

Switch ON Tx1 and TWTAl
File: H_CRP_TTC_T101.xls
Author: E. Picallo



Procedure Summary

Objectives

This procedure describes the steps needed to switch ON the transmitter 1 and the travelling wave tube assembly 1 (nominal downlink branch)

This procedure does not use the logical addressing.

Summary of Constraints

TX1&2 and TWTAl&2 are switched OFF a through ASW TCs(8,4,115,1);
TX1 and TWTAl are switched ON a through ASW TCs(8,4,115,2);
moreover the XPND1 and the TM encoder are configured using
TC(8,4,115,9), TC(8,4,115,17/18) and TC(8,4,115,20); Optionally the RFDN
switches are commanded using ASW TCs(8,4,115,5/6/7/8), 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 reference and Internal bit pattern generator are always OFF.

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

Spacecraft Configuration

Start of Procedure

CDMU in default configuration;

End of Procedure

CDMU in default configuration;
Downlink enabled via TX1 and TWTAl.

Reference File(s)

Input Command Sequences

Output Command Sequences

HRRT1011
HRRT1012
HRRT1013
HRRT101F

Referenced Displays

ANDs	GRDs	SLDs
ZAZ7I999		(None)
ZAZ7J999		
ZAZ7M999		

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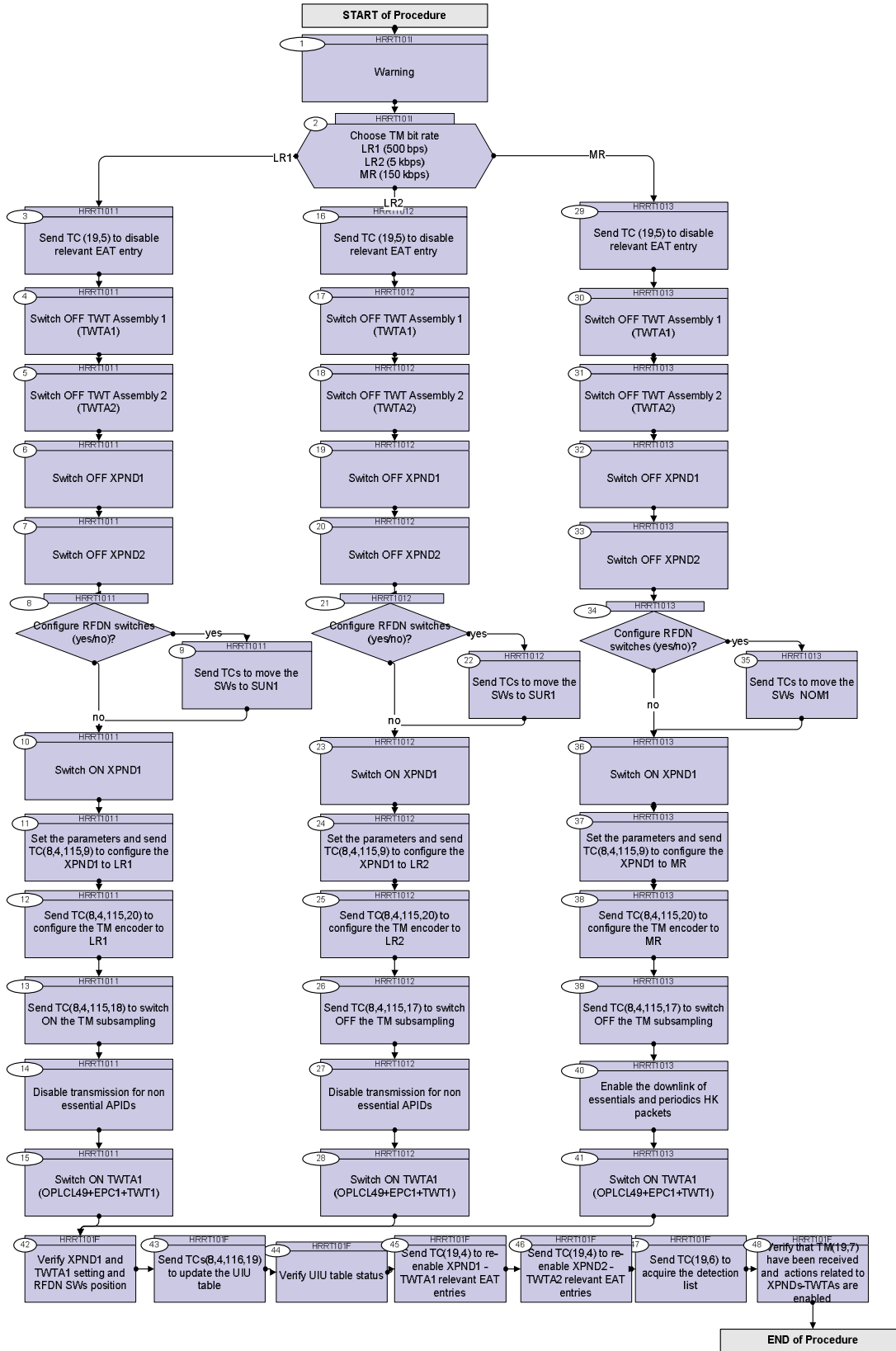
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
29/07/08	1	1	Created	E. Picallo	
03/12/08		2	TC DCT18170 Configure Xpnd mask update Analog parameters expected values updated	E. Picallo	
05/01/09		3	Option to configure RFDN switches added	E. Picallo	
08/01/09	2	4	CDMU ASW V3.8 and BSW V2.4 alignment	E. Picallo	
18/03/09	2.2	4.01	Validation : Minor AND reference correction	E. Picallo	
25/09/09	2.5	5	comment on TC XPND1 OFF leaves LCL23 ON comment on TC XPND2 OFF leaves LCL16 ON EAT entry ID 161 (XPND2 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
Beginning of Procedure				
<p><i>TC Seq. Name :HRRT101I (Tx1+TWTA1 ON initial)</i> Switch ON Tx1 and TWTA1 initialisation</p> <p><i>TimeTag Type: B</i> <i>Sub Schedule ID:</i></p> <p style="text-align: center;">□</p>				
1		Warning		Next Step: 2
		<p>In the next steps the downlink is deactivated. Therefore no CLCW will be available to acknowledge the TCs .</p> <p>Switch to BD mode in order to avoid triggering the TC re-transmission or</p> <p>Send the next TCs time-tagged selecting a execution time in the future such that no ore of four time-tagged TCs are released per second .</p>		
2		<p><i>Choose TM bit rate</i> <i>LR1 (500 bps)</i> <i>LR2 (5 kbps)</i> <i>MR (150 kbps)</i></p>		Next Step: LR1 3 LR2 16 MR 29
<p><i>TC Seq. Name :HRRT1011 (Tx1+TWTA1 ON in LR1)</i> Tx1 and TM encoder configuration for LR1</p> <p><i>TimeTag Type: B</i> <i>Sub Schedule ID:</i></p> <p style="text-align: center;">□</p>				
