

Tx and TM encoder in use configuration for MR
File: H_FCP_TTC_TUMR.xls
Author: E. Picallo



Procedure Summary

Objectives

This procedure describes the steps needed to change the TM bit rate to 150 kbps when the downlink and the uplink are already established.

This procedure uses the logical addressing thus can be executed under Ground control or not (the commands used can be inserted in the MTL).

Summary of Constraints

XPND and the TM encoder are configured using TC(8,4,115,9), TC(8,4,115,18) and TC(8,4,115,20), 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 value of the RNG modulation index, when CM and RNG are ON, is always 0.6;
- the value of the Output power level is always - 4dBm;
- the External reference and Internal bit pattern generator are always OFF.

If the ASW function "On board Scheduling" is stopped the TCs can not be added into the MTL.
If the function is running, up to four time-tagged TCs are released per second.

Spacecraft Configuration

Start of Procedure

CDMU in default configuration;
Downlink active via TX and TWTA marked as "Nominal" and "Not Failed" in the "Unit in Use" table (nominally the branch 1);
TM bit rate set to any value;
XPND configuration: CM OFF or CM ON and RNG OFF or CM ON and RNG ON.

End of Procedure

CDMU in default configuration;
Downlink active via TX and TWTA marked as "Nominal" and "Not Failed" in the "Unit in Use" table (nominally the branch 1);
TM bit rate equal to 150 kbps;
XPND configuration: CM OFF or CM ON and RNG OFF or CM ON and RNG ON.

Reference File(s)

Input Command Sequences

Output Command Sequences

HFR TUMR1
HFR TUMR2
HFR TUMR3

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Referenced Displays

ANDs **GRDs** **SLDs**
 ZAZ7J999
 ZAZ7I999

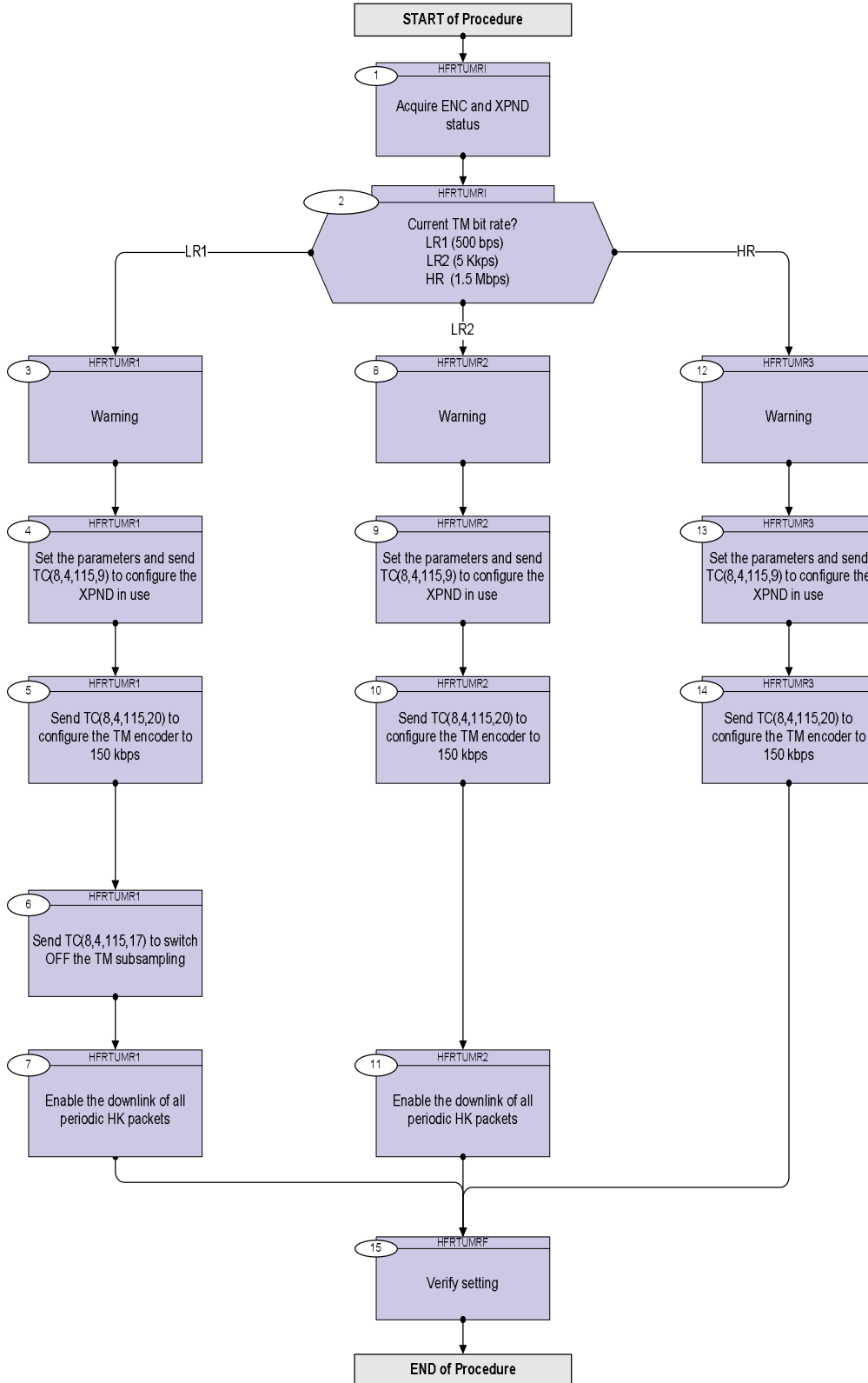
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
14/07/08		1	Created	R. Miniscalco	
30/07/08	1	2	Enable downlink periodic HK packets procedure call updated	E. Picallo	
28/08/08		3	TC DCT18170 Configure Xpnd mask update	E. Picallo	
22/10/08		4	TCs XPND Config & TM ENC Config blocked	E. Picallo	
03/11/08	2	5	configuration XPND CM and RM not updated	E. Picallo	
21/03/09	2.2	5.01	Validation : Step 6: wrong command description corrected	E. Picallo	

