

Switch to chain 2 after XPND2 or TWTA2 failure  
File: H\_CRP\_TTC\_T20R.xls  
Author: E. Picallo



## Procedure Summary

### Objectives

This procedure describes the steps needed to switch ON the transmitter 2 and the travelling wave tube assembly 2 after an onboard TTC-S switchover.

### 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 on-board lock;
- the value of the Output power level is always - 4dBm;
- the External ref. and Internal bit pattern generator are always OFF.

It is highlighted that the transponder needs a maximum warm-up of 20 minutes.

Before switching ON the branch 2 through physical command it is necessary to mark OK (not failed) the relevant units in the UIU table.

When the branch 2 has been switched ON it is necessary to reenble the entries in the Event-Action Table (EAT) through TC(19,4), thus the status of the ASW function "Event/Action Management" has to be "running".

### Spacecraft Configuration

#### Start of Procedure

CDMU in default configuration.  
Downlink active via TX1 and TWT1.  
Chain 2 marked as "failed" in UIU table.

#### End of Procedure

CDMU in default configuration.  
Downlink active via TX2 and TWTA2.

### Reference File(s)

#### Input Command Sequences

#### Output Command Sequences

HRRT20R1  
HRRT20R2  
HRRT20R3  
HRRT20RF

### Referenced Displays

ANDs      GRDs      SLDs

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ZAZ7I999 (None)  
 ZAZ7J999  
 ZAZ7M999

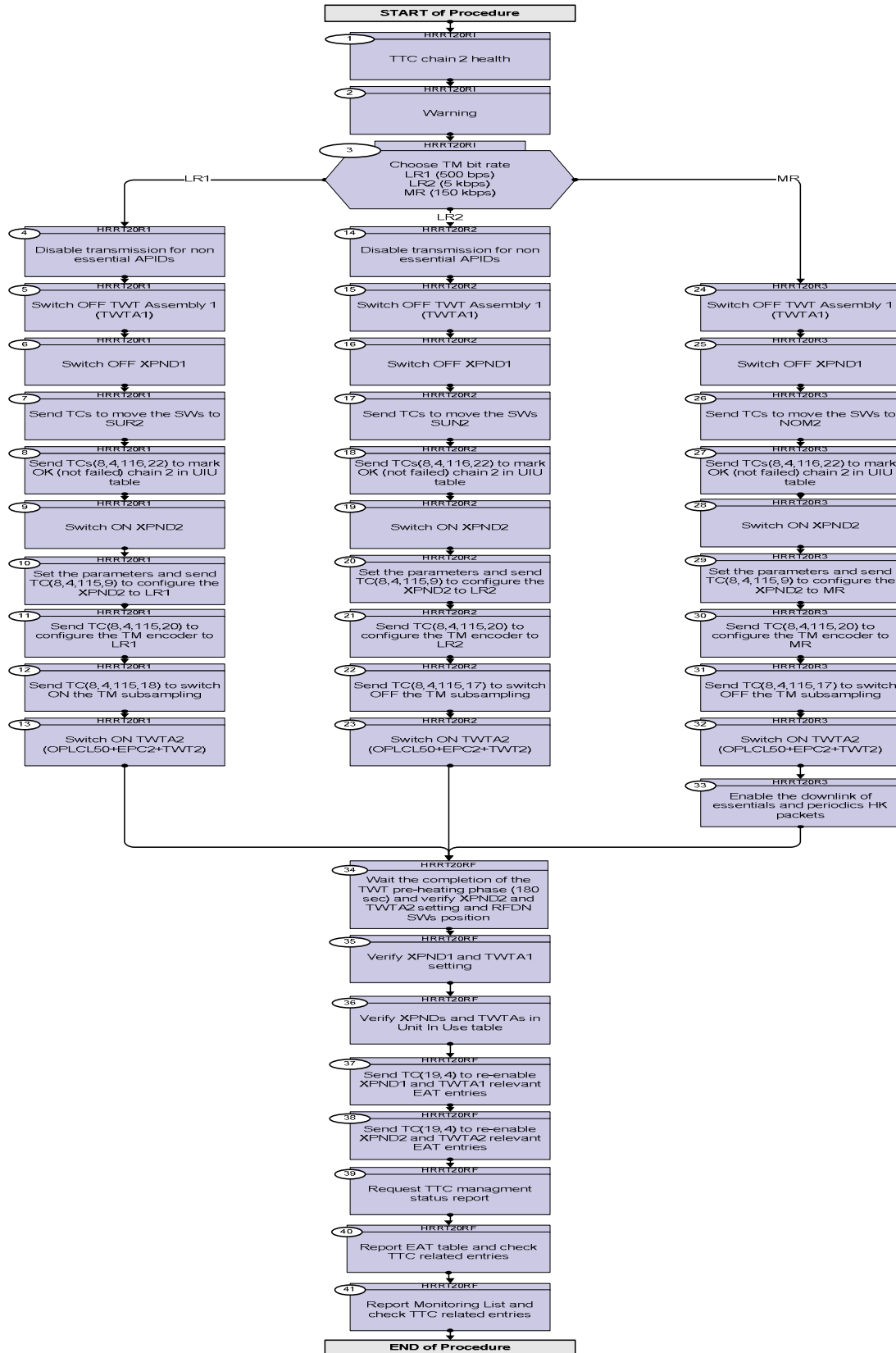
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
30/07/08	1	1	Created	E. Picallo	
01/12/08		2	TC DCT18170 Configure Xpnd mask <input type="checkbox"/> Update UIU update for a single TTC unit <input type="checkbox"/> Analog parameters expected values updated <input type="checkbox"/>	E. Picallo	
09/01/09	2	3	CDMU ASW V3.8 and BSW V2.4 alignment	E. Picallo	
14/03/09	2.2	4	Include encoder configuration and XPND bit rate configuration for LR1, LR2 and MBR	E. Picallo	
25/09/09	2.5	5	TTC chain 2 health check added <input type="checkbox"/> comment on TC XPND1 OFF , it leaves LCL23 ON <input type="checkbox"/> TM check Xpnd1Tx_L23 Status & current and XPND1_TX1_SUP_V updated <input type="checkbox"/> EAT entry ID 160 (XPND1 invalid RT) remains DISABLED.	E. Picallo	

