

LO functional test  
 File: H\_COP\_HIF\_RFLE.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:  
 HCHRFLEY\_LO\_FT\_7B\_vvvv.IPF

### Spacecraft Configuration

**Start of Procedure**  
 n/a

**End of Procedure**  
 n/a

### Reference File(s)

**Input Command Sequences**

**Output Command Sequences**  
 HCHRFLEX  
 HCHRFLEY

### 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 |         |
| 27/11/08 | 2         | 2       | Updates due to updates from D. Teyssier<br>- Step 3 and 4 moved to the second sequence<br>- Last 2 parameters of TC HIFI_P_Configure_FCU (step 5) changed to FP | R. Biggins |         |
| 08/04/09 | 2.3       | 3       | Changes due to updates from D. Teyssier<br>- Step 3 removed<br>- HIFI_non_periodic_hk_FCU TC removed from step 5<br>- TC flags updated                          | R. Biggins |         |
| 10/09/09 | 2.5       | 4       | Updates based on comments by D. Teyssier<br>- Pause added after step 5 and 6<br>- TC HC198289 added before HC019289 quintuplet                                  | R. Biggins |         |

Status : Version 7 - Updated  
 Last Checkin: 11/01/10

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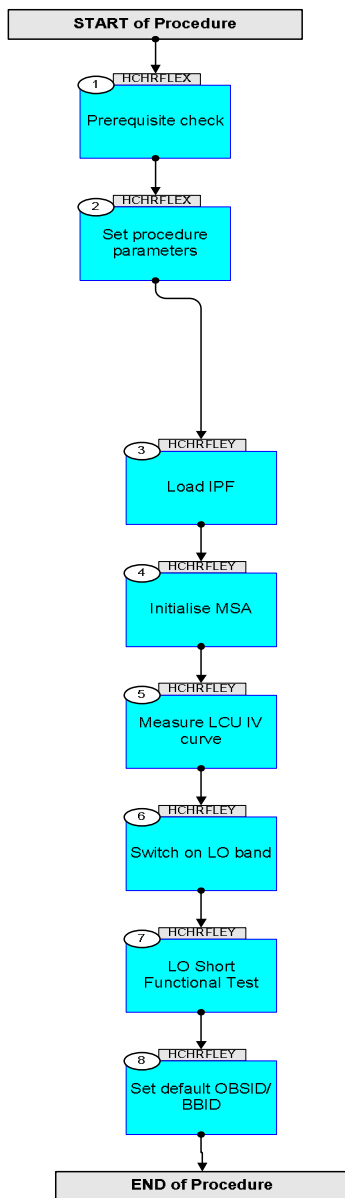


|          |   |   |   |            |  |
|----------|---|---|---|------------|--|
| 07/01/10 |   | 5 | All ET times removed  | R. Biggins |  |
| 08/01/10 |   | 6 | Update due to MOIS error in generating FPs                                  | R. Biggins |  |
| 11/01/10 | 3 | 7 | Update due to MOIS associating incorrect calibration curves to imported FPs | R. Biggins |  |

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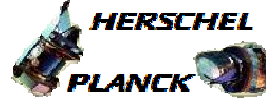
## Procedure Flowchart Overview



