

LO functional test
 File: H_COP_HIF_NFLB.xls
 Author: R. Biggins



Procedure Summary

Objectives

The objective of this procedure is to execute the standard functional test of the Local Oscillator Unit. It consists of a switch of each of the LO-band at the default frequencies and safe voltages, as well as an IV Curve characterization of the multipliers.

Based on procedure:
 HIFI-COP-1.2-LO_FT (v1)

Summary of Constraints

Note that this procedure is made up of 2 sequences.
 The second sequence is executed via the following TPF file:
 HCHNFLBY_LO_FT_6A_vvvv.IPF

Spacecraft Configuration

Start of Procedure

n/a

End of Procedure

n/a

Reference File(s)

Input Command Sequences

Output Command Sequences

HCHNFLBX
 HCHNFLBY

Referenced Displays

ANDs **GRDs** **SLDs**
 ZAZ9C999

Configuration Control Information

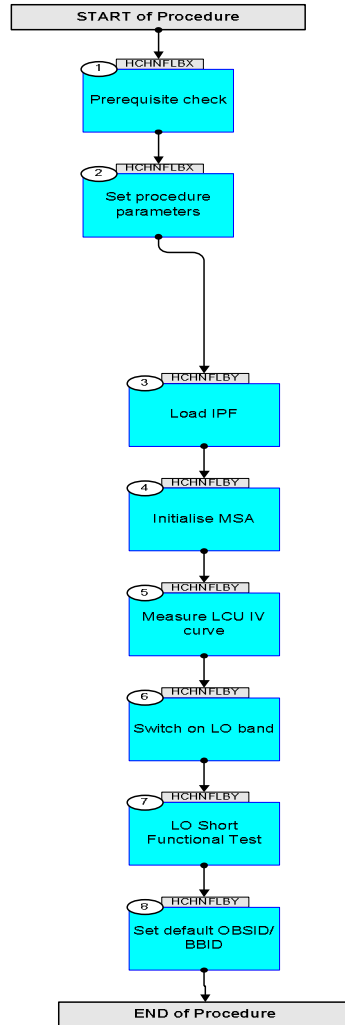
DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
31/10/08		1	Created	R. Biggins	
20/11/08		2	Updates due to updates from D. Teyssier - Step 3 and 4 moved to the second sequence - Last 2 parameters of TC HIFI_P_Configure_FCU (step 5) changed to FP	R. Biggins	
12/12/08		3	Changes due to IPF testing - ALL time tags updated (ET removed) - no change bars	R. Biggins	
13/12/08	2	4	Updates due to errors in the formal parameters	R. Biggins	
08/04/09	2.3	5	Changes due to updates from D. Teyssier - Step 3 removed - HIFI_non_periodic_hk_FCU TC removed from step 5 - TC flags updated	R. Biggins	

Status : Version 5 - Unchanged
 Last Checkin: 08/04/09

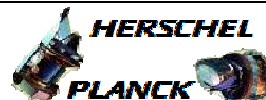
LO functional test
File: H_COP_HIF_NFLB.xls
Author: R. Biggins



Procedure Flowchart Overview



LO functional test
 File: H_COP_HIF_NFLB.xls
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry OBS_ID_per_hk	HM003190	OBS_ID AND=ZAZ9C999
	ET=+ UT=+00.00.00	HIFI_Housekeeping_on HIFI_Housekeeping_on Command Parameter(s) : HIF_HK_rate HP012197 HIF_FCU_S HP006197 HIF_LCU_S HP007197 HIF_WBSV_S HP009197 HIF_WBSH_S HP008197 HIF_HRSV_S HP011197 HIF_HRSB_S HP010197 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 70 Det. descr. : Sets periodic housekeeping packet generation period	HC016289 1_pkt_per_s ON (Def) ON (Def) ON (Def) ON (Def) ON (Def) ON (Def)	
		Verify: The following TM(3,25) packets should be produced once every second: HIFI_essential_HK (APID 1024) HIFI_HK_rev_7 (APID 1026)		
TC Seq. Name :HCHNFLBY (LO functional test) TimeTag Type: N Sub Schedule ID: □				
3		Load IPF		Next Step: 4
		Load the following IPF (TPF) file into the Manual Stack (where vvvv is the latest version number): HCHNFLBY_LO_FT_6A_vvvv.IPF		
4		Initialise MSA		Next Step: 5

