TTC commisioning sequence of activities
File: H_COP_TTC_TTC0.xls
Author: E. Picallo

Procedure Summary

Objectives

This procedure describes the TTC commisioning sequence of activities.

There is a Prime and Redundant TTC subsystem, and the basic Commissioning sequence is:
- TTC1 Health Check
- TTC1 Receiver Thresholds Check
- TTC1 Transmitter + Telemetry + Ranging Functional check
- TTC1 Telemetry Rates Functional Check
- TTC2 Health Check
- TTC2 Receiver Thresholds Check
- TTC2 Telemetry Rates Functional Check
- MGA Characterisation

Summary of Constraints

This procedure is basically addressing the list of activities in TTC commisioning providing a mapping between COP activities IDS and FOP procedures IDs.

The order in the steps execution of this procedure is not constaining the TTC COP activites, being their execution possibly reschedule according to the need.

Constrain on the different activities are reported in the dedicated procedures

Spacecraft Configuration

Start of Procedure

CDMU in default configuration;
RX1 TC rate 4 kbps
RX2 TC rate 125 bps
TX1 ON and TX2 OFF, TM rate 150kbps
RFDN configuration: BBAB (LGA-1 on TX1&RX1 / MGA on TX2&RX2)

End of Procedure

CDMU in default configuration;
RX1 TC rate 4 kbps
RX2 TC rate 125 bps
TX1 ON and TX2 OFF, TM rate 150kbps
RFDN configuration: ABAB (MGA on TX1&RX1 / LGA-1 on TX2&RX2)

Reference File(s)

Input Command Sequences

Output Command Sequences

Referenced Displays

ANDs **GRDs** **SLDs**
(None)

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Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
09/01/09	2	1	Created	E. Picallo	
02/03/09	2.1	2	MGA Characterisation procedure reference added	E. Picallo	
16/03/09		3	References updated according to 090228 HCOP Timeline (1_0_00).mpp	E. Picallo	
22/03/09	2.2	4	constarin execution of this procedure is not constaining the TTC COP activites added	E. Picallo	
07/04/09		5	Initial/End config corrected: RX1 rate = 4 Kbps , RX2 rate= 125 bps	E. Picallo	
16/04/09	2.3	6	TTC HR TM Check on LGA added□ Anntenna configurations for ACMS SCM Functional Checks added	E. Picallo	

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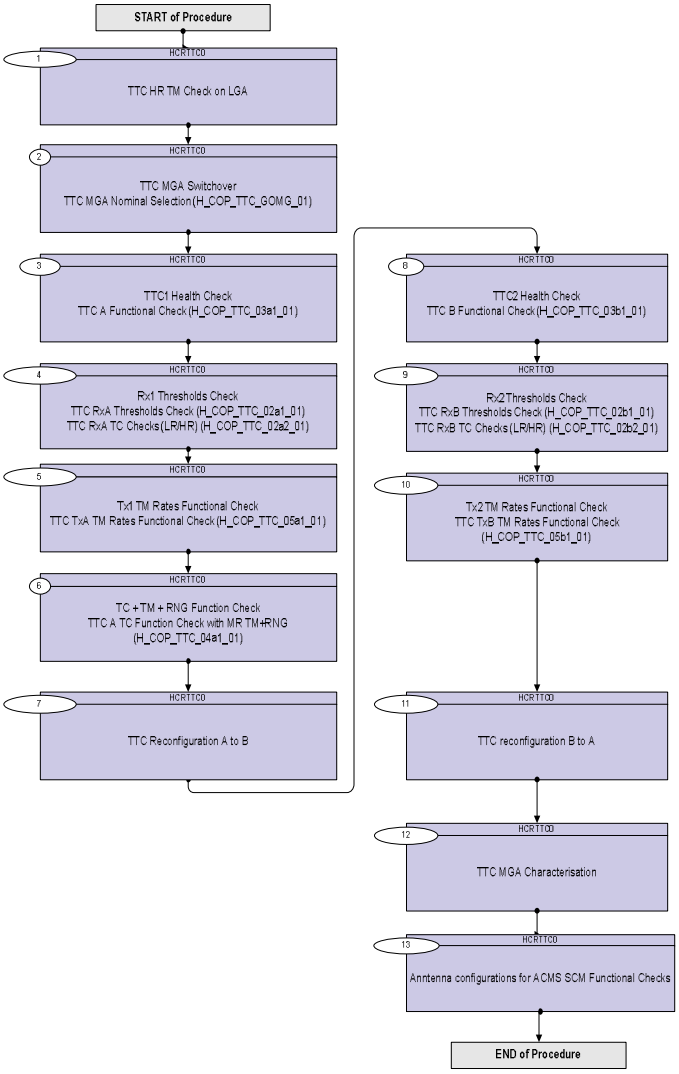
Procedure Flowchart Overview