3		Send TC (19,5) to disable relevant EAT entry		Next Step: 4
		<p>When this request is received, the action-telecommand associated with the corresponding event shall be disabled.</p> <p>In the TC(19,5) it is necessary to set the following parameters:</p> <p>N, number of events to be disabled</p> <p>APID, identifier of the Application Process generating this event report, in this case always equal to 16 (CDMU).</p> <p>Event ID, identifier of the event to be disabled, in this case equal to:</p> <p>37400 & 37416 (TWTA1 failure), 37401 & 37417 (TWTA2 failure), 37402 (XPND1 RX failure), 37403 (XPND2 RX failure), 160 (XPND1 invalid RT), 161 (XPND2 invalid RT).</p>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.05 UT=+	Execute Telecommand TtcCommandTwta2Off <i>TC Control Flags :</i> Subsch. ID : 10 Det. descr. : Ttc Command TWTA 2 Off TC(8,4,115,1) GBM IL DSE --Y -- ---	DC07E170	
6		Switch OFF XPND1		Next Step: 7
		Command XPND1 OFF - TC(8,4,115,1) performs : Switch XPND TX1 OFF Configure TX1 "OFF" and "INVALID" on the 1553 S/C bus Note that it leaves LCL23 (XPND1) ON		
	ET=+00.00.05 UT=+	Execute Telecommand TtcCommandXpnd1Off <i>TC Control Flags :</i> Subsch. ID : 10 Det. descr. : Ttc Command Xpnd 1 Off TC(8,4,115,1) GBM IL DSE --Y -- ---	DCN80170	
7		Switch OFF XPND2		Next Step: 8
		Command XPND2 OFF - TC(8,4,115,1) performs : Switch XPND TX2 OFF Configure TX2 "OFF" and "INVALID" on the 1553 S/C bus Note that it leaves LCL16 (XPND2) ON		
	ET=+00.00.30 UT=+	Execute Telecommand TtcCommandXpnd2Off <i>TC Control Flags :</i> Subsch. ID : 10 Det. descr. : Ttc Command Xpnd 2 Off TC(8,4,115,1) GBM IL DSE --Y -- ---	DCN81170	
8		Configure RFDN switches (yes/no)?		Next Step: yes 9 no 10
9		Send TCs to move the SWs to SUN1		Next Step: 10
		Sun acquisition otherwise (SUN1) RFDN SWs position BBAB <i>D/L path:</i> TX1 - TWTA1 - LGA1 <i>U/L path:</i> LGA1 - RX1 (MGA - RX2)		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		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.		
		<p>Notice that at 500 bps another possible RFDN switches configuration would be Survival (SUR1) to set an omnidirectional coverage:</p> <p>RFDN SWs position BBBB</p> <p>D/L path: TX1 - TWTA1 - LGA1 U/L path: LGA1 - RX1 (LGA2 - RX2)</p> <p>In this case SW3_SW4 shall be commanded to Pos_A:</p> <p>TC DC48E170 (RfdnArmSW3_SW4_log_A) TC DC68E170 (RfdnFireSW3_SW4_log_A)</p>		
	ET=+00.00.05 UT=+	<p>Execute Telecommand</p> <p style="text-align: right;">RfdnArmSW1_SW2_log_A</p> <p>TC Control Flags :</p> <p style="text-align: right;">GBM IL DSE --Y -- ---</p> <p>Subsch. ID : 10 Det. descr. : Rfdn Arm Command SW1/SW2 (logical) Position A TC(8,4,115,5)</p>	DC47E170	