|  |  |
|--|--|
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|--|--|

| Step No.   | Time                 | Activity/Remarks   | TC/TLM | Display/ Branch |
|--|----------------------|--|--------|-----------------|
| <b>Beginning of Procedure</b>                      |                      |  |        |                 |
| <i>TC Seq. Name :HCHRFLEX (LO functional test)</i> |                      |  |        |                 |
| <i>TimeTag Type: B</i><br><i>Sub Schedule ID:</i>  |                      |  |        |                 |
| □  |                      |  |        |                 |
| 1  |                      | <i>Prerequisite check</i>  |        | Next Step:<br>2 |
| 1.1  |                      | <i>HSC/ICC input</i>   |        | □               |
|  |                      | Verify that the HSC has supplied a valid OBSID value:<br><br><b>OBS_ID = 0xnnnn nnnn</b>   |        |                 |
|  |                      | Verify: the following IPF file has been generated and can be called from the Manual Stack (where vvvv is the latest version number):<br><br><b>HCHRFLEY_LO_FT_7B_vvvv.IPF</b>  |        |                 |
| 1.2  |                      | <i>Verify initial conditions</i>   |        | □               |
|  |                      | Verify Telemetry<br><br><div style="display: flex; justify-content: space-between;"> <span><b>HI_Prime_red</b></span> <span><b>HM009190</b></span> <span><b>= HIFI_redundant</b></span> </div>   |        | AND=ZAZ9C999    |
|  |                      | Verify: Verify the content of the following AND with the HIFI representative:<br><br><b>HA006289 LCU_temperatures</b>  |        |                 |
| 2  |                      | <i>Set procedure parameters</i>  |        | Next Step:<br>3 |
|  | ET=+<br>UT=+00.00.01 | HIFI_Set_OBS_ID<br><br><div style="display: flex; justify-content: space-between; margin-top: 10px;"> <span><b>HIFI_Set_OBS_ID</b></span> <span><b>HC014289</b></span> </div> Command Parameter(s) : <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><b>HIFI_BB_ID</b></span> <span><b>HP001197</b></span> <span><b>17700001 &lt;hex&gt;</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 2px;"> <span><b>HIFI_OBS_ID</b></span> <span><b>HP000197</b></span> <span><b>OBS_ID</b></span> </div> TC Control Flags : <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><b>GBM IL DSE</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 2px;"> <span><b>--Y --</b></span> </div> Subsch. ID : 70<br>Det. descr. : Set Observation-ID and Building-Block-ID |        |                 |
|  |                      | Verify Telemetry<br><br><div style="display: flex; justify-content: space-between;"> <span><b>BB_ID_per_hk</b></span> <span><b>HM004190</b></span> <span><b>= 17700001 &lt;hex&gt;</b></span> </div>   |        | AND=ZAZ9C999    |

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| Step No.  | Time                 | Activity/Remarks   | TC/TLM   | Display/ Branch |
|---|----------------------|--|----------|-----------------|
|   |                      | Verify Telemetry<br>OBS_ID_per_hk                    HM003190  | OBS_ID   | AND=ZAZ9C999    |
|   | ET=+<br>UT+=00.00.00 | HIFI_Housekeeping_on<br>HIFI_Housekeeping_on<br>Command Parameter(s) :<br>HIF_HK_rate                    HP012197                    1_pkt_per_s<br>HIF_FCU_S                     HP006197                    ON (Def)<br>HIF_LCU_S                     HP007197                    ON (Def)<br>HIF_WBSV_S                    HP009197                    ON (Def)<br>HIF_WBSH_S                    HP008197                    ON (Def)<br>HIF_HRSV_S                    HP011197                    ON (Def)<br>HIF_HRSH_S                    HP010197                    ON (Def)<br>TC Control Flags :<br>GBM IL DSE<br>--Y -- ---<br>Subsch. ID : 70<br>Det. descr. : Sets periodic housekeeping packet generation period | HC016289 |                 |
|   |                      | Verify: The following <b>TM(3,25)</b> packets should be produced once every second:<br><br><b>HIFI_essential_HK</b> (APID 1025)<br><b>HIFI_HK_rev_7</b> (APID 1027)  |          |                 |
| <p>TC Seq. Name : HCHRFLEY (LO functional test)</p> <p>TimeTag Type: N<br/>           Sub Schedule ID:<br/>           ☐</p> |                      |  |          |                 |
| 3   |                      | Load IPF   |          | Next Step: 4    |
|   |                      | Load the following IPF (TPF) file into the Manual Stack (where vvvv is the latest version number):<br><br><b>HCHRFLEY_LO_FT_7B_vvvv.IPF</b>  |          |                 |
| 4   |                      | Initialise MSA   |          | Next Step: 5    |

