

HW Differences between Cinterion[®] PLSx3-X and PLSx3-X2 Products

Delta Report

Version: 01
DocID: plsx3-x_plsx3-x2_rev22_hw_delta_v01

Document Name: **HW Differences between Cinterion® PLSx3-X and PLSx3-X2 Products**

Version: **01**

Date: **December 03, 2020**

DocId: **plsx3-x_plsx3-x2_rev22_hw_delta_v01**

Status: **Confidential / Released**

GENERAL NOTES

THE PRODUCT INCLUDING THE SOFTWARE PROVIDED BY THALES DIS AIS DEUTSCHLAND GMBH ("THALES") WITH THE PRODUCT ("PRODUCT") IS DEEMED ACCEPTED BY RECIPIENT AND IS PROVIDED WITHOUT INTERFACE TO RECIPIENT'S PRODUCTS. THE DOCUMENTATION AND/OR PRODUCT ARE PROVIDED FOR TESTING, EVALUATION, INTEGRATION AND INFORMATION PURPOSES.

COPYRIGHTS

THE SOFTWARE OBTAINED FROM THALES TOGETHER WITH THE PRODUCT ("SOFTWARE") IS THE INTELLECTUAL PROPERTY OF THALES AND/OR ITS LICENSORS.

LIMITED LICENCE GRANT

SUBJECT TO THE TERMS AND CONDITIONS IN THIS AGREEMENT, THE RECIPIENT, ITS CUSTOMERS AND END-CUSTOMERS OF THE PRODUCT SHALL HAVE A NON-EXCLUSIVE RIGHT TO USE THE PRODUCT OBTAINED FROM THALES. THE RECIPIENT SHALL NOT AND SHALL CONTRACTUALLY BIND ITS CUSTOMERS AND THE END-CUSTOMERS NOT TO TRANSFER, COPY, MODIFY, TRANSLATE, REVERSE ENGINEER, CREATE DERIVATIVE WORKS, DISASSEMBLE OR DECOMPILE THE SOFTWARE OR OTHERWISE USE THE SOFTWARE EXCEPT AS SPECIFICALLY AUTHORIZED BY THE PURPOSE OF THIS AGREEMENT OR BY MANDATORY LAW. THALES SHALL BE A THIRD PARTY BENEFICIARY IN THE AGREEMENTS WITH CUSTOMERS AND END-CUSTOMERS REGARDING THE SOFTWARE.

ANY RIGHT, TITLE AND INTEREST IN AND TO THE PRODUCT, OTHER THAN THOSE EXPRESSLY GRANTED TO THE RECIPIENT UNDER THIS AGREEMENT, SHALL REMAIN VESTED WITH THALES OR ITS THIRD PARTY LICENSORS.

THALES IS NOT OBLIGED TO MAKE THE SOURCE CODE OF THE SOFTWARE AVAILABLE TO THE RECIPIENT.

DISCLAIMER OF WARRANTY

THE DOCUMENTATION AND/OR PRODUCT ARE PROVIDED ON AN "AS IS" BASIS ONLY AND MAY CONTAIN DEFICIENCIES OR INADEQUACIES. THE DOCUMENTATION AND/OR PRODUCT ARE PROVIDED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, THALES FURTHER DISCLAIMS ALL WARRANTIES, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, COMPLETENESS, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OF THIRD-PARTY RIGHTS. THIS PRODUCT IS NOT INTENDED FOR USE IN LIFE SUPPORT APPLIANCES, DEVICES OR SYSTEMS WHERE A MALFUNCTION OF THE PRODUCT CAN REASONABLY BE EXPECTED TO RESULT IN PERSONAL INJURY. APPLICATIONS INCORPORATING THE DESCRIBED PRODUCT MUST BE DESIGNED TO BE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS PROVIDED IN THESE GUIDELINES. FAILURE TO COMPLY WITH ANY OF THE REQUIRED PROCEDURES CAN RESULT IN MALFUNCTIONS OR SERIOUS DISCREPANCIES IN RESULTS. FURTHERMORE, ALL SAFETY INSTRUCTIONS REGARDING THE USE OF MOBILE TECHNICAL SYSTEMS, INCLUDING GSM AND GPS PRODUCTS, WHICH ALSO APPLY TO CELLULAR PHONES MUST BE FOLLOWED. THALES CUSTOMERS USING THIS PRODUCT FOR USE IN ANY APPLICATIONS DO SO AT THEIR OWN RISK AND AGREE TO FULLY INDEMNIFY THALES FOR ANY DAMAGES RESULTING FROM ILLEGAL USE.

