

TTC S/S Routine Quick Check-out  
File: H\_FCP\_TTC\_QCHK.xls  
Author: E. Picallo



## Procedure Summary

### Objectives

This procedure describes the steps to check the status of the TTC S/S and RF link after AOS:

- wait for TM reception from S/C
- verify TX state
- verify RX state
- verify TWT state
- verify antenna configuration
- check TC link by sending test TCs

### Summary of Constraints

S/C in ground station visibility

### Spacecraft Configuration

#### Start of Procedure

Ground station pass preparation procedure completed  
LCL23/16 (XPND1/2 Tx) closed;  
TM bit rate MBR 150 kbps (nominally), 500 bps (SUN or Survival);  
ranging & coherent mode ON (nominally) or OFF (TTC FDIR);  
ranging modulation index 0,6;  
TM modulation index 1,2;  
output power -4 dbm;  
TWTAl/2 ON (EPC1/2 ON , TWT1/2 ON)  
TC rate 4 kbps (nominally) or 125 bps (SUN or Survival);  
MGA connected to Rx1, LGA1 connected to RX2 (Nominally)  
or AntRx2Config = MGA & AntRx1Config = LGA1(TTC FDIR)  
or AntRx1Config = LGA1 & AntRx2Config = MGA (SUN)  
or AntRx2Config = LGA1 & AntRx1Config = LGA2(Survival);

#### End of Procedure

TTC-Link health verified;  
LCL23/16 (XPND1/2 Tx) closed;  
TM bit rate MBR 150 kbps (nominally), 500 bps (SUN or Survival);  
ranging & coherent mode ON (nominally) or OFF (TTC FDIR);  
ranging modulation index 0,6;  
TM modulation index 1,2;  
output power -4 dbm;  
TWTAl/2 ON (EPC1/2 ON , TWT1/2 ON)  
TC rate 4 kbps (nominally) or 125 bps (SUN or Survival);  
MGA connected to Rx1, LGA1 connected to RX2 (Nominally)  
or AntRx2Config = MGA & AntRx1Config = LGA1(TTC FDIR)  
or AntRx1Config = LGA1 & AntRx2Config = MGA (SUN)  
or AntRx2Config = LGA1 & AntRx1Config = LGA2(Survival);

### Reference File(s)

#### Input Command Sequences

#### Output Command Sequences

HFRQCHK

### Referenced Displays

Status : Version 5 - Updated  
Last Checkin: 17/03/2011

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**ANDs**      **GRDs**      **SLDs**  
 ZAZ7I999  
 ZAZ7J999  
 ZAZA0999