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| Step No. | Time                 | Activity/Remarks   | TC/TLM  | Display/ Branch |
|----------|----------------------|--|---|-----------------|
|          | ET=+<br>UT=+00.00.01 | HIFI_Configure_FCU_Power<br><br><b>HIFI_Configure_FCU_Power</b><br><br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br>HF_CPR_Mixer_H_S          HP203191<br>HF_CPR_Mixer_V_S          HP204191<br>HF_CPR_Chopper_S          HP205191<br>HF_CPR_UCH_S              HP206191<br>HF_CPR_UCV_S              HP207191<br><br>TC Control Flags :<br>GBM IL DSE<br>--Y -- ---<br><br>Subsch. ID : 70<br><br>Det. descr. : Switch ON or OFF the five FCU-boards<br>(mixer H/V, chopper, IF HV)  | HC027289<br><br>C800001 <hex><br>ON (Def)<br>ON (Def)<br>ON (Def)<br>ON (Def)<br>ON (Def)   |                 |
|          | ET=+<br>UT=+00.00.00 | HIFI_R_Configure_FCU<br><br><b>HIFI_R_Configure_FCU</b><br><br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br>HF_CPR_MX BAND              HP202191<br>HF_CH1_DPFPFP1              HP176191<br>HF_CH2_FIF1_Drain_V          HP177191<br>HF_CH2_FIF1_Drain_C          HP178191<br>HF_CH2_FIF2_Drain_V          HP179191<br>HF_CH2_FIF2_Drain_C          HP180191<br>HF_CH2_SIF1_Drain_V          HP181191<br>HF_CH2_SIF1_Drain_C          HP182191<br>HF_CH2_SIF2_Drain_V          HP183191<br>HF_CH2_SIF2_Drain_C          HP184191  | HC183289<br><br>C800001 <hex><br>7 <dec><br>227 <dec> (Def)<br>0.75 V<br>4.0 mA<br>0.65 V<br>3.0 mA<br>0.57 V<br>3.5 mA<br>0.8 V<br>1.85 mA                       |                 |
|          |                      | HF_CH2_SIF3_Drain_V          HP185191<br>HF_CH2_SIF3_Drain_C          HP186191<br>HF_CV1_DPFPFP1              HP191191<br>HF_CV2_FIF1_Drain_V          HP192191<br>HF_CV2_FIF1_Drain_C          HP193191<br>HF_CV2_FIF2_Drain_V          HP194191<br>HF_CV2_FIF2_Drain_C          HP195191<br>HF_CV2_SIF1_Drain_V          HP196191<br>HF_CV2_SIF1_Drain_C          HP197191<br>HF_CV2_SIF2_Drain_V          HP198191<br>HF_CV2_SIF2_Drain_C          HP199191<br>HF_CV2_SIF3_Drain_V          HP200191<br>HF_CV2_SIF3_Drain_C          HP201191<br>HF_CPR_CH_SINE_S              HP211191<br>HF_CPR_CH_LOOP_S              HP210191 | 0.8 V<br>2.5 mA<br>227 <dec> (Def)<br>0.75 V<br>4.0 mA<br>0.65 V<br>3.0 mA<br>0.57 V<br>3.5 mA<br>0.57 V<br>3.5 mA<br>0.71 V<br>2.8 mA<br>ON (Def)<br>CLOSE (Def) |                 |