LO functional test
 File: H_COP_HIF_NFLB.xls
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.01	HIFI_Configure_FCU_Power HIFI_Configure_FCU_Power Command Parameter(s) : HIFI_BB_ID HP001197 HF_CPR_Mixer_H_S HP203191 HF_CPR_Mixer_V_S HP204191 HF_CPR_Chopper_S HP205191 HF_CPR_UCH_S HP206191 HF_CPR_UCV_S HP207191 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 70 Det. descr. : Switch ON or OFF the five FCU-boards (mixer H/V, chopper, IF HV)	HC027289 C800001 <hex> ON (Def) ON (Def) ON (Def) ON (Def) ON (Def) ON (Def)	
	ET=+ UT=+00.00.00	HIFI_P_Configure_FCU HIFI_P_Configure_FCU Command Parameter(s) : HIFI_BB_ID HP001197 HF_CPR_MX BAND HP202191 HF_CH1_DPFPFP1 HP176191 HF_CH2_FIF1_Drain_V HP177191 HF_CH2_FIF1_Drain_C HP178191 HF_CH2_FIF2_Drain_V HP179191 HF_CH2_FIF2_Drain_C HP180191 HF_CH2_SIF1_Drain_V HP181191 HF_CH2_SIF1_Drain_C HP182191 HF_CH2_SIF2_Drain_V HP183191 HF_CH2_SIF2_Drain_C HP184191 HF_CH2_SIF3_Drain_V HP185191 HF_CH2_SIF3_Drain_C HP186191 HF_CV1_DPFPFP1 HP191191 HF_CV2_FIF1_Drain_V HP192191 HF_CV2_FIF1_Drain_C HP193191 HF_CV2_FIF2_Drain_V HP194191 HF_CV2_FIF2_Drain_C HP195191 HF_CV2_SIF1_Drain_V HP196191 HF_CV2_SIF1_Drain_C HP197191 HF_CV2_SIF2_Drain_V HP198191 HF_CV2_SIF2_Drain_C HP199191 HF_CV2_SIF3_Drain_V HP200191 HF_CV2_SIF3_Drain_C HP201191 HF_CPR_CH_SINE_S HP211191 HF_CPR_CH_LOOP_S HP210191	HC182289 C800001 <hex> 6 <dec> 227 <dec> (Def) 0.75 V 4.0 mA 0.65 V 3.0 mA 0.57 V 3.5 mA 0.8 V 1.85 mA 0.57 V 3.5 mA 227 <dec> (Def) 0.75 V 4.0 mA 0.65 V 3.0 mA 0.57 V 3.5 mA 0.57 V 3.5 mA 0.57 V 3.5 mA 0.57 V 3.5 mA 0.57 V ON (Def) CLOSE (Def)	

