZAD1L999
		Verify Response 2 Manchester error Telemetry Rsp2Manch DE4VR161	= 0 <dec>	AND=ZAD1L999
		Verify Response 2 parity error Telemetry Rsp2Par DE4VS161	= 0 <dec>	AND=ZAD1L999
		Verify Response 2 word count error Telemetry Rsp2WdCnt DE4VT161	= 0 <dec>	AND=ZAD1L999
7		Verify Decoder A TC inputs status		Next Step: 8
		Verify TC0 Status Decoder A Telemetry TC0_Status_A DEEP7160	= Active	(None)
		Verify TC1 Status Decoder A Telemetry TC1_Status_A DEEP6160	= Active	(None)
		<p>The TC Active status TM provides the information that the following conditions are meet:</p> <ul style="list-style-type: none"> - Rx Demodulator locked on uplink carrier and - Rx Demodulator locked on uplink subcarrier <p>i.e. it is the logic AND of Carrier Lock Status and Squelch Status Telemetry</p> <p>Assuming U/L swept in wide range and modulated at 4Kbps then Rx2 configured at 4Kbps achieves bit lock and Rx1 configured at 125 bps (multiple of 4Kbps) achieves bit lock as well:</p> <p>TC0_Status_A is Active (XPND1 Rx valid signal to Decoder A)</p> <p>TC1_Status_A is Active (XPND2 Rx valid signal to Decoder A)</p>		
7.1		Check Analogue XPND1 TM		☐
		Verify RX1 AGC Level Telemetry XPD1_RX1_AGC_LV RMB09442	>= -141.0 dbmW	AND=ZAZ7I999
		Verify RX1 PLL SPE Telemetry XPD1_RX1_PLL_SP RMB11442	<= 130.0 kHz >= -130.0 kHz	AND=ZAZ7I999
		Verify Tx1 RF Output Power Telemetry XPD1_RF1_OUT_PW RMB13442	<= -13.0 dbmW	AND=ZAZ7I999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Rx1 TC bit rate Telemetry RX1 125-4K Stat RMB17442	= 125 bps	AND=ZAZ7I999
		Verify Rx1 temperature Telemetry RX1_TEMP RMB02442		AND=ZAZ7I999
8		Check 1553 XPND1 TM		Next Step: 9
		Verify XPND1 status X1 Status - XS RMB22442	= TM mode active	AND=ZAZ7I999
		Verify Low Rate-1 status Telemetry X1 LowRate-1 MD RMB30442	= OFF	AND=ZAZ7I999
		Verify Low Rate-2 status Telemetry X1 LowRate-2 MD RMB31442	= OFF	AND=ZAZ7I999
		Verify Medium Rate Modulator status Telemetry X1 MedRate-MRM RMB29442	= ON	AND=ZAZ7I999
		Verify High Rate status Telemetry X1 HIRateMD-HRM RMB28442	= OFF	AND=ZAZ7I999
		Verify Ranging Modulator status Telemetry X1 Rang MOD-RM RMB27442	= ON	AND=ZAZ7I999
		Verify Coherent Mode status Telemetry X1 Coher MOD-CM RMB26442	= ON	AND=ZAZ7I999
		Verify Ranging Modulation Index Telemetry X1 RNGMD ID-RMI RMB32442	= 0.6 rad	AND=ZAZ7I999
		Verify Telemetry Modulation Index Telemetry X1 TM MD ID-TMI RMB33442	= 1.2 rad	AND=ZAZ7I999
		Verify Power level at transmitter output Telemetry X1 OutPowLevSet RMB35442	= -4 dbmW	AND=ZAZ7I999
		Verify Internal Bit Pattern Generator status Telemetry X1 IntBitPatGen RMB34442	= OFF	AND=ZAZ7I999
		Verify External Reference status Telemetry X1 Ext Ref - ER RMB25442	= OFF	AND=ZAZ7I999
		Verify Receiver lock status Telemetry X1 Rx Lock - RL RMB24442	= Locked	AND=ZAZ7I999
		Verify RX AGC Level Telemetry X1 AGC TMUpInk RMB20442	>= -141.00 dbmW	AND=ZAZ7I999
		Verify PLL Phase Error Telemetry X1 RX PLL PhErr RMB19442	<= 130.00 kHz >= -130.00 kHz	AND=ZAZ7I999
		Verify Squelch Status Telemetry X1 SqlchSt - SS RMB23442	= OFF	AND=ZAZ7I999
		Verify Tx1 TC Bit Rate Telemetry X1 TcBitRateTCB RMB61442	= Low	AND=ZAZ7I999

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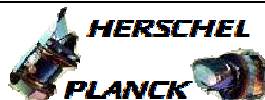


Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
9		Select Rx1 bit rate to 4 Kbps		Next Step: 10
		Execute Procedure: H_FCP_TTC_R1BR Select RX1 TC bit rate		
		Initial Rxs configuration is RX2 TC rate = 4 Kbps and RX1 TC rate= 125 bps. Before the TTC switch-over from chain 2 to chain 1 both RXs are set to 4 kbps TC rate.		