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Beginning of Procedure		
		TC Seq. Name :HCRTTC0 (TTC COP sequence) TTC commisioning sequence of activities *TimeTag Type: N* *Sub Schedule ID:*		
1		*TTC HR TM Check on LGA*		Next Step: 2
1.1		*TTC HR Telemetry Check (H_COP_TTC_HRTM_01)*		
		Call procedure H_FCP_TTC_TUHR to perform SSMM Dumps at HR TM		
		Execute Procedure: **H_FCP_TTC_TUHR** **Tx and TM encoder in use configuration for HR**		
1.2		*TTC switch to MR Telemetry (H_COP_TTC_MRTM_01)*		
		Execute Procedure: **H_FCP_TTC_TUMR** **Tx and TM encoder in use configuration for MR**		
2		*TTC MGA Switchover* *TTC MGA Nominal Selection (H_COP_TTC_GOMG_01)*		Next Step: 3
		Call procedure H_COP_TTC_TTC1 (Switch TTC chain 1 to MGA) to configure the Nominal/Earth acquisition (NOM1) antenna configuration: RFDN SWs position ABAB D/L path: TX1 - TWTA1 - MGA U/L path: MGA - RX1 (LGA1 – RX2)		
		Execute Procedure: **H_COP_TTC_TTC1** **Switch TTC chain 1 to MGA**		
3		*TTC1 Health Check* *TTC A Functional Check (H_COP_TTC_03a1_01)*		Next Step: 4

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Procedure: **H_FCP_TTC_CHECK** **TTC Subsystem Checkout**		
		Check the expected values according to the current spacecraft mode. **TTC 1 Nominal mode:** **RX1 TC rate 4 kbps** **RX2 TC rate 125 bps (commanded during LEOP)** **TX1 ON and TX2 OFF, TM rate 150kbps** **RFDN configuration ABAB: MGA on TX1 & RX1, LGA-1 on TX2 & RX2**		
4		*Rx1 Thresholds Check* *TTC RxA Thresholds Check (H_COP_TTC_02a1_01)* *TTC RxA TC Checks (LR/HR) (H_COP_TTC_02a2_01)*		Next Step: 5
		Call the procedure H_COP_TTC_TTC2 (RXs Thresholds Check) and select Rx1		
		Execute Procedure: **H_COP_TTC_TTC2** **RXs Thresholds Check**		
5		*Tx1 TM Rates Functional Check* *TTC TxA TM Rates Functional Check (H_COP_TTC_05a1_01)*		Next Step: 6
		Call the procedure H_COP_TTC_TTC5 (TM Functional Check) and select XPND1		
		Execute Procedure: **H_COP_TTC_TTC5** **TM Functional Check**		
6		*TC + TM + RNG Function Check* *TTC A TC Function Check with MR TM+RNG (H_COP_TTC_04a1_01)*		Next Step: 7
		Call the procedure H_COP_TTC_TTC4 (TC + TM + ranging check)		
		Execute Procedure: **H_COP_TTC_TTC4** **TC + TM + ranging check**		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
7		*TTC Reconfiguration A to B*		Next Step: 8
7.1		*TTC MGA/LGA1 Gain Comparison (H_COP_TTC_05ml_01)*		
		This is a passive check of the Rx1 Rx2 AGC values (since they are nominally connected to either MGA/LGA or LGA/MGA). **The check should be performed by obtaining the AGC telemetry immediately before and after the RFDN switchover, since this will remove any asymmetry. (Changes due to the range effect will also be minimised.)**		
		Verify Telemetry **XPD1_RX1_AGC_LV RMB09442**		(None)
		Verify Telemetry **XPD2_RX2_AGC_LV RMB10442**		(None)
7.2		*TTC Reconfiguration A to B* *TTC Reconfigure to TTC B (H_COP_TTC_03b0_01)*		
		Call the procedure H_COP_TTC_T12 (Switchover from chain 1 to 2) and choose option "XPND2/NOM" in MBR		
		Execute Procedure: **H_COP_TTC_T12** **Switchover from chain 1 to 2** *Parameters:* HRM XpndConfDW1_HRM OFF MRM XpndConfDW1_MRM ON LRM1 XpndConfDW1LRM1 OFF LRM2 XpndConfDW1LRM2 OFF		
7.3		*TTC MGA/LGA1 Gain Comparison (H_COP_TTC_05ml_02)*		
		Verify Telemetry **XPD1_RX1_AGC_LV RMB09442**		(None)
		Verify Telemetry **XPD2_RX2_AGC_LV RMB10442**		(None)
8		*TTC2 Health Check* *TTC B Functional Check (H_COP_TTC_03b1_01)*		Next Step: 9