LO functional test
 File: H_COP_HIF_NFLB.xls
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		HF_CPR_CHFPG1 HP212191 HF_CPR_CHFPG2 HP213191 HF_CPR_CHFPG1 HP214191 HF_CPR_CHFPG2 HP215191 HF_CPR_CHFPG2 HP216191 HF_CPR_Cal_Heater_C HP217191 HF_CH1_MXBIAS_V HP172191 HF_CH1_MX_MG_C HP173191 HF_CV1_MXBIAS_V HP187191 HF_CV1_MX_MG_C HP188191 HF_P_Chopper_Rot HP454191 HF_CH1_DPACT_C HP174191 HF_CV1_DPACT_C HP189191 Subsch. ID : 70 Det. descr. : Configure the FCU-subsystem (prime)	17 <dec> 201 <dec> 1010 <dec> 885 <dec> 149 <dec> 1.1 mA 6.0 mV 0.0 mA (Def) 6.0 mV 0.0 mA (Def) -1.07 V A B	
	ET=+ UT=+00.00.03	HIFI_CH1_MXBIAS_V HIFI_CH1_MXBIAS_V Command Parameter(s) : HIFI_BB_ID HP001197 HF_CH1_MXBIAS_V HP172191 Subsch. ID : 70 Det. descr. : Send single command to set H mixer bias voltage	HC095289 C800001 <hex> 0.6 mV	
	ET=+ UT=+00.00.00	HIFI_CV1_MXBIAS_V HIFI_CV1_MXBIAS_V Command Parameter(s) : HIFI_BB_ID HP001197 HF_CV1_MXBIAS_V HP187191 Subsch. ID : 70 Det. descr. : Send single command to set V mixer bias voltage	HC098289 C800001 <hex> 0.6 mV	
	ET=+ UT=+00.00.01	HIFI_HL_Normal HIFI_HL_Normal Command Parameter(s) : HIFI_BB_ID HP001197 Subsch. ID : 70 Det. descr. : Send single command to switch LCU to normal mode	HC082289 E2F0001 <hex>	
	ET=+ UT=+00.00.00	HIFI_Conf_nom_LCU_ch0 HIFI_Conf_nom_LCU_ch0 Command Parameter(s) : HIFI_BB_ID HP001197 Subsch. ID : 70 Det. descr. : Create macro-command to switch off the bands	HC049289 E2F0001 <hex>	

LO functional test
 File: H_COP_HIF_NFLB.xls
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.10	HIFI_HL_heater HIFI_HL_heater Command Parameter(s) : HIFI_BB_ID HP001197 HL_heater HP397194 Subsch. ID : 70 Det. descr. : Send single command to control the LCU heater	HC086289 E2F0001 <hex> 6.0 V	
		Verify Telemetry HL_Channel_S HM003194	= OFF	AND=ZAZ9C999
		Verify Telemetry HL_MODE_S HM258194	= normal	AND=ZAZ9C999
5		Measure LCU IV curve		Next Step: 6
	ET=+ UT=+00.00.00	HIFI_measure_LCU_IV HIFI_measure_LCU_IV Command Parameter(s) : HIFI_BB_ID HP001197 HIF_LCU_diode HP072197 HIF_LCU_IV_delay HP073197 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 70 Det. descr. : Perform IV-measurement on an LOU-diode	HC108289 E4F0001 <hex> M1_6a 90 <dec>	
		Verify Telemetry BB_ID_per_hk HM004190	= E4F0001 <hex>	AND=ZAZ9C999
	ET=+ UT=+00.01.32	HIFI_measure_LCU_IV HIFI_measure_LCU_IV Command Parameter(s) : HIFI_BB_ID HP001197 HIF_LCU_diode HP072197 HIF_LCU_IV_delay HP073197 Subsch. ID : 70 Det. descr. : Perform IV-measurement on an LOU-diode	HC108289 E4F0002 <hex> M2_6a 90 <dec>	
	ET=+ UT=+00.01.32	HIFI_measure_LCU_IV HIFI_measure_LCU_IV Command Parameter(s) : HIFI_BB_ID HP001197 HIF_LCU_diode HP072197 HIF_LCU_IV_delay HP073197 Subsch. ID : 70 Det. descr. : Perform IV-measurement on an LOU-diode	HC108289 E4F0003 <hex> M3_6a 90 <dec>	