10		Warning		Next Step: 11
		In the next step the downlink is deactivated. Therefore no CLCW will be available to acknowledge the TCs Send TCs time-tagged or switch to BD mode in order to avoid triggering the TC re-transmission.		
TC Seq. Name : HCRT213 (Switch TTC 2 to 1 Nominal/Earth acquisition MBR) Switch TTC 2 to 1 Nominal/Earth acquisition MBR TimeTag Type: B Sub Schedule ID: <input type="checkbox"/>				
11		Send TC (19,5) to disable relevant EAT entry		Next Step: 12
		When this request is received, the action-telecommand associated with the corresponding event shall be disabled. In the TC(19,5) it is necessary to set the following parameters: N, number of events to be disabled APID, identifier of the Application Process generating this event report, in this case always equal to 16 (CDMU). Event ID, identifier of the event to be disabled, in this case equal to: 37400 & 37416 (TWTA1 failure), 37401 & 37417 (TWTA2 failure), 37402 (XPND1 RX failure), 37403 (XPND2 RX failure), 160 (XPND1 invalid RT), 161 (XPND2 invalid RT).		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.00 UT=+	Execute Telecommand DisableActions Command Parameter(s) : N_Repetition DH041170 APID_for_EAT_TC DH236170 8 <dec> EventId DH146170 CDMS (Def) EventId DH146170 37400 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 37401 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 37402 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 37403 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 37416 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 37417 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 160 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 161 <dec> TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 10 Det. descr. : TEMPLATE Disable Actions TC(19,5)	DCT85170	
12		Switch OFF TWT Assembly 2 (TWTA2)		Next Step: 13
		The following command switches OFF the TWT2, the EPC2 and open the TWTA2 OP-LCL.		
	ET=+00.00.05 UT=+	Execute Telecommand TtcCommandTwta2Off TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 10 Det. descr. : Ttc Command TWTA 2 Off TC(8,4,115,1)	DC07E170	
13		Switch OFF TX2		Next Step: 14
		The following command switch OFF the Tx; the status of the XPND LCL does not change (it remains closed) as well as the configuration of the Tx on the 1553 s/c bus (it remains 'ON' and 'valid')		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.05 UT=+	Execute Telecommand TtcCommandTx2Off TC Control Flags : Subsch. ID : 10 Det. descr. : Ttc Command Tx 2 Off TC(8,4,115,1) GBM IL DSE --Y -- --	DC04E170	
14		Send TCs(8,4,116,19) to mark chain 1 as "nominal" in UIU table		Next Step: 15
		Select Nominal Unit telecommand is used for choosing the unit A (1) or unit B (2) of a redundant unit pair to be considered as the nominal unit. After the execution of this TC the other unit of the commanded unit pair is considered the redundant unit.		