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Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
Beginning of Procedure				
TC Seq. Name : HFRTUMRI (Tx use for MR initial) Tx and TM encoder in use configuration for MR TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
1		Acquire ENC and XPND status		Next Step: 2
		Verify Telemetry TME_BITRATE DEMRF160		AND=ZAZ7I999
1.1		Verifications if XPND1 in use		<input type="checkbox"/>
		Verify Rx1 AGC/Uplink Level Telemetry X1 AGC TMUplnk RMB20442	>= -141.0 dbmW <= -45.0 dbmW	AND=ZAZ7I999
		Verify Rx1 Lock status Telemetry X1 Rx Lock - RL RMB24442	= Locked	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	= OFF	AND=ZAZ7I999
		Verify High Rate status Telemetry X1 HIRateMD-HRM RMB28442		AND=ZAZ7I999
		Verify Coherent Mode status Telemetry X1 Coher MOD-CM RMB26442		AND=ZAZ7I999
		Verify Ranging Modulator status Telemetry X1 Rang MOD-RM RMB27442		AND=ZAZ7I999
1.2		Verifications if XPND2 in use		<input type="checkbox"/>
		Verify RX2 AGC Level Telemetry X2 AGC TMUplnk RMB41442	>= -141.0 dbmW <= -45.0 dbmW	AND=ZAZ7I999
		Verify RX2 Lock status Telemetry X2 Rx Lock - RL RMB45442	= Locked	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

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Medium Rate Modulator status Telemetry X2 MedRate-MRM RMB50442	= OFF	AND=ZAZ7I999
		Verify High Rate Modulator status Telemetry X2 HIRateMD-HRM RMB49442		AND=ZAZ7I999
		Verify Coherent Mode status Telemetry X2 Coher MOD-CM RMB47442		AND=ZAZ7I999
		Verify Ranging Modulator status Telemetry X2 Rang MD - RM RMB48442		AND=ZAZ7I999
2		Current TM bit rate? LR1 (500 bps) LR2 (5 Kkps) HR (1.5 Mbps)		Next Step: LR1 3 LR2 8 HR 12
<p>TC Seq. Name :HFRTUMR1 (Txuse from LR1 to MR) Tx and TM encoder configuration from LR1 to MR</p> <p>TimeTag Type: B Sub Schedule ID:</p> <p style="text-align: center;">□</p>				
3		Warning		Next Step: 4
		<p>The current TM bit rate is not MR. Therefore a TM bit rate switch will be performed.</p> <p>A specific feature of this switching, is that it shall be done by several TC. Specifically, separate TC will be necessary to set-up the TM encoder, and the XPND.</p> <p>In the time interval between those TC, the TM flux will be some TM disruption, and no CLCW will be available to acknowledge the TC.</p> <p>Therefore send those TCs blocked. The blocked commands will be encoded in a single CLTU.</p>		
4		Set the parameters and send TC(8,4,115,9) to configure the XPND in use		Next Step: 5