	ET=+00.00.05 UT=+	<p>Execute Telecommand</p> <p style="text-align: right;">RfdnFireSW1_SW2_log_A</p> <p>TC Control Flags :</p> <p style="text-align: right;">GBM IL DSE --Y -- ---</p> <p>Subsch. ID : 10 Det. descr. : Rfdn Fire SW1/SW2 (logical) Position A TC(8,4,115,7)</p>	DC67E170	
	ET=+00.00.05 UT=+	<p>Execute Telecommand</p> <p style="text-align: right;">RfdnArmSW3_SW4LogB</p> <p>TC Control Flags :</p> <p style="text-align: right;">GBM IL DSE --Y -- ---</p> <p>Subsch. ID : 10 Det. descr. : Rfdn Arm SW3/SW4 (logical) Position B TC(8,4,115,6)</p>	DC58E170	
	ET=+00.00.05 UT=+	<p>Execute Telecommand</p> <p style="text-align: right;">RfdnFireSW3_SW4_log_B</p> <p>TC Control Flags :</p> <p style="text-align: right;">GBM IL DSE --Y -- ---</p> <p>Subsch. ID : 10 Det. descr. : Rfdn Fire SW3/SW4 (logical) Position B TC(8,4,115,8)</p>	DC78E170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
10		Switch ON XPND1		Next Step: 11
		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+=00.00.30 UT=+	Execute Telecommand TtcCommandXpnd1On <i>TC Control Flags :</i> Subsch. ID : 10 Det. descr. : Ttc Command Xpnd 1 On TC(8,4,115,2) GBM IL DSE --Y -- --	DCN83170	
11		Set the parameters and send TC(8,4,115,9) to configure the XPND1 to LR1		Next Step: 12
	ET+=00.00.30 UT=+	Execute Telecommand XpndConfigure_Templ <i>Command Parameter(s) :</i> 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 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) XpndConfDW2OPLS DH032170 -4 <i>TC Control Flags :</i> Subsch. ID : 10 Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9) GBM IL DSE --Y -- --	DCT18170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
12		Send TC(8,4,115,20) to configure the TM encoder to LR1		Next Step: 13
	ET+=00.00.05 UT=+	Execute Telecommand TtcConfigTmEncInUseLow1 TC Control Flags : Subsch. ID : 10 Det. descr. : TTC: Config TM Enc In Use Mode Low 1,500 bps, TC(8,4,115,20) GBM IL DSE --Y -- ---	DC12F170	
13		Send TC(8,4,115,18) to switch ON the TM subsampling		Next Step: 14
	ET+=00.00.05 UT=+	Execute Telecommand TtcSwitchTmSubsamplOn TC Control Flags : Subsch. ID : 10 Det. descr. : TTC: Switch TM Subsampling On TC(8,4,115,18) GBM IL DSE --Y -- ---	DC04F170	
14		Disable transmission for non essential APIDs		Next Step: 15
		Execute Procedure: H_CRP_DHS_1001 Disabling transmission for non essential APIDs.		
15		Switch ON TWTA1 (OPLCL49+EPC1+TWT1)		Next Step: 42
	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 : HRRT1012 (Tx1+TWTA1 ON in LR2)
 Tx1 and TM encoder configuration for LR2

