

Switch ON TX and TWTA in use
File: H_FCP_TTC_TU01.xls
Author: E. Picallo



Procedure Summary

Objectives

This procedure describes the steps needed to switch ON the transmitter and the travelling wave tube assembly in use (that is marked as "Nominal" and "Not Failed" in the "Unit in Use" table).

This procedure uses the logical addressing, thus can be executed under Ground control or not (the commands used can be inserted in the MTL to enable the downlink at the begin of DTCP).

Summary of Constraints

TX and TWTA in use are switched ON through ASW TCs(8,4,115,1), thus the status of the ASW function "TTC Management" has to be "running".

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.

Note that:

- the value of the TM modulation index is always 1.2;
- the Coherent mode and Ranging modulator are expected to be set OFF because these parameters have to be commanded ON after confirmation of onboard lock;
- the value of the Output power level is always - 4dBm;
- the External reference and Internal bit pattern generator are always OFF.

It is highlighted that the transponder needs a maximum warm-up of 20 minutes.

Spacecraft Configuration

Start of Procedure

CDMU in default configuration;
Downlink not active (TX1/2 and TWTA1/2 OFF);
XPND LCL (23/16) closed;
TX in use configured "ON" and "VALID" on the 1553 S/C bus;
TWTA OPLCL (49/50) open;

End of Procedure

CDMU in default configuration;
Downlink enabled via TX and TWTA marked as "Nominal" and "Not Failed" in the "Unit in Use" table (nominally the branch 1).

Reference File(s)

