

TM Functional Check
 File: H_COP_TTC_TTC5.xls
 Author: E. Picallo



Procedure Summary

Objectives

This procedure describes the steps needed to perform a comparison of MGA and LGAl received signals to check gain difference

Summary of Constraints

The TTC configuration is selected through ASW TC(8,4,115,X); thus the status of the ASW function "TTC Management" has to be "running".

The test should be performed at high elevation to avoid atmospheric loss, e.g greater than 20deg .

Downlink TM link test is dependent on range and antenna. The expected bit rates would be corrected according to distance, so performing this test close to the Earth (low range) is OK.

The downlink TM link test can be performed in Coherent or non Coherent mode.

Spacecraft Configuration

Start of Procedure

CDMU in default configuration;
 MGA on TX in use, LGAl on Rx not in use
 RX in use = 4Kbps, RX not in use = 125bps
 TX in use = 150 Kbps

End of Procedure

CDMU in default configuration;
 LGAl on TX in use, MGA on Rx not in use
 RX in use = 4 Kbps, RX not in use = 125 bps
 TX in use = 150 Kbps

Reference File(s)

Input Command Sequences

Output Command Sequences

HCRTTC51
 HCRTTC52

Referenced Displays

ANDs GRDs SLDs

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
10/10/08		1	Created	E. Picallo	

Status : Version 5 - Unchanged
 Last Checkin: 03/04/09

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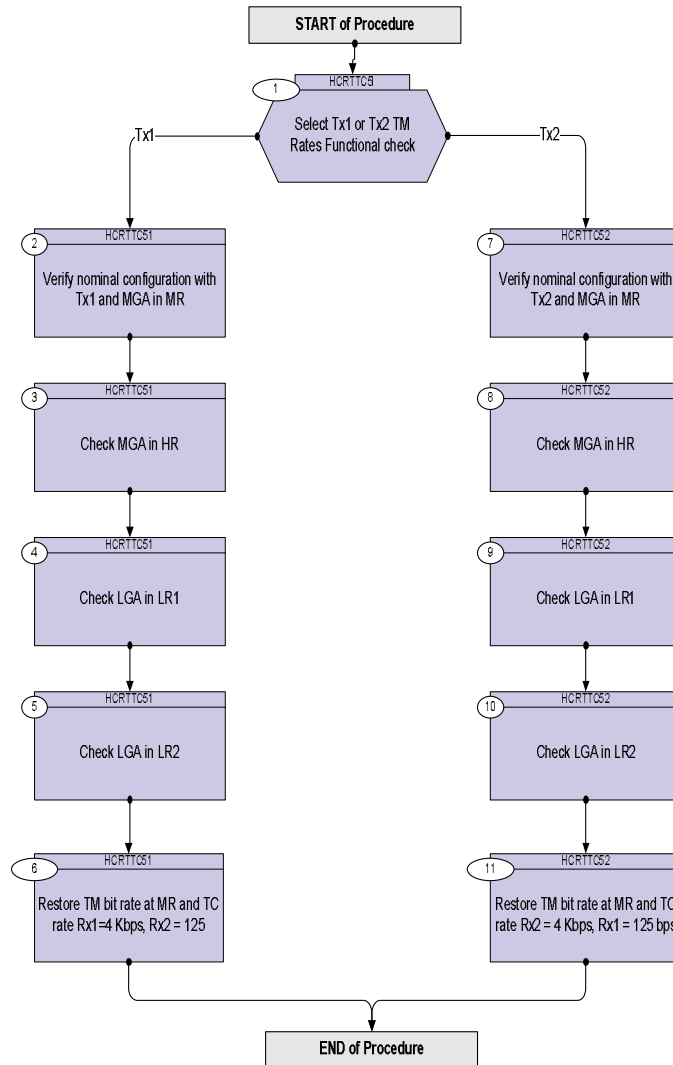