TimeTag Type: B
 Sub Schedule ID:

□

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16		Send TC (19,5) to disable relevant EAT entry		Next Step: 17																																																						
		<p>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:</p> <p>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:</p> <p>37400 & 37416 (TWTA1 failure), 37401 & 37417 (TWTA2 failure), 37402 (XPND1 RX failure), 37403 (XPND2 RX failure), 160 (XPND1 invalid RT), 161 (XPND2 invalid RT).</p>																																																								
	ET=+00.00.00 UT=+	<p>Execute Telecommand</p> <p style="text-align: center;">DisableActions</p> <p>Command Parameter(s) :</p> <table border="0"> <tr> <td>N Repetition</td> <td>DH041170</td> <td>8 <dec></td> </tr> <tr> <td>APID_for_EAT_TC</td> <td>DH236170</td> <td>CDMS (Def)</td> </tr> <tr> <td>EventId</td> <td>DH146170</td> <td>37400 <dec></td> </tr> <tr> <td>APID_for_EAT_TC</td> <td>DH236170</td> <td>CDMS (Def)</td> </tr> <tr> <td>EventId</td> <td>DH146170</td> <td>37401 <dec></td> </tr> <tr> <td>APID_for_EAT_TC</td> <td>DH236170</td> <td>CDMS (Def)</td> </tr> <tr> <td>EventId</td> <td>DH146170</td> <td>37402 <dec></td> </tr> <tr> <td>APID_for_EAT_TC</td> <td>DH236170</td> <td>CDMS (Def)</td> </tr> <tr> <td>EventId</td> <td>DH146170</td> <td>37403 <dec></td> </tr> <tr> <td>APID_for_EAT_TC</td> <td>DH236170</td> <td>CDMS (Def)</td> </tr> <tr> <td>EventId</td> <td>DH146170</td> <td>37416 <dec></td> </tr> <tr> <td colspan="3"> </td> </tr> <tr> <td>APID_for_EAT_TC</td> <td>DH236170</td> <td>CDMS (Def)</td> </tr> <tr> <td>EventId</td> <td>DH146170</td> <td>37417 <dec></td> </tr> <tr> <td>APID_for_EAT_TC</td> <td>DH236170</td> <td>CDMS (Def)</td> </tr> <tr> <td>EventId</td> <td>DH146170</td> <td>160 <dec></td> </tr> <tr> <td>APID_for_EAT_TC</td> <td>DH236170</td> <td>CDMS (Def)</td> </tr> <tr> <td>EventId</td> <td>DH146170</td> <td>161 <dec></td> </tr> </table> <p>TC Control Flags :</p> <p style="text-align: center;">GBM IL DSE --Y -- --</p> <p>Subsch. ID : 10 Det. descr. : TEMPLATE Disable Actions TC(19,5)</p>	N Repetition	DH041170	8 <dec>	APID_for_EAT_TC	DH236170	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>	DCT85170	
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17		Switch OFF TWT Assembly 1 (TWTA1)		Next Step: 18																																																						
		<p>Command TWTA1 OFF - TC(8,4,115,1) performs :</p> <p>Switch TWT Amplifier 1 (TWT1) OFF Switch EPC1 OFF Switch OP-LCL49 (TWTA1) OFF</p>																																																								

