LOU Tuning Table Release Note

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1   Document Change Record

1.1   History of changes

Date	Issue/revision	Pages	Change
17.08.2006	Issue 0.01	All	New
25.08.2006	Issue 0.02	4	Updated according to changes in the table file format. Refers to configuration with a LO dummy
06.09.2006	Issue 0.03	4	New table file for dummy LOU generated.
08.09.2006	Issue 0.04	4	New table file for dummy LOU generated. Corrected "ut" entries.
15.09.2006	Issue 0.05	4	New table file for dummy LOU generated.
18.09.2006	Issue 0.07	4	Changes in the naming of parameters, to match the MIB entries names.
18.09.2006	Issue 0.08	4	Eng. "9e99" introduced for not-converted values. New calibration dlls used.
09.11.2006	Issue 0.09	4	New table file for dummy LOU generated, with little restrictions. High voltage range in blue and red table, high current range in green table.
15.11.2006	Issue 0.10	4	New table file for dummy LOU generated, GREEN TABLE values according to SRC/LCU/2001-007 Issue 2.7 corrected.
16.11.2006	Issue 0.11	4	New table file for dummy LOU generated, fixing LSU frequency telemetry problem
20.11.2006	Issue 0.12	4	New table file for dummy LOU generated, string 9E99 placed as eng. value in HL_LSUMX_power. Description for LSU telemetry voltage in bands 2a, 3b, 4a changed.
19.03.2007	Issue 0.13	8	Table file for LO dummy, LCU main and redundant. Revised GREENTABLE, SAFETABLE.
31.05.2007	Issue 0.14-IMD2	8	Table file for LO dummy, to be used only with IMD2
29.06.2007	Issue 0.15	10	Table file for LO dummy. Same safe operational tables as in release 0.13. New LCU patch 16 included.
02.07.2007	Issue 0.16	10	Table file for LO dummy. Revised blue limit in bands 6ab and 7ab. New LCU patch 17 included
18.07.2007	Issue 0.17	11	Upload order changed. Table content based on Issue 0.16. LSU table revised, LSU PFM tuning allowed by increased telemetry voltage range in LSU table. LCU patch 17 included
28.09.2007	Issue 0.18	11	Based on Issue 0.17. Corrected a bug in LSU telemetry file for bands 2a,3b,4a. Telemetry voltage decreases with increasing frequency.
22.11.2006	Issue 1.00	5	Table file generated for ILT test configuration. LOUFM, LCUFM, LSUDM.
04.12.2006	Issue 1.01	5	Table file generated for ILT test configuration. LOUFM, LCUFM, LSUPFM.
08.12.2006	Issue 1.02	5	Table file generated for ILT test configuration. LOUFM, LCUFM, LSUPFM. LSU frequency telemetry margins corrected in band 4a.

