

Switch ON Tx and TWTA in use contingency  
File: H\_CRP\_TTC\_TU01.xls  
Author: E. Picallo



## Procedure Summary

### Objectives

This procedure describes the steps needed to switch ON the transmitter and the travelling wave tube assembly in use in a contingency case. Therefore both TTC chains (nominal and redundant chain) are switched OFF before switching the TTC chain in use back ON.

This procedure does use the logical addressing.

### Summary of Constraints

TWTA1&2 are switched OFF a through ASW TCs(8,4,115,1).  
TXs are switched OFF by dedicated commands to switch OFF the TX RF relay and set the relevant RT OFF and Invalid on the Bus.  
This is a temporary implementation to cope with the current CDMS ASW version with respect to the actual new TTC configuration where both TXs LCLs are always kept ON.

TX and TWTA in use 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), thus the status of the ASW function "TTC Management" has to be "running".

This procedure to Switch TX and TWTA in use ON does not include a re-configuration of the RFDN switches.

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 generato

### Spacecraft Configuration

#### Start of Procedure

CDMU in default configuration;

#### End of Procedure

CDMU in default configuration;  
Downlink enabled via TX and TWTA in use.

### Reference File(s)

#### Input Command Sequences

#### Output Command Sequences

HRRTU011  
HRRTU012  
HRRTU013

### Referenced Displays

ANDs      GRDs      SLDs

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ZAZ7I999 (None)  
 ZAZ7J999  
 ZAZ7M999