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### Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
<b>Beginning of Procedure</b>				
<p>TC Seq. Name :HRRT20RI (Tx2+TWTA2ONfail Init)            Switch to chain 2 after XPND2 or TWTA2 failure Initial</p> <p>TimeTag Type: B            Sub Schedule ID:</p> <p style="text-align: center;">□</p>				
1		TTC chain 2 health		Next Step: 2
		<b>Call procedure H_FCP_TTC_T2HC (TTC chain 2 health check)</b>		
2		Warning		Next Step: 3
		<b>In the next step the downlink is deactivated. Therefore no CLCW will be available to acknowledge the TCs</b>		
		<b>Send TCs time-tagged or switch to BD mode in order to avoid triggering the TC re-transmission.</b>		
3		Choose TM bit rate LR1 (500 bps) LR2 (5 kbps) MR (150 kbps)		Next Step: LR1 4 LR2 14 MR 24
<p>TC Seq. Name :HRRT20R1 (Tx2+TWTA2ON Fail LR1)            Switch chain 2 after XPND2orTWTA Sun after sep/Surv at LR1</p> <p>TimeTag Type: B            Sub Schedule ID:</p> <p style="text-align: center;">□</p>				
4		Disable transmission for non essential APIDs		Next Step: 5
		Execute Procedure: <b>H_CRP_DHS_1001</b> <b>Disabling transmission for non essential APIDs.</b>		
5		Switch OFF TWT Assembly 1 (TWTA1)		Next Step: 6
		<b>The following command switches OFF the TWT1, the EPC1 and open the TWTA1 OP-LCL.</b>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.00 UT=+	Execute Telecommand  TtcCommandTwtalOff  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command TWTA 1 Off TC(8,4,115,1)  GBM IL DSE -SY -- ---	DC06E170	
6		Switch OFF XPND1		Next Step: 7
		<b>The following command switches OFF the XPND1 TX, changes the configuration of the TX1 on the 1553 S/C bus (to "OFF" and "Invalid") though leaves the XPND1 LCL ON.</b>		
	ET=+00.00.05 UT=+	Execute Telecommand  TtcCommandXpnd1Off  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command Xpnd 1 Off TC(8,4,115,1)  GBM IL DSE -E- -- ---	DCN80170	
7		Send TCs to move the SWs to SUR2		Next Step: 8
		<b>Launch/Sun acquisition after separation/Survival (SUR2) RFDN SWs position ABBB</b>  D/L path: TX2 - TWTA2 - LGA1 U/L path: LGA1 - RX2 (LGA2 - RX1)		
		<b>Notice that at 500 bps another possible RFDN swithes configuration would be Sun acquisition otherwise (SUN2) RFDN SWs position ABAB</b>  D/L path: TX2 - TWTA2 - LGA1 U/L path: LGA1 - RX2 (MGA - RX1)  <b>In this case the SW3_SW4 shal be commnaded to Pos B: TC DC58E170 (RfdnArmSW3_SW4LogB) TC DC78E170 (RfdnFireSW3_SW4_log_B)</b>		
		<b>WARNING: if the commands are sent in real time, after the execution of the first pair of commands ("arm" and "fire") Ground station has to re-sweep the uplink to re-acquire the lock and sent the second pair of TCs.</b>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET+=00.00.05 UT=+	Execute Telecommand  RfdnArmSW1_SW2LogB  TC Control Flags :  Subsch. ID : 10 Det. descr. : Rfdn Arm SW1/SW2 (logical) Position B TC(8,4,115,6)  GBM IL DSE -SY -- ---	DC57E170	
	ET+=00.00.05 UT=+	Execute Telecommand  RfdnFireSW1_SW2_log_B  TC Control Flags :  Subsch. ID : 10 Det. descr. : Rfdn Fire SW1/SW2 (logical) Position B TC(8,4,115,8)  GBM IL DSE -E- -- ---	DC77E170	