15.12.2006	Issue 1.03	5	Table file for ILT test configuration. GREENTABLE values revised.
11.01.2007	Issue 1.04	6	Table file for ILT test configuration. GREENTABLE values for T_range 123-135K SAFE values band 4A, 4B revised for M2 stage
18.01.2007	Issue 1.05	7	Table file for ILT test configuration. GREENTABLE values as in FMLCU PROM.
31.01.2007	Issue 1.06	7	Table file for ILT test configuration. GREENTABLE values as in FMLCU PROM. LSUTABLE for LSU redundant.
01.02.2007	Issue 1.07	7	Table files for ILT test configuration, generated two export files one for main and second for redundant part of the subsystem.
05.02.2007	Issue 1.08	7	Table files for ILT test configuration, generated two export files one for main and second for redundant part of the subsystem. Latest .DLL version for HEX to ENGconversion used. LSU redundant table updated.
19.03.2007	Issue 1.09	8	Table files for ILT test configuration, LOUFM with all bands installed. Two sets of export files: main and redundant. Updated SAFETABLE for line resistances. LSUTABLE overlapping increased by 10mV. BLUETABLE adapted.
22.03.2007	Issue 1.10	8	Based on Issue 1.09. Fixed BLUETABLE max error D1V in band 4b.
27.03.2007	Issue 1.11	8	Updated BLUETABLE and SAFETABLE to account for line resistance in bands 6 and 7
28.03.2007	Issue 1.JPL	8	ATTENTION: this is a special safe table with expanded blue and green table limits. Only to be used with MPIfR personnel present during operation.
17.04.2007	Issue 1.12	8	Updated GREENTABLE , fixes out of limit error band 3b
25.05.2007	Issue 1.13	8	Updated GREENTABLE, should fix out of limit errors in band 2b and 3b
31.05.2007	Issue 1.14-IMD2	8	Table file to be used only on LCU IMD2. Created from I1.13 LCU FM, with the proper calibration table for IMD2.
05.06.2007	Issue 1.15-IMD2	8	Table file to be used only on LCU IMD2. Safe and Blue Table revised for line resistance in ILT setup
08.06.2007	Issue 1.16-IMD2	8	Table file to be used only on LCU IMD2. Safe and Blue Table revised. Input from vector-scan HK data performed with Table 1.15-IMD2.
14.06.2007	Issue 1.17-IMD2	8	Table file to be used only on LCU IMD2. Green Table revised. Input from OOL reports.
19.06.2007	Issue 1.18-300K	8	Table file for 300K operation of LOUFM with LCU FM and LSU PFM.
21.06.2007	Issue 1.19-IMD2	8	Table file to be used only on LCU IMD2. Green table in band 3b revised. Input from OOL reports.
26.06.2007	Issue 1.19-IMD2	9	New release note, including patch LCU_FM_15.txt.
26.06.2007	Issue 1.JPL-IMD2	9	ATTENTION: this is a special safe table with expanded blue and green table limits. Only to be used with MPIfR personnel present during operation. This release was prepared for use on LCU IMD2 only.

HERSCHEL/HIFI - LO

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Hifi no.: MPIfR/HIFI/PR/2006-564
Inst.no.: 25
Issue: Issue 2.21-Purity-B
Date: 10th June, 2009
Category: 1

27.06.2007	Issue 1.JPL2-IMD2	9	ATTENTION: this is a special safe table with expanded blue and green table limits. Only to be used with MPIfR personnel present during operation. This release was prepared for use on LCU IMD2 only. Fixed blue limit above red limit problem
28.06.2007	Issue 1.20	9	Updated GREENTABLE to include OOL fixes observed during IMD2 operation.
29.06.2007	Issue 1.21	10	Same safe operational tables as in release 1.20. New LCU patch 16 included
01.07.2007	Issue 1.22-300K	10	Revised version 1.18-300K, table file for 300K operation of LOUFM with LCUFM and LSU PFM. Tuning in bands 5a and 7b limited to EIDP data.
02.07.2007	Issue 1.23-300K	11	Safe table from release 1.22-300K, table file for 300K operation of LOUFM with LCUFM and LSU PFM. Tuning in bands 5a and 7b limited to EIDP data. LCU patch 1.7 included
03.07.2007	Issue 1.24-300K	11	Safe table from release 1.22-300K, CUS export location of SAFE table placed after BLUE TABLE
03.07.2007	Issue1.25-300K	11	Revised BLUE and SAFE table from Issue 1.24-300K for the DxV voltage drop. ATTENTION! THIS SAFE OPERATIONAL TABLE CAN ONLY BE UPLOADED IF ISSUE1.24 IS INSTALLED IN LCU FIRST
17.01.2007	Issue 2.00	7	Table file for flight hardware configuration, generated for FMLCU PROM burning.
19.08.2007	Issue 2.01	10	CUS export file generated from FMLCU PROM data. Upload of safe operational table does not change table memory area of FMLCU. This release also includes LCU patch 1.7.
09.04.2008	Issue 2.02	7, 10, 11	Revised BLUE and SAFE table from Issue 1.25-300 K for flight harness for 300 K operation ONLY!
16.04.2008	Issue 2.03	10, 11	Revised safe tables from Issue 2.02-300 K according to the test performed on 16th April 2008
17.04.2008	Issue 2.04	10, 11	Revised safe tables from Issue 2.03-300 K with restricted limits on blue table
07.05.2008	Issue 2.05	10, 11	Revised safe tables from Issue 2.04-300 K with enlarged limits on green table for the M2 multipliers of bands 5a and 6a. This was necessary due to out of limit errors during diplexer scans.
10.05.2008	Issue 2.06	7	The only change concerns the release note. All tables are unchanged compared to issue 2.05-300K!
21.07.2008	Issue 2.07	7, 10, 11	Revised safe tables from Issue 2.06-300 K with enlarged limit on green table for the M2 multiplier of band 5a. This was necessary due to out of limit errors during diplexer scans.