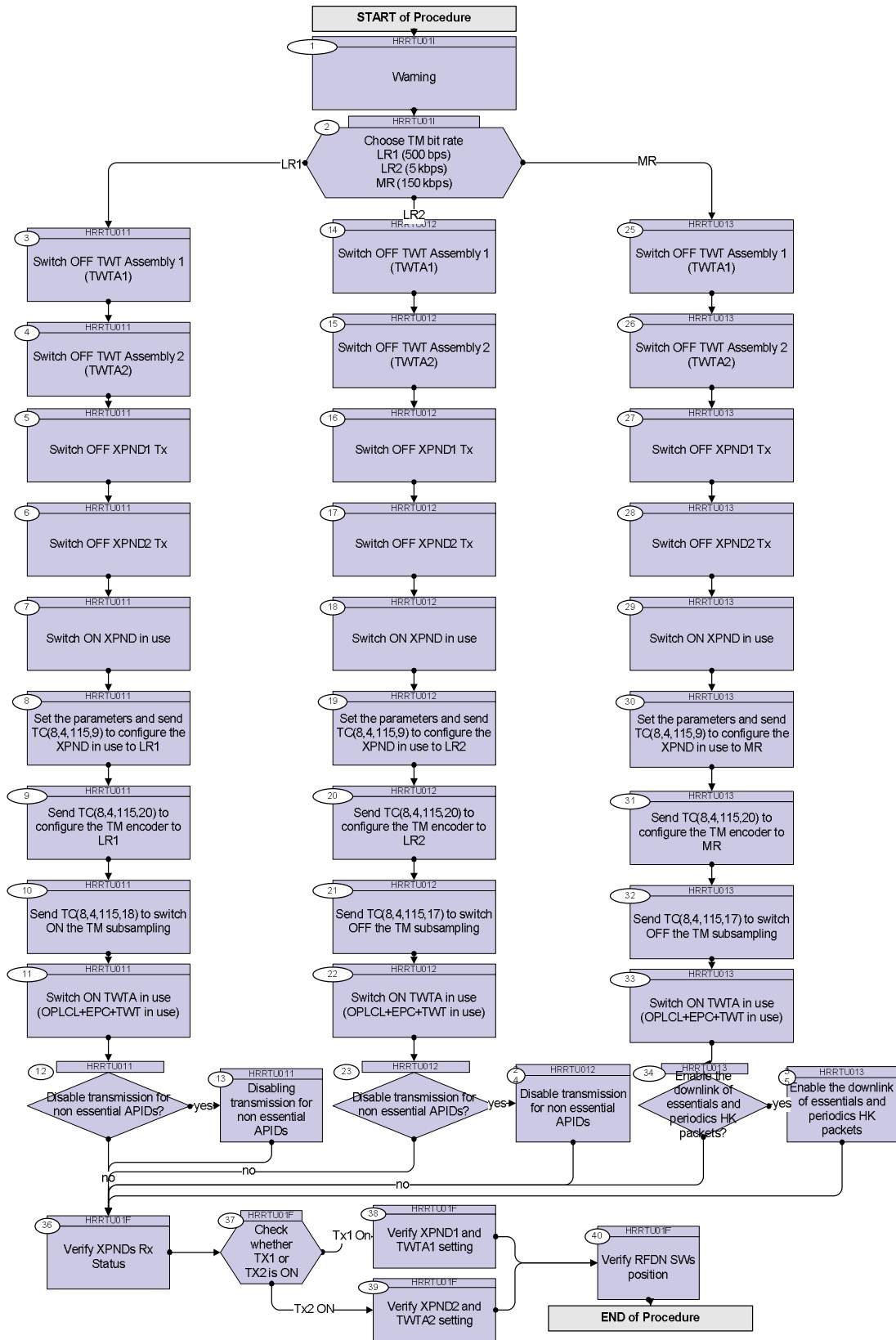
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
03/12/08		1	Created	E. Picallo	
03/12/08		2	sequence name correction	E. Picallo	
08/01/09	2	3	CDMU ASW V3.8 and BSW V2.4 alignment	E. Picallo	
18/03/09	2.2	3.01	Validation : Minor AND reference correction	E. Picallo	
06/07/09		4	TX RF OFF and RT OFF and Invalid on SDB. Temporary implementation to cope with current CDMS ASW with respect to new TTC configuration where both TXs LCLs are always kept ON.	E. Picallo	
25/09/09		5	Re-introduced TC XPND1 OFF (leaves LCL23 ON in ASW 4.0) Re-introduced TC XPND2 OFF (leaves LCL16 ON in ASW 4.0) Verify Tx1 Status based on TX1 ON-OFF Status TM Verify Tx2 Status based on TX2 ON-OFF Status TM	E. Picallo	
25/09/09	2.5	6	sequence generation	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>				
TC Seq. Name : HRRTU01I (Tx+TWTAuseONCRP init) Switch ON Tx and TWTA in use contingency init  TimeTag Type: B Sub Schedule ID:  <input type="checkbox"/>				
1		Warning		Next Step: 2
		<b>In the next steps the downlink is deactivated. Therefore no CLCW will be available to acknowledge the TCs .</b>  <b>Switch to BD mode in order to avoid triggering the TC re-transmission or</b>  <b>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 .</b>		
		<b>Note: This procedure to Switch TX and TWTA in use ON does not include a re-configuration of the RFDN switches.</b>		
2		Choose TM bit rate LR1 (500 bps) LR2 (5 kbps) MR (150 kbps)		Next Step: LR1 3 LR2 14 MR 25
TC Seq. Name : HRRTU011 (Tx+TWTAuseON CRP LR1) Tx and TM encoder in use ON configuration for LR1 contingency  TimeTag Type: B Sub Schedule ID:  <input type="checkbox"/>				
3		Switch OFF TWT Assembly 1 (TWTA1)		Next Step: 4
		<b>Command TWTA1 OFF - TC(8,4,115,1) performs :</b> <b>Switch TWT Amplifier 1 (TWT1) OFF</b> <b>Switch EPC1 OFF</b> <b>Switch OP-LCL49 (TWTA1) OFF</b>		
	ET+=00.00.05 UT=+	Execute Telecommand <div style="text-align: right;">TtcCommandTwtalOff</div> TC Control Flags : <div style="text-align: right;">GBM IL DSE --Y -- --</div> Subsch. ID : 10 Det. descr. : Ttc Command TWTA 1 Off TC(8,4,115,1)	DC06E170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
4		Switch OFF TWT Assembly 2 (TWTA2)		Next Step: 5
		<b>Command TWTA2 OFF - TC(8,4,115,1) performs :</b> <b>Switch TWT Amplifier 2 (TWT2) OFF</b> <b>Switch EPC2 OFF</b> <b>Switch OP-LCL50 (TWTA2) OFF</b>		
	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	
5		Switch OFF XPND1 Tx		Next Step: 6
		<b>Command XPND1 OFF - TC(8,4,115,1) performs :</b> <b>Switch XPND TX1 OFF</b> <b>Configure TX1 "OFF" and "INVALID" on the 1553 S/C bus</b>  <b>Note that it leaves LCL23 (XPND1 ) 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 --Y -- ---	DCN80170	
6		Switch OFF XPND2 Tx		Next Step: 7
		<b>The following command switches OFF the XPND2 TX, changes the configuration of the TX2 on the 1553 S/C bus (to "OFF" and "Invalid") though leaves the XPND2 LCL ON.</b>		
	ET=+00.00.05 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	
7		Switch ON XPND in use		Next Step: 8