	ET+=00.00.05 UT=+	Execute Telecommand  RfdnArmSW3_SW4_log_A  TC Control Flags :  Subsch. ID : 10 Det. descr. : Rfdn Arm Command SW3/SW4 (logical) Position A TC(8,4,115,5)  GBM IL DSE -SY -- ---	DC48E170	
	ET+=00.00.05 UT=+	Execute Telecommand  RfdnFireSW3_SW4_log_A  TC Control Flags :  Subsch. ID : 10 Det. descr. : Rfdn Fire SW3/SW4 (logical) Position A TC(8,4,115,7)  GBM IL DSE -E- -- ---	DC68E170	
8		Send TCs(8,4,116,22) to mark OK (not failed) chain 2 in UIU table		Next Step: 9
		<b>Mark Unit OK telecommand is used to modify the health status of a unit as OK.</b>  <b>Note that for XPND TX, XPND RX, TWT assembly, TWT amplifier, and EPC the Failed / Not Failed configuration status is common.</b>		
	ET+=00.00.05 UT=+	Execute Telecommand  MarkOKUnitB_XpndRx  TC Control Flags :  Subsch. ID : 10 Det. descr. : Fdir Mark OK Unit B XPND RX, TC(8,4,116,22)  GBM IL DSE --Y -- ---	DCB8H170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
9		Switch ON XPND2		Next Step: 10
		<b>Command XPND2 ON - TC(8,4,115,2) performs :</b> <b>Switch LCL16 (XPND2) ON</b> <b>Configure TX2 "ON" and "VALID" on the 1553 S/C bus</b> <b>Switch XPND TX2 ON</b>		
	ET+=+00.00.30 UT=+	Execute Telecommand  TtcCommandXpnd2On  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command Xpnd 2 On TC(8,4,115,2)  GBM IL DSE --Y -- ---	DCN84170	
10		Set the parameters and send TC(8,4,115,9) to configure the XPND2 to LR1		Next Step: 11
	ET+=+00.00.30 UT=+	Execute Telecommand  XpndConfigure_Templ  Command Parameter(s) : XpndId DH018170 XpndB 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 OFF (Def) XpndConfDW1_RM DH023170 OFF (Def) XpndConfDW1_HRM DH024170 OFF (Def) XpndConfDW1_MRM DH025170 OFF (Def) XpndConfDW1LRM1 DH026170 ON XpndConfDW1LRM2 DH027170 OFF (Def) XpndConfDW1_RMI DH028170 0.6 XpndConfDW1_TMI DH029170 1.2 XpndConfDW2_PG DH030170 OFF (Def) XpndConfDW2Unus DH031170 0 <dec> (Def)	DCT18170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<p>XpndConfDW2OPLS DH032170</p> <p>TC Control Flags :</p> <p style="text-align: right;">GBM IL DSE -SY -- ---</p> <p>Subsch. ID : 10            Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9)</p>	-4	
11		Send TC(8,4,115,20) to configure the TM encoder to LRI		Next Step: 12
	ET+=00.00.05 UT=+	<p>Execute Telecommand</p> <p style="text-align: right;">TtcConfigTmEncInUseLow1</p> <p>TC Control Flags :</p> <p style="text-align: right;">GBM IL DSE -E- -- ---</p> <p>Subsch. ID : 10            Det. descr. : TTC: Config TM Enc In Use Mode Low 1,500 bps, TC(8,4,115,20)</p>	DC12F170	
12		Send TC(8,4,115,18) to switch ON the TM subsampling		Next Step: 13
	ET+=00.00.05 UT=+	<p>Execute Telecommand</p> <p style="text-align: right;">TtcSwitchTmSubsamplOn</p> <p>TC Control Flags :</p> <p style="text-align: right;">GBM IL DSE --Y -- ---</p> <p>Subsch. ID : 10            Det. descr. : TTC: Switch TM Subsampling On TC(8,4,115,18)</p>	DC04F170	
13		Switch ON TWTA2 (OPLCL50+EPC2+TWT2)		Next Step: 34
	ET+=00.00.05 UT=+	<p>Execute Telecommand</p> <p style="text-align: right;">TtcCommandTwta2On</p> <p>TC Control Flags :</p> <p style="text-align: right;">GBM IL DSE --Y -- ---</p> <p>Subsch. ID : 10            Det. descr. : Ttc Command TWTA 2 On TC(8,4,115,2)</p>	DC17E170	