	ET=+00.00.05 UT=+	Execute Telecommand SelNomUnitA_XpndRx TC Control Flags : Subsch. ID : 10 Det. descr. : Fdir Select Nominal Unit XPND RX A, TC(8,4,116,19) GBM IL DSE --Y -- --	DC63G170	
15		Switch ON XPND1		Next Step: 16
		Command XPND1 ON - TC(8,4,115,2) performs : Switch LCL23 (XPND1) ON Configure TX1 "ON" and "VALID" on the 1553 S/C bus Switch XPND TX1 ON		
	ET=+00.00.05 UT=+	Execute Telecommand TtcCommandXpnd1On TC Control Flags : Subsch. ID : 10 Det. descr. : Ttc Command Xpnd 1 On TC(8,4,115,2) GBM IL DSE --Y -- --	DCN83170	
16		Set the parameters and send TC(8,4,115,9) to configure the XPND1 to MR		Next Step: 17

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.30 UT=+	Execute Telecommand XpndConfigure_Templ Command Parameter(s) : XpndId DH018170 XpndA (Def) XpndConfMask1Unus DH220170 11 <bin> XpndConfMask1_ER DH221170 ON XpndConfMask1_CM DH222170 ON XpndConfMask1_RM DH223170 ON XpndConfMask1_HRM DH224170 ON XpndConfMask1_MRM DH225170 ON XpndConfMask1LRM1 DH226170 ON XpndConfMask1LRM2 DH227170 ON XpndConfMask1_RMI DH228170 Update XpndConfMask1_TMI DH229170 Update XpndConfMask2_PG DH230170 ON XpndConfMask2Unus DH231170 1111111111 <bin> XpndConfMask2OPLS DH232170 Update XpndConfDW1Unus DH020170 0 <dec> (Def) XpndConfDW1_ER DH021170 OFF (Def) XpndConfDW1_CM DH022170 ON XpndConfDW1_RM DH023170 ON XpndConfDW1_HRM DH024170 OFF (Def) XpndConfDW1_MRM DH025170 ON XpndConfDW1LRM1 DH026170 OFF (Def) XpndConfDW1LRM2 DH027170 OFF (Def) XpndConfDW1_RMI DH028170 0.6 XpndConfDW1_TMI DH029170 1.2 XpndConfDW2_PG DH030170 OFF (Def) XpndConfDW2Unus DH031170 0 <dec> (Def) XpndConfDW2OPLS DH032170 -4 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 10 Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9)	DCT18170	
17		Send TC(8,4,115,20) to configure the TM encoder to MR		Next Step: 18
	ET=+00.00.05 UT=+	Execute Telecommand TtcConfTmEncInUseMedium TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 10 Det. descr. : TTC: Config TM Enc In Use Mode Medium 150 kbps, TC(8,4,115,20)	DC22F170	
18		Send TC(8,4,115,17) to switch OFF the TM subsampling		Next Step: 19

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch																																	
	ET+=00.00.05 UT=+	Execute Telecommand TtcSwitchTmSubsAMPLoff TC Control Flags : Subsch. ID : 10 Det. descr. : TTC: Switch TM Subsampling Off TC(8,4,115,17) GBM IL DSE --Y -- --	DC03F170																																		
19		Switch ON TWTA1 (OPLCL49+EPC1+TWT1)		Next Step: 20																																	
	ET+=00.00.05 UT=+	Execute Telecommand TtcCommandTwtalOn TC Control Flags : Subsch. ID : 10 Det. descr. : Ttc Command TWTA 1 On TC(8,4,115,2) GBM IL DSE --Y -- --	DC16E170																																		
TC Seq. Name : HCRT21F (Switch TTC 2to1Final) Switchover from chain 2 to 1 Final TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>																																					
20		Wait the completion of the TWT pre-heating phase (180 sec)		Next Step: 21																																	
21		Set XPND2 RT to OFF and Invalid		Next Step: 22																																	