HERSCHEL/HIFI - LO

LOU Tuning Table Release Note

Hifi no.: MPIfR/HIFI/PR/2006-564
Inst.no.: 25
Issue: Issue 2.21-Purity-B
Date: 10th June, 2009
Category: 1

14.11.2008	Issue 2.08	7, 10, 11, 12	Revised safe tables from Issue 1.21 for operation in temperature range between 123 and 145 K. Values are corrected for the flight line resistances. A table with the resistances is given in Section 2.4. The blue table values in 6a and 7b have been set to the resistance-corrected EIDP values plus 50 mV. This is more restricted than in I1.21. (agreed on TRR 13.11.08 Utrecht). Purity test results of ILT3 for band 7b have been incorporated (agreed on TRR 13.11.08 Utrecht, values distributed by PD email 06.11.2008). The blue table has been changed for M1V (see Section 2.5). No information of the corresponding expected currents for M1I and M2I have been distributed to MPIfR, so that the GREEN TABLE is left unchanged.
16.11.2008	Issue 2.09a	11; 14pages	Safety table release based on issue 2.08. Full set of configlcuXX.config files have been included. M1V settings as per Section 2.5 are included in "configlcu7b.config". Keyfreq_list.txt included with frequencies and D2V settings coded according to Section 2.6 for LO SFT.
25.11.2008	Issue 2.10	13, 14	Revised Safety Tables from Issue 2.09a. The Green Table has been changed according to the results of the SFT on 24.11.2008 in the following parameters: G1C_Max_1B, G2C_Max_3B, D2C_Min_3B, G2C_Max_7B
26.11.2008	Issue 2.11	11, 13, 14	Revised Safety Tables from Issue 2.09b. The Green Table has been changed according to the results of the SFT on 24.11.2008 in the following parameters: G1C_Max_1B, G2C_Max_3B, D2C_Min_3B, G2C_Max_7B, and D1V_Safe for all Indices. The frequency dependent M1V settings in "configlcu7b.config" are set to the original settings discarding the purity test results of ILT3 for band 7b.
27.11.2008	Issue 2.12	13,14	Revised Safety Tables from Issue 2.11. The telemetry-voltage overlap has been enlarged in the LSU tables for main and redundant part.
28.11.2008	Issue 2.13	8, 13, 14	Special Safety Table Release for the "Purity Test" based on Issue 2.12. Tuning is only permitted in bands 3b (Indices 16 – 21) and 7b (Indices 11 – 19). According to the emails of J. Ward and J. Pearson (2008-11-22) the current limit of the multiplier M1 in band 7b was set to 3mA.