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch																																																																																							
		<b>Command XPND1 ON - TC(8,4,115,2) performs :</b> <b>Switch LCL XPND in use ON</b> <b>Configure TX in use "ON" and "VALID" on the 1553 S/C bus</b> <b>Switch XPND TX in use ON</b>																																																																																									
	ET=+00.00.30 UT=+	Execute Telecommand <p style="text-align: right;">TtcCommandXpndInUseOn</p> TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 10 Det. descr. : Ttc Command Xpnd InUse On TC(8,4,115,2)	DCN85170																																																																																								
8		Set the parameters and send TC(8,4,115,9) to configure the XPND in use to LRI		Next Step: 9																																																																																							
	ET=+00.00.30 UT=+	Execute Telecommand <p style="text-align: right;">XpndConfigure_Templ</p> Command Parameter(s) : <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">XpndId</td> <td style="width: 30%;">DH018170</td> <td style="width: 40%;">XpndInUseLogic</td> </tr> <tr> <td>XpndConfMask1Unus</td> <td>DH220170</td> <td>11 &lt;bin&gt;</td> </tr> <tr> <td>XpndConfMask1_ER</td> <td>DH221170</td> <td>ON</td> </tr> <tr> <td>XpndConfMask1_CM</td> <td>DH222170</td> <td>ON</td> </tr> <tr> <td>XpndConfMask1_RM</td> <td>DH223170</td> <td>ON</td> </tr> <tr> <td>XpndConfMask1_HRM</td> <td>DH224170</td> <td>ON</td> </tr> <tr> <td>XpndConfMask1_MRM</td> <td>DH225170</td> <td>ON</td> </tr> <tr> <td>XpndConfMask1LRM1</td> <td>DH226170</td> <td>ON</td> </tr> <tr> <td>XpndConfMask1LRM2</td> <td>DH227170</td> <td>ON</td> </tr> <tr> <td>XpndConfMask1_RMI</td> <td>DH228170</td> <td>Update</td> </tr> <tr> <td>XpndConfMask1_TMI</td> <td>DH229170</td> <td>Update</td> </tr> <tr> <td colspan="3"> </td> </tr> <tr> <td>XpndConfMask2_PG</td> <td>DH230170</td> <td>ON</td> </tr> <tr> <td>XpndConfMask2Unus</td> <td>DH231170</td> <td>1111111111 &lt;bin&gt;</td> </tr> <tr> <td>XpndConfMask2OPLS</td> <td>DH232170</td> <td>Update</td> </tr> <tr> <td>XpndConfDW1Unus</td> <td>DH020170</td> <td>0 &lt;dec&gt; (Def)</td> </tr> <tr> <td>XpndConfDW1_ER</td> <td>DH021170</td> <td>OFF (Def)</td> </tr> <tr> <td>XpndConfDW1_CM</td> <td>DH022170</td> <td>OFF (Def)</td> </tr> <tr> <td>XpndConfDW1_RM</td> <td>DH023170</td> <td>OFF (Def)</td> </tr> <tr> <td>XpndConfDW1_HRM</td> <td>DH024170</td> <td>OFF (Def)</td> </tr> <tr> <td>XpndConfDW1_MRM</td> <td>DH025170</td> <td>OFF (Def)</td> </tr> <tr> <td>XpndConfDW1LRM1</td> <td>DH026170</td> <td>ON</td> </tr> <tr> <td>XpndConfDW1LRM2</td> <td>DH027170</td> <td>OFF (Def)</td> </tr> <tr> <td>XpndConfDW1_RMI</td> <td>DH028170</td> <td>0.6</td> </tr> <tr> <td>XpndConfDW1_TMI</td> <td>DH029170</td> <td>1.2</td> </tr> <tr> <td>XpndConfDW2_PG</td> <td>DH030170</td> <td>OFF (Def)</td> </tr> <tr> <td>XpndConfDW2Unus</td> <td>DH031170</td> <td>0 &lt;dec&gt; (Def)</td> </tr> <tr> <td colspan="3"> </td> </tr> <tr> <td>XpndConfDW2OPLS</td> <td>DH032170</td> <td>-4</td> </tr> </table> TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 10 Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9)	XpndId	DH018170	XpndInUseLogic	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		
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XpndConfDW1_MRM	DH025170	OFF (Def)																																																																																									
XpndConfDW1LRM1	DH026170	ON																																																																																									
XpndConfDW1LRM2	DH027170	OFF (Def)																																																																																									
XpndConfDW1_RMI	DH028170	0.6																																																																																									
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XpndConfDW2_PG	DH030170	OFF (Def)																																																																																									
XpndConfDW2Unus	DH031170	0 <dec> (Def)																																																																																									
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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
9		Send TC(8,4,115,20) to configure the TM encoder to LRI		Next Step: 10
	ET=+00.00.05 UT=+	Execute Telecommand <b>TtcConfigTmEncInUseLow1</b>  TC Control Flags :  Subsch. ID : 10 Det. descr. : TTC: Config TM Enc In Use Mode Low 1,500 bps, TC(8,4,115,20)	DC12F170	
10		Send TC(8,4,115,18) to switch ON the TM subsampling		Next Step: 11
	ET=+00.00.05 UT=+	Execute Telecommand <b>TtcSwitchTmSubsamplOn</b>  TC Control Flags :  Subsch. ID : 10 Det. descr. : TTC: Switch TM Subsampling On TC(8,4,115,18)	DC04F170	
11		Switch ON TWTA in use (OPLCL+EPC+TWT in use)		Next Step: 12
	ET=+00.00.05 UT=+	Execute Telecommand <b>TtcCommandTwtaInUseOn</b>  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command Twta In Use On TC(8,4,115,2)	DC18E170	
12		Disable transmission for non essential APIDs?		Next Step: yes 13 no 36
13		Disabling transmission for non essential APIDs		Next Step: 36
		Execute Procedure: <b>H_CRP_DHS_1001</b> Disabling transmission for non essential APIDs.		