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	ET=+00.00.05 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 --Y -- --	DC06E170	
18		Switch OFF TWT Assembly 2 (TWTA2)		Next Step: 19
		Command TWTA2 OFF - TC(8,4,115,1) performs : Switch TWT Amplifier 2 (TWT2) OFF Switch EPC2 OFF Switch OP-LCL50 (TWTA2) OFF		
	ET=+00.00.05 UT=+	Execute Telecommand TtcCommandTwt2Off TC Control Flags : Subsch. ID : 10 Det. descr. : Ttc Command TWTA 2 Off TC(8,4,115,1) GBM IL DSE --Y -- --	DC07E170	
19		Switch OFF XPND1		Next Step: 20
		Command XPND1 OFF - TC(8,4,115,1) performs : Switch XPND TX1 OFF Configure TX1 "OFF" and "INVALID" on the 1553 S/C bus Note that it leaves LCL23 (XPND1) ON		
	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 --Y -- --	DCN80170	
20		Switch OFF XPND2		Next Step: 21
		Command XPND2 OFF - TC(8,4,115,1) performs : Switch XPND TX2 OFF Configure TX2 "OFF" and "INVALID" on the 1553 S/C bus Note that it leaves LCL16 (XPND2) ON		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.30 UT=+	Execute Telecommand TtcCommandXpnd2Off TC Control Flags : Subsch. ID : 10 Det. descr. : Ttc Command Xpnd 2 Off TC(8,4,115,1) GBM IL DSE --Y -- ---	DCN81170	
21		Configure RFDN switches (yes/no)?		Next Step: yes 22 no 23
22		Send TCs to move the SWs to SUR1		Next Step: 23
		Launch/Sun acquisition after separation/Survival (SUR1) RFDN SWs position BBBB D/L path: TX1 - TWTA1 - LGA1 U/L path: LGA1 - RX1 (LGA2 – RX2)		
		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.		
	ET=+00.00.05 UT=+	Execute Telecommand RfdnArmSW1_SW2_log_A TC Control Flags : Subsch. ID : 10 Det. descr. : Rfdn Arm Command SW1/SW2 (logical) Position A TC(8,4,115,5) GBM IL DSE --Y -- ---	DC47E170	
	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 --Y -- ---	DC67E170	
	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 --Y -- ---	DC48E170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	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 --Y -- ---	DC68E170	
23		Switch ON XPND1		Next Step: 24
		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=+00.00.30 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	
24		Set the parameters and send TC(8,4,115,9) to configure the XPND1 to LR2		Next Step: 25
	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	DCT18170	

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		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 XpndConfDW2OPLS DH032170 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9)	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)	
25		Send TC(8,4,115,20) to configure the TM encoder to LR2		Next Step: 26
	ET=+00.00.05 UT=+	Execute Telecommand TtcConfigTmEncInUseLow2 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : TTC: Config TM Enc In Use Mode Low 2 - 5kbps, TC(8,4,115,20)	DC17F170	
26		Send TC(8,4,115,17) to switch OFF the TM subsampling		Next Step: 27
	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	
27		Disable transmission for non essential APIDs		Next Step: 28

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Procedure: H_CRP_DHS_1001 Disabling transmission for non essential APIDs.		
28		Switch ON TWTA1 (OPLCL49+EPC1+TWT1)		Next Step: 42
	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	
<p>TC Seq. Name : HRRT1013 (Tx1+TWTA1 ON in MR) Tx1 and TM encoder configuration for MR</p> <p>TimeTag Type: B Sub Schedule ID: <input type="checkbox"/></p>				
29		Send TC (19,5) to disable relevant EAT entry		Next Step: 30
		<p>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:</p> <p>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:</p> <p>37400 & 37416 (TWTA1 failure), 37401 & 37417 (TWTA2 failure), 37402 (XPND1 RX failure), 37403 (XPND2 RX failure), 160 (XPND1 invalid RT), 161 (XPND2 invalid RT).</p>		