01.12.2008	Issue 2.14b	8, 13,12,14	Applicable programmable hardware current limits for the drain stages of LCU included in table 4.7. Revised Safety Tables from Issue 2.12. The Green Table limits have been adjusted after the vector scans of 28th November 2008 to avoid green out of limit events. The Blue Table has been changed to allow for higher VD2 at the band edges of 3b, 4a, 4b. In band 2b VD2 has been changed to sample Best Guess VD2 plus margin. M1V setting of band 7b, as given in the EIDP, are included in "configlcu7b.config".
02.12.2008	Issue 2.15b	13,14	Revised Safety Tables from Issue 2.14b. Changes have been applied to the blue table to avoid conflicts between red and blue table at table upload (due to conversion problems).
04.12.2008	Issue 2.16	11, 13, 14	Revised Safety Tables from Issue 2.15b. The resistances of the cold flight harness are taken into account for the red and blue tables. A table with the resistances is given in Section 4.4.
08.12.2008	Issue 2.17	8, 9, 14, 15	Revised Safety Tables from Issue 2.16. Changes have been applied to the blue table and "configlcu7b.config" file as proposed by JPL (08.12.2008 00:51 CET)
03.04.2009	Issue 2.18-Beta	8, 14, 15, 17, 18	Revised Safety Tables from Issue 2.17 for **test purpose only!** Changes have been applied to the blue and green table (maximum D2V settings and maximum current limits as proposed by JPL 01.04.2009). The "configlcuXX.config" file has been changed in structure. The purified settings at impure frequencies have been applied to the "configlcu3b.config" (see Section 4.5). The SFT frequency for band 5a has been moved to 1124 GHz.
09.04.2009	Issue 2.18	8, 17, 18	The tables of Issue 2.18 are based on the verified Safety Tables from Issue 2.18-Beta. No changes have been applied to the values. Issue 2.18 is intended for flight operation.
28.04.2009	Issue 2.18-Purity	8, 17, 18, 19	Special Safety Table Release for the "Purity Test" based on Issue 2.18. Changes have been applied to the blue table in band 3b to meet the requirements of this test.
28.05.2009	Issue 2.19	8, 14, 19, 20	Revised Safety Tables from Issue 2.18. The impure settings in the "configlcu3b.config" file have been restored. The green table has been updated due to higher currents (M1) in band 5a and 7b.
03.06.2009	Issue 2.20	7, 9, 12, 19, 20	Revised Safety Tables from Issue 2.19. The "**configlcuXXonfig**" files have been updated. **No changes have been applied to the green, blue nor red table!**
10.06.2009	Issue 2.21-Purity-B	7, 10, 20, 21	Special Safety Table Release for the "Purity Test" based on Issue 2.20. Changes have been applied to the blue table in band 3b to meet the requirements of this test. Additionally, the "drain2_v_blmx" values in the frequency range 1850 – 1900 GHz in band 7b have been applied as proposed by JPL (09.06.2009)

1.2 Detailed list of changes for the current Issue

Issue: 2.18-Beta	**Based on Issue:** 2.17	**Date:** 3rd April, 2009

#	Change	Reference
1	The maximum D2V settings in the **blue table** have been changed to meet the requirements proposed by JPL. For the bands 1a, 2a, 3b, 4a, and 6b the maximum set values are now equal to the nominal bias settings without RF (Amplifier EIDPs). For band 4b the maximum D2V set value has been reduced to 2.8 V.	"MMICChart.xls" by JPL (01.04.2009)
2	The minimum D2V settings in the **blue table** have been consistently changed to D2V_SAFE – 100 mV.	
3	The **green table** has been updated to meet the current limit requirements proposed by JPL. The settings for the programmable hardware current limits have not been changed (see Section 4.7)	"Technical Note" by JPL (22.01.2009)
4	The structure of the "**configlcuXX.config**" has been changed as proposed by David Teyssier. The column called "drain2_v" has been replaced by two new columns called "drain2_v_blmn"and "drain2_v_blmx". The first one is equal to the blue table minimum. The latter one is equal to the EIDP set value unless this value exceeds the blue max limit for a certain index. In this case the value equals the blue table maximum.	Templates by David Teyssier (24.02.2009)
5	The purified settings, given in Section 4.5, have been applied to the "**configlcu7b.config**" file. They are result of the purity test in the TB/TV test and were proposed by JPL. (Note that these values had been included in Issue 2.17 already).	Updated EIDP for 7b by JPL (08.12.2008)
6	The purified settings, given in Section 4.5, have been applied to the "**configlcu3b.config**" file. They are result of the purity test in the TB/TV test and were proposed by Thomas Klein.	"testblock_1_M3_75.xls" by Thomas Klein (19.03.2009)
7	The SFT frequency in the "**keyfreq_list.txt**" file has been moved to 1124 GHz for band 5a, to avoid problems with 1122 GHz lying on an index border exactly. The D2V for this frequency was set to 2.25 V, which is equal to the set value of the T_{sys}-survey, to have a reference measurement. A list of the SFT frequencies and D2V set values is given in Section 4.6.	