		Execute Telecommand ConfiguresDBFDIR Command Parameter(s) : <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">RTA</td> <td style="width: 30%;">DH011161</td> <td style="width: 40%;">XPND 2</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>Ignore Flag</td> </tr> <tr> <td>M7</td> <td>DH037161</td> <td>Ignore Flag</td> </tr> <tr> <td>F0</td> <td>DH018161</td> <td>OFF</td> </tr> <tr> <td>F1</td> <td>DH019161</td> <td>Alive</td> </tr> </table>	RTA	DH011161	XPND 2	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	Ignore Flag	M7	DH037161	Ignore Flag	F0	DH018161	OFF	F1	DH019161	Alive	DC005161	
RTA	DH011161	XPND 2																																			
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	Ignore Flag																																			
M7	DH037161	Ignore Flag																																			
F0	DH018161	OFF																																			
F1	DH019161	Alive																																			

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		F2 DH020161 F3 DH021161 F4 DH022161 F5 DH023161 F6 DH024161 F7 DH025161 M12 DH051161 M_C DH043161 M8 DH038161 M9 DH039161 M10 DH040161 M11 DH041161 F12 DH050161 CNT DH042161 F8 DH026161	Well TC Well TM Invalid Non-vital NOMINAL ON Ignore Flag Ignore CNT Ignore Flag Ignore Flag Ignore Flag Ignore Flag ENABLED LoopCnt1 Bus A	
		F9 DH027161 F10 DH028161 F11 DH029161	Healthy Healthy ENABLED	
		TC Control Flags : Subsch. ID : 10 Det. descr. : Configure SDB FDIR	GBM IL DSE --Y -- ---	
21.1		Verify XPND2 status on the 1553 S/C bus		<input type="checkbox"/>
		Verify Telemetry XPND2On_Off DEFD1160	= OFF	AND=ZAZ7I999
		Verify Telemetry XPND2Val_Inval DEFD5160	= Invalid	AND=ZAZ7I999
22		Verify XPND1 and TWT A1 setting and RFDN SWS position		Next Step: 23
22.1		Rx1 power line status verification		<input type="checkbox"/>
		Verify FCL3 (XPND1 Rx) voltage Telemetry Xpnd1_Rx_FCL3_V WM703565	>= 27.96 V <= 28.71 V	
		Verify FCL3 (XPND1 Rx) current Telemetry Xpnd1_Rx_FCL3_I WM702565	>= 0.20 A <= 0.35 A	AND=ZAZ7I999
22.2		Rx1 analogue telemetry verification		<input type="checkbox"/>
		Verify RX1 AGC Level Telemetry XPD1_RX1_AGC_LV RMB09442	>= -141.0 dbmW	AND=ZAZ7I999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify RX1 PLL SPE Telemetry XPND1_RX1_PLL_SP RMB11442	<= 130.0 kHz >= -130.0 kHz	AND=ZAZ7I999
		Verify Rx1 TC bit rate Telemetry RX1 125-4K Stat RMB17442	= 4 Kbps	AND=ZAZ7I999
		Verify Rx1 Supply Voltage Telemetry XPND1_RX1_SUP_V RMB07442	>= 4.8 V <= 5.5 V	AND=ZAZ7I999
		Verify Rx1 temperature Telemetry RX1_TEMP RMB02442		AND=ZAZ7I999
22.3		<i>Tx1 power line status verification</i>		☐
		Verify LCL23 (XPND1 Tx) status Telemetry Xpnd1Tx_L23_S WM12D565	= ON	AND=ZAZ7I999
		Verify LCL23 (XPND1 Tx) current Telemetry Xpnd1Tx_L23_I WM109565	>= 0.41 A <= 0.55 A	AND=ZAZ7I999
22.4		<i>Tx1 analogue telemetry verification</i>		☐
		Verify Tx1 Status Telemetry TX1 ON-OFF Stat RMB15442	= ON	AND=ZAZ7I999
		Verify Tx1 RF Output Power Telemetry XPD1_RF1_OUT_PW RMB13442	<= -4.2 dbmW >= -5.2 dbmW	AND=ZAZ7I999
		Verify Tx1 Supply Voltage Telemetry XPND1_TX1_SUP_V RMB05442	>= 6.0 V <= 6.9 V	AND=ZAZ7I999