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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 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 APID_for_EAT_TC DH236170 EventId DH146170 APID_for_EAT_TC DH236170 EventId DH146170 APID_for_EAT_TC DH236170 EventId DH146170 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 10 Det. descr. : TEMPLATE Disable Actions TC(19,5)	DCT85170 8 <dec> CDMS (Def) 37400 <dec> CDMS (Def) 37401 <dec> CDMS (Def) 37402 <dec> CDMS (Def) 37403 <dec> CDMS (Def) 37416 <dec>	
30		Switch OFF TWT Assembly 1 (TWTA1)		Next Step: 31
		Command TWTA1 OFF - TC(8,4,115,1) performs : Switch TWT Amplifier 1 (TWT1) OFF Switch EPC1 OFF Switch OP-LCL49 (TWTA1) OFF		
	ET=+00.00.05 UT=+	Execute Telecommand TtcCommandTwtalOff TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 10 Det. descr. : Ttc Command TWTA 1 Off TC(8,4,115,1)	DC06E170	
31		Switch OFF TWT Assembly 2 (TWTA2)		Next Step: 32
		Command TWTA2 OFF - TC(8,4,115,1) performs : Switch TWT Amplifier 2 (TWT2) OFF Switch EPC2 OFF Switch OP-LCL50 (TWTA2) OFF		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.05 UT=+	Execute Telecommand TtcCommandTwta2Off TC Control Flags : Subsch. ID : 10 Det. descr. : Ttc Command TWTA 2 Off TC(8,4,115,1) GBM IL DSE --Y -- --	DC07E170	
32		Switch OFF XPND1		Next Step: 33
		Command XPND1 OFF - TC(8,4,115,1) performs : Switch XPND TX1 OFF Configure TX1 "OFF" and "INVALID" on the 1553 S/C bus Note that it leaves LCL23 (XPND1) ON		
	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 --Y -- --	DCN80170	
33		Switch OFF XPND2		Next Step: 34
		Command XPND2 OFF - TC(8,4,115,1) performs : Switch XPND TX2 OFF Configure TX2 "OFF" and "INVALID" on the 1553 S/C bus Note that it leaves LCL16 (XPND2) ON		
	ET=+00.00.30 UT=+	Execute Telecommand TtcCommandXpnd2Off TC Control Flags : Subsch. ID : 10 Det. descr. : Ttc Command Xpnd 2 Off TC(8,4,115,1) GBM IL DSE --Y -- --	DCN81170	
34		Configure RFDN switches (yes/no)?		Next Step: yes 35 no 36
35		Send TCs to move the SWs NOM1		Next Step: 36
		Nominal/Earth acquisition (NOM1) RFDN SWs position ABAB D/L path: TX1 - TWTA1 - MGA U/L path: MGA - RX1 (LGA1 - RX2)		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		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.		
	ET=+00.00.05 UT=+	Execute Telecommand RfdnArmsW1_SW2LogB TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Rfdn Arm SW1/SW2 (logical) Position B TC(8,4,115,6)	DC57E170	
	ET=+00.00.05 UT=+	Execute Telecommand RfdnFireSW1_SW2_log_B TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Rfdn Fire SW1/SW2 (logical) Position B TC(8,4,115,8)	DC77E170	
	ET=+00.00.05 UT=+	Execute Telecommand RfdnArmsW3_SW4LogB TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Rfdn Arm SW3/SW4 (logical) Position B TC(8,4,115,6)	DC58E170	
	ET=+00.00.05 UT=+	Execute Telecommand RfdnFireSW3_SW4_log_B TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Rfdn Fire SW3/SW4 (logical) Position B TC(8,4,115,8)	DC78E170	
36		Switch ON XPND1		Next Step: 37
		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		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.30 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	
37		Set the parameters and send TC(8,4,115,9) to configure the XPND1 to MR		Next Step: 38
	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 111111111111 <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 --Y -- --	DCT18170	
38		Send TC(8,4,115,20) to configure the TM encoder to MR		Next Step: 39