Issue: 2.18	**Based on Issue:** 2.18-Beta	**Date:** 9th April, 2009

#	Change	Reference
1	None	

Issue: 2.18-Purity	**Based on Issue:** 2.18	**Date:** 28th April, 2009

#	Change	Reference
1	The blue table has been updated in band 3b to meet the requirements of the "Purity Test": M1V_Min → 3.98V, M2V_Min → -9.52V, M3V_Max → 2.02V.	"testblock_1_M3_75.xls" by Thomas Klein (28.04.2009)

Issue: 2.19	**Based on Issue:** 2.18	**Date:** 27th May, 2009

#	Change	Reference
1	The impure settings in the "configlcu3b.config" file have been restored.	
2	The green table has been updated in bands 5a and 7b due to slightly higher currents at the first multipliers.	SFT 26.05.2009

Issue:	2.20	**Based on Issue:**	2.19	**Date:**	3rd June, 2009
#	**Change**				**Reference**
1	Frequencies close to the index-borders have been added to the "**configlcuXXonfig**" files to avoid blue-max errors.				

Issue:	2.21-Purity-B	**Based on Issue:**	2.20	**Date:**	10th June, 2009
#	**Change**				**Reference**
1	The blue table has been updated in band 3b to meet the requirements of the "Purity Test": M1V_Min → 3.98V, M2V_Min → -9.52V, M3V_Max → 2.02V, D2V → Indices 16 – 20.				
2	The "drain2_v_blmx" values in the frequency range 930 – 951 GHz "**configlcu3b.config**" file have been updated to achieve the read values of the purity test in TV/TB.				
3	The "drain2_v_blmx" values in the frequency range 1850 – 1900 GHz "**configlcu7b.config**" file have been updated to Blue_Table_Max – 50 mV				Proposed by J. Pearson 09.06.2009

2   Documents

2.1   Applicable Documents

AD	TITLE	REFERENCE	ISSUE
01	Procedure for Exchange and Upload of LCU Safety Tables	SRON-G/HIFI/AIV/2006-022	0.4 - 24.08.2006

2.2   Reference Documents

RD	TITLE	REFERENCE	ISSUE

3   Scope

This document releases the FM LOU tuning tables defined in a file specified below for upload to the LCU.

The release notes numbered with 0.xx belong to test activities with LO-DUMMY.

Issues numbered with 1.xx are applicable in ILT test phase.
For ILT when LCU IMD2 is used, the table release is labeled with extension x.xx-IMD2.

Issue 1.22-300K is applicable for LOU FM warm unit tests during ILT. These tests will be supervised by MPIfR personnel. No action on the LOU FM hardware, this means no switch on, shall be carried out without MPIfR personnel present. Upload of the safe operational tables and the patch of Issue 1.22-300K is allowed.

ATTENTION: Issue 1.25-300K can only be uploaded to LCU if safe operational tables from Issue 1.24 have been installed in LCU before. This is because of limit checking of LCU on the uploaded safe table values against LCU`s internal RED table.

Releases 2.xx are for satellite level only! Issue 2.00 was prepared for integration in the final software of FMLCU PROM. CUS export file in issue 2.01 was generated from FMLCU PROM content. Uploading this safety table does not change the table memory content of FMLCU and changes therefore not the checksum value.

All previous releases to 2.06 for 300 K operation are obsolete and must not be used!

ATTENTION: The releases 2.07 is for 300 K operation only!
The release 2.07 enlarges the current limit for M2 of band 5a. The operation of band 5a at high multiplier current must be of short duration and excessive use has to be avoided!
300K operations shall be minimized to the absolute necessary, such as SFT and other short duration on-time test for a given LO band. Any other room temperature operation of the LOU must be approved by MPIfR.

ATTENTION: The release 2.13 is only intended to be used during the Purity Test. Tuning is only possible in bands 3b (Indices 16 – 21) and 7b (Indices 11 – 19).

ATTENTION: The releases 2.08 (2.18-Beta, 2.18-Purity) are for operation in the temperature range between 123 K and 145 K!

ATTENTION: The release 2.17 is only intended to be used for TV tests. Specific deviations from previous releases are:
1. **This release is based on numbers sent by JPL via email to MPIfR. MPIfR has not created the table entries in a defined process as usual. The entries have not run on the table checker software. MPIfR shall not be responsible for errors due to inconsistencies.**
2. **The table entries are not derived from the process established at MPIfR. MPIfR is not aware of the process, these entries have been derived from.**
3. **MPIfR is not aware of in which specific tests these tables will be used. It has only been stated in a telecon on 08.12.08 (John Pearson, Willem Jellema, Herman Jacobs, Thomas Klein) that these tables shall be used only for the rest of the TV tests. Which specific tests are performed in this phase is unknown to MPIfR. The user of this safety table shall contact JPL for getting clearance for use in a specific test.**

ATTENTION: The release 2.18-Beta is intended for test purpose only!