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.00 UT=+	Execute Telecommand XpndConfigure_Templ Command Parameter(s) : 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 XpndConfDW2OPLS DH032170 TC Control Flags : GBM IL DSE -SY -- --- Subsch. ID : 10 Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9)	DCT18170 XpndInUseLogic 11 <bin> ON OFF (Def) OFF (Def) ON ON ON ON ON 111 <bin> 1111 <bin> ON 111111111111 <bin> 1111 <bin> 0 <dec> (Def) OFF (Def) OFF (Def) OFF (Def) OFF (Def) ON OFF (Def) OFF (Def) 0.6 1.2 OFF (Def) 0 <dec> (Def)	
		Notice that in the configuration of the XPND the coherent mode is unchanged. Although if the receiver losses lock for more than 0.2 s, then the transponder reverts back to noncoherent mode. When receiver locks again, the transponder automatically returns to the memorised mode.		
5		Send TC(8,4,115,20) to configure the TM encoder to 150 kbps		Next Step: 6
	ET=+00.00.05 UT=+	Execute Telecommand TtcConfTmEncInUseMedium TC Control Flags : GBM IL DSE -E -- --- Subsch. ID : 10 Det. descr. : TTC: Config TM Enc In Use Mode Medium 150 kbps, TC(8,4,115,20)	DC22F170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
6		Send TC(8,4,115,17) to switch OFF the TM subsampling		Next Step: 7
	ET=+00.00.05 UT=+	Execute Telecommand TtcSwitchTmSubsamlOff TC Control Flags : <div style="text-align: right;">GBM IL DSE --Y -- ---</div> Subsch. ID : 10 Det. descr. : TTC: Switch TM Subsampling Off TC(8,4,115,17)	DC03F170	
7		Enable the downlink of all periodic HK packets		Next Step: 15
		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))		
TC Seq. Name :HFRTUMR2 (Txuse from LR2 to MR) Tx and TM encoder in use configuration from LR2 to MR TimeTag Type: B Sub Schedule ID: <input type="checkbox"/>				
8		Warning		Next Step: 9
		<p>The current TM bit rate is not MR. Therefore a TM bit rate switch will be performed.</p> <p>A specific feature of this switching, is that it shall be done by several TC. Specifically, separate TC will be necessary to set-up the TM encoder, and the XPND.</p> <p>In the time interval between those TC, the TM flux will be some TM disruption, and no CLCW will be available to acknowledge the TC.</p> <p>Therefore send those TCs blocked. The blocked commands will be encoded in a single CLTU.</p>		
9		Set the parameters and send TC(8,4,115,9) to configure the XPND in use		Next Step: 10

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.00 UT=+	Execute Telecommand XpndConfigure_Templ Command Parameter(s) : XpndId DH018170 XpndInUseLogic XpndConfMask1Unus DH220170 11 <bin> XpndConfMask1_ER DH221170 ON XpndConfMask1_CM DH222170 OFF (Def) XpndConfMask1_RM DH223170 OFF (Def) XpndConfMask1_HRM DH224170 ON XpndConfMask1_MRM DH225170 ON XpndConfMask1LRM1 DH226170 ON XpndConfMask1LRM2 DH227170 ON XpndConfMask1_RMI DH228170 111 <bin> XpndConfMask1_TMI DH229170 1111 <bin> XpndConfMask2_PG DH230170 ON XpndConfMask2Unus DH231170 111111111111 <bin> XpndConfMask2OPLS DH232170 1111 <bin> 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 : GBM IL DSE -SY -- --- Subsch. ID : 10 Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9)	DCT18170	
		Notice that in the configuration of the XPND the coherent mode is unchanged. Although if the receiver losses lock for more than 0.2 s, then the transponder reverts back to noncoherent mode. When receiver locks again, the transponder automatically returns to the memorised mode.		
10		Send TC(8,4,115,20) to configure the TM encoder to 150 kbps		Next Step: 11
	ET=+00.00.05 UT=+	Execute Telecommand TtcConfTmEncInUseMedium TC Control Flags : GBM IL DSE -E -- --- Subsch. ID : 10 Det. descr. : TTC: Config TM Enc In Use Mode Medium 150 kbps, TC(8,4,115,20)	DC22F170	