06/01/09	2	2	re-align sequence of activities according to H-CPOP	E. Picallo	
28/02/09	2.1	3	constrains section updated according to SRE-PT-055178 (COP #08 HP-SVM) MoM inputs	E. Picallo	
15/03/09		4	Added Ground station TM bit rate configurations steps Restore TM bit rate to MR and TC rate to 4 Kbps at end of sequence	E. Picallo	
16/03/09	2.2	4.01	Validation : comment about survial configuration deleted	E. Picallo	
03/04/09	2.3	5	End TC bit rates changed: - For TTC1 check Rx1=4Kbps, Rx2=125bps - For TTC2 check Rx2=4Kbps, Rx1=125bps	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 : HCR TTC5I (TM Function CheckIni) COP_TTC_05 TM Functional Check Initial TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
1		Select Tx1 or Tx2 TM Rates Functional check		Next Step: Tx1 2 Tx2 7
		The test should be performed at high elevation to avoid atmospheric loss, e.g greater than 20deg .		
		Downlink TM link test is dependent on range and antenna. The expected bit rates would be corrected according to distance, so performing this test close to the Earth (low range) is OK.		
		The downlink TM link test an be performed in Coherent or non Coherent mode.		
TC Seq. Name : HCR TTC51 (Tx1 TM FunctionCheck) COP_TTC_05a Tx1 TM Functional Check TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
2		Verify nominal configuration with Tx1 and MGA in MR		Next Step: 3
		Execute Procedure: H_FCP_TTC_CHECK TTC Subsystem Checkout		
2.1		Verify received signal at ground		<input type="checkbox"/>
		Verify received signal at ground to derive Eb/No to derive Eb/No (Nit Energy to Noise density Ratio)		
3		Check MGA in HR		Next Step: 4
3.1		Set GS TM Back-up chain for HR TM		<input type="checkbox"/>
3.2		Configure TX and TM encoder in use configuration for HR		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Procedure: H_FCP_TTC_TUHR Tx and TM encoder in use configuration for HR		
3.3		Set GS TM main chain for HR TM		<input type="checkbox"/>
3.4		Verify received signal at ground		<input type="checkbox"/>
		Verify received signal at ground to derive Eb/No to derive Eb/No (Nit Energy to Noise density Ratio)		
3.5		Send connection test TC (17,1)		<input type="checkbox"/>
		Execute Telecommand TC Control Flags : Subsch. ID : 10 Det. descr. : Perform Connection Test	ConnectionTest DC810180 GBM IL DSE --Y -- --	
3.6		Verify connexion report packet TM(17,2)		<input type="checkbox"/>
		Verify Packet Reception Packet Details:	Link Connection Report APID: 16 Type: 17 Subtype: 2 PI1: PI2:	LnkConnecRep
4		Check LGA in LRI		Next Step: 5
4.1		Change RX1 TC rate to 125bps		<input type="checkbox"/>
		Execute Procedure: H_FCP_TTC_R1BR Select RX1 TC bit rate		
4.2		Set GS uplink rate to 125 bps		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
4.3		Send connection test TC (17,1)		<input type="checkbox"/>
		Execute Telecommand ConnectionTest TC Control Flags : Subsch. ID : 10 Det. descr. : Perform Connection Test GBM IL DSE --Y -- --	DC810180	
4.4		Verify connexion report packet TM(17,2)		<input type="checkbox"/>
		Verify Packet Reception Link Connection Report Packet Details: APID: 16 Type: 17 Subtype: 2 PI1: PI2:	LnkConnecRep	
4.5		Change RX2 TC rate to 4 Kbps		<input type="checkbox"/>
		Execute Procedure: H_FCP_TTC_R2BR Select RX2 TC bit rate		
4.6		Set GS TM Back-up chain for LR1 TM		<input type="checkbox"/>
4.7		Configure Tx and TM encoder in use in LR1		<input type="checkbox"/>
		Execute Procedure: H_CRP_TTC_TUL1 Tx and TM encoder in use configuration for LR1		
4.8		Set GS TM main chain for LR1 TM		<input type="checkbox"/>
4.9		Send connection test TC (17,1)		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand ConnectionTest TC Control Flags : Subsch. ID : 10 Det. descr. : Perform Connection Test GBM IL DSE --Y -- --	DC810180	
4.10		Verify connexion report packet TM(17,2)		<input type="checkbox"/>
		Verify Packet Reception Packet Details: Link Connection Report APID: 16 Type: 17 Subtype: 2 PI1: PI2:	LnkConnecRep	
4.11		Change Tx1 antenna to LGA1		<input type="checkbox"/>
		Call procedure H_FCP_TTC_SWX (Configure RFDN switches) and choose XPND1 Sun otherwise (SUN1): - RFDN SWs position BBAB - D/L path: TX1-TWTA1-LGA1 - U/L path: LGA1-RX1 (MGA-RX2)		
		Execute Procedure: H_FCP_TTC_SWX Configure RFDN switches		
		Send the TCs included in sub-steps #4.11 to #4.12 Time-tagged (loaded into the MTL)		
4.12		Switch ON downlink		<input type="checkbox"/>
		Execute Procedure: H_FCP_TTC_TU01 Switch ON TX and TWTA in use		
4.13		Verify received signal at ground		<input type="checkbox"/>
		Verify received signal at ground to derive Eb/No to derive Eb/No (Nit Energy to Noise density Ratio)		
4.14		Send connection test TC (17,1)		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand ConnectionTest TC Control Flags : Subsch. ID : 10 Det. descr. : Perform Connection Test GBM IL DSE --Y -- --	DC810180	
4.15		Verify connexion report packet TM(17,2)		<input type="checkbox"/>
		Verify Packet Reception Packet Details: Link Connection Report APID: 16 Type: 17 Subtype: 2 PI1: PI2:	LnkConnecRep	
5		Check LGA in LR2		Next Step: 6
5.1		Set GS TM Back-up chain for LR2 TM		<input type="checkbox"/>
5.2		Configure TX and TM encoder in use configuration for LR2		<input type="checkbox"/>