ATTENTION: The release 2.18-Purity is intended for the "Purity Test" only! This release <u>does not</u> account for changes in the temperature conditions and/or harness resistances occurring in flight operation which may be revealed after HIFI switch-on and LO-SFT! It is designed for the assumed temperature range of 123 K – 145 K.

ATTENTION: The releases 2.19, 2.20, and 2.21-Purity-B are for operation in the temperature range between 115 K and 140 K!

ATTENTION: The config-files of release 2.20 are also applicable to release 2.19!

ATTENTION: For releases 2.21-Purity-B the Max_D2V values in the blue table for band 7b (1850 – 1900 GHz) have been modified according to the values proposed by JPL (09.06.2009): Blue_Table_Max_D2V – 50 mV

In case that a LCU on-board software patch is required together with the safe operational table upload, it is stated in section 4.2. The signed software release note will be made available by the software engineer who prepared the patch. The below given checksum values are only valid in case that LCU was power cycled before safe operational table upload and not put into NORMAL mode afterwards. Otherwise, only the NORMAL mode checksum value stated below is valid.

4   Applicable Subsystem Configuration

4.1   Unit Configuration

LOU Model: LOU FM	Section: N.A.	
LCU Model: LCU FM	Section: Main/Redundant	PROM Version: 0x2917
LSU Model: LSU PFM	Section: Main/Redundant	

4.2   Required LCU On-Board Software Patches

Patch	LCU Model	Section	Change
patch_LCUFM_17	**FM**	**Prime or Redundant in FM**	**1) Version number changed for 2977** **2) Activation of** *copy safe to default* **command in Standby mode** **3) Delay increased in LSU_FREQ_TLMY measurement in FSW** **4)Change I4 of M3 in band 3b /Main** **5)Change I4 of M3 in band 3b /Redundant**

4.3 Harness Configuration

LOU BAND	LOUFM – LCUFM	LOUFM – LSUFM
1a	Satellite Harness for BAND I A	HIFI WAVEGUIDE ASSEMBLY for BAND I A
1b	Satellite Harness for BAND I B	HIFI WAVEGUIDE ASSEMBLY for BAND I B
2a	Satellite Harness for BAND II A	HIFI WAVEGUIDE ASSEMBLY for BAND II A
2b	Satellite Harness for BAND II B	HIFI WAVEGUIDE ASSEMBLY for BAND II B
3a	Satellite Harness for BAND III A	HIFI WAVEGUIDE ASSEMBLY for BAND III A
3b	Satellite Harness for BAND III B	HIFI WAVEGUIDE ASSEMBLY for BAND III B
4a	Satellite Harness for BAND IV A	HIFI WAVEGUIDE ASSEMBLY for BAND IV A
4b	Satellite Harness for BAND IV B	HIFI WAVEGUIDE ASSEMBLY for BAND IV A
5a	Satellite Harness for BAND V A	HIFI WAVEGUIDE ASSEMBLY for BAND V A
5b	Satellite Harness for BAND V B	HIFI WAVEGUIDE ASSEMBLY for BAND V B
6a	Satellite Harness for BAND VI A	HIFI WAVEGUIDE ASSEMBLY for BAND VI A **with attenuator SRON ATT5DB**
6b	Satellite Harness for BAND VI B	HIFI WAVEGUIDE ASSEMBLY for BAND VI B **with attenuator SRON ATT6DB-SN3**
7a	Satellite Harness for BAND VII A	HIFI WAVEGUIDE ASSEMBLY for BAND VII A **with attenuator SRON ATT6DB-SN4**
7b	Satellite Harness for BAND VII B	HIFI WAVEGUIDE ASSEMBLY for BAND VII B **with attenuator SRON ATT6DB-SN1**