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|----------|----------------------|--|--|-----------------|
|          |                      | HF_CPR_CHFPG1 HP212191<br>HF_CPR_CHFPG2 HP213191<br>HF_CPR_CHFPG1 HP214191<br>HF_CPR_CHFPG2 HP215191<br>HF_CPR_CHFPG2 HP216191<br>HF_CPR_Cal_Heater_C HP217191<br>HF_CH1_MXBIAS_V HP172191<br>HF_CH1_MX_MG_C HP173191<br>HF_CV1_MXBIAS_V HP187191<br>HF_CV1_MX_MG_C HP188191<br>HF_R_Chopper_Rot HP455191<br>HF_CH1_DPACT_C HP174191<br>HF_CV1_DPACT_C HP189191<br><br>Subsch. ID : 70 | 17 <dec><br>201 <dec> (Def)<br>1010 <dec><br>885 <dec> (Def)<br>149 <dec> (Def)<br>1.1 mA<br>6.0 mV<br>0.0 mA (Def)<br>6.0 mV<br>0.0 mA (Def)<br>-2.33 V<br>A<br>B |                 |
|          |                      | Det. descr. : Configure the FCU-subsystem (redundant)  |  |                 |
|          | ET=+<br>UT=+00.00.03 | HIFI_CH1_MXBIAS_V<br><br>HIFI_CH1_MXBIAS_V<br><br>Command Parameter(s) :<br>HIFI_BB_ID HP001197<br>HF_CH1_MXBIAS_V HP172191<br><br>Subsch. ID : 70<br>Det. descr. : Send single command to set H mixer bias voltage  | HC095289<br><br>C800001 <hex><br>0.6 mV  |                 |
|          | ET=+<br>UT=+00.00.00 | HIFI_CV1_MXBIAS_V<br><br>HIFI_CV1_MXBIAS_V<br><br>Command Parameter(s) :<br>HIFI_BB_ID HP001197<br>HF_CV1_MXBIAS_V HP187191<br><br>Subsch. ID : 70<br>Det. descr. : Send single command to set V mixer bias voltage  | HC098289<br><br>C800001 <hex><br>0.6 mV  |                 |
|          | ET=+<br>UT=+00.00.01 | HIFI_HL_Normal<br><br>HIFI_HL_Normal<br><br>Command Parameter(s) :<br>HIFI_BB_ID HP001197<br><br>Subsch. ID : 70<br>Det. descr. : Send single command to switch LCU to normal mode   | HC082289<br><br>E2F0001 <hex>  |                 |
|          | ET=+<br>UT=+00.00.00 | HIFI_Conf_nom_LCU_ch0<br><br>HIFI_Conf_nom_LCU_ch0<br><br>Command Parameter(s) :<br>HIFI_BB_ID HP001197<br><br>Subsch. ID : 70<br>Det. descr. : Create macro-command to switch off the bands   | HC049289<br><br>E2F0001 <hex>  |                 |

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|----------|----------------------|--|---|-----------------|
|          | ET=+<br>UT=+00.00.10 | HIFI_HL_heater<br><br>HIFI_HL_heater<br><br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br>HL_heater                  HP397194<br><br>Subsch. ID : 70<br>Det. descr. : Send single command to control the LCU heater  | HC086289<br><br>E2F0001 <hex><br>6.0 V              |                 |
|          |                      | Verify Telemetry<br><br>HL_Channel_S                  HM003194   | = OFF   | AND=ZAZ9C999    |
|          |                      | Verify Telemetry<br><br>HL_MODE_S                  HM258194  | = normal  | AND=ZAZ9C999    |
| 5        |                      | Measure LCU IV curve   |   | Next Step:<br>6 |
|          | ET=+<br>UT=+00.00.00 | HIFI_measure_LCU_IV<br><br>HIFI_measure_LCU_IV<br><br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br>HIF_LCU_diode                  HP072197<br>HIF_LCU_IV_delay                  HP073197<br><br>TC Control Flags :<br><br>GBM IL DSE<br>--Y -- ---<br><br>Subsch. ID : 70<br>Det. descr. : Perform IV-measurement on an LOU-diode | HC108289<br><br>E4F0001 <hex><br>M1_7b<br>90 <dec>  |                 |
|          | ET=+<br>UT=+00.01.32 | HIFI_measure_LCU_IV<br><br>HIFI_measure_LCU_IV<br><br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br>HIF_LCU_diode                  HP072197<br>HIF_LCU_IV_delay                  HP073197<br><br>Subsch. ID : 70<br>Det. descr. : Perform IV-measurement on an LOU-diode   | HC108289<br><br>E4F0002 <hex><br>M2_7b<br>109 <dec> |                 |
|          |                      | SPACON:<br><br>Confirmation from the HIFI representative should be requested before continuing.  |   |                 |
| 6        |                      | Switch on LO band  |   | Next Step:<br>7 |