TC Seq. Name : HRRT20R2 (Tx2+TWTA2ON Fail LR2)  
 Switch chain 2 after XPND2orTWTA2 fail Sun acq.  
 otherwise at LR2

TimeTag Type: B  
 Sub Schedule ID:

□



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
14		Disable transmission for non essential APIDs		Next Step: 15
		Execute Procedure: H_CRP_DHS_1001 Disabling transmission for non essential APIDs.		
15		Switch OFF TWT Assembly 1 (TWTA1)		Next Step: 16
		<b>The following command switches OFF the TWT1, the EPC1 and open the TWTA1 OP-LCL.</b>		
	ET=+00.00.00 UT=+	Execute Telecommand  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command TWTA 1 Off TC(8,4,115,1)	TtcCommandTwtalOff  GBM IL DSE -SY -- ---	DC06E170
16		Switch OFF XPND1		Next Step: 17
		<b>The following command switches OFF the XPND1 TX, changes the configuration of the TX1 on the 1553 S/C bus (to "OFF" and "Invalid") though leaves the XPND1 LCL ON.</b>		
	ET=+00.00.05 UT=+	Execute Telecommand  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command Xpnd 1 Off TC(8,4,115,1)	TtcCommandXpnd1Off  GBM IL DSE -E- -- ---	DCN80170
17		Send TCs to move the SWs SUN2		Next Step: 18
		<b>Sun acquisition otherwise (SUN2) RFDN SWs position ABAB</b>  D/L path: TX2 - TWTA2 - LGA1 U/L path: LGA1 - RX2 (MGA - RX1)		
		<b>WARNING: if the commands are sent in real time, after the execution of the first pair of commands ("arm" and "fire") Ground station has to re-sweep the uplink to re-acquire the lock and send the second pair of TCs.</b>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.05 UT=+	Execute Telecommand  RfdnArmSW1_SW2LogB  TC Control Flags :  Subsch. ID : 10 Det. descr. : Rfdn Arm SW1/SW2 (logical) Position B TC(8,4,115,6)  GBM IL DSE -SY -- ---	DC57E170	
	ET=+00.00.05 UT=+	Execute Telecommand  RfdnFireSW1_SW2_log_B  TC Control Flags :  Subsch. ID : 10 Det. descr. : Rfdn Fire SW1/SW2 (logical) Position B TC(8,4,115,8)  GBM IL DSE -E- -- ---	DC77E170	
	ET=+00.00.05 UT=+	Execute Telecommand  RfdnArmSW3_SW4LogB  TC Control Flags :  Subsch. ID : 10 Det. descr. : Rfdn Arm SW3/SW4 (logical) Position B TC(8,4,115,6)  GBM IL DSE --Y -- ---	DC58E170	
	ET=+00.00.05 UT=+	Execute Telecommand  RfdnFireSW3_SW4_log_B  TC Control Flags :  Subsch. ID : 10 Det. descr. : Rfdn Fire SW3/SW4 (logical) Position B TC(8,4,115,8)  GBM IL DSE --Y -- ---	DC78E170	
18		Send TCs(8,4,116,22) to mark OK (not failed) chain 2 in UIU table		Next Step: 19
		<b>Mark Unit OK telecommand is used to modify the health status of a unit as OK.</b>  <b>Note that for XPND TX, XPND RX, TWT assembly, TWT amplifier, and EPC the Failed / Not Failed configuration status is common.</b>		
	ET=+00.00.05 UT=+	Execute Telecommand  MarkOKUnitB_XpndRx  TC Control Flags :  Subsch. ID : 10 Det. descr. : Fdir Mark OK Unit B XPND RX, TC(8,4,116,22)  GBM IL DSE --Y -- ---	DCB8H170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
19		Switch ON XPND2		Next Step: 20
		<b>Command XPND2 ON - TC(8,4,115,2) performs :</b> <b>Switch LCL16 (XPND2) ON</b> <b>Configure TX2 "ON" and "VALID" on the 1553 S/C bus</b> <b>Switch XPND TX2 ON</b>		
	ET+=00.00.30 UT=+	Execute Telecommand  <b>TtcCommandXpnd2On</b>  <i>TC Control Flags :</i>  Subsch. ID : 10 Det. descr. : Ttc Command Xpnd 2 On TC(8,4,115,2)  GBM IL DSE --Y -- --	DCN84170	
20		Set the parameters and send TC(8,4,115,9) to configure the XPND2 to LR2		Next Step: 21
	ET+=00.00.30 UT=+	Execute Telecommand  <b>XpndConfigure_Templ</b>  <i>Command Parameter(s) :</i> XpndId DH018170 XpndConfMask1Unus DH220170 XpndConfMask1_ER DH221170 XpndConfMask1_CM DH222170 XpndConfMask1_RM DH223170 XpndConfMask1_HRM DH224170 XpndConfMask1_MRM DH225170 XpndConfMask1LRM1 DH226170 XpndConfMask1LRM2 DH227170 XpndConfMask1_RMI DH228170 XpndConfMask1_TMI DH229170  XpndConfMask2_PG DH230170 XpndConfMask2Unus DH231170 XpndConfMask2OPLS DH232170 XpndConfDW1Unus DH020170 XpndConfDW1_ER DH021170 XpndConfDW1_CM DH022170 XpndConfDW1_RM DH023170 XpndConfDW1_HRM DH024170 XpndConfDW1_MRM DH025170 XpndConfDW1LRM1 DH026170 XpndConfDW1LRM2 DH027170 XpndConfDW1_RMI DH028170 XpndConfDW1_TMI DH029170 XpndConfDW2_PG DH030170 XpndConfDW2Unus DH031170	DCT18170	XpndB 11 <bin> ON ON ON ON ON ON ON ON ON Update Update  ON 1111111111 <bin> Update 0 <dec> (Def) OFF (Def) OFF (Def) OFF (Def) OFF (Def) OFF (Def) OFF (Def) OFF (Def) ON 0.6 1.2 OFF (Def) 0 <dec> (Def)

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		XpndConfDW2OPLS DH032170 TC Control Flags : GBM IL DSE -SY -- --- Subsch. ID : 10 Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9)	-4	
21		Send TC(8,4,115,20) to configure the TM encoder to LR2		Next Step: 22
	ET=+00.00.05 UT=+	Execute Telecommand TtcConfigTmEncInUseLow2 TC Control Flags : GBM IL DSE -E- -- --- Subsch. ID : 10 Det. descr. : TTC: Config TM Enc In Use Mode Low 2 - 5kbps, TC(8,4,115,20)	DC17F170	
22		Send TC(8,4,115,17) to switch OFF the TM subsampling		Next Step: 23
	ET=+00.00.05 UT=+	Execute Telecommand TtcSwitchTmSubsamplOff TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : TTC: Switch TM Subsampling Off TC(8,4,115,17)	DC03F170	
23		Switch ON TWTA2 (OPLCL50+EPC2+TWT2)		Next Step: 34
	ET=+00.00.05 UT=+	Execute Telecommand TtcCommandTwta2On TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Ttc Command TWTA 2 On TC(8,4,115,2)	DC17E170	
TC Seq. Name : HRRT20R3 (Tx2+TWTA2ON Fail MBR) Switch chain 2 after XPND2orTWTA2 fail Nominal/Earth acq. at MBR  TimeTag Type: B Sub Schedule ID:  <input type="checkbox"/>				