4.4 Harness Line Resistances Drain 2

LOU Band	R in ILT3 [mOhm]	R_{warm} IST [mOhm]	R_{Cold} SOVT-2 [mOhm]	R_{Cold} COP [mOhm]
1a	411.5	281.1	233.3	232.2
1b	422.0	295.6	246.0	245.4
2a	412.1	288.7	234.1	234.1
2b	426.6	299.0	245.0	244.4
3a	399.2	285.2	236.0	234.9
3b	404.6	301.5	249.6	248.6
4a	394.3	275.1	222.8	221.9
4b	396.4	284.5	232.8	232.5
5a	390.6	258.7	205.5	204.7
5b	390.1	265.3	216.4	209.6
6a	393.8	269.0	216.8	215.5
6b	390.0	279.7	228.6	227.3
7a	399.5	258.0	206.2	205.0
7b	388.3	267.6	216.9	215.9

4.5   Results of purity test in TB/TV for bands 3b and 7b

Frequency [GHz]	M1V [V]	M2V [V]	M3V [V]
930.00	10.00	-8.50	1.20
931.50	10.00	-8.50	1.20
933.00	8.00	-8.50	1.50
934.50	7.00	-8.50	1.50
936.00	5.00	-8.50	1.20
937.50	5.00	-8.50	1.20
939.00	5.00	-8.50	1.50
940.50	6.00	-8.50	1.50
942.00	7.00	-8.50	2.00
943.50	8.00	-8.50	1.20
945.00	10.00	-8.50	1.50
946.50	10.00	-8.50	1.50
948.00	8.00	-8.50	1.20
949.50	8.00	-8.50	1.20
951.00	6.50	-8.50	1.20

Settings for band 3b

Frequency [GHz]	M1V [V]	M2V [V]
1827.00	-6.90	-9.85
1831.50	-6.90	-9.39
1836.00	-6.90	-8.24
1840.50	-6.90	-7.54
1842.75	-6.90	-8.46
1845.00	-6.90	-9.74
1849.50	-6.90	-9.66
1854.00	-6.90	-9.88
1858.50	-7.13	-10.39
1863.00	-7.70	-10.40
1865.25	-7.70	-10.23
1867.50	-7.96	-10.68
1872.00	-8.47	-11.18
1876.50	-8.52	-10.49
1878.75	-8.28	-10.47
1881.00	-8.00	-11.53
1885.50	-7.50	-12.00
1890.00	-7.50	-9.30
1894.50	-7.50	-11.00
1899.00	-7.60	-12.00
1903.50	-7.60	-12.00
1908.00	-7.60	-11.28

Settings for band 7b

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4.6 Frequency List for LO SFT (cold) and D2V Settings for Prime and Redundant

LOU Band	Frequency [GHz]	D2Vset [V]
1a	520.0	2.60
1b	579.0	2.63
2a	652.0	2.35
2b	732.0	2.32
3a	845.5	2.79
3b	882.0	2.40
4a	991.0	2.33
4b	1070.0	2.31
5a	1124.0	2.11
5b	1167.0	2.09
6a	1568.0	2.15
6b	1584.0	2.78
7a	1768.5	2.07
7b	1723.5	2.04

4.7 Setting for the programmable hardware current limits on the drain stages of LCU

The settings for the programmable hardware current limits on the drain stages shall be as in the cold phase of ILT. As reference they are given in the table below.

LOU Band	Parameter	Current Limit [A]	LOU Band	Parameter	Current Limit [A]
1a	**drain 1**	1.22	**1b**	**drain 1**	1.22
	drain 2	1.30		**drain 2**	1.22
2a	**drain 1**	1.22	**2b**	**drain 1**	1.30
	drain 2	1.40		**drain 2**	1.30
3a	**drain 1**	1.22	**3b**	**drain 1**	1.22
	drain 2	1.22		**drain 2**	1.40
4a	**drain 1**	1.22	**4b**	**drain 1**	1.30
	drain 2	1.40		**drain 2**	1.40
5a	**drain 1**	1.30	**5b**	**drain 1**	1.30
	drain 2	1.22		**drain 2**	1.30
6a	**drain 1**	1.30	**6b**	**drain 1**	1.22
	drain 2	1.30		**drain 2**	1.40
7a	**drain 1**	1.22	**7b**	**drain 1**	1.22
	drain 2	1.22		**drain 2**	1.30

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5 Applicable LOU Temperature Range

LOU Operational Temperature Range	T_min: 115K	T_max: 140K

6   Verification of the tables

The following has been checked on the tables of the current Issue.