		Verify Tx1 Temperature Telemetry TX1_TEMP RMB01442		AND=ZAZ7I999
22.5		<i>Verify XPNDs status on the 1553 S/C bus</i>		☐
		Verify XPND1 status X1 Status - XS RMB22442	= TM mode active	AND=ZAZ7I999
		Verify Low Rate-1 status Telemetry X1 LowRate-1 MD RMB30442	= OFF	AND=ZAZ7I999
		Verify Low Rate-2 status Telemetry X1 LowRate-2 MD RMB31442	= OFF	AND=ZAZ7I999
		Verify Medium Rate Modulator status Telemetry X1 MedRate-MRM RMB29442	= ON	AND=ZAZ7I999
		Verify High Rate status Telemetry X1 HIRateMD-HRM RMB28442	= OFF	AND=ZAZ7I999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Ranging Modulator status Telemetry X1 Rang MOD-RM RMB27442	= ON	AND=ZAZ7I999
		Verify Coherent Mode status Telemetry X1 Coher MOD-CM RMB26442	= ON	AND=ZAZ7I999
		Verify Ranging Modulation Index Telemetry X1 RNGMD ID-RMI RMB32442	= 0.6 rad	AND=ZAZ7I999
		Verify Telemetry Modulation Index Telemetry X1 TM MD ID-TMI RMB33442	= 1.2 rad	AND=ZAZ7I999
		Verify Power level at transmitter output Telemetry X1 OutPowLevSet RMB35442	= -4 dbmW	AND=ZAZ7I999
		Verify Internal Bit Pattern Generator status Telemetry X1 IntBitPatGen RMB34442	= OFF	AND=ZAZ7I999
		Verify External Reference status Telemetry X1 Ext Ref - ER RMB25442	= OFF	AND=ZAZ7I999
		Verify Receiver lock status Telemetry X1 Rx Lock - RL RMB24442	= Locked	AND=ZAZ7I999
		Verify RX AGC Level Telemetry X1 AGC TMUplnk RMB20442	>= -141.0 dbmW	AND=ZAZ7I999
		Verify PLL Phase Error Telemetry X1 RX PLL PhErr RMB19442	<= 130.0 kHz >= -130.0 kHz	AND=ZAZ7I999
		Verify Squelch Status Telemetry X1 SqlchSt - SS RMB23442	= ON	AND=ZAZ7I999
		Verify Tx1 TC Bit Rate Telemetry X1 TcBitRateTCB RMB61442	= High	AND=ZAZ7I999
22.6		TM Encoder (in use) verification		<input type="checkbox"/>
		Verify Telemetry TME_BITRATE DEMRF160	= 150 Kbps	AND=ZAZ7J999
22.7		TWTA1 setting verification		<input type="checkbox"/>
		Verify OPLCL49 (TWTA 1) Status Telemetry TwtA_1_L49_1S WM22E565	= ON	AND=ZAZ7J999
		Verify TWTA1 current Telemetry TwtA_1_L49_I WM210565	>= 2.2 A <= 2.8 A	AND=ZAZ7J999
		Verify EPC1 Status Telemetry EPC1_ONOFF_STS RMB05439	= ON	AND=ZAZ7J999
		Verify EPC1 Anode Voltage Telemetry EPC1_ANODE_VOLT RMB01439	>= 1077.0 V <= 1137.0 V	AND=ZAZ7J999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify EPC1 Helix current Telemetry EPC1_HELIX_CURR RMB02439	>= 0.19 mA <= 1.20 mA	AND=ZAZ7J999
		Verify EPC1 Automatic Restart Status Telemetry EPC1_AUT_RSTART RMB06439	= NOTACTIVE	AND=ZAZ7J999
		Verify EPC1 Temperature Telemetry EPC1_TEMP RMB11439		AND=ZAZ7J999
		Verify TWT1 Status Telemetry TWT1_ONOFF_STS RMB09439	= ON	AND=ZAZ7J999
22.8		RFDN SWS position verification		<input type="checkbox"/>
		Verify Telemetry RFDN SW1 Pos A RMB05436	= ON	AND=ZAZ7J999
		Verify Telemetry RFDN SW2 Pos B RMB10436	= ON	AND=ZAZ7J999
		Verify Telemetry RFDN SW3 Pos A RMB07436	= ON	AND=ZAZ7J999
		Verify Telemetry RFDN SW4 Pos B RMB12436	= ON	AND=ZAZ7J999
23		Verify XPND2 and TWTA2 setting		Next Step: 24
23.1		RX2 power line status verification		<input type="checkbox"/>
		Verify FCL4 (XPND2 Rx) voltage Telemetry Xpnd2_Rx_FCL4_V WM403565	>= 27.96 V <= 28.71 V	(None)