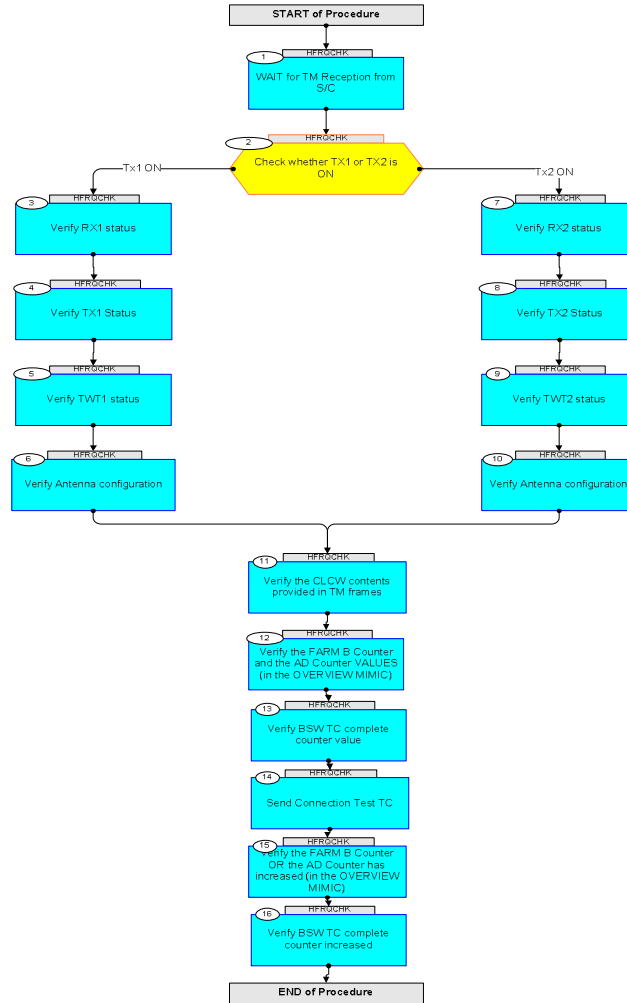
**Configuration Control Information**

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
12/01/2009		1	Created	E. Picallo	
12/01/2009	2	1.01	Validation : start/end procedure conditions corrected	E. Picallo	
18/03/2009	2.2	1.02	Validation : Minor AND reference corrected	E. Picallo	
08/04/2009		2	Report Rx AGC level and PLL SPE to CCC added	E. Picallo	
16/04/2009	2.3	3	Update to use dedicated VC0 & VC1 CLCW TM parameters	E. Picallo	
25/09/2009	2.5	4	Verify Tx1 Status based on TX1 ON-OFF Status Verify Tx2 Status based on TX2 ON-OFF Status	E. Picallo	
17/03/2011	3.1	5	FARM B Counter OR and AD Counter checks in OVERVIEW MIMIC added	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 :HFRQCHK (TTC S/S RoutineCheck) TTC S/S Check-out during routine  TimeTag Type: N Sub Schedule ID:  <input type="checkbox"/>				
1		WAIT for TM Reception from S/C		Next Step: 2
		<b>To be started at expected S/C ground station visibility</b>		
2		Check whether TX1 or TX2 is ON		Next Step: Tx1 ON 3 Tx2 ON 7
		<b>Nominally TTC chain 1 shall be ON. In non nominal condition, Survival mode or TTC failure, the TTC chain 2 is switch ON.</b>		
2.1		Check if TX1 status ON		<input type="checkbox"/>
		Verify Telemetry TX1 ON-OFF Stat RMB15442	= ON	AND=ZAZ7I999
		Verify TX1 Output Power Telemetry XPD1_RF1_OUT_PW RMB13442	<= -4.0 dbmW >= -4.8 dbmW	AND=ZAZ7I999
2.2		OR Check if TX2 status ON		<input type="checkbox"/>
		Verify Telemetry TX2 ON-OFF Stat RMB16442	= ON	AND=ZAZ7I999
		Verify TX2 Output Power Telemetry XPD2_RF2_OUT_PW RMB14442	<= -4.0 dbmW >= -4.5 dbmW	AND=ZAZ7I999
3		Verify RX1 status		Next Step: 4
		<b>To confirm RX1 LOCK status and main Rx1 parameters</b>		
		Verify Rx1 FCL3 current Telemetry Xpnd1_Rx_FCL3_I WM702565	>= 0.20 A <= 0.35 A	AND=ZAZ7I999
		Verify Rx1 Supply Voltage Telemetry XPND1_RX1_SUP_V RMB07442	>= 4.8 V <= 5.2 V	AND=ZAZ7I999
		Verify RX1 AGC Level Telemetry XPD1_RX1_AGC_LV RMB09442	>= -130.0 dbmW	AND=ZAZ7I999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify RX1 PLL SPE Telemetry XPD1_RX1_PLL_SP RMB11442		AND=ZAZ7I999
		Verify RX1 Lock status Telemetry X1 Rx Lock - RL RMB24442	= Locked	AND=ZAZ7I999
		Verify RX1 Squelch status Telemetry X1 SqlchSt - SS RMB23442	= ON	AND=ZAZ7I999
		Verify RX1 bit rate Telemetry RX1 125-4K Stat RMB17442	= 4 Kbps	AND=ZAZ7I999
		<b>Note: In non nominal condition (Sun Acquisition mode): RX1 TC bit rate is set to 125 bps</b>		
		<b>Report Rx1 AGC level (RMB09442) and Rx1 PPL SPE (RMB11442) to ESTRACK Control Centre (ECC) at ESOC.</b>		
4		Verify TX1 Status		Next Step: 5
		Verify Coherent Mode status Telemetry X1 Coher MOD-CM RMB26442	= ON	AND=ZAZ7I999
		Verify Ranging Mode status Telemetry X1 Rang MOD-RM RMB27442	= ON	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 Medium Rate status Telemetry X1 MedRate-MRM RMB29442	= ON	AND=ZAZ7I999
		Verify Low Rate-2 status Telemetry X1 LowRate-1 MD RMB30442	= OFF	AND=ZAZ7I999
		<b>Note: In non nominal condition (Sun Acquisition mode): TX1 TM bit rate is set to 500 bps (LR1).</b>		
5		Verify TWT1 status		Next Step: 6
		Verify TWT1 Status Telemetry TWT1_ONOFF_STS RMB09439	= ON	AND=ZAZ7J999
		Verify EPC1 Helix current Telemetry EPC1_HELIX_CURR RMB02439	>= 0.19 mA <= 1.20 mA	AND=ZAZ7J999
6		Verify Antenna configuration		Next Step: 11
		Verify Telemetry AntRx1Config XD036992	= MGA	AND=ZAZ7J999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry AntRx2Config                   XD037992	= LGA-1	AND=ZAZ7J999