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Procedure: **H_FCP_TTC_CHECK** **TTC Subsystem Checkout**		
		Check the expected values according to the current spacecraft mode. **TTC 2 Nominal mode:** **RX2 TC rate 4 kbps** **RX1 TC rate 125 bps** **TX2 ON and TX1 OFF, TM rate 150kbps** **RFDN configuration BBAB: MGA on TX2 & RX2, LGA-1 on TX1 & RX1**		
9		*Rx2 Thresholds Check* *TTC RxB Thresholds Check (H_COP_TTC_02b1_01)* *TTC RxB TC Checks (LR/HR) (H_COP_TTC_02b2_01)*		Next Step: 10
		Call the procedure H_COP_TTC_TTC2 (RXs Thresholds Check) and select Rx2		
		Execute Procedure: **H_COP_TTC_TTC2** **RXs Thresholds Check**		
10		*Tx2 TM Rates Functional Check* *TTC TxB TM Rates Functional Check (H_COP_TTC_05b1_01)*		Next Step: 11
		Call the procedure H_COP_TTC_TTC5 (TM Functional Check) and select XPND2		
		Execute Procedure: **H_COP_TTC_TTC5** **TM Functional Check**		
11		*TTC reconfiguration B to A*		Next Step: 12
11.1		*TTC MGA/LGA1 Gain Comparison (H_COP_TTC_05ml_03)*		□
		Verify Telemetry **XPD1_RX1_AGC_LV** **RMB09442**		(None)
		Verify Telemetry **XPD2_RX2_AGC_LV** **RMB10442**		(None)

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
11.2		*TTC Reconfiguration B to A* *TTC Reconfigure to TTC A (H_COP_TTC_03a0_01)*		□
		Call the procedure H_COP_TTC_T21 (Switchover from chain 2 to 1) and choose option "XPND1/NOM" in MBR		
		Execute Procedure: **H_COP_TTC_T21** **Switchover from chain 2 to 1** *Parameters:* HRM XpndConfDW1_HRM OFF MRM XpndConfDW1_MRM ON LRM1 XpndConfDW1LRM1 OFF LRM2 XpndConfDW1LRM2 OFF		
11.3		*TTC MGA/LGA1 Gain Comparison (H_COP_TTC_05ml_04)*		□
		Verify Telemetry **XPD1_RX1_AGC_LV RMB09442**		(None)
		Verify Telemetry **XPD2_RX2_AGC_LV RMB10442**		(None)
12		*TTC MGA Characterisation*		Next Step: 13
12.1		*ACMS PTG Slew to 15 Theta for MGA Check (H_COP_AOC_T151_01)*		□
12.2		*TTC1 MGA Edges check* *TTC MGA Check at 15 Theta (H_COP_TTC_07a1_01)*		□
		Sequence of activities: **ACMS PTG Slew to 15 Theta for MGA Check (H_COP_AOC_T151_01)** **TTC MGA Check at 15 Theta (H_COP_TTC_07a1_01)** **ACMS PTG Slew to OP domain (H_COP_AOC_T150_01)** **TTC MGA Edge Check #1 (Pointing) (H_COP_TTC_07a5_01)** **TTC MGA Edge Check #2 (Line) (_COP_TTC_07a7_01)** **Call the procedure H_COP_TTC_TTC7 (MGA Characterisation)**		
		Execute Procedure: **H_COP_TTC_TTC7** **MGA Characterisation**		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
13		*Anntenna configurations for ACMS SCM Functional Checks*		Next Step: END
13.1		*TTC LGA Nominal Selection for ACMS PTG check (H_COP_TTC_GOLG_02)*		
		Configure RFDN SWs position BBAB *D/L path:* TX1 - TWTA1 - LGA1 *U/L path:* LGA1 - RX1 *(MGA - RX2)*		
		Execute Procedure: **H_LEO_TTC_MGAR** **Switch RX2 to MGA**		
13.2		*ACMS SCM Fine Pointing Functional Check (LGA) (H_COP_AOC_0650_01)*		
		Reference to ACMS activity added here for completness only.		
13.3		*TTC Return to MGA Nominal Selection (H_COP_TTC_GOMG_02)*		
		Call procedure H_COP_TTC_TTC1 (Switch TTC chain 1 to MGA) to configure the Nominal/Earth acquisition (NOM1) antenna configuration: RFDN SWs position ABAB D/L path: TX1 - TWTA1 - MGA U/L path: MGA - RX1 (LGA1 – RX2)		
		Execute Procedure: **H_COP_TTC_TTC1** **Switch TTC chain 1 to MGA**		
End of Procedure				