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<p><i>TC Seq. Name : HRRTU012 (Tx+TWTAuseON CRP LR2)</i>            Tx and TM encoder in use ON configuration for LR2 contingency</p> <p><i>TimeTag Type: B</i>  <i>Sub Schedule ID:</i></p> <p>□</p>				
14		Switch OFF TWT Assembly 1 (TWTA1)		Next Step: 15
		<b>Command TWTA1 OFF - TC(8,4,115,1) performs :</b> <b>Switch TWT Amplifier 1 (TWT1) OFF</b> <b>Switch EPC1 OFF</b> <b>Switch OP-LCL49 (TWTA1) OFF</b>		
	ET=+00.00.05 UT=+	Execute Telecommand <p style="text-align: right;"><b>TtcCommandTwtalOff</b></p> <i>TC Control Flags :</i> <p style="text-align: right;"><b>GBM IL DSE</b>  <b>--Y -- ---</b></p> <i>Subsch. ID : 10</i> <i>Det. descr. : Ttc Command TWTA 1 Off TC(8,4,115,1)</i>	DC06E170	
15		Switch OFF TWT Assembly 2 (TWTA2)		Next Step: 16
		<b>Command TWTA2 OFF - TC(8,4,115,1) performs :</b> <b>Switch TWT Amplifier 2 (TWT2) OFF</b> <b>Switch EPC2 OFF</b> <b>Switch OP-LCL50 (TWTA2) OFF</b>		
	ET=+00.00.05 UT=+	Execute Telecommand <p style="text-align: right;"><b>TtcCommandTwt2Off</b></p> <i>TC Control Flags :</i> <p style="text-align: right;"><b>GBM IL DSE</b>  <b>--Y -- ---</b></p> <i>Subsch. ID : 10</i> <i>Det. descr. : Ttc Command TWTA 2 Off TC(8,4,115,1)</i>	DC07E170	
16		Switch OFF XPND1 Tx		Next Step: 17
		<b>Command XPND1 OFF - TC(8,4,115,1) performs :</b> <b>Switch XPND TX1 OFF</b> <b>Configure TX1 "OFF" and "INVALID" on the 1553 S/C bus</b>		
		<b>Note that it leaves LCL23 (XPND1 ) ON</b>		
	ET=+00.00.05 UT=+	Execute Telecommand <p style="text-align: right;"><b>TtcCommandXpnd1Off</b></p> <i>TC Control Flags :</i> <p style="text-align: right;"><b>GBM IL DSE</b>  <b>--Y -- ---</b></p> <i>Subsch. ID : 10</i> <i>Det. descr. : Ttc Command Xpnd 1 Off TC(8,4,115,1)</i>	DCN80170	