		Execute Procedure: H_CRP_TTC_TUL2 Tx and TM encoder in use configuration for LR2		
5.3		Set GS TM main chain for LR2 TM		<input type="checkbox"/>
5.4		Verify received signal at ground		<input type="checkbox"/>
		Verify received signal at ground to derive Eb/No to derive Eb/No (Nit Energy to Noise density Ratio)		
5.5		Send connection test TC (17,1)		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand ConnectionTest <i>TC Control Flags :</i> Subsch. ID : 10 Det. descr. : Perform Connection Test GBM IL DSE --Y -- --	DC810180	
5.6		Verify connexion report packet TM(17,2)		<input type="checkbox"/>
		Verify Packet Reception Link Connection Report <i>Packet Details:</i> APID: 16 Type: 17 Subtype: 2 PI1: PI2:	LnkConnecRep	
6		Restore TM bit rate at MR and TC rate Rx1=4 Kbps, Rx2 = 125		Next Step: END
6.1		Change RX1 TC rate to 4 Kbps		<input type="checkbox"/>
		Execute Procedure: H_FCP_TTC_R1BR Select RX1 TC bit rate		
6.2		Set GS uplink rate to 4 Kbps		<input type="checkbox"/>
6.3		Send connection test TC (17,1)		<input type="checkbox"/>
		Execute Telecommand ConnectionTest <i>TC Control Flags :</i> Subsch. ID : 10 Det. descr. : Perform Connection Test GBM IL DSE --Y -- --	DC810180	
6.4		Verify connexion report packet TM(17,2)		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
TC Seq. Name : HCR TTC52 (Tx2 TM FunctionCheck) COP_TTC_05b Tx2 TM Functional Check TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
7		Verify nominal configuration with Tx2 and MGA in MR		Next Step: 8
		Execute Procedure: H_FCP_TTC_CHECK TTC Subsystem Checkout		
7.1		Verify received signal at ground		<input type="checkbox"/>
		Verify received signal at ground to derive Eb/No to derive Eb/No (Nit Energy to Noise density Ratio)		
8		Check MGA in HR		Next Step: 9
8.1		Set GS TM Back-up chain for HR TM		<input type="checkbox"/>
8.2		Configure TX and TM encoder in use configuration for HR		<input type="checkbox"/>
		Execute Procedure: H_FCP_TTC_TUHR Tx and TM encoder in use configuration for HR		
8.3		Set GS TM main chain for HR TM		<input type="checkbox"/>
8.4		Verify received signal at ground		<input type="checkbox"/>
		Verify received signal at ground to derive Eb/No to derive Eb/No (Nit Energy to Noise density Ratio)		
8.5		Send connection test TC (17,1)		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand ConnectionTest <i>TC Control Flags :</i> Subsch. ID : 10 Det. descr. : Perform Connection Test GBM IL DSE --Y -- ---	DC810180	
8.6		Verify connexion report packet TM(17,2)		<input type="checkbox"/>
		Verify Packet Reception Link Connection Report <i>Packet Details:</i> APID: 16 Type: 17 Subtype: 2 PI1: PI2:	LnkConnecRep	
9		Check LGA in LR1		Next Step: 10
9.1		Change RX2 TC rate to 125bps		<input type="checkbox"/>
		Execute Procedure: H_FCP_TTC_R2BR Select RX2 TC bit rate		
9.2		Set GS uplink rate to 125 bps		<input type="checkbox"/>
9.3		Send connection test TC (17,1)		<input type="checkbox"/>
		Execute Telecommand ConnectionTest <i>TC Control Flags :</i> Subsch. ID : 10 Det. descr. : Perform Connection Test GBM IL DSE --Y -- ---	DC810180	
9.4		Verify connexion report packet TM(17,2)		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
9.11		Change Tx2 antenna to LGA1		<input type="checkbox"/>
		Call procedure H_FCP_TTC_SWX (Configure RFDN switches) and choose XPND2 Sun otherwise (SUN2): - RFDN SWs position ABAB - D/L path: TX2-TWTA2-LGA1 - U/L path: LGA1-RX2 (MGA-RX1)		
		Execute Procedure: H_FCP_TTC_SWX Configure RFDN switches		
		Sent the TCs included in sub-steps #9.11 to #9.12 Time-tagged (loaded into MTL)		
9.12		Switch ON downlink		<input type="checkbox"/>
		Execute Procedure: H_FCP_TTC_TU01 Switch ON TX and TWTA in use		
9.13		Verify received signal at ground		<input type="checkbox"/>
		Verify received signal at ground to derive Eb/No to derive Eb/No (Nit Energy to Noise density Ratio)		
9.14		Send connection test TC (17,1)		<input type="checkbox"/>
		Execute Telecommand ConnectionTest TC Control Flags : GBM IL DSE ---Y --- Subsch. ID : 10 Det. descr. : Perform Connection Test	DC810180	
9.15		Verify connexion report packet TM(17,2)		<input type="checkbox"/>
		Verify Packet Reception Link Connection Report Packet Details: APID: 16 Type: 17 Subtype: 2 PI1: PI2:	LnkConnecRep	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
10		Check LGA in LR2		Next Step: 11
10.1		Set GS TM Back-up chain for LR2 TM		<input type="checkbox"/>
10.2		Configure TX and TM encoder in use configuration for LR2		<input type="checkbox"/>
		Execute Procedure: H_CRP_TTC_TUL2 Tx and TM encoder in use configuration for LR2		
10.3		Set GS TM main chain for LR2 TM		<input type="checkbox"/>
10.4		Verify received signal at ground		<input type="checkbox"/>
		Verify received signal at ground to derive Eb/No to derive Eb/No (Nit Energy to Noise density Ratio)		
10.5		Send connection test TC (17,1)		<input type="checkbox"/>
		Execute Telecommand ConnectionTest DC810180 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 10 Det. descr. : Perform Connection Test		
10.6		Verify connexion report packet TM(17,2)		<input type="checkbox"/>
		Verify Packet Reception Link Connection Report Packet Details: APID: 16 Type: 17 Subtype: 2 PI1: PI2:		LnkConneRep
11		Restore TM bit rate at MR and TC rate Rx2 = 4 Kbps, Rx1 = 125 bps		Next Step: END