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
24		Switch OFF TWT Assembly 1 (TWTA1)		Next Step: 25
		<b>The following command switches OFF the TWT1, the EPC1 and open the TWTA1 OP-LCL.</b>		
	ET=+00.00.00 UT=+	Execute Telecommand  <b>TtcCommandTwtalOff</b>  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command TWTA 1 Off TC(8,4,115,1)  GBM IL DSE -SY -- ---	DC06E170	
25		Switch OFF XPND1		Next Step: 26
		<b>The following command switches OFF the XPND1 TX, changes the configuration of the TX1 on the 1553 S/C bus (to "OFF" and "Invalid") though leaves the XPND1 LCL ON.</b>		
	ET=+00.00.05 UT=+	Execute Telecommand  <b>TtcCommandXpnd1Off</b>  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command Xpnd 1 Off TC(8,4,115,1)  GBM IL DSE -E- -- ---	DCN80170	
26		Send TCs to move the SWs to NOM2		Next Step: 27
		<b>Nominal/Earth acquisition (NOM2) RFDN SWs position BBAB</b>  D/L path: TX2 - TWTA2 - MGA U/L path: MGA - RX2 (LGA1 - RX1)		
		<b>WARNING: if the commands are sent in real time, after the execution of the first pair of commands ("arm" and "fire") Ground station has to re-sweep the uplink to re-acquire the lock and sent the second pair of TCs.</b>		
	ET=+00.00.05 UT=+	Execute Telecommand  <b>RfdnArmSW1_SW2_log_A</b>  TC Control Flags :  Subsch. ID : 10 Det. descr. : Rfdn Arm Command SW1/SW2 (logical) Position A TC(8,4,115,5)  GBM IL DSE -SY -- ---	DC47E170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.05 UT=+	Execute Telecommand  RfdnFireSW1_SW2_log_A  TC Control Flags :  Subsch. ID : 10 Det. descr. : Rfdn Fire SW1/SW2 (logical) Position A TC(8,4,115,7)  GBM IL DSE -E- -- ---	DC67E170	
	ET=+00.00.05 UT=+	Execute Telecommand  RfdnArmsSW3_SW4LogB  TC Control Flags :  Subsch. ID : 10 Det. descr. : Rfdn Arm SW3/SW4 (logical) Position B TC(8,4,115,6)  GBM IL DSE -SY -- ---	DC58E170	
	ET=+00.00.05 UT=+	Execute Telecommand  RfdnFireSW3_SW4_log_B  TC Control Flags :  Subsch. ID : 10 Det. descr. : Rfdn Fire SW3/SW4 (logical) Position B TC(8,4,115,8)  GBM IL DSE -E- -- ---	DC78E170	
27		Send TCs(8,4,116,22) to mark OK (not failed) chain 2 in UIU table		Next Step: 28
		<b>Mark Unit OK telecommand is used to modify the health status of a unit as OK.</b>  <b>Note that for XPND TX, XPND RX, TWT assembly, TWT amplifier, and EPC the Failed / Not Failed configuration status is common.</b>		
	ET=+00.00.05 UT=+	Execute Telecommand  MarkOKUnitB_XpndRx  TC Control Flags :  Subsch. ID : 10 Det. descr. : Fdir Mark OK Unit B XPND RX, TC(8,4,116,22)  GBM IL DSE --Y -- ---	DCB8H170	
28		Switch ON XPND2		Next Step: 29
		<b>Command XPND2 ON - TC(8,4,115,2) performs :</b> <b>Switch LCL16 (XPND2) ON</b> <b>Configure TX2 "ON" and "VALID" on the 1553 S/C bus</b> <b>Switch XPND TX2 ON</b>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.30 UT=+	Execute Telecommand  TtcCommandXpnd2On  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command Xpnd 2 On TC(8,4,115,2)  GBM IL DSE --Y -- --	DCN84170	
29		Set the parameters and send TC(8,4,115,9) to configure the XPND2 to MR		Next Step: 30
	ET=+00.00.30 UT=+	Execute Telecommand  XpndConfigure_Templ  Command Parameter(s) :  XpndId DH018170 XpndB 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 11111111111 <bin> XpndConfMask2OPLS DH232170 Update XpndConfDW1Unus DH020170 0 <dec> (Def) XpndConfDW1_ER DH021170 OFF (Def) XpndConfDW1_CM DH022170 OFF (Def) XpndConfDW1_RM DH023170 OFF (Def) 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 :  Subsch. ID : 10 Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9)  GBM IL DSE -SY -- --	DCT18170	
30		Send TC(8,4,115,20) to configure the TM encoder to MR		Next Step: 31

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.05 UT=+	Execute Telecommand  <b>TtcConfTmEncInUseMedium</b>  TC Control Flags :  Subsch. ID : 10 Det. descr. : TTC: Config TM Enc In Use Mode Medium 150 kbps, TC(8,4,115,20)  GBM IL DSE -E- - - -	DC22F170	
31		Send TC(8,4,115,17) to switch OFF the TM subsampling		Next Step: 32
	ET=+00.00.05 UT=+	Execute Telecommand  <b>TtcSwitchTmSubsamplOff</b>  TC Control Flags :  Subsch. ID : 10 Det. descr. : TTC: Switch TM Subsampling Off TC(8,4,115,17)  GBM IL DSE --Y - - - -	DC03F170	
32		Switch ON TWTA2 (OPLCL50+EPC2+TWT2)		Next Step: 33
	ET=+00.00.05 UT=+	Execute Telecommand  <b>TtcCommandTwt2On</b>  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command TWTA 2 On TC(8,4,115,2)  GBM IL DSE --Y - - - -	DC17E170	
33		Enable the downlink of essentials and periodics HK packets		Next Step: 34
		Execute procedures  H_FCP_DHS_1003 (Set the default values for the TRANSMIT/STORAGE flags with TC(14,5))  H_FCP_DHS_1009 ( Enable the default HK (essential + periodic) packets with TC(14,1))		
<p>TC Seq. Name :HRRT20RF (Tx2+TWTA2ONfailFinal)          Switch chain 2 after XPND2 or TWTA2 failure Final</p> <p>TimeTag Type: N          Sub Schedule ID:  <input type="checkbox"/></p>				



