Tx1 and TM encoder in use configuration for LR1
File: H_CRP_TTC_T1L1.xls
Author: E. Picallo

Procedure Summary

Objectives

This procedure describes the steps needed to change the TM bit rate to 500 bps when the downlink and the uplink are already established.

This procedure does not use the logical addressing, thus must be executed under Ground control (the commands used cannot be inserted in the MTL).

Summary of Constraints

XPND1 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.

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

Spacecraft Configuration

Start of Procedure

CDMU in default configuration;
Downlink active via TX 1 and TWTA 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 1 and TWTA 1;
TM bit rate equal to 500 bps;
XPND configuration: CM and RM unchanged.

Reference File(s)

Input Command Sequences

Output Command Sequences

HRRT1L11
HRRT1L12

Referenced Displays

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ANDs	GRDs	SLDs
ZAZ7I999		
ZAZ7J999		

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
29/07/08	1	1	Created	E. Picallo	
15/12/08	2	2	TC DCT18170 Configure Xpnd mask update TCs XPND Config & TM ENC Config blocked TC XPND Config do not update CM and RM	E. Picallo	
14/03/09	2.2	2.01	Validation : Verification RNG mod status corrected	E. Picallo	

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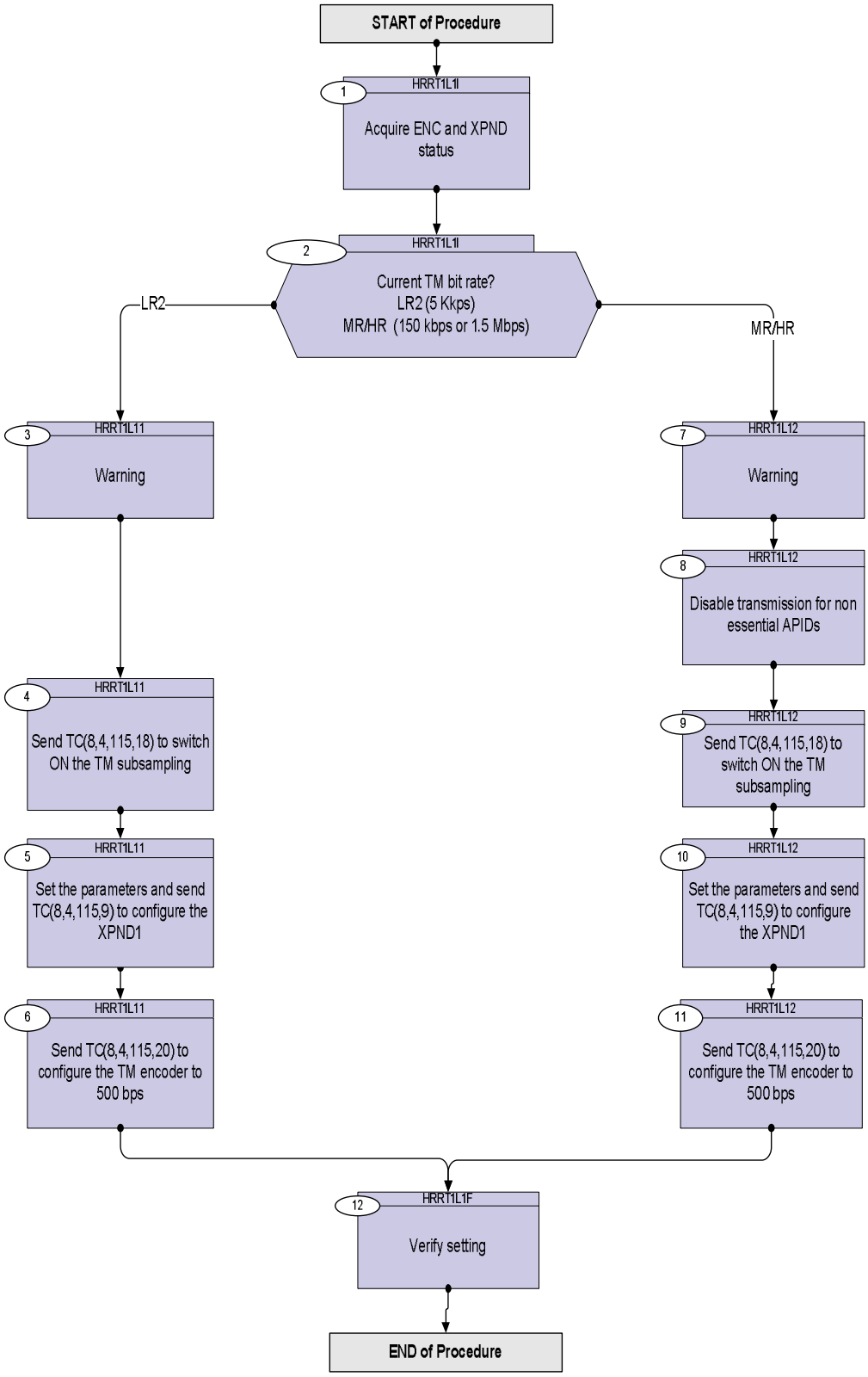
Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Beginning of Procedure		
		TC Seq. Name :HRRT1L1I (Tx1 for LR1 initial) Tx1 and TM encoder in use configuration for LR1 *TimeTag Type: N* *Sub Schedule ID:*		
1		*Acquire ENC and XPND status*		Next Step: 2
		Verify RX Lock status Telemetry **X1 Rx Lock - RL** **RMB24442**	**= Locked**	AND=ZAZ7I999
		Verify AGC/Uplink Level Telemetry **X1 AGC TMUplnk** **RMB20442**	**>= -141.0 dbmW**	AND=ZAZ7I999
		Verify Low Rate-1 status Telemetry **X1 LowRate-1 MD** **RMB30442**	**= OFF**	AND=ZAZ7I999
		Verify Low Rate-2 status Telemetry **X1 LowRate-2 MD** **RMB31442**		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 Coherent Mode status Telemetry **X1 Coher MOD-CM** **RMB26442**		AND=ZAZ7I999
		Verify Ranging Modulator status Telemetry **X1 Rang MOD-RM** **RMB27442**		AND=ZAZ7I999
		Verify Telemetry **TME_BITRATE** **DEMRF160**		AND=ZAZ7J999
2		*Current TM bit rate?* *LR2 (5 Kkps)* *MR/HR (150 kbps or 1.5 Mbps)*		Next Step: MR/HR 7 LR2 3
		TC Seq. Name :HRRT1L11 (Tx1 from LR2 to LR1) Tx1 and TM encoder in use configuration from LR2 to LR1 *TimeTag Type: N* *Sub Schedule ID:*		
3		*Warning*		Next Step: 4