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
17		Switch OFF XPND2 Tx		Next Step: 18
		<b>The following command switches OFF the XPND2 TX, changes the configuration of the TX2 on the 1553 S/C bus (to "OFF" and "Invalid") though leaves the XPND2 LCL ON.</b>		
	ET=+00.00.05 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	
18		Switch ON XPND in use		Next Step: 19
		<b>Command XPND1 ON - TC(8,4,115,2) performs : Switch LCL XPND in use ON Configure TX in use "ON" and "VALID" on the 1553 S/C bus Switch XPND TX in use ON</b>		
	ET=+00.00.30 UT=+	Execute Telecommand  TtcCommandXpndInUseOn  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command Xpnd InUse On TC(8,4,115,2)  GBM IL DSE --Y -- ---	DCN85170	
19		Set the parameters and send TC(8,4,115,9) to configure the XPND in use to LR2		Next Step: 20
	ET=+00.00.30 UT=+	Execute Telecommand  XpndConfigure_Templ  Command Parameter(s) :  XpndId DH018170 XpndInUseLogic 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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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		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)	
20		Send TC(8,4,115,20) to configure the TM encoder to LR2		Next Step: 21
	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	
21		Send TC(8,4,115,17) to switch OFF the TM subsampling		Next Step: 22
	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	
22		Switch ON TWTA in use (OPLCL+EPC+TWT in use)		Next Step: 23