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| Step No. | Time                 | Activity/Remarks  | TC/TLM  | Display/ Branch |
|----------|----------------------|---|---|-----------------|
|          | ET=+<br>UT=+00.01.51 | HIFI_HL_Normal<br><br><b>HIFI_HL_Normal</b><br><br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br><br>TC Control Flags :<br>GBM IL DSE<br>--Y -- ---<br><br>Subsch. ID : 70<br>Det. descr. : Send single command to switch LCU to normal mode  | HC082289<br><br>E2A0001 <hex>   |                 |
|          | ET=+<br>UT=+00.00.01 | HIFI_Conf_nom_LCU_ch7b<br><br><b>HIFI_Conf_nom_LCU_ch7b</b><br><br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br>HL_freq_nx                  HP436194<br>HL_LSU_main                  HP438194<br>HL_LSU_offset                HP439194<br>HL_D2_step                  HP437194<br>HL_PL_7B_C                  HP389194<br>HL_M1_7B_V                  HP390194<br>HL_M2_7B_V                  HP391194<br>HL_Gate1_7B_V                HP392194<br>HL_Gate2_7B_V                HP393194<br>HL_Drain1_7B_V              HP394194 | HC048289<br><br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11 |                 |
|          |                      | HL_Curlim1                  HP290194<br>HL_Drain2_7B_V              HP395194<br>HL_Curlim2                  HP291194<br>HL_macro_checksum            HP440194<br><br>Subsch. ID : 70<br>Det. descr. : Create macro-command to configure LCU band 7b   | 12<br>13<br>14<br>15  |                 |
|          | ET=+<br>UT=+00.00.20 | Execute Telecommand<br><br><b>HIFI_LCU_read_settings</b><br><br>Subsch. ID : 70<br>Det. descr. : Requests setting parameters from LCU RAM page 7A   | HC198289  |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br><br><b>HIFI_LCU_macro_tuning_hk</b><br><br>Command Parameter(s) :<br>HIF_LCU_memmacro            HP068197<br><br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets  | HC019289<br><br>HSK_TM1 (Def)   |                 |

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| Step No. | Time                 | Activity/Remarks  | TC/TLM                                      | Display/ Branch |
|----------|----------------------|---|---|-----------------|
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br>HIFI_LCU_macro_tuning_hk<br>Command Parameter(s) :<br>HIF_LCU_memmacro                  HP068197<br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_TM2                     |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br>HIFI_LCU_macro_tuning_hk<br>Command Parameter(s) :<br>HIF_LCU_memmacro                  HP068197<br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_TM3                     |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br>HIFI_LCU_macro_tuning_hk<br>Command Parameter(s) :<br>HIF_LCU_memmacro                  HP068197<br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_TM                      |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br>HIFI_LCU_macro_tuning_hk<br>Command Parameter(s) :<br>HIF_LCU_memmacro                  HP068197<br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_G                       |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_Single<br>HIFI_LCU_Single<br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br>LCU_cmd                  HP234194<br>Subsch. ID : 70<br>Det. descr. : Send a single command to LCU                    | HC101289<br><br>E210001 <hex><br>HL_CLR_ERR |                 |
|          | ET=+<br>UT=+00.00.01 | HIFI_HL_heater<br>HIFI_HL_heater<br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br>HL_heater                  HP397194<br>Subsch. ID : 70<br>Det. descr. : Send single command to control the LCU heater   | HC086289<br><br>16<br>17                    |                 |

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|----------|----------------------|---|--|-----------------|
|          |                      | Verify Telemetry<br>HL_Channel_S HM003194   | = 7b   | AND=ZAZ9C999    |
|          |                      | Verify Telemetry<br>HL_MODE_S HM258194  | = normal   | AND=ZAZ9C999    |
|          |                      | SPACON:<br>Confirmation from the HIFI representative should be requested before continuing.   |  |                 |
| 7        |                      | LO Short Functional Test  |  | Next Step:<br>8 |
|          |                      | Verify: Monitor the following parameter and ensure that any occurrences of a 'FAULT' condition are communicated immediately to the HIFI representative (use AND HA004289).<br><br>HM259194 HL_error_word_S  |  |                 |
|          | ET=+<br>UT=+00.00.00 | HIFI_HL_Normal<br><br>Command Parameter(s) :<br>HIFI_BB_ID HP001197<br><br>TC Control Flags :<br><br>Subsch. ID : 70<br>Det. descr. : Send single command to switch LCU to normal mode  | HIFI_HL_Normal<br><br>HC082289<br><br>E2A0002 <hex>  |                 |
|          | ET=+<br>UT=+00.00.01 | HIFI_Conf_nom_LCU_ch7b<br><br>Command Parameter(s) :<br>HIFI_BB_ID HP001197<br>HL_freq_nx HP436194<br>HL_LSU_main HP438194<br>HL_LSU_offset HP439194<br>HL_D2_step HP437194<br>HL_PL_7B_C HP389194<br>HL_M1_7B_V HP390194<br>HL_M2_7B_V HP391194<br>HL_Gate1_7B_V HP392194<br>HL_Gate2_7B_V HP393194<br>HL_Drain1_7B_V HP394194 | HIFI_Conf_nom_LCU_ch7b<br><br>HC048289<br><br>18<br>19<br>20<br>21<br>22<br>23<br>24<br>25<br>26<br>27<br>28 |                 |
|          |                      | HL_Curlim1 HP290194<br>HL_Drain2_7B_V HP395194<br>HL_Curlim2 HP291194<br>HL_macro_checksum HP440194<br><br>Subsch. ID : 70<br>Det. descr. : Create macro-command to configure LCU band 7b   | 29<br>30<br>31<br>32   |                 |