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		The current TM bit rate is not LR1. Therfore a TM bit rate switch will be performed. **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.** **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. Therefore send those TCs blocked (encoded in a single CLTU) or send TCs TT.**		
4		*Send TC(8,4,115,18) to switch ON the TM subsampling*		Next Step: 5
		Execute Telecommand **TtcSwitchTmSubsamplOn** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : TTC: Switch TM Subsampling On TC(8,4,115,18)	**DC04F170**	
5		*Set the parameters and send TC(8,4,115,9) to configure the XPND1*		Next Step: 6
		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**	**DCT18170** **XpndA** (Def) **11 <bin>** **ON** **OFF** (Def) **OFF** (Def) **ON** **ON** **ON** **ON** **Update** **Update**	

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** **-SY -- ---** *Subsch. ID : 10* Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9)	**ON** **11111111111 <bin>** **Update** **0 <dec>** (Def) **OFF** (Def) **OFF** (Def) **OFF** (Def) **OFF** (Def) **OFF** (Def) **ON** **OFF** (Def) **0.6** **1.2** **OFF** (Def) **0 <dec>** (Def) **-4**	
		Notice that in the configuration of the XPND the coherent mode is unchanged. Altought 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.		
6		*Send TC(8,4,115,20) to configure the TM encoder to 500 bps*		Next Step: 12
		Execute Telecommand **TtcConfigTmEncInUseLow1** *TC Control Flags :* **GBM IL DSE** **-E- -- ---** *Subsch. ID : 10* Det. descr. : TTC: Config TM Enc In Use Mode Low 1,500 bps, TC(8,4,115,20)	**DC12F170**	
		TC Seq. Name :HRRT1L12 (Tx1 from MR to LR1) Tx1 and TM encoder in use configuration from MR to LR1 *TimeTag Type: N* *Sub Schedule ID:*		
7		*Warning*		Next Step: 8

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		The current TM bit rate is not LR1. Therfore a TM bit rate switch will be performed. **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.** **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. Therfore send those TCs blocked (encoded in a single CLTU) or send TCs TT.**		
8		*Disable transmission for non essential APIDs*		Next Step: 9
		Execute Procedure: **H_CRP_DHS_1001** **Disabling transmission for non essential APIDs.**		
9		*Send TC(8,4,115,18) to switch ON the TM subsampling*		Next Step: 10
		Execute Telecommand **TtcSwitchTmSubsamplOn** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : TTC: Switch TM Subsampling On TC(8,4,115,18)	**DC04F170**	
10		*Set the parameters and send TC(8,4,115,9) to configure the XPND1*		Next Step: 11
		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**	**DCT18170** **XpndA** (Def) **11 <bin>** **ON** **OFF** (Def) **OFF** (Def) **ON** **ON** **ON** **ON** **Update** **Update**	

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 -SY -- --- *Subsch. ID : 10* Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9)	ON 11111111111 <bin> Update 0 <dec> (Def) OFF (Def) OFF (Def) OFF (Def) OFF (Def) OFF (Def) ON OFF (Def) 0.6 1.2 OFF (Def) 0 <dec> (Def) -4	
		Notice that in the configuration of the XPND the coherent mode is unchanged. Altought 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.		
11		*Send TC(8,4,115,20) to configure the TM encoder to 500 bps*		Next Step: 12
		Execute Telecommand TtcConfigTmEncInUseLow1 *TC Control Flags :* GBM IL DSE -E- -- --- *Subsch. ID : 10* Det. descr. : TTC: Config TM Enc In Use Mode Low 1,500 bps, TC(8,4,115,20)	DC12F170	
		TC Seq. Name :HRRT1L1F (Tx1 in LR1 final) *TimeTag Type:* *Sub Schedule ID:*		
12		*Verify setting*		Next Step: END
		Verify Telemetry TME_BITRATE DEMRF160	= 500 bps	AND=ZAZ7J999

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Step No.	Time	Activity/Remarks		TC/TLM	Display/ Branch
		Verify Telemetry **BSW_TM_MODE**	**DEMF0160**	**= OnlyFilteredVc**	AND=ZAZ7J999
		Verify Low Rate-1 status Telemetry **X1 LowRate-1 MD**	**RMB30442**	**= 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
		End of Procedure			