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	ET=+00.00.05 UT=+	Execute Telecommand <b>TtcCommandTwtaInUseOn</b>  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command Twta In Use On TC(8,4,115,2)  GBM IL DSE --Y -- ---	DC18E170	
23		Disable transmission for non essential APIDs?		Next Step: yes 24 no 36
24		Disable transmission for non essential APIDs		Next Step: 36
		Execute Procedure: <b>H_CRP_DHS_1001</b> Disabling transmission for non essential APIDs.		
<p>TC Seq. Name : HRRTU013 (Tx+TWTAuseON CRP MR)          Tx and TM encoder in use configuration for MR contingency</p> <p>TimeTag Type: B          Sub Schedule ID:  <input type="checkbox"/></p>				
25		Switch OFF TWT Assembly 1 (TWTA1)		Next Step: 26
		<b>Command TWTA1 OFF - TC(8,4,115,1) performs :</b> <b>Switch TWT Amplifier 1 (TWT1) OFF</b> <b>Switch EPC1 OFF</b> <b>Switch OP-LCL49 (TWTA1) OFF</b>		
	ET=+00.00.05 UT=+	Execute Telecommand <b>TtcCommandTwta1Off</b>  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command TWTA 1 Off TC(8,4,115,1)  GBM IL DSE --Y -- ---	DC06E170	
26		Switch OFF TWT Assembly 2 (TWTA2)		Next Step: 27
		<b>Command TWTA2 OFF - TC(8,4,115,1) performs :</b> <b>Switch TWT Amplifier 2 (TWT2) OFF</b> <b>Switch EPC2 OFF</b> <b>Switch OP-LCL50 (TWTA2) OFF</b>		

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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	
27		Switch OFF XPND1 Tx		Next Step: 28
		<b>Command XPND1 OFF - TC(8,4,115,1) performs :</b> <b>Switch XPND TX1 OFF</b> <b>Configure TX1 "OFF" and "INVALID" on the 1553 S/C bus</b>  <b>Note that it leaves LCL23 (XPND1 ) 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 --Y -- --	DCN80170	
28		Switch OFF XPND2 Tx		Next Step: 29
		<b>The following command switches OFF the XPND2 TX, changes the configuration of the TX2 on the 1553 S/C bus (to "OFF" and "Invalid") though leaves the XPND2 LCL ON.</b>		
	ET=+00.00.05 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	
29		Switch ON XPND in use		Next Step: 30
		<b>Command XPND1 ON - TC(8,4,115,2) performs :</b> <b>Switch LCL XPND in use ON</b> <b>Configure TX in use "ON" and "VALID" on the 1553 S/C bus</b> <b>Switch XPND TX in use ON</b>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET+=00.00.30 UT=+	Execute Telecommand  TtcCommandXpndInUseOn  TC Control Flags :  Subsch. ID : 10 Det. descr. : Ttc Command Xpnd InUse On TC(8,4,115,2)  GBM IL DSE --Y -- ---	DCN85170	
30		Set the parameters and send TC(8,4,115,9) to configure the XPND in use to MR		Next Step: 31
	ET+=00.00.30 UT=+	Execute Telecommand  XpndConfigure_Templ  Command Parameter(s) :  XpndId DH018170 XpndInUseLogic 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 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	
31		Send TC(8,4,115,20) to configure the TM encoder to MR		Next Step: 32