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| Step No. | Time                 | Activity/Remarks   | TC/TLM                        | Display/ Branch |
|----------|----------------------|--|-------------------------------|-----------------|
|          | ET=+<br>UT=+00.00.20 | Execute Telecommand<br><br>HIFI_LCU_read_settings<br><br>Subsch. ID : 70<br>Det. descr. : Requests setting parameters from LCU RAM page 7A   | HC198289                      |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br><br>HIFI_LCU_macro_tuning_hk<br><br>Command Parameter(s) :<br>HIF_LCU_memmacro HP068197<br><br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_TM1 (Def) |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br><br>HIFI_LCU_macro_tuning_hk<br><br>Command Parameter(s) :<br>HIF_LCU_memmacro HP068197<br><br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_TM2       |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br><br>HIFI_LCU_macro_tuning_hk<br><br>Command Parameter(s) :<br>HIF_LCU_memmacro HP068197<br><br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_TM3       |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br><br>HIFI_LCU_macro_tuning_hk<br><br>Command Parameter(s) :<br>HIF_LCU_memmacro HP068197<br><br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_TM        |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br><br>HIFI_LCU_macro_tuning_hk<br><br>Command Parameter(s) :<br>HIF_LCU_memmacro HP068197<br><br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_G         |                 |

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| Step No. | Time                 | Activity/Remarks  | TC/TLM   | Display/ Branch |
|----------|----------------------|---|--|-----------------|
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_Single<br><br><b>HIFI_LCU_Single</b><br><br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br>LCU_cmd                  HP234194<br><br>Subsch. ID : 70<br>Det. descr. : Send a single command to LCU   | HC101289<br><br>E210002 <hex><br>HL_CLR_ERR                                    |                 |
|          | ET=+<br>UT=+00.00.01 | HIFI_HL_heater<br><br><b>HIFI_HL_heater</b><br><br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br>HL_heater                  HP397194<br><br>Subsch. ID : 70<br>Det. descr. : Send single command to control the LCU heater  | HC086289<br><br>33<br>34   |                 |
|          | ET=+<br>UT=+00.00.20 | HIFI_HL_Normal<br><br><b>HIFI_HL_Normal</b><br><br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br><br>Subsch. ID : 70<br>Det. descr. : Send single command to switch LCU to normal mode  | HC082289<br><br>E2A0003 <hex>  |                 |
|          | ET=+<br>UT=+00.00.01 | HIFI_Conf_nom_LCU_ch7b<br><br><b>HIFI_Conf_nom_LCU_ch7b</b><br><br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br>HL_freq_nx                  HP436194<br>HL_LSU_main                  HP438194<br>HL_LSU_offset                  HP439194<br>HL_D2_step                  HP437194<br>HL_PL_7B_C                  HP389194<br>HL_M1_7B_V                  HP390194<br>HL_M2_7B_V                  HP391194<br>HL_Gate1_7B_V                  HP392194<br>HL_Gate2_7B_V                  HP393194<br>HL_Drain1_7B_V                  HP394194 | HC048289<br><br>35<br>36<br>37<br>38<br>39<br>40<br>41<br>42<br>43<br>44<br>45 |                 |
|          |                      | HL_Curlim1                  HP290194<br>HL_Drain2_7B_V                  HP395194<br>HL_Curlim2                  HP291194<br>HL_macro_checksum                  HP440194<br><br>Subsch. ID : 70<br>Det. descr. : Create macro-command to configure LCU band 7b   | 46<br>47<br>48<br>49   |                 |
|          | ET=+<br>UT=+00.00.20 | Execute Telecommand<br><br><b>HIFI_LCU_read_settings</b><br><br>Subsch. ID : 70<br>Det. descr. : Requests setting parameters from LCU RAM page 7A   | HC198289   |                 |