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.05 UT=+	Execute Telecommand TtcConfTmEncInUseMedium <i>TC Control Flags :</i> Subsch. ID : 10 Det. descr. : TTC: Config TM Enc In Use Mode Medium 150 kbps, TC(8,4,115,20) GBM IL DSE --Y -- ---	DC22F170	
39		Send TC(8,4,115,17) to switch OFF the TM subsampling		Next Step: 40
	ET=+00.00.05 UT=+	Execute Telecommand TtcSwitchTmSubsamplOff <i>TC Control Flags :</i> Subsch. ID : 10 Det. descr. : TTC: Switch TM Subsampling Off TC(8,4,115,17) GBM IL DSE --Y -- ---	DC03F170	
40		Enable the downlink of essentials and periodics HK packets		Next Step: 41
		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))		
41		Switch ON TWTA1 (OPLCL49+EPC1+TWT1)		Next Step: 42
	ET=+00.00.05 UT=+	Execute Telecommand TtcCommandTwtalOn <i>TC Control Flags :</i> Subsch. ID : 10 Det. descr. : Ttc Command TWTA 1 On TC(8,4,115,2) GBM IL DSE --Y -- ---	DC16E170	
<p><i>TC Seq. Name : HRRT101F (Tx1+TWTA1 ON final)</i></p> <p><i>TimeTag Type: N</i> <i>Sub Schedule ID:</i></p> <p>□</p>				

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
42		Verify XPND1 and TWTA1 setting and RFDN SWS position		Next Step: 43
42.1		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	(None)
		Verify FCL3 (XPND1 Rx) current Telemetry Xpnd1_Rx_FCL3_I WM702565	>= 0.20 A <= 0.35 A	AND=ZAZ7I999
42.2		Rx1 analogue telemetry verification		<input type="checkbox"/>
		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 Rx1 TC bit rate Telemetry RX1_125-4K Stat RMB17442		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
42.3		Tx1 power line status verification		<input type="checkbox"/>
		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
42.4		Tx1 analogue telemetry verification		<input type="checkbox"/>
		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