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
34		Wait the completion of the TWT pre-heating phase (180 sec) and verify XPND2 and TWTA2 setting and RFDN SWs position		Next Step: 35
34.1		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
34.2		RX2 Analogue Telemetry verification		<input type="checkbox"/>
		Verify Receiver 2 bit rate Telemetry RX2 125-4K Stat RMB18442		AND=ZAZ7I999
		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 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
34.3		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	>= 0.41 A <= 0.55 A	AND=ZAZ7I999
34.4		TX2 Analogue Telemetry verification		<input type="checkbox"/>
		Verify TX2 Status Telemetry TX2 ON-OFF Stat RMB16442	= ON	AND=ZAZ7I999
		Verify RF2 Output Power Telemetry XPD2_RF2_OUT_PW RMB14442	<= -4.0 dbmW >= -4.8 dbmW	AND=ZAZ7I999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		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
34.5		Verify XPND2 status on the 1553 S/C bus		<input type="checkbox"/>
		Verify Telemetry XPND2On_Off	DEFD1160 = ON	AND=ZAZ7I999
		Verify Telemetry XPND2Val_Inval	DEFD5160 = Valid	AND=ZAZ7I999
34.6		XPND2 1553 S/C bus TM verification		<input type="checkbox"/>
		Verify XPND2 status Telemetry X2 Status - XS	RMB43442 = TM mode active	AND=ZAZ7I999
		Verify Low Rate-1 status Telemetry X2 LowRate-1 MD	RMB51442	AND=ZAZ7I999
		Verify Low Rate-2 status Telemetry X2 LowRate-2 MD	RMB52442	AND=ZAZ7I999
		Verify Medium Rate Modulator status Telemetry X2 MedRate-MRM	RMB50442	AND=ZAZ7I999
		Verify High Rate status Telemetry X2 HIRateMD-HRM	RMB49442	AND=ZAZ7I999
		Verify Ranging Modulator status Telemetry X2 Rang MD - RM	RMB48442 = OFF	AND=ZAZ7I999
		Verify Coherent Mode status Telemetry X2 Coher MOD-CM	RMB47442 = OFF	AND=ZAZ7I999
		Verify Telemetry X2 RNGMD ID-RMI	RMB53442 = 0.6 rad	AND=ZAZ7I999
		Verify Telemetry X2 TM MD ID-TMI	RMB54442 = 1.2 rad	AND=ZAZ7I999
		Verify Telemetry X2 OutPowLevSet	RMB56442 = -4 dbmW	AND=ZAZ7I999
		Verify Telemetry X2 IntBitPatGen	RMB55442 = OFF	AND=ZAZ7I999
		Verify Telemetry X2 Ext Ref - ER	RMB46442 = OFF	AND=ZAZ7I999
		Verify Receiver lock status Telemetry X2 Rx Lock - RL	RMB45442	AND=ZAZ7I999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify RX AGC Level Telemetry X2 AGC TMUplnk RMB41442	>= -141.0 dbmW	AND=ZAZ7I999
		Verify PLL Phase Error Telemetry X2 RX PLL PhErr RMB40442	< 130.0 kHz > -130.0 kHz	AND=ZAZ7I999
		Verify Squelch Status Telemetry X2 SqlchSts-SS RMB44442		AND=ZAZ7I999
		Verify Telemetry X2 TcBitRateTCB RMB62442		AND=ZAZ7I999
34.7		Verify TM encoder TM bit rate		<input type="checkbox"/>
		Verify Telemetry TME_BITRATE DEMRF160		AND=ZAZ7J999
		Verify Telemetry BSW_TM_MODE DEMF0160		AND=ZAZ7J999
34.8		Verify TWTA2 setting		<input type="checkbox"/>
		Verify OPLCL50 (TWTA 2) Status Telemetry TwtA_2_L50_1S WM92E565	= ON	AND=ZAZ7J999
		Verify Telemetry TwtA_2_L50_I WM910565	>= 2.2 A <= 2.8 A	AND=ZAZ7J999
		Verify EPC2 Status Telemetry EPC2_ONOFF_STS RMB07439	= ON	AND=ZAZ7J999
		Verify EPC2 Anode Voltage Telemetry EPC2_ANODE_VOLT RMB03439	<= 1058.0 V >= 998.0 V	AND=ZAZ7J999
		Verify EPC2 Helix current Telemetry EPC2_HELIX_CURR RMB04439	>= 0.46 mA <= 1.59 mA	AND=ZAZ7J999
		Verify EPC2 Automatic Restart Status Telemetry EPC2_AUT_RSTART RMB08439	= NOTACTIVE	AND=ZAZ7J999
		Verify EPC2 Temperature Telemetry EPC2_TEMP RMB12439		AND=ZAZ7J999
		Verify TWT2 Status Telemetry TWT2_ONOFF_STS RMB10439	= ON	AND=ZAZ7J999
35		Verify XPND1 and TWTA1 setting		Next Step: 36
35.1		Rx1 power line status verification		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify FCL3 (XPND1 Rx ) voltage Telemetry Xpnd1_Rx_FCL3_V WM703565	>= 27.96 V <= 28.71 V	(None)
		Verify FCL3 (XPND1 Rx) current Telemetry Xpnd1_Rx_FCL3_I WM702565	>= 0.20 A <= 0.35 A	AND=ZAZ7I999
35.2		Rx1 Analogue Telemetry verification		☐
		Verify RX1 AGC Level Telemetry XPD1_RX1_AGC_LV RMB09442		AND=ZAZ7I999
		Verify RX1 PLL SPE Telemetry XPD1_RX1_PLL_SP RMB11442		AND=ZAZ7I999
		Verify Receiver 1 bit rate Telemetry RX1 125-4K Stat RMB17442		AND=ZAZ7I999
		Verify Rx1 Supply Voltage Telemetry XPND1_RX1_SUP_V RMB07442	>= 4.800 V <= 5.200 V	AND=ZAZ7I999
		Verify Rx1 temperature Telemetry RX1_TEMP RMB02442		AND=ZAZ7I999
35.3		TX1 power line status verification		☐
		Verify LCL23 ( XPND1 Tx ) status Telemetry Xpnd1Tx_L23_S WM12D565	= ON	AND=ZAZ7I999
		Verify LCL23 ( XPND1 Tx ) current Telemetry Xpnd1Tx_L23_I WM109565	>= 0.3 A <= 0.4 A	AND=ZAZ7I999
35.4		TX1 Analogue Telemetry verification		☐
		Verify Tx1 Status Telemetry TX1 ON-OFF Stat RMB15442	= OFF	AND=ZAZ7I999
		Verify RF1 Output Power Telemetry XPD1_RF1_OUT_PW RMB13442	< -13.0 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
35.5		Verify XPND1 status on the 1553 S/C bus		☐