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
11.1		Change RX2 TC rate to 4 Kbps		<input type="checkbox"/>
		Execute Procedure: H_FCP_TTC_R2BR Select RX2 TC bit rate		
11.2		Set GS uplink rate to 4 Kbps		<input type="checkbox"/>
11.3		Send connection test TC (17,1)		<input type="checkbox"/>
		Execute Telecommand ConnectionTest TC Control Flags : Subsch. ID : 10 Det. descr. : Perform Connection Test GBM IL DSE --Y -- --	DC810180	
11.4		Verify connexion report packet TM(17,2)		<input type="checkbox"/>
		Verify Packet Reception Packet Details: Link Connection Report APID: 16 Type: 17 Subtype: 2 PI1: PI2:	LnkConnecRep	
11.5		Change RX1 TC rate to 125 bps		<input type="checkbox"/>
		Execute Procedure: H_FCP_TTC_R1BR Select RX1 TC bit rate		
11.6		Set GS TM Back-up chain for MR TM		<input type="checkbox"/>
11.7		Configure TX and TM encoder in use configuration for MR		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Procedure: H_FCP_TTC_TUMR Tx and TM encoder in use configuration for MR		
11.8		Set GS TM main chain for MR TM		<input type="checkbox"/>
11.9		Send connection test TC (17,1)		<input type="checkbox"/>
		Execute Telecommand ConnectionTest TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 10 Det. descr. : Perform Connection Test	DC810180	
11.10		Verify connexion report packet TM(17,2)		<input type="checkbox"/>
		Verify Packet Reception Packet Details: Link Connection Report	LnkConnecRep APID: 16 Type: 17 Subtype: 2 PI1: PI2:	
End of Procedure				