Input Command Sequences

Output Command Sequences

HPRTU01

Referenced Displays

ANDs GRDs SLDs

Switch ON TX and TWTA in use
 File: H_FCP_TTC_TU01.xls
 Author: E. Picallo



ZAZ7I999 (None)
 ZAZ7J999
 ZAZ7M999

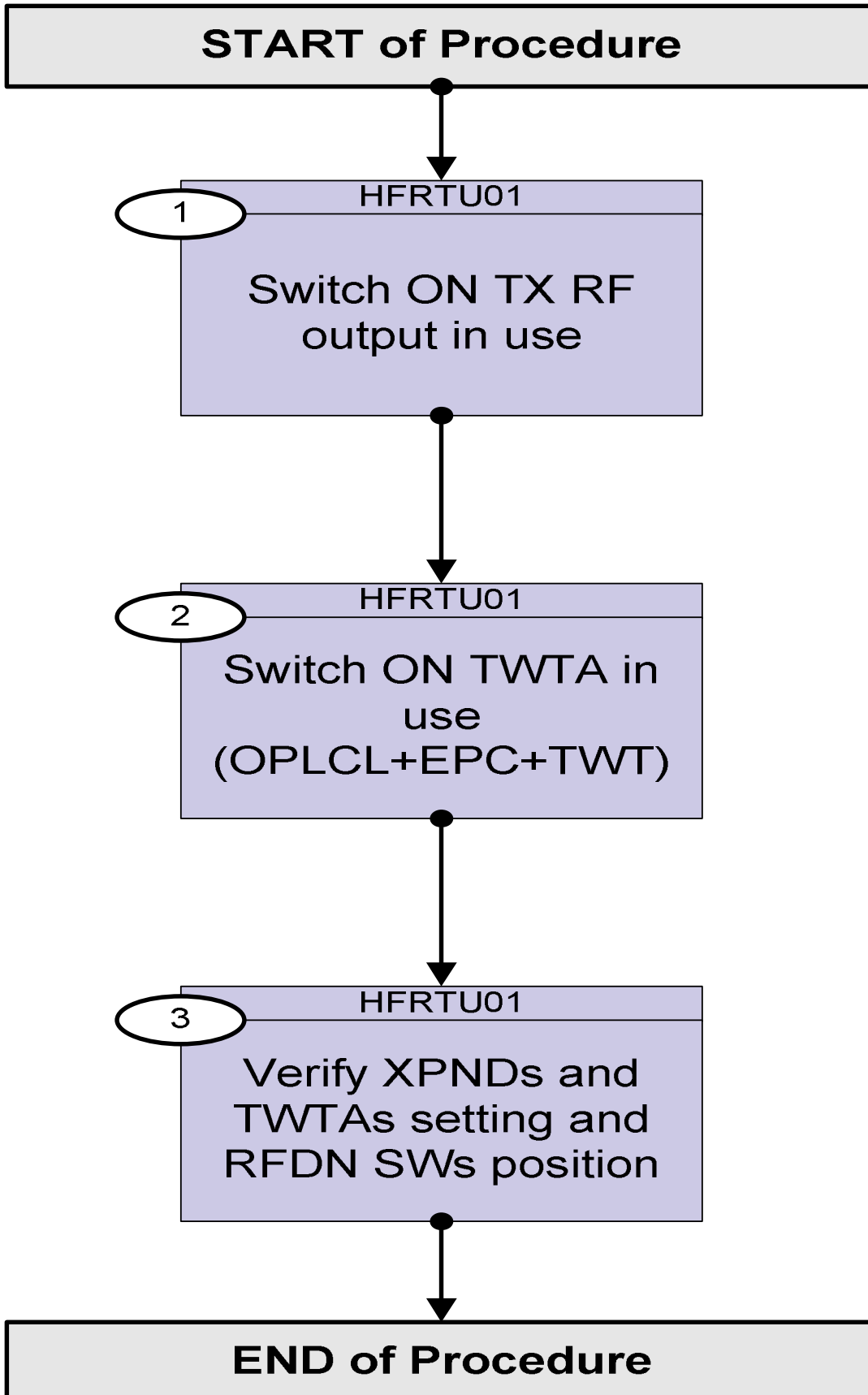
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
14/07/08		1	Created	R. Miniscalco	
29/07/08	1	1.01	Validation : TWTA expected values updated	E. Picallo	
02/12/08	2	2	Send TC Tx On & TWTA On Blocked Analog parameters expected values updated	E. Picallo	
12/03/09	2.2	2.01	Validation : Minor correction (RXs Voltage associated AND)	E. Picallo	
30/06/09	2.5	3	Xpnd2Tx_L16_S=ON Xpnd2Tx_L16_I >= 0.3 A <= 0.4 A	E. Picallo	

Switch ON TX and TWTA in use
File: H_FCP_TTC_TU01.xls
Author: E. Picallo



Procedure Flowchart Overview



Switch ON TX and TWTA in use
File: H_FCP_TTC_TU01.xls
Author: E. Picallo



Procedure Flowchart Overview

Switch ON TX and TWTA in use
 File: H_FCP_TTC_TU01.xls
 Author: E. Picallo



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
Beginning of Procedure				
TC Seq. Name : HFRTU01 (Tx+TWTA use ON) Switch ON Tx and TWTA in use TimeTag Type: B Sub Schedule ID: <input type="checkbox"/>				
1		Switch ON TX RF output in use		Next Step: 2
	ET+=00.00.00 UT=+	Execute Telecommand <div style="text-align: right;">TtcCommandTxInUseOn</div> TC Control Flags : <div style="text-align: right;">GBM IL DSE -SY -- ---</div> Subsch. ID : 10 Det. descr. : Ttc Command Tx InUse On TC(8,4,115,2)	DC15E170	
2		Switch ON TWTA in use (OPLCL+EPC+TWT)		Next Step: 3
	ET+=00.00.05 UT=+	Execute Telecommand <div style="text-align: right;">TtcCommandTwtaInUseOn</div> TC Control Flags : <div style="text-align: right;">GBM IL DSE -E- -- ---</div> Subsch. ID : 10 Det. descr. : Ttc Command Twta In Use On TC(8,4,115,2)	DC18E170	
3		Verify XPNDs and TWTAs setting and RFDN SWS position		Next Step: END
		Wait the completion of the TWT pre-heating phase (180 sec) TM verifications assumes that XPND1+TWTA1 is in use		
		WARNING: when the downlink has been enabled, verify that the AD mode is set on the MCS. Moreover check that the correct content of the CLCW provided in the telemetry transfer frames received (RF available, bit lock, lock out, wait, retransmit).		
3.1		Rx1 power line status verification		<input type="checkbox"/>
		Verify FCL3 (XPND1 Rx) voltage Telemetry <div style="text-align: center;">Xpnd1_Rx_FCL3_V WM703565</div>	>= 27.96 V <= 28.71 V	(None)