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry XPND1On_Off DEFPCG160	= OFF	AND=ZAZ7I999
		Verify Telemetry XPND1Val_Inval DEFCK160	= Invalid	AND=ZAZ7I999
35.6		TWTA1 Status verification		<input type="checkbox"/>
		Verify OPLCL49 (TWTA 1) Status Telemetry Twta_1_L49_1S WM22E565	= OFF	AND=ZAZ7J999
		Verify TWTA1 current Telemetry Twta_1_L49_I WM210565	> 0.0 A < 0.1 A	AND=ZAZ7J999
		Verify EPC1 Status Telemetry EPC1_ONOFF_STS RMB05439	= OFF	AND=ZAZ7J999
		Verify EPC1 Anode Voltage Telemetry EPC1_ANODE_VOLT RMB01439		AND=ZAZ7J999
		Verify EPC1 Helix current Telemetry EPC1_HELIX_CURR RMB02439		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	= OFF	AND=ZAZ7J999
36		Verify XPNDs and TWTAs in Unit In Use table		Next Step: 37
36.1		XPND2 UIU table status verification		<input type="checkbox"/>
		Verify Telemetry XpndRx2FuncSts DEL62170	= On	AND=ZAZ7M999
		Verify Telemetry XpndRx2Use DEL60170	= In_Use	AND=ZAZ7M999
		Verify Telemetry XpndRx2LogSts DEL61170	= Nominal	AND=ZAZ7M999
		Verify Telemetry XpndRx2FailSts DEL63170	= Not_Failed	AND=ZAZ7M999
		Verify Telemetry XpndTx2FuncSts DEL31170	= On	AND=ZAZ7M999
		Verify Telemetry XpndTx2Use DEL33170	= In_Use	AND=ZAZ7M999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry XpndTx2LogSts DEL32170	= Nominal	AND=ZAZ7M999
		Verify Telemetry XpndTx2FailSts DEL30170	= Not_Failed	AND=ZAZ7M999
36.2		TWTA2 UIU table status verification		□
		Verify Telemetry Twta2FuncSts DEL23170	= On	AND=ZAZ7M999
		Verify Telemetry Twta2Use DEL25170	= In_Use	AND=ZAZ7M999
		Verify Telemetry Twta2LogSts DEL24170	= Nominal	AND=ZAZ7M999
		Verify Telemetry Twta2FailSts DEL22170	= Not_Failed	AND=ZAZ7M999
		Verify Telemetry Epc2FuncSts DEG29170	= On	AND=ZAZ7M999
		Verify Telemetry Epc2Use DEG31170	= In_Use	AND=ZAZ7M999
		Verify Telemetry Epc2LogSts DEG30170	= Nominal	AND=ZAZ7M999
		Verify Telemetry Epc2FailSts DEG28170	= Not_Failed	AND=ZAZ7M999
		Verify Telemetry TwtAmp2FuncSts DEH17170	= On	AND=ZAZ7M999
		Verify Telemetry TwtAmp2Use DEH19170	= In_Use	AND=ZAZ7M999
		Verify Telemetry TwtAmp2LogSts DEH18170	= Nominal	AND=ZAZ7M999
		Verify Telemetry TwtAmp2FailSts DEH16170	= Not_Failed	AND=ZAZ7M999
36.3		XPND1 UIU table status verification		□
		Verify Telemetry XpndRx1FuncSts DEL58170	= On	AND=ZAZ7M999
		Verify Telemetry XpndRx1Use DEL56170	= Not_In_Use	AND=ZAZ7M999
		Verify Telemetry XpndRx1LogSts DEL57170	= Redundant	AND=ZAZ7M999
		Verify Telemetry XpndRx1FailSts DEL59170	= Not_Failed	AND=ZAZ7M999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry XpndTx1FuncSts DEL27170	= Off	AND=ZAZ7M999
		Verify Telemetry XpndTx1Use DEL29170	= Not_In_Use	AND=ZAZ7M999
		Verify Telemetry XpndTx1LogSts DEL28170	= Redundant	AND=ZAZ7M999
		Verify Telemetry XpndTx1FailSts DEL26170	= Not_Failed	AND=ZAZ7M999
36.4		TWTA1 UIU table status verification		□
		Verify Telemetry TwtalFuncSts DEL19170	= Off	AND=ZAZ7M999
		Verify Telemetry TwtalUse DEL21170	= Not_In_Use	AND=ZAZ7M999
		Verify Telemetry TwtalLogSts DEL20170	= Redundant	AND=ZAZ7M999
		Verify Telemetry TwtalFailSts DEL18170	= Not_Failed	AND=ZAZ7M999
		Verify Telemetry Epc1FuncSts DEG25170	= Off	AND=ZAZ7M999
		Verify Telemetry Epc1Use DEG27170	= Not_In_Use	AND=ZAZ7M999
		Verify Telemetry Epc1LogSts DEG26170	= Redundant	AND=ZAZ7M999
		Verify Telemetry Epc1FailSts DEG24170	= Not_Failed	AND=ZAZ7M999
		Verify Telemetry TwtAmplFuncSts DEH13170	= Off	AND=ZAZ7M999
		Verify Telemetry TwtAmplUse DEH15170	= Not_In_Use	AND=ZAZ7M999
		Verify Telemetry TwtAmplLogSts DEH14170	= Redundant	AND=ZAZ7M999
		Verify Telemetry TwtAmplFailSts DEH12170	= Not_Failed	AND=ZAZ7M999
37		Send TC(19,4) to re-enable XPND1 and TWTA1 relevant EAT entries		Next Step: 38