LO functional test
 File: H_COP_HIF_NFLB.xls
 Author: R. Biggins



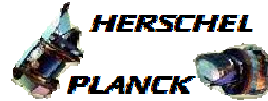
Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
6		Switch on LO band		Next Step: 7
	ET=+ UT=+00.01.32	HIFI_HL_Normal HIFI_HL_Normal Command Parameter(s) : HIFI_BB_ID HP001197 Subsch. ID : 70 Det. descr. : Send single command to switch LCU to normal mode	HC082289 E2A0001 <hex>	
	ET=+ UT=+00.00.01	HIFI_Conf_nom_LCU_ch6a HIFI_Conf_nom_LCU_ch6a Command Parameter(s) : HIFI_BB_ID HP001197 HL_freq_nx HP436194 HL_LSU_main HP438194 HL_LSU_offset HP439194 HL_D2_step HP437194 HL_PL_6A_C HP367194 HL_M1_6A_V HP368194 HL_M2_6A_V HP369194 HL_M3_6A_V HP370194 HL_Gate1_6A_V HP371194 HL_Gate2_6A_V HP372194 HL_Drain1_6A_V HP373194 HL_Curlim1 HP290194 HL_Drain2_6A_V HP374194 HL_Curlim2 HP291194 HL_macro_checksum HP440194 Subsch. ID : 70 Det. descr. : Create macro-command to configure LCU band 6a	HC045289 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
	ET=+ UT=+00.00.20	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_TM1 (Def)	
	ET=+ UT=+00.00.02	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_TM2	

LO functional test
 File: H_COP_HIF_NFLB.xls
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.02	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_TM3	
	ET=+ UT=+00.00.02	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_TM	
	ET=+ UT=+00.00.02	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_G	
	ET=+ UT=+00.00.02	HIFI_LCU_Single HIFI_LCU_Single Command Parameter(s) : HIFI_BB_ID HP001197 LCU_cmd HP234194 Subsch. ID : 70 Det. descr. : Send a single command to LCU	HC101289 E210001 <hex> HL_CLR_ERR	
	ET=+ UT=+00.00.01	HIFI_HL_heater HIFI_HL_heater Command Parameter(s) : HIFI_BB_ID HP001197 HL_heater HP397194 Subsch. ID : 70 Det. descr. : Send single command to control the LCU heater	HC086289 17 18	
		Verify Telemetry HL_Channel_S HM003194	= 6a	AND=ZAZ9C999
		Verify Telemetry HL_MODE_S HM258194	= normal	AND=ZAZ9C999
7		LO Short Functional Test		Next Step: 8

LO functional test
File: H_COP_HIF_NFLB.xls
Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify: Monitor the following parameter and ensure that any occurrences of a 'FAULT' condition are communicated immediately to the HIFI representative (use AND HA004289). HM259194 HL_error_word_S		
	ET=+ UT=+00.00.00	HIFI_HL_Normal HIFI_HL_Normal Command Parameter(s) : HIFI_BB_ID HP001197 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 70 Det. descr. : Send single command to switch LCU to normal mode	HC082289 E2A0002 <hex>	
	ET=+ UT=+00.00.01	HIFI_Conf_nom_LCU_ch6a HIFI_Conf_nom_LCU_ch6a Command Parameter(s) : HIFI_BB_ID HP001197 19 HL_freq_nx HP436194 20 HL_LSU_main HP438194 21 HL_LSU_offset HP439194 22 HL_D2_step HP437194 23 HL_PL_6A_C HP367194 24 HL_M1_6A_V HP368194 25 HL_M2_6A_V HP369194 26 HL_M3_6A_V HP370194 27 HL_Gate1_6A_V HP371194 28 HL_Gate2_6A_V HP372194 29 HL_Drain1_6A_V HP373194 30 HL_Curlim1 HP290194 31 HL_Drain2_6A_V HP374194 32 HL_Curlim2 HP291194 33 HL_macro_checksum HP440194 34 Subsch. ID : 70 Det. descr. : Create macro-command to configure LCU band 6a	HC045289	
	ET=+ UT=+00.00.20	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_mmacro HP068197 HSK_TM1 (Def) Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289	