Switch ON TX and TWTA in use
 File: H_FCP_TTC_TU01.xls
 Author: E. Picallo



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify FCL3 (XPND1 Rx) current Telemetry Xpnd1_Rx_FCL3_I WM702565	>= 0.20 A <= 0.35 A	AND=ZAZ7I999
3.2		Rx1 analogue telemetry verification		<input type="checkbox"/>
		Verify RX1 AGC Level Telemetry XPD1_RX1_AGC_LV RMB09442	>= -141.0 dbmW	AND=ZAZ7I999
		Verify RX1 PLL SPE Telemetry XPD1_RX1_PLL_SP RMB11442	>= -130.0 kHz <= 130.0 kHz	AND=ZAZ7I999
		Verify Rx1 TC bit rate Telemetry RX1 125-4K Stat RMB17442		AND=ZAZ7I999
		Verify Rx1 Supply Voltage Telemetry XPND1_RX1_SUP_V RMB07442	>= 4.8 V <= 5.5 V	AND=ZAZ7I999
		Verify Rx1 temperature Telemetry RX1_TEMP RMB02442		AND=ZAZ7I999
3.3		Rx2 power line status verification		<input type="checkbox"/>
		Verify FCL4 (XPND2 Rx) voltage Telemetry Xpnd2_Rx_FCL4_V WM403565	>= 27.96 V <= 28.71 V	
		Verify Verify FCL4 (XPND2 Rx) current Telemetry Xpnd2_Rx_FCL4_I WM402565	>= 0.20 A <= 0.35 A	AND=ZAZ7I999
3.4		Rx2 analogue telemetry verification		<input type="checkbox"/>
		Verify Rx2 AGC Level Telemetry XPD2_RX2_AGC_LV RMB10442		AND=ZAZ7I999
		Verify Rx2 PLL SPE Telemetry XPD2_RX2_PLL_SP RMB12442		AND=ZAZ7I999
		Verify Rx2 TC bit rate Telemetry RX2 125-4K Stat RMB18442		AND=ZAZ7I999
		Verify Rx2 Supply Voltage Telemetry XPND2_RX2_SUP_V RMB08442	>= 4.8 V <= 5.5 V	AND=ZAZ7I999
		Verify Rx2 temperature Telemetry RX2_TEMP RMB04442		AND=ZAZ7I999
3.5		Tx1 power line status verification		<input type="checkbox"/>

Switch ON TX and TWTA in use
 File: H_FCP_TTC_TU01.xls
 Author: E. Picallo



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify LCL23 (XPND1 Tx) status Telemetry Xpnd1Tx_L23_S WMI2D565	= ON	AND=ZAZ7I999
		Verify LCL23 (XPND1 Tx) current Telemetry Xpnd1Tx_L23_I WMI09565	>= 0.41 A <= 0.55 A	AND=ZAZ7I999
3.6		<i>Tx1 analogue telemetry verification</i>		□
		Verify Tx1 Status Telemetry TX1 ON-OFF Stat RMB15442	= ON	AND=ZAZ7I999
		Verify Tx1 RF Output Power Telemetry XPDI_RF1_OUT_PW RMB13442	>= -5.2 dbmW <= -4.2 dbmW	AND=ZAZ7I999
		Verify Tx1 Supply Voltage Telemetry XPND1_TX1_SUP_V RMB05442	>= 6.0 V <= 6.9 V	AND=ZAZ7I999
		Verify Tx1 Temperature Telemetry TX1_TEMP RMB01442		AND=ZAZ7I999
3.7		<i>XPND1 1553 S/C bus TM verification</i>		□
		Verify XPND1 status X1 Status - XS RMB22442	= TM mode active	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		AND=ZAZ7I999
		Verify High Rate status Telemetry X1 HIRateMD-HRM RMB28442		AND=ZAZ7I999
		Verify Ranging Modulator status Telemetry X1 Rang MOD-RM RMB27442		AND=ZAZ7I999
		Verify Coherent Mode status Telemetry X1 Coher MOD-CM RMB26442		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 Power level at transmitter output Telemetry X1 OutPowLevSet RMB35442	= -4 dbmW	AND=ZAZ7I999