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Tx1 Temperature Telemetry TX1_TEMP RMB01442		AND=ZAZ7I999
42.5		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
42.6		XPND1 1553 S/C bus TM verification		<input type="checkbox"/>
		Verify XPND1 status X1 Status - XS RMB22442	= TM mode active	AND=ZAZ7I999
		Verify Low Rate-1 status Telemetry X1 LowRate-1 MD RMB30442		AND=ZAZ7I999
		Verify Low Rate-2 status Telemetry X1 LowRate-2 MD RMB31442		AND=ZAZ7I999
		Verify Medium Rate Modulator status Telemetry X1 MedRate-MRM RMB29442		AND=ZAZ7I999
		Verify High Rate status Telemetry X1 HIRateMD-HRM RMB28442		AND=ZAZ7I999
		Verify Ranging Modulator status Telemetry X1 Rang MOD-RM RMB27442	= OFF	AND=ZAZ7I999
		Verify Coherent Mode status Telemetry X1 Coher MOD-CM RMB26442	= OFF	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		AND=ZAZ7I999
		Verify RX AGC Level Telemetry X1 AGC TMuplnc RMB20442		AND=ZAZ7I999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify PLL Phase Error Telemetry X1 RX PLL PhErr RMB19442		AND=ZAZ7I999
		Verify Squelch Status Telemetry X1 SsqlchSt - SS RMB23442		AND=ZAZ7I999
		Verify Tx1 TC Bit Rate Telemetry X1 TcBitRateTCB RMB61442		
42.7		<i>TM Encoder (in use) verification</i>		<input type="checkbox"/>
		Verify Telemetry TME_BITRATE DEMRF160		AND=ZAZ7J999
		Verify Telemetry BSW_TM_MODE DEMF0160		AND=ZAZ7J999
42.8		<i>TWTAl setting verification</i>		<input type="checkbox"/>
		Verify OPLCL49 (TWTAl 1) Status Telemetry Twta_1_L49_1S WM22E565	= ON	AND=ZAZ7J999
		Verify TWTAl 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
		Verify EPC1 Helix current Telemetry EPC1_HELIX_CURR RMB02439	>= 0.19 mA <= 1.2 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
42.9		<i>RFDN SWs position verification</i>		<input type="checkbox"/>
		Verify Telemetry RFDN SW1 Pos A RMB05436		AND=ZAZ7J999
		Verify Telemetry RFDN SW1 Pos B RMB09436		AND=ZAZ7J999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry RFDN SW2 Pos A RMB06436		AND=ZAZ7J999
		Verify Telemetry RFDN SW2 Pos B RMB10436		AND=ZAZ7J999
		Verify Telemetry RFDN SW3 Pos A RMB07436		AND=ZAZ7J999
		Verify Telemetry RFDN SW3 Pos B RMB11436		AND=ZAZ7J999
		Verify Telemetry RFDN SW4 Pos A RMB08436		AND=ZAZ7J999
		Verify Telemetry RFDN SW4 Pos B RMB12436		AND=ZAZ7J999
		Verify RFDN Isolator 1 Temp Telemetry RFDN_ISOL1_TEMP RMB01436		AND=ZAZ7J999
		Verify RFDN Isolator 2 Temp Telemetry RFDN_ISOL2_TEMP RMB02436		AND=ZAZ7J999
		Verify RFDN Diplexer 1 Temp Telemetry RFDN_DIPL1_TEMP RMB03436		AND=ZAZ7J999
		Verify RFDN Diplexer 2 Temp Telemetry RFDN_DIPL2_TEMP RMB04436		AND=ZAZ7J999
42.10		UIU table verification		□
		Verify Telemetry XpndTx1FuncSts DEL27170	= On	AND=ZAZ7M999
		Verify Telemetry TwtalFuncSts DEL19170	= On	AND=ZAZ7M999
		Verify Telemetry Epc1FuncSts DEG25170	= On	AND=ZAZ7M999
		Verify Telemetry TwtAmp1FuncSts DEH13170	= On	AND=ZAZ7M999
		Verify Telemetry Rfdn1FuncSts DEH49170		AND=ZAZ7M999
		Verify Telemetry Rfdn2FuncSts DEH53170		AND=ZAZ7M999
		Verify Telemetry Rfdn3FuncSts DEH57170		AND=ZAZ7M999
		Verify Telemetry Rfdn4FuncSts DEH61170		AND=ZAZ7M999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
43		Send TCs(8,4,116,19) to update the UIU table		Next Step: 44
		After the execution of this TC the XPND1 (RX+TX) and the TWTA1 (EPC+TWT) are considered the nominal units.		
		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	
44		Verify UIU table status		Next Step: 45
		Verify Telemetry XpndRx1LogSts DEL57170	= Nominal	AND=ZAZ7M999
		Verify Telemetry XpndTx1LogSts DEL28170	= Nominal	AND=ZAZ7M999
		Verify Telemetry TwtalLogSts DEL20170	= Nominal	AND=ZAZ7M999
		Verify Telemetry TwtAmp1LogSts DEH14170	= Nominal	AND=ZAZ7M999
		Verify Telemetry Epc1LogSts DEG26170	= Nominal	AND=ZAZ7M999
45		Send TC(19,4) to re-enable XPND1 -TWTA1 relevant EAT entries		Next Step: 46
		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).		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand <p style="text-align: right;">EnableActions</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;">GBM IL DSE --Y -- ---</p> Subsch. ID : 10 Det. descr. : TEMPLATE Enable Actions TC(19,4)	DCT84170	
46		Send TC(19,4) to re-enable XPND2 -TWTA2 relevant EAT entries		Next Step: 47
		<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 EAT ID 161 (XPND2 invalid RT) remains Disabled.</p>		
		Execute Telecommand <p style="text-align: right;">EnableActions</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 TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 10 Det. descr. : TEMPLATE Enable Actions TC(19,4)	DCT84170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
47		Send TC(19,6) to acquire the detection list		Next Step: 48
		Execute Telecommand <p style="text-align: right;">ReptEvtActTable</p> TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- --</p> Subsch. ID : 10 Det. descr. : TEMPLATE Report The contents of the event/action table TC(19,6)	DCT86170	
48		Verify that TM(19,7) have been received and actions related to XPNDs-TWTAs are enabled		Next Step: END
		Verify Packet Reception <p style="text-align: center;">TM 19-7 Event-Action Table Content Report</p> Packet Details: <p style="text-align: right;">APID: 16 Type: 19 Subtype: 7 PI1: PI2:</p>	EvtActTblRpt	
		Verify that the following Event ID are enabled: 37400 & 37416 (TWTA1 failure), 37402 (XPND1 RX failure), 160 (XPND1 invalid RT), 37401 & 37417 (TWTA2 failure), 37403 (XPND2 RX failure), Verify that the Event ID 161 (XPND2 invalid RT) is Disabled.		
End of Procedure				