LO functional test
 File: H_COP_HIF_NFLB.xls
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.02	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_TM2	
	ET=+ UT=+00.00.02	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_TM3	
	ET=+ UT=+00.00.02	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_TM	
	ET=+ UT=+00.00.02	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_G	
	ET=+ UT=+00.00.02	HIFI_LCU_Single HIFI_LCU_Single Command Parameter(s) : HIFI_BB_ID HP001197 LCU_cmd HP234194 Subsch. ID : 70 Det. descr. : Send a single command to LCU	HC101289 E210002 <hex> HL_CLR_ERR	
	ET=+ UT=+00.00.01	HIFI_HL_heater HIFI_HL_heater Command Parameter(s) : HIFI_BB_ID HP001197 HL_heater HP397194 Subsch. ID : 70 Det. descr. : Send single command to control the LCU heater	HC086289 35 36	

LO functional test
 File: H_COP_HIF_NFLB.xls
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.20	HIFI_HL_Normal HIFI_HL_Normal Command Parameter(s) : HIFI_BB_ID HP001197 Subsch. ID : 70 Det. descr. : Send single command to switch LCU to normal mode	HC082289 E2A003 <hex>	
	ET=+ UT=+00.00.01	HIFI_Conf_nom_LCU_ch6a HIFI_Conf_nom_LCU_ch6a Command Parameter(s) : HIFI_BB_ID HP001197 HL_freq_nx HP436194 HL_LSU_main HP438194 HL_LSU_offset HP439194 HL_D2_step HP437194 HL_PL_6A_C HP367194 HL_M1_6A_V HP368194 HL_M2_6A_V HP369194 HL_M3_6A_V HP370194 HL_Gate1_6A_V HP371194 HL_Gate2_6A_V HP372194 HL_Drain1_6A_V HP373194 HL_Curlim1 HP290194 HL_Drain2_6A_V HP374194 HL_Curlim2 HP291194 HL_macro_checksum HP440194 Subsch. ID : 70 Det. descr. : Create macro-command to configure LCU band 6a	HC045289 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52	
	ET=+ UT=+00.00.06	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_TM1 (Def)	
	ET=+ UT=+00.00.02	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_TM2	

LO functional test
 File: H_COP_HIF_NFLB.xls
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.02	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_TM3	
	ET=+ UT=+00.00.02	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_TM	
	ET=+ UT=+00.00.02	HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets	HC019289 HSK_G	
	ET=+ UT=+00.00.02	HIFI_LCU_Single HIFI_LCU_Single Command Parameter(s) : HIFI_BB_ID HP001197 LCU_cmd HP234194 Subsch. ID : 70 Det. descr. : Send a single command to LCU	HC101289 E210003 <hex> HL_CLR_ERR	
		Verify: Verify the content of the following ANDs with the HIFI representative: HA004289 LCU_status2 HA017289 LCU_6a		
	ET=+ UT=+00.00.01	HIFI_Housekeeping_on HIFI_Housekeeping_on Command Parameter(s) : HIF_HK_rate HP012197 HIF_FCU_S HP006197 HIF_LCU_S HP007197 HIF_WBSV_S HP009197 HIF_WBSH_S HP008197 HIF_HRSV_S HP011197 HIF_HRSH_S HP010197 TC Control Flags : GBM IL DSE --Y -- ---	HC016289 1_pkt_per_4_s ON (Def) ON (Def) ON (Def) ON (Def) ON (Def) ON (Def)	

LO functional test
 File: H_COP_HIF_NFLB.xls
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Subsch. ID : 70 Det. descr. : Sets periodic housekeeping packet generation period		
		Verify: The following TM(3,25) packets should be produced once every 4 seconds: HIFI_essential_HK (APID 1024) HIFI_HK_rev_7 (APID 1026)		
8		Set default OBSID/BBID		Next Step: END
	ET=+ UT=+00.00.01	HIFI_Set_OBS_ID Command Parameter(s) : HIFI_BB_ID HP001197 HIFI_OBS_ID HP000197 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 70 Det. descr. : Set Observation-ID and Building-Block-ID	HIFI_Set_OBS_ID HC014289	0 <hex> (Def) 0 <hex> (Def)
		Verify Telemetry BB_ID_per_hk HM004190	= 0 <hex>	AND=ZAZ9C999
		Verify Telemetry OBS_ID_per_hk HM003190	= 0 <hex>	AND=ZAZ9C999
End of Procedure				