Switch ON TX and TWTA in use
 File: H_FCP_TTC_TU01.xls
 Author: E. Picallo



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Internal Bit Pattern Generator status Telemetry X1 IntBitPatGen RMB34442	= OFF	AND=ZAZ7I999
		Verify External Reference status Telemetry X1 Ext Ref - ER RMB25442	= OFF	AND=ZAZ7I999
		Verify Receiver lock status Telemetry X1 Rx Lock - RL RMB24442		AND=ZAZ7I999
		Verify RX AGC Level Telemetry X1 AGC TMUplnk RMB20442	>= -141.0 dbmW	AND=ZAZ7I999
		Verify PLL Phase Error Telemetry X1 RX PLL PhErr RMB19442	>= -130.0 kHz <= 130.0 kHz	AND=ZAZ7I999
		Verify Squelch Status Telemetry X1 SqlchSt - SS RMB23442		AND=ZAZ7I999
		Verify Tx1 TC Bit Rate Telemetry X1 TcBitRateTCB RMB61442		
3.8		<i>Tx2 power line status verification</i>		<input type="checkbox"/>
		Verify LCL16 (XPND2 Tx) status Telemetry Xpnd2Tx_L16_S WM92C565	= ON	AND=ZAZ7I999
		Verify LCL16 (XPND2 Tx) Telemetry Xpnd2Tx_L16_I WM908565	>= 0.3 A <= 0.4 A	AND=ZAZ7I999
3.9		<i>Tx2 analogue telemetry verification</i>		<input type="checkbox"/>
		Verify Tx2 Status Telemetry TX2 ON-OFF Stat RMB16442	= OFF	AND=ZAZ7I999
		Verify Tx2 RF Output Power Telemetry XPND2_RF2_OUT_PW RMB14442	< -13.0 dbmW	AND=ZAZ7I999
		Verify Tx2 Supply Voltage Telemetry XPND2_TX2_SUP_V RMB06442	>= 0.3 V <= 0.4 V	AND=ZAZ7I999
		Verify Tx2 Temperature Telemetry TX2_TEMP RMB03442		AND=ZAZ7I999
3.10		<i>TM Encoder (in use) verification</i>		<input type="checkbox"/>
		Verify Telemetry TME_BITRATE DEMRF160		AND=ZAZ7J999
3.11		<i>TWTA1 setting verification</i>		<input type="checkbox"/>