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11		Enable the downlink of all periodic HK packets		Next Step: 15																																	
		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 : HFRUMR3 (Tx use from HR to MR)</p> <p>TimeTag Type: B Sub Schedule ID: <input type="checkbox"/></p>																																					
12		Warning		Next Step: 13																																	
		<p>The current TM bit rate is not MR. Therefore a TM bit rate switch will be performed.</p> <p>A specific feature of this switching, is that it shall be done by several TC. Specifically, separate TC will be necessary to set-up the TM encoder, and the XPND.</p> <p>In the time interval between those TC, the TM flux will be some TM disruption, and no CLCW will be available to acknowledge the TC.</p> <p>Therefore send those TCs blocked. The blocked commands will be encoded in a single CLTU.</p>																																			
13		Set the parameters and send TC(8,4,115,9) to configure the XPND in use		Next Step: 14																																	
	ET=+00.00.00 UT=+	Execute Telecommand <p style="text-align: center;">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 <bin></td> </tr> <tr> <td>XpndConfMask1_ER</td> <td>DH221170</td> <td>ON</td> </tr> <tr> <td>XpndConfMask1_CM</td> <td>DH222170</td> <td>OFF (Def)</td> </tr> <tr> <td>XpndConfMask1_RM</td> <td>DH223170</td> <td>OFF (Def)</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>111 <bin></td> </tr> <tr> <td>XpndConfMask1_TMI</td> <td>DH229170</td> <td>1111 <bin></td> </tr> </table>	XpndId	DH018170	XpndInUseLogic	XpndConfMask1Unus	DH220170	11 <bin>	XpndConfMask1_ER	DH221170	ON	XpndConfMask1_CM	DH222170	OFF (Def)	XpndConfMask1_RM	DH223170	OFF (Def)	XpndConfMask1_HRM	DH224170	ON	XpndConfMask1_MRM	DH225170	ON	XpndConfMask1LRM1	DH226170	ON	XpndConfMask1LRM2	DH227170	ON	XpndConfMask1_RMI	DH228170	111 <bin>	XpndConfMask1_TMI	DH229170	1111 <bin>	DCT18170	
XpndId	DH018170	XpndInUseLogic																																			
XpndConfMask1Unus	DH220170	11 <bin>																																			
XpndConfMask1_ER	DH221170	ON																																			
XpndConfMask1_CM	DH222170	OFF (Def)																																			
XpndConfMask1_RM	DH223170	OFF (Def)																																			
XpndConfMask1_HRM	DH224170	ON																																			
XpndConfMask1_MRM	DH225170	ON																																			
XpndConfMask1LRM1	DH226170	ON																																			
XpndConfMask1LRM2	DH227170	ON																																			
XpndConfMask1_RMI	DH228170	111 <bin>																																			
XpndConfMask1_TMI	DH229170	1111 <bin>																																			

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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	ON 111111111111 <bin> 1111 <bin> 0 <dec> (Def) OFF (Def) OFF (Def) OFF (Def) OFF (Def) OFF (Def) ON OFF (Def) OFF (Def) 0.6 1.2 OFF (Def) 0 <dec> (Def)	
		XpndConfDW2OPLS DH032170 TC Control Flags : GBM IL DSE -SY -- --- Subsch. ID : 10 Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9)	-4	
		Notice that in the configuration of the XPND the coherent mode is unchanged. Although if the receiver losses lock for more than 0.2 s, then the transponder reverts back to noncoherent mode. When receiver locks again, the transponder automatically returns to the memorised mode.		
14		Send TC(8,4,115,20) to configure the TM encoder to 150 kbps		Next Step: 15
	ET=+00.00.05 UT=+	Execute Telecommand TtcConfTmEncInUseMedium TC Control Flags : GBM IL DSE -E- -- --- Subsch. ID : 10 Det. descr. : TTC: Config TM Enc In Use Mode Medium 150 kbps, TC(8,4,115,20)	DC22F170	
TC Seq. Name : HFRTUMRF (Tx use for MR final) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
15		Verify setting		Next Step: END
		Verify Telemetry TME_BITRATE DEMRF160	= 150 Kbps	AND=ZAZ7J999

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		Verify Telemetry BSW_TM_MODE DEMF0160	= AllVc	AND=ZAZ7I999
15.1		<i>verifications if XPND1 in use</i>		<input type="checkbox"/>
		Verify Medium Rate Modulator status Telemetry X1 MedRate-MRM RMB29442	= ON	AND=ZAZ7I999
		Verify Coherent Mode status Telemetry X1 Coher MOD-CM RMB26442		AND=ZAZ7I999
		Verify Ranging Modulator status Telemetry X1 Rang MOD-RM RMB27442		AND=ZAZ7I999
		Verify RNG Modulation Index Telemetry X1 RNGMD ID-RMI RMB32442	= 0.6 rad	AND=ZAZ7I999
15.2		<i>Verifications if XPND2 in use</i>		<input type="checkbox"/>
		Verify Medium Rate Modulator status Telemetry X2 MedRate-MRM RMB50442	= ON	AND=ZAZ7I999
		Verify Coherent Mode status Telemetry X2 Coher MOD-CM RMB47442		AND=ZAZ7I999
		Verify Ranging Modulator status Telemetry X2 Rang MD - RM RMB48442		AND=ZAZ7I999
		Verify RNG Modulation Index Telemetry X2 RNGMD ID-RMI RMB53442	= 0.6 rad	AND=ZAZ7I999
End of Procedure				