		Verify FCL4 (XPND2 Rx) current Telemetry Xpnd2_Rx_FCL4_I WM402565	>= 0.20 A <= 0.35 A	AND=ZAZ7I999
23.2		RX2 Analogue Telemetry verification		<input type="checkbox"/>
		Verify RX2 AGC Level Telemetry XPD2_RX2_AGC_LV RMB10442	>= -141.0 dbmW	AND=ZAZ7I999
		Verify RX2 PLL SPE Telemetry XPD2_RX2_PLL_SP RMB12442	<= 130.0 kHz >= -130.0 kHz	AND=ZAZ7I999
		Verify Receiver 2 bit rate Telemetry RX2 125-4K Stat RMB18442	= 4 Kbps	AND=ZAZ7I999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify RX2 Supply Voltage Telemetry XPND2_RX2_SUP_V RMB08442	>= 4.8 V <= 5.5 V	AND=ZAZ7I999
		Verify Rx2 temperature Telemetry RX2_TEMP RMB04442		AND=ZAZ7I999
23.3		TX2 power line status verification		<input type="checkbox"/>
		Verify LCL16 (XPND2 Tx) voltage Telemetry Xpnd2Tx_L16_S WM92C565	= ON	AND=ZAZ7I999
		Verify LCL16 (XPND2 Tx) current Telemetry Xpnd2Tx_L16_I WM908565	>= 0.3 A <= 0.4 A	AND=ZAZ7I999
23.4		TX2 Analogue Telemetry verification		<input type="checkbox"/>
		Verify TX2 Status Telemetry TX2 ON-OFF Stat RMB16442	= OFF	AND=ZAZ7I999
		Verify RF2 Output Power Telemetry XPD2_RF2_OUT_PW RMB14442	<= -13.0 dbmW	AND=ZAZ7I999
		Verify TX2 Supply Voltage Telemetry XPND2_TX2_SUP_V RMB06442	>= 6.0 V <= 6.9 V	AND=ZAZ7I999
		Verify TX2 Temperature Telemetry TX2_TEMP RMB03442		AND=ZAZ7I999
23.5		Verify TWTA2 setting		<input type="checkbox"/>
		Verify OPLCL50 (TWTA 2) Status Telemetry Twta_2_L50_1S WM92E565	= OFF	AND=ZAZ7J999
		Verify Telemetry Twta_2_L50_I WM910565	>= 0.0 A <= 0.1 A	AND=ZAZ7J999
		Verify EPC2 Status Telemetry EPC2_ONOFF_STS RMB07439	= OFF	AND=ZAZ7J999
		Verify EPC2 Anode Voltage Telemetry EPC2_ANODE_VOLT RMB03439		AND=ZAZ7J999
		Verify EPC2 Helix current Telemetry EPC2_HELIX_CURR RMB04439		AND=ZAZ7J999
		Verify EPC2 Automatic Restart Status Telemetry EPC2_AUT_RSTART RMB08439	= NOTACTIVE	AND=ZAZ7J999
		Verify EPC2 Temperature Telemetry EPC2_TEMP RMB12439		AND=ZAZ7J999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify TWT2 Status Telemetry TWT2_ONOFF_STS RMB10439	= OFF	AND=ZAZ7J999
24		Verify XPNDs status on the 1553 S/C bus		Next Step: 25
		Verify Telemetry XPND1On_Off DEFPG160	= ON	AND=ZAZ7I999
		Verify Telemetry XPND1Val_Inval DEFCK160	= Valid	AND=ZAZ7I999
		Verify Telemetry XPND2On_Off DEFD1160	= OFF	AND=ZAZ7I999
		Verify Telemetry XPND2Val_Inval DEFD5160	= Invalid	AND=ZAZ7I999
25		Verify XPNDs and TWTAs in Unit In Use table		Next Step: 26
25.1		XPND1 UIU table status verification		<input type="checkbox"/>
		Verify Telemetry XpndRx1FuncSts DEL58170	= On	AND=ZAZ7M999
		Verify Telemetry XpndRx1Use DEL56170	= In_Use	AND=ZAZ7M999
		Verify Telemetry XpndRx1LogSts DEL57170	= Nominal	AND=ZAZ7M999
		Verify Telemetry XpndRx1FailSts DEL59170	= Not_Failed	AND=ZAZ7M999
		Verify Telemetry XpndTx1FuncSts DEL27170	= On	AND=ZAZ7M999
		Verify Telemetry XpndTx1Use DEL29170	= In_Use	AND=ZAZ7M999
		Verify Telemetry XpndTx1LogSts DEL28170	= Nominal	AND=ZAZ7M999
		Verify Telemetry XpndTx1FailSts DEL26170	= Not_Failed	AND=ZAZ7M999
25.2		XPND2 UIU table status verification		<input type="checkbox"/>
		Verify Telemetry XpndRx2FuncSts DEL62170	= On	AND=ZAZ7M999