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<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:  <b>N</b>, number of events to be enabled.  <b>APID</b>, identifier of the Application Process generating this event report, in this case always equal to 16 (CDMU).  <b>Event ID</b>, identifier of the event to be enabled, in this case equal to:            37400 &amp; 37416 (TWTA1 failure),            37402 (XPND1 RX failure).</p> <p>Note that Event ID 160 (XPND1 invalid RT) remains disabled.</p>		
		<pre> Execute Telecommand                                  EnableActions                                 DCT84170  Command Parameter(s) :     N_Repetition                DH041170    3 &lt;dec&gt;     APID_for_EAT_TC             DH236170  CDMS (Def)     EventId                     DH146170  37400 &lt;dec&gt;     APID_for_EAT_TC             DH236170  CDMS (Def)     EventId                     DH146170  37402 &lt;dec&gt;     APID_for_EAT_TC             DH236170  CDMS (Def)     EventId                     DH146170  37416 &lt;dec&gt;  TC Control Flags :                                 GBM IL DSE                                 --Y -- ---  Subsch. ID : 10 Det. descr. : TEMPLATE Enable Actions TC(19,4)           </pre>		
38		<p>Send TC(19,4) to re-enable XPND2 and TWTA2 relevant EAT entries</p>		Next Step: 39
		<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:  <b>N</b>, number of events to be enabled.  <b>APID</b>, identifier of the Application Process generating this event report, in this case always equal to 16 (CDMU).  <b>Event ID</b>, identifier of the event to be enabled, in this case equal to:            37401 &amp; 37417 (TWTA2 failure),            37403 (XPND2 RX failure),            161 (XPND2 invalid RT).</p>		



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand <p style="text-align: right;"><b>EnableActions</b></p> Command Parameter(s) : N_Repetition          DH041170 APID_for_EAT_TC      DH236170 EventId          DH146170 APID_for_EAT_TC      DH236170 EventId          DH146170 APID_for_EAT_TC      DH236170 EventId          DH146170 APID_for_EAT_TC      DH236170 EventId          DH146170 APID_for_EAT_TC      DH236170 EventId          DH146170 TC Control Flags : <p style="text-align: right;"><b>GBM IL DSE</b> --Y -- ---</p> Subsch. ID : 10 Det. descr. : TEMPLATE Enable Actions TC(19,4)	DCT84170	
39		Request TTC managment status report		Next Step: 40
		Execute Telecommand <p style="text-align: right;"><b>TtcReportStatus</b></p> TC Control Flags : <p style="text-align: right;"><b>GBM IL DSE</b> --Y -- ---</p> Subsch. ID : 10 Det. descr. : TTC: Report TTC Management Status TC(8,5,115)	DC30F170	
		<b>Check that all the information of the TTC Management function is consistent</b>		
40		Report EAT table and check TTC related entries		Next Step: 41
		Execute Telecommand <p style="text-align: right;"><b>ReptEvtActTable</b></p> TC Control Flags : <p style="text-align: right;"><b>GBM IL DSE</b> --Y -- ---</p> Subsch. ID : 10 Det. descr. : TEMPLATE Report The contents of the event/action table TC(19,6)	DCT86170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<p>Check that the following EAT entries are enabled:</p> <p>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</p> <p>Check that the EAT entry 0x00A0 XPND1_NOT_VIT_RT_INV is disabled.</p>		
41		Report Monitoring List and check TTC related entries		Next Step: END
		<p>Execute Telecommand</p> <p style="text-align: center;">ReportMonitList</p> <p>TC Control Flags :</p> <p style="text-align: center;">GBM IL DSE --Y -- ---</p> <p>Subsch. ID : 10            Det. descr. : TEMPLATE Report current monitoring list,            TC(12,8) no appl. data</p>	DC51F170	
		<p>Verify that the TTC entries status are as follows            Monitoring ID= 17,76,77 (TTC Chain 1) are disabled , and            Monitoring ID= 18,96,97 (TTC Chain 2) are enabled</p> <p>where:</p> <p>MonID Parameter ID            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>		
<b>End of Procedure</b>				