Issue: 2.20-Purity		**Date:** 10th June, 2009	
Table	**Test**		**Checked**
LSU	All bands (1a – 7b) are present in the table		OK
LSU	Format of all lines is correct		OK
LSU	MIN_LSUFRQ_Voltage < MAX_LSUFRQ_Voltage		OK
Red/Blue	All bands (1a – 7b) are present in the table		OK
Red/Blue	Format of all lines is correct		OK
Red/Blue	MIN_RED < SAFE_RED < MAX_RED		OK
Red/Blue	MIN_BLUE > MIN_RED and SAFE_Red > MIN_BLUE		OK
Red/Blue	MAX_BLUE < Max_RED and SAFE_Red < MAX_BLUE		OK
Red/Blue	MAX_BLUE_D2V < MAX_RED and SAFE_RED < MAX_BLUE_D2V		OK
Green	All bands (1a – 7b) are present in the table		OK
Green	Format of all lines is correct		OK
Green	MIN_GREEN < MAX_GREEN		OK
Green	MIN_GREEN ≥ INDEX -1		OK
Green	Is MAX_GREEN ≤ INDEX -1		OK
CUS	All values of the red, blue, and green table equal to the corresponding values of the CUS-table		OK
ConfiglcuXX.config	All parameters (M1, M2, M3, G1, G2, D1) are within blue limits		OK
ConfiglcuXX.config	All values for G1, G2, D1 are equal to the safe values		OK
ConfiglcuXX.config	D2V_MIN = MIN_BLUE		OK
ConfiglcuXX.config	D2V_MAX = MAX_BLUE		OK
ConfigloXX.config	Current Limits are correct		OK

7 Filename / CHEKSUM Value / HASH Value for MAIN Section

		Signature
LCUFM MAIN, LSUFM MAIN, LOUFM		
File Identification MAIN	**090610_I2-21-Purity-A_CUS-Table_115-140K_FLIGHT_MAIN.txt**	**TK**
Calculated Hash Value Date: 10.06.2009 Time 16:59:30	**e97d4dadcd4bd04b6b551e8344617a62**	
Check with "Table_Checker_Tool" Vers. 2.2	**Successful**	**MC**
LCU On-Board Software Patch		
File Identification	**Patch_LCUFM_17.txt**	
Calculated CHEKSUM Value after patch upload	**STANDBY mode: 0x8E3B**	**Refer to LCU On-Board Software Release Note: SRC/LCU/PR /2006-077 Issue 1.7 02.July 2007**
Calculated CHEKSUM Value with uploaded safe operational table and after patch upload (If command HL_DEF_SAFE **followed by command** HIFI_check_LCU_memory **is send after table upload in STANDBY mode, checksum value changes to its final value which is equal to the stated NORMAL mode value)**	**STANDBY mode: 0x7129** **NORMAL mode: 0x7888**	
LCU on-board software version changes to	**0x2977**	
Calculated Hash Value	**2a85fa30556bfb8297e9859211d5446b**	

8   Filename / CHEKSUM Value / HASH Value for Redundant Section

		Signature
LCUFM REDUNDANT, LSUFM REDUNDANT, LOUFM		
File Identification REDUNDANT	**090610_I2-21-Purity-A_CUS-Table_115-140K_FLIGHT_RED.txt**	**TK**
Calculated Hash Value Date: 10.06.2009 Time 16:59:46	**a2498b6d725560fd3d616737f674dd09**	
Check with "Table_Checker_Tool" Vers. 2.2	**Successful**	**MC**
LCU On-Board Software Patch		
File Identification	**Patch_LCUFM_17.txt**	**Refer to LCU On-Board Software Release Note: SRC/LCU/PR /2006-077 Issue 1.7 02.July 2007**
Calculated CHEKSUM Value after patch upload	**STANDBY mode: 0x8E3B**	
Calculated CHEKSUM Value with uploaded safe operational table and after patch upload (If command HL_DEF_SAFE **followed by command** HIFI_check_LCU_memory **is send after table upload in STANDBY mode, checksum value changes to its final value which is equal to the stated NORMAL mode value)**	**STANDBY mode: 0x0E52** **NORMAL mode: 0x15AF**	
LCU on-board software version changes to	**0x2977**	
Calculated Hash Value	**2a85fa30556bfb8297e9859211d5446b**	