		Verify Telemetry XpndRx2Use DEL60170	= Not_In_Use	AND=ZAZ7M999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry XpndRx2LogSts DEL61170	= Redundant	AND=ZAZ7M999
		Verify Telemetry XpndRx2FailSts DEL63170	= Not_Failed	AND=ZAZ7M999
		Verify Telemetry XpndTx2FuncSts DEL31170	= Off	AND=ZAZ7M999
		Verify Telemetry XpndTx2Use DEL33170	= Not_In_Use	AND=ZAZ7M999
		Verify Telemetry XpndTx2LogSts DEL32170	= Redundant	AND=ZAZ7M999
		Verify Telemetry XpndTx2FailSts DEL30170	= Not_Failed	AND=ZAZ7M999
25.3		TWTA1 UIU table status verification		□
		Verify Telemetry TwtalFuncSts DEL19170	= On	AND=ZAZ7M999
		Verify Telemetry TwtalUse DEL21170	= In_Use	AND=ZAZ7M999
		Verify Telemetry TwtalLogSts DEL20170	= Nominal	AND=ZAZ7M999
		Verify Telemetry TwtalFailSts DEL18170	= Not_Failed	AND=ZAZ7M999
		Verify Telemetry Epc1FuncSts DEG25170	= On	AND=ZAZ7M999
		Verify Telemetry Epc1Use DEG27170	= In_Use	AND=ZAZ7M999
		Verify Telemetry Epc1LogSts DEG26170	= Nominal	AND=ZAZ7M999
		Verify Telemetry Epc1FailSts DEG24170	= Not_Failed	AND=ZAZ7M999
		Verify Telemetry TwtAmp1FuncSts DEH13170	= On	AND=ZAZ7M999
		Verify Telemetry TwtAmp1Use DEH15170	= In_Use	AND=ZAZ7M999
		Verify Telemetry TwtAmp1LogSts DEH14170	= Nominal	AND=ZAZ7M999
		Verify Telemetry TwtAmp1FailSts DEH12170	= Not_Failed	AND=ZAZ7M999
25.4		TWTA2 UIU table status verification		□

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry Twta2FuncSts DEL23170	= Off	AND=ZAZ7M999
		Verify Telemetry Twta2Use DEL25170	= Not_In_Use	AND=ZAZ7M999
		Verify Telemetry Twta2LogSts DEL24170	= Redundant	AND=ZAZ7M999
		Verify Telemetry Twta2FailSts DEL22170	= Not_Failed	AND=ZAZ7M999
		Verify Telemetry Epc2FuncSts DEG29170	= Off	AND=ZAZ7M999
		Verify Telemetry Epc2Use DEG31170	= Not_In_Use	AND=ZAZ7M999
		Verify Telemetry Epc2LogSts DEG30170	= Redundant	AND=ZAZ7M999
		Verify Telemetry Epc2FailSts DEG28170	= Not_Failed	AND=ZAZ7M999
		Verify Telemetry TwtAmp2FuncSts DEH17170	= Off	AND=ZAZ7M999
		Verify Telemetry TwtAmp2Use DEH19170	= Not_In_Use	AND=ZAZ7M999
		Verify Telemetry TwtAmp2LogSts DEH18170	= Redundant	AND=ZAZ7M999
		Verify Telemetry TwtAmp2FailSts DEH16170	= Not_Failed	AND=ZAZ7M999
26		Send TC(19,4) to re-enable XPND1 -TWTA1 relevant EAT entries		Next Step: 27
		<p>When this request is received, the action-telecommand associated with the corresponding event shall be enabled. In the TC(19,4) it is necessary to set the following parameters: N, number of events to be enabled APID, identifier of the Application Process generating this event report, in this case always equal to 16 (CDMU). Event ID, identifier of the event to be enabled, in this case equal to: 37400 & 37416 (TWTA1 failure), 37402 (XPND1 RX failure), 160 (XPND1 invalid RT).</p>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand <p style="text-align: right;">EnableActions</p> DCT84170 <i>Command Parameter(s) :</i> N_Repetition DH041170 4 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 37400 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 37402 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 37416 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 160 <dec> <i>TC Control Flags :</i> <p style="text-align: right;">GBM IL DSE</p> --Y -- --- <i>Subsch. ID : 10</i> Det. descr. : TEMPLATE Enable Actions TC(19,4)		