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET+=00.00.05 UT=+	Execute Telecommand  <b>TtcConfTmEncInUseMedium</b>  <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	
32		Send TC(8,4,115,17) to switch OFF the TM subsampling		Next Step: 33
	ET+=00.00.05 UT=+	Execute Telecommand  <b>TtcSwitchTmSubsamplOff</b>  <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	
33		Switch ON TWTA in use (OPLCL+EPC+TWT in use)		Next Step: 34
	ET+=00.00.05 UT=+	Execute Telecommand  <b>TtcCommandTwtaInUseOn</b>  <i>TC Control Flags :</i>  Subsch. ID : 10 Det. descr. : Ttc Command Twta In Use On TC(8,4,115,2)  GBM IL DSE --Y -- ---	DC18E170	
34		Enable the downlink of essentials and periodics HK packets?		Next Step: yes 35 no 36
35		Enable the downlink of essentials and periodics HK packets		Next Step: 36
		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))		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
TC Seq. Name :HRRTU01F (Tx+TWTAuseONCRPfinal) Tx and TWTA in use ON final configuration contingency  TimeTag Type: N Sub Schedule ID:  <input type="checkbox"/>				
36		Verify XPNDs Rx Status		Next Step: 37
36.1		Rx1 power line status verification		<input type="checkbox"/>
		Verify FCL3 (XPND1 Rx ) voltage Telemetry Xpnd1_Rx_FCL3_V WM703565	>= 28.0 V <= 28.7 V	(None)
		Verify FCL3 (XPND1 Rx) current Telemetry Xpnd1_Rx_FCL3_I WM702565	>= 0.20 A <= 0.35 A	AND=ZAZ7I999
36.2		Rx2 power line status verification		<input type="checkbox"/>
		Verify FCL4 (XPND2 Rx) voltage Telemetry Xpnd2_Rx_FCL4_V WM403565	>= 28.0 V <= 28.7 V	(None)
		Verify FCL4 (XPND2 Rx) current Telemetry Xpnd2_Rx_FCL4_I WM402565	>= 0.20 A <= 0.35 A	AND=ZAZ7I999
36.3		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
36.4		Rx2 analogue telemetry verification		<input type="checkbox"/>
		Verify RX2 AGC Level Telemetry XPD2_RX2_AGC_LV RMB10442		AND=ZAZ7I999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify RX2 PLL SPE Telemetry XPD2_RX2_PLL_SP RMB12442		AND=ZAZ7I999
		Verify Rx2 TC bit rate Telemetry RX2 125-4K Stat RMB18442		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
37		Check whether TX1 or TX2 is ON		Next Step: Tx1 On 38 Tx2 ON 39
37.1		Check if TX1 status ON		<input type="checkbox"/>
		Verify Telemetry TX1 ON-OFF Stat RMB15442	= ON	AND=ZAZ7I999
37.2		Check if TX2 status ON		<input type="checkbox"/>
		Verify Telemetry TX2 ON-OFF Stat RMB16442	= ON	AND=ZAZ7I999
38		Verify XPND1 and TWTA1 setting		Next Step: 40
38.1		Tx1 power line status verification		<input type="checkbox"/>
		Verify LCL23 ( XPND1 Tx ) current Telemetry Xpnd1Tx_L23_I WM109565	>= 0.41 A <= 0.55 A	AND=ZAZ7I999
38.2		Tx1 analogue telemetry verification		<input type="checkbox"/>
		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



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
38.3		Verify XPND1 status on the 1553 S/C bus		<input type="checkbox"/>
		Verify Telemetry XPND1On_Off DEFCG160	= ON	AND=ZAZ7I999
		Verify Telemetry XPND1Val_Inval DEFCK160	= Valid	AND=ZAZ7I999
38.4		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 TMUplnk RMB20442		AND=ZAZ7I999
		Verify PLL Phase Error Telemetry X1 RX PLL PhErr RMB19442		AND=ZAZ7I999
		Verify Squelch Status Telemetry X1 SqlchSt - SS RMB23442		AND=ZAZ7I999