		<b>Note: In non nominal condition (Sun Acquisition mode): AntRx1Config =LGA1 &amp; AntRx2Config =MGA.</b>		
7		Verify RX2 status		Next Step: 8
		Verify Rx2 FCL4 current Telemetry Xpnd2_Rx_FCL4_I                   WM402565	>= 0.20 A <= 0.35 A	AND=ZAZ7I999
		Verify Rx2 Supply Voltage Telemetry XPND2_RX2_SUP_V                   RMB08442	>= 4.8 V <= 5.2 V	AND=ZAZ7I999
		Verify RX2 AGC Level Telemetry XPD2_RX2_AGC_LV                   RMB10442	>= -130.0 dbmW	AND=ZAZ7I999
		Verify RX2 PLL SPE Telemetry XPD2_RX2_PLL_SP                   RMB12442		AND=ZAZ7I999
		Verify RX2 Lock status Telemetry X2 Rx Lock - RL                   RMB45442	= Locked	AND=ZAZ7I999
		Verify RX2 Squelch status Telemetry X2 SqlchSts-SS                   RMB44442	= ON	AND=ZAZ7I999
		Verify RX2 bit rate Telemetry RX2 125-4K Stat                   RMB18442	= 4 Kbps	AND=ZAZ7I999
		<b>In case of TTC chain switch over: RX2 TC bit rate is set to 4 Kbps. In case of Survival mode: RX2 TC bit rate is set to 125 bps.</b>		
		<b>Report Rx2 AGC level (RMB10442) and Rx2 PPL SPE (RMB12442) to ESTRACK Control Centre (ECC) at ESOC.</b>		
8		Verify TX2 Status		Next Step: 9
		Verify Coherent Mode status Telemetry X2 Coher MOD-CM                   RMB47442	= OFF	AND=ZAZ7I999
		Verify Ranging Mode status Telemetry X2 Rang MD - RM                   RMB48442	= OFF	AND=ZAZ7I999
		Verify Ranging Modulation Index Telemetry X2 RNGMD ID-RMI                   RMB53442	= 0.6 rad	AND=ZAZ7I999
		Verify Telemetry Modulation Index Telemetry X2 TM MD ID-TMI                   RMB54442	= 1.2 rad	AND=ZAZ7I999
		Verify Medium Rate status Telemetry X2 MedRate-MRM                   RMB50442	= ON	AND=ZAZ7I999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Low Rate-1 status Telemetry X2 LowRate-1 MD RMB51442	= OFF	AND=ZAZ7I999
		<b>In case of TTC chain switch over: TX2 TM bit rate is set to 150 Kbps (MBR). In case of Survival mode: TX2 TM bit rate is set to 500 bps (LR1).</b>		
9		Verify TWT2 status		Next Step: 10
		Verify TWT2 Status Telemetry TWT2_ONOFF_STS RMB10439	= ON	AND=ZAZ7J999
		Verify EPC2 Helix current Telemetry EPC2_HELIX_CURR RMB04439	>= 0.19 mA <= 1.46 mA	AND=ZAZ7J999
10		Verify Antenna configuration		Next Step: 11
		Verify Telemetry AntRx2Config XD037992	= MGA	AND=ZAZ7J999
		Verify Telemetry AntRx1Config XD036992	= LGA-1	AND=ZAZ7J999
		<b>In case of TTC chain switch over: AntRx2Config = MGA &amp; AntRx1Config = LGA1. In case of Survival mode: AntRx2Config = LGA1 &amp; AntRx1Config = LGA2.</b>		
11		Verify the CLCW contents provided in TM frames		Next Step: 12
		Verify Telemetry NO RF AVAIL. XD165991	= Valid RF	AND=ZAZ7J999
		Verify Telemetry NO B/T LOCK XD195991	= Valid BitLock	AND=ZAZ7J999
12		Verify the FARM B Counter and the AD Counter VALUES (in the OVERVIEW MIMIC)		Next Step: 13
13		Verify BSW TC complete counter value		Next Step: 14
		Verify Telemetry BSW_TC_Complete DELAF160	NN	AND=ZAZA0999
14		Send Connection Test TC		Next Step: 15

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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	
15		Verify the FARM B Counter OR the AD Counter has increased (in the OVERVIEW MIMIC)		Next Step: 16
		<b>The FARM B Counter shall increase, if commanding in BD OR The AD Counter shall increase, if commanding in AD</b>		
16		Verify BSW TC complete counter increased		Next Step: END
		Verify Telemetry BSW_TC_Complete DELAF160	NN + 1	AND=ZAZA0999
<b>End of Procedure</b>				