Switch ON TX and TWTA in use
 File: H_FCP_TTC_TU01.xls
 Author: E. Picallo



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify OPLCL49 (TWTA 1) Status Telemetry Twta_1_L49_1S WM22E565	= ON	AND=ZAZ7J999
		Verify TWTA1 current Telemetry Twta_1_L49_I WM210565	>= 2.2 A <= 2.8 A	AND=ZAZ7J999
		Verify EPC1 Status Telemetry EPC1_ONOFF_STS RMB05439	= ON	AND=ZAZ7J999
		Verify EPC1 Anode Voltage Telemetry EPC1_ANODE_VOLT RMB01439	>= 1077.0 V <= 1137.0 V	AND=ZAZ7J999
		Verify EPC1 Helix current Telemetry EPC1_HELIX_CURR RMB02439	<= 0.19 mA >= 1.20 mA	AND=ZAZ7J999
		Verify EPC1 Automatic Restart Status Telemetry EPC1_AUT_RSTART RMB06439	= NOTACTIVE	AND=ZAZ7J999
		Verify EPC1 Temperature Telemetry EPC1_TEMP RMB11439		AND=ZAZ7J999
		Verify TWT1 Status Telemetry TWT1_ONOFF_STS RMB09439	= ON	AND=ZAZ7J999
3.12		<i>TWTA2 setting verification</i>		□
		Verify OPLCL50 (TWTA 2) Status Telemetry Twta_2_L50_1S WM92E565	= OFF	AND=ZAZ7J999
		Verify TWTA2 current Telemetry Twta_2_L50_I WM910565	>= 0.0 A <= 0.1 A	AND=ZAZ7J999
		Verify EPC2 Status Telemetry EPC2_ONOFF_STS RMB07439	= OFF	AND=ZAZ7J999
		Verify EPC2 Automatic Restart Status Telemetry EPC2_AUT_RSTART RMB08439	= NOTACTIVE	AND=ZAZ7J999
		Verify EPC2 Temperature Telemetry EPC2_TEMP RMB12439		AND=ZAZ7J999
		Verify TWT2 Status Telemetry TWT2_ONOFF_STS RMB10439	= OFF	AND=ZAZ7J999
3.13		<i>RFDN SWS position verification</i>		□
		Verify Telemetry RFDN SW1 Pos A RMB05436		AND=ZAZ7J999
		Verify Telemetry RFDN SW1 Pos B RMB09436		AND=ZAZ7J999

Switch ON TX and TWTA in use
 File: H_FCP_TTC_TU01.xls
 Author: E. Picallo



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry RFDN SW2 Pos A RMB06436		AND=ZAZ7J999
		Verify Telemetry RFDN SW2 Pos B RMB10436		AND=ZAZ7J999
		Verify Telemetry RFDN SW3 Pos A RMB07436		AND=ZAZ7J999
		Verify Telemetry RFDN SW3 Pos B RMB11436		AND=ZAZ7J999
		Verify Telemetry RFDN SW4 Pos A RMB08436		AND=ZAZ7J999
		Verify Telemetry RFDN SW4 Pos B RMB12436		AND=ZAZ7J999
		Verify RFDN Isolator 1 Temp Telemetry RFDN_ISOL1_TEMP RMB01436		AND=ZAZ7J999
		Verify RFDN Isolator 2 Temp Telemetry RFDN_ISOL2_TEMP RMB02436		AND=ZAZ7J999
		Verify RFDN Diplexer 1 Temp Telemetry RFDN_DIPL1_TEMP RMB03436		AND=ZAZ7J999
		Verify RFDN Diplexer 2 Temp Telemetry RFDN_DIPL2_TEMP RMB04436		AND=ZAZ7J999
3.14		UIU table verification		□
		Verify Telemetry XpndTx1FuncSts DEL27170	= On	AND=ZAZ7M999
		Verify Telemetry TwtalFuncSts DEL19170	= On	AND=ZAZ7M999
		Verify Telemetry Epc1FuncSts DEG25170	= On	AND=ZAZ7M999
		Verify Telemetry TwtAmp1FuncSts DEH13170	= On	AND=ZAZ7M999
		Verify Telemetry XpndTx2FuncSts DEL31170	= Off	AND=ZAZ7M999
		Verify Telemetry TwtA2FuncSts DEL23170	= Off	AND=ZAZ7M999
		Verify Telemetry Epc2FuncSts DEG29170	= Off	AND=ZAZ7M999
		Verify Telemetry TwtAmp2FuncSts DEH17170	= Off	AND=ZAZ7M999
		Verify Telemetry Rfdn1FuncSts DEH49170		AND=ZAZ7M999

Switch ON TX and TWTA in use
 File: H_FCP_TTC_TU01.xls
 Author: E. Picallo



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry Rfdn2FuncSts DEH53170		AND=ZAZ7M999
		Verify Telemetry Rfdn3FuncSts DEH57170		AND=ZAZ7M999
		Verify Telemetry Rfdn4FuncSts DEH61170		AND=ZAZ7M999
End of Procedure				