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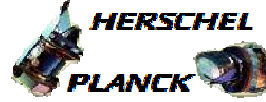
Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Tx1 TC Bit Rate Telemetry <b>X1 TcBitRateTCB</b> <b>RMB61442</b>		
38.5		<i>TM Encoder (in use) verification</i>		<input type="checkbox"/>
		Verify Telemetry <b>TME_BITRATE</b> <b>DEMRF160</b>		AND=ZAZ7J999
		Verify Telemetry <b>BSW_TM_MODE</b> <b>DEMF0160</b>		AND=ZAZ7J999
38.6		<i>TWTA1 setting verification</i>		<input type="checkbox"/>
		Verify OPLCL49 (TWTA 1) Status Telemetry <b>Twta_1_L49_1S</b> <b>WM22E565</b>	= ON	AND=ZAZ7J999
		Verify TWTA1 current Telemetry <b>Twta_1_L49_I</b> <b>WM210565</b>	>= 2.2 A <= 2.8 A	AND=ZAZ7J999
		Verify EPC1 Status Telemetry <b>EPC1_ONOFF_STS</b> <b>RMB05439</b>	= ON	AND=ZAZ7J999
		Verify EPC1 Anode Voltage Telemetry <b>EPC1_ANODE_VOLT</b> <b>RMB01439</b>	>= 1077.0 V <= 1137.0 V	AND=ZAZ7J999
		Verify EPC1 Helix current Telemetry <b>EPC1_HELIX_CURR</b> <b>RMB02439</b>	>= 0.19 mA <= 1.2 mA	AND=ZAZ7J999
		Verify EPC1 Automatic Restart Status Telemetry <b>EPC1_AUT_RSTART</b> <b>RMB06439</b>	= NOTACTIVE	AND=ZAZ7J999
		Verify EPC1 Temperature Telemetry <b>EPC1_TEMP</b> <b>RMB11439</b>		AND=ZAZ7J999
		Verify TWT1 Status Telemetry <b>TWT1_ONOFF_STS</b> <b>RMB09439</b>	= ON	AND=ZAZ7J999
38.7		<i>UIU table verification</i>		<input type="checkbox"/>
		Verify Telemetry <b>XpndTx1FuncSts</b> <b>DEL27170</b>	= On	AND=ZAZ7M999
		Verify Telemetry <b>Twta1FuncSts</b> <b>DEL19170</b>	= On	AND=ZAZ7M999
		Verify Telemetry <b>Epc1FuncSts</b> <b>DEG25170</b>	= On	AND=ZAZ7M999
		Verify Telemetry <b>TwtaAmplFuncSts</b> <b>DEH13170</b>	= On	AND=ZAZ7M999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
39		Verify XPND2 and TWTA2 setting		Next Step: 40
39.1		Tx2 power line status verification		<input type="checkbox"/>
		Verify LCL16 ( XPND2 Tx ) Telemetry Xpnd2Tx_L16_I	WM908565 >= 0.41 A <= 0.55 A	AND=ZAZ7I999
39.2		Tx2 analogue telemetry verification		<input type="checkbox"/>
		Verify Tx2 RF Output Power Telemetry XPD2_RF2_OUT_PW	RMB14442 <= -4.0 dbmW >= -4.8 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
39.3		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
39.4		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

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		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
		Verify RX AGC Level Telemetry X2 AGC TMUplnk RMB41442		AND=ZAZ7I999
		Verify PLL Phase Error Telemetry X2 RX PLL PhErr RMB40442		AND=ZAZ7I999
		Verify Squelch Status Telemetry X2 SqlchSts-SS RMB44442		AND=ZAZ7I999
		Verify Telemetry X2 TcBitRateTCB RMB62442		(None)
39.5		TM Encoder (in use) verification		<input type="checkbox"/>
		Verify Telemetry TME_BITRATE DEMRF160		AND=ZAZ7J999
		Verify Telemetry BSW_TM_MODE DEMF0160		AND=ZAZ7J999
39.6		TWTA2 setting verification		<input type="checkbox"/>
		Verify OPLCL50 (TWTA 2) Status Telemetry TwtA_2_L50_1S WM92E565	= ON	AND=ZAZ7J999
		Verify TWTA2 current 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

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		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
39.7		UIU table verification		□
		Verify Telemetry XpndTx2FuncSts DEL31170	= On	AND=ZAZ7M999
		Verify Telemetry Twta2FuncSts DEL23170	= On	AND=ZAZ7M999
		Verify Telemetry Epc2FuncSts DEG29170	= On	AND=ZAZ7M999
		Verify Telemetry TwtAmp2FuncSts DEH17170	= On	AND=ZAZ7M999
40		Verify RFDN SWs position		Next Step: END
		Verify Telemetry RFDN SW1 Pos A RMB05436		AND=ZAZ7J999
		Verify Telemetry RFDN SW1 Pos B RMB09436		AND=ZAZ7J999
		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 Telemetry Rfdn1FuncSts DEH49170		AND=ZAZ7M999

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		Verify Telemetry Rfdn2FuncSts DEH53170		AND=ZAZ7M999
		Verify Telemetry Rfdn3FuncSts DEH57170		AND=ZAZ7M999
		Verify Telemetry Rfdn4FuncSts DEH61170		AND=ZAZ7M999
		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
<b>End of Procedure</b>				