27		Send TC(19,4) to re-enable XPND2 -TWTA2 relevant EAT entries		Next Step: 28
		<p>When this request is received, the action-telecommand associated with the corresponding event shall be enabled. In the TC(19,4) it is necessary to set the following parameters:</p> <p>N, number of events to be enabled. APID, identifier of the Application Process generating this event report, in this case always equal to 16 (CDMU). Event ID, identifier of the event to be enabled, in this case equal to: 37401 & 37417 (TWTA2 failure), 37403 (XPND2 RX failure),</p> <p>Note that event 161 (XPND2 invalid RT) is kept disabled.</p>		
		Execute Telecommand <p style="text-align: right;">EnableActions</p> DCT84170 <i>Command Parameter(s) :</i> N_Repetition DH041170 3 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 37401 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 37403 <dec> APID_for_EAT_TC DH236170 CDMS (Def) EventId DH146170 37417 <dec> <i>TC Control Flags :</i> <p style="text-align: right;">GBM IL DSE</p> --Y -- --- <i>Subsch. ID : 10</i> Det. descr. : TEMPLATE Enable Actions TC(19,4)		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
28		Request TTC management status report		Next Step: 29
		Execute Telecommand TtcReportStatus TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : TTC: Report TTC Management Status TC(8,5,115)	DC30F170	
		Check that all the information of the TTC Management function is consistent		
29		Report EAT table and check TTC related entries		Next Step: 30
		Execute Telecommand ReptEvtActTable TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : TEMPLATE Report The contents of the event/action table TC(19,6)	DCT86170	
		Check that the following EAT entries are enabled: EventID Event Description 0x00A0 XPND1_NOT_VIT_RT_INV 0x9218 EPC1_HelixCur_OutHi_Lim 0x9219 EPC2_HelixCur_OutHi_Lim 0x9228 EPC1_HelixCur_OutLo_Lim 0x9229 EPC2_HelixCur_OutLo_Lim 0x921A XPND1 RX Failure 0x921B XPND2 RX Failure		
30		Report Monitoring List and check TTC related entries		Next Step: 31
		Execute Telecommand ReportMonitList TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : TEMPLATE Report current monitoring list, TC(12,8) no appl. data	DC51F170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<p>Verify that the TTC entries status are as follows Monitoring ID= 17,76,77 (TTC Chain 1) are enabled , and Monitoring ID= 18,96,97 (TTC Chain 2) are disabled</p> <p>where:</p> <p>MonID Parameter ID</p> <p>17 XPND1_RX_Power: DID_ASW_CCC_RES_5:6 76 DID_EPC1_HELIX_CURRENT (4.25 mA Threshold) 77 DID_EPC1_HELIX_CURRENT (0.6 mA Threshold)</p> <p>18 XPND2_RX_Power: DID_ASW_CCC_RES_5:7 96 DID_EPC2_HELIX_CURRENT (4.25 mA Threshold) 97 DID_EPC2_HELIX_CURRENT (0.6 mA Threshold)</p>		
31		Select Rx2 bit rate to 125 bits		Next Step: END
		<p>Execute Procedure: H_FCP_TTC_R2BR Select RX2 TC bit rate</p>		
End of Procedure				