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| Step No. | Time                 | Activity/Remarks  | TC/TLM                                      | Display/ Branch |
|----------|----------------------|---|---|-----------------|
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br>HIFI_LCU_macro_tuning_hk<br>Command Parameter(s) :<br>HIF_LCU_memmacro                  HP068197<br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_TM1 (Def)               |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br>HIFI_LCU_macro_tuning_hk<br>Command Parameter(s) :<br>HIF_LCU_memmacro                  HP068197<br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_TM2                     |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br>HIFI_LCU_macro_tuning_hk<br>Command Parameter(s) :<br>HIF_LCU_memmacro                  HP068197<br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_TM3                     |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br>HIFI_LCU_macro_tuning_hk<br>Command Parameter(s) :<br>HIF_LCU_memmacro                  HP068197<br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_TM                      |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_macro_tuning_hk<br>HIFI_LCU_macro_tuning_hk<br>Command Parameter(s) :<br>HIF_LCU_memmacro                  HP068197<br>Subsch. ID : 70<br>Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289<br><br>HSK_G                       |                 |
|          | ET=+<br>UT=+00.00.02 | HIFI_LCU_Single<br>HIFI_LCU_Single<br>Command Parameter(s) :<br>HIFI_BB_ID                  HP001197<br>LCU_cmd                  HP234194<br>Subsch. ID : 70<br>Det. descr. : Send a single command to LCU                    | HC101289<br><br>E210003 <hex><br>HL_CLR_ERR |                 |

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| Step No.                | Time                 | Activity/Remarks  | TC/TLM  | Display/ Branch   |
|-------------------------|----------------------|---|---|-------------------|
|                         |                      | Verify: Verify the content of the following ANDs with the HIFI representative:<br><br>HA004289 LCU_status2<br>HA020289 LCU_7b   |   |                   |
|                         | ET=+<br>UT=+00.00.01 | HIFI_Housekeeping_on<br><br>HIFI_Housekeeping_on<br><br>Command Parameter(s) :<br>HIF_HK_rate          HP012197<br>HIF_FCU_S          HP006197<br>HIF_LCU_S          HP007197<br>HIF_WBSV_S         HP009197<br>HIF_WBSH_S         HP008197<br>HIF_HRSV_S         HP011197<br>HIF_HRSH_S         HP010197<br><br>TC Control Flags :<br><br>GBM IL DSE<br>--Y -- ---<br><br>Subsch. ID : 70<br>Det. descr. : Sets periodic housekeeping packet generation period | HC016289<br><br>1_pkt_per_4_s<br>ON (Def)<br>ON (Def)<br>ON (Def)<br>ON (Def)<br>ON (Def)<br>ON (Def) |                   |
|                         |                      | Verify: The following <b>TM(3,25)</b> packets should be produced once every 4 seconds:<br><br>HIFI_essential_HK (APID 1025)<br>HIFI_HK_rev_7 (APID 1027)  |   |                   |
| 8                       |                      | Set default OBSID/BBID  |   | Next Step:<br>END |
|                         | ET=+<br>UT=+00.00.01 | HIFI_Set_OBS_ID<br><br>HIFI_Set_OBS_ID<br><br>Command Parameter(s) :<br>HIFI_BB_ID          HP001197<br>HIFI_OBS_ID         HP000197<br><br>TC Control Flags :<br><br>GBM IL DSE<br>--Y -- ---<br><br>Subsch. ID : 70<br>Det. descr. : Set Observation-ID and Building-Block-ID   | HC014289<br><br>0 <hex> (Def)<br>0 <hex> (Def)  |                   |
|                         |                      | Verify Telemetry<br><br>BB_ID_per_hk          HM004190  | = 0 <hex>   | AND=ZAZ9C999      |
|                         |                      | Verify Telemetry<br><br>OBS_ID_per_hk          HM003190   | = 0 <hex>   | AND=ZAZ9C999      |
| <b>End of Procedure</b> |                      |   |   |                   |