EXCLUSION OF LIABILITY

THALES, ITS LEGAL REPRESENTATIVES AND VICARIOUS AGENTS SHALL – IRRESPECTIVE OF THE LEGAL GROUND – ONLY BE LIABLE FOR DAMAGES IF THE DAMAGE WAS CAUSED THROUGH CULPABLE BREACH OF A MAJOR CONTRACTUAL OBLIGATION (CARDINAL DUTY), I.E. A DUTY THE FULFILMENT OF WHICH ALLOWS THE PROPER EXECUTION OF THE RESPECTIVE AGREEMENT IN THE FIRST PLACE OR THE BREACH OF WHICH PUTS THE ACHIEVEMENT OF THE PURPOSE OF THE AGREEMENT AT STAKE, RESPECTIVELY, AND ON THE FULFILMENT OF WHICH THE RECIPIENT THEREFORE MAY RELY ON OR WAS CAUSED BY GROSS NEGLIGENCE OR INTENTIONALLY. ANY FURTHER LIABILITY FOR DAMAGES SHALL – IRRESPECTIVE OF THE LEGAL GROUND – BE EXCLUDED. IN THE EVENT THAT THALES IS LIABLE FOR THE VIOLATION OF A MAJOR CONTRACTUAL OBLIGATION IN THE ABSENCE OF GROSS NEGLIGENCE OR WILFUL CONDUCT, SUCH LIABILITY FOR DAMAGE SHALL BE LIMITED TO AN EXTENT WHICH, AT THE TIME WHEN THE RESPECTIVE AGREEMENT IS CONCLUDED, THALES SHOULD NORMALLY EXPECT TO ARISE DUE TO CIRCUMSTANCES THAT THE PARTIES HAD KNOWLEDGE OF AT SUCH POINT IN TIME. THALES SHALL IN NO EVENT BE LIABLE FOR INDIRECT AND CONSEQUENTIAL DAMAGES OR LOSS OF PROFIT. THALES SHALL IN NO EVENT BE LIABLE FOR AN AMOUNT EXCEEDING € 20,000.00 PER EVENT OF DAMAGE. WITHIN THE BUSINESS RELATIONSHIP THE OVERALL LIABILITY SHALL BE LIMITED TO A TOTAL OF € 100,000.00. CLAIMS FOR DAMAGES SHALL BECOME TIME-BARRED AFTER ONE YEAR AS OF THE BEGINNING OF THE STATUTORY LIMITATION PERIOD. IRRESPECTIVE OF THE RECIPIENT'S KNOWLEDGE OR GROSS NEGLIGENT LACK OF KNOWLEDGE OF THE CIRCUMSTANCES GIVING RISE FOR A LIABILITY ANY CLAIMS SHALL BECOME TIME-BARRED AFTER FIVE YEARS AS OF THE LIABILITY AROSE. THE AFOREMENTIONED LIMITATION OR EXCLUSION OF LIABILITY SHALL NOT APPLY IN THE CASE OF CULPABLE INJURY TO LIFE, BODY OR HEALTH, IN CASE OF INTENTIONAL ACTS, UNDER THE LIABILITY PROVISIONS OF THE GERMAN PRODUCT LIABILITY ACT (*PRODUKTHAFTUNGSGESETZ*) OR IN CASE OF A CONTRACTUALLY AGREED OBLIGATION TO ASSUME LIABILITY IRRESPECTIVE OF ANY FAULT (GUARANTEE).

SECRECY

THE RECIPIENT UNDERTAKES FOR AN UNLIMITED PERIOD OF TIME TO OBSERVE SECRECY REGARDING ANY INFORMATION AND DATA PROVIDED TO HIM IN THE CONTEXT OF THE CONTRACTUAL RELATIONSHIP AND CLASSIFIED AS CONFIDENTIAL OR OTHERWISE RECOGNISABLE AS CONFIDENTIAL, IN PARTICULAR AS TRADE OR COMPANY SECRET AND – AS FAR AS NOT NECESSARY FOR THE ACHIEVEMENT OF THE PURPOSE OF THE CONTRACT – TO NEITHER RECORD NOR FORWARD TO THIRD PARTIES NOR USE IN ANY WAY. EMPLOYEES AND THIRD PARTIES INVOLVED SHALL BE BOUND TO OBSERVE THE ABOVE PROVISIONS.

MISCELLANEOUS

THE INTERPRETATION OF THIS GENERAL NOTE SHALL BE GOVERNED AND CONSTRUED ACCORDING TO GERMAN LAW WITHOUT REFERENCE TO ANY OTHER SUBSTANTIVE LAW. LEGAL VENUE FOR ALL DISPUTES ARISING FROM THIS AGREEMENT SHALL BE MUNICH, GERMANY. IN THE EVENT OF A CONFLICT BETWEEN THE PROVISIONS OF THIS AGREEMENT AND ANOTHER AGREEMENT REGARDING THE PRODUCT (EXCEPT THE GENERAL TERMS AND CONDITIONS OF THALES) THE OTHER AGREEMENT SHALL PREVAIL.

Copyright

Transmittal, reproduction, dissemination and/or editing of this document as well as utilization of its contents and communication thereof to others without express authorization are prohibited. Offenders will be held liable for payment of damages. All rights created by patent grant or registration of a utility model or design patent are reserved.

Copyright © 2020, THALES DIS AIS Deutschland GmbH

Trademark Notice

Thales, the Thales logo, are trademarks and service marks of Thales and are registered in certain countries. Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. All other registered trademarks or trademarks mentioned in this document are property of their respective owners.

Contents

1 Introduction5

2 Baseband Hardware Differences between PLSx3-X Rev. 2.2 and PLSx3-X2 Rev. 2.26

Schematic Differences6

3 RF Hardware Differences between PLSx3-X Rev. 2.2 and PLSx3-X2 Rev. 2.28

Schematic Differences8

1 Introduction

This document describes the Cinterion® PLSx3-X and PLSx3-X2 hardware design differences, including:

- Changes from PLSx3-X Rev. 2.2 to PLSx3-X2 Rev. 2.2
- Differences between PLS83-X/X2 Rev. 2.2 and PLS63-X/X2 Rev. 2.2

As US operator projects, PLSx3-X2 variants support different bands from base variants PLSx3-X, as shown in Table 1. Both variants use the same footprint and PCB layout. Different hardware IDs are implemented to identify different variants.

Table 1: Supported frequent bands

Variants	Technology	2	4	5	12	13	14	25	26	66	71
PLS63/83-X (base variants)	LTE	x	x	x	x	x	x	x	x	x	x
	WCDMA	x	x	x							
PLS63/83-X2	LTE	x	x		x	x	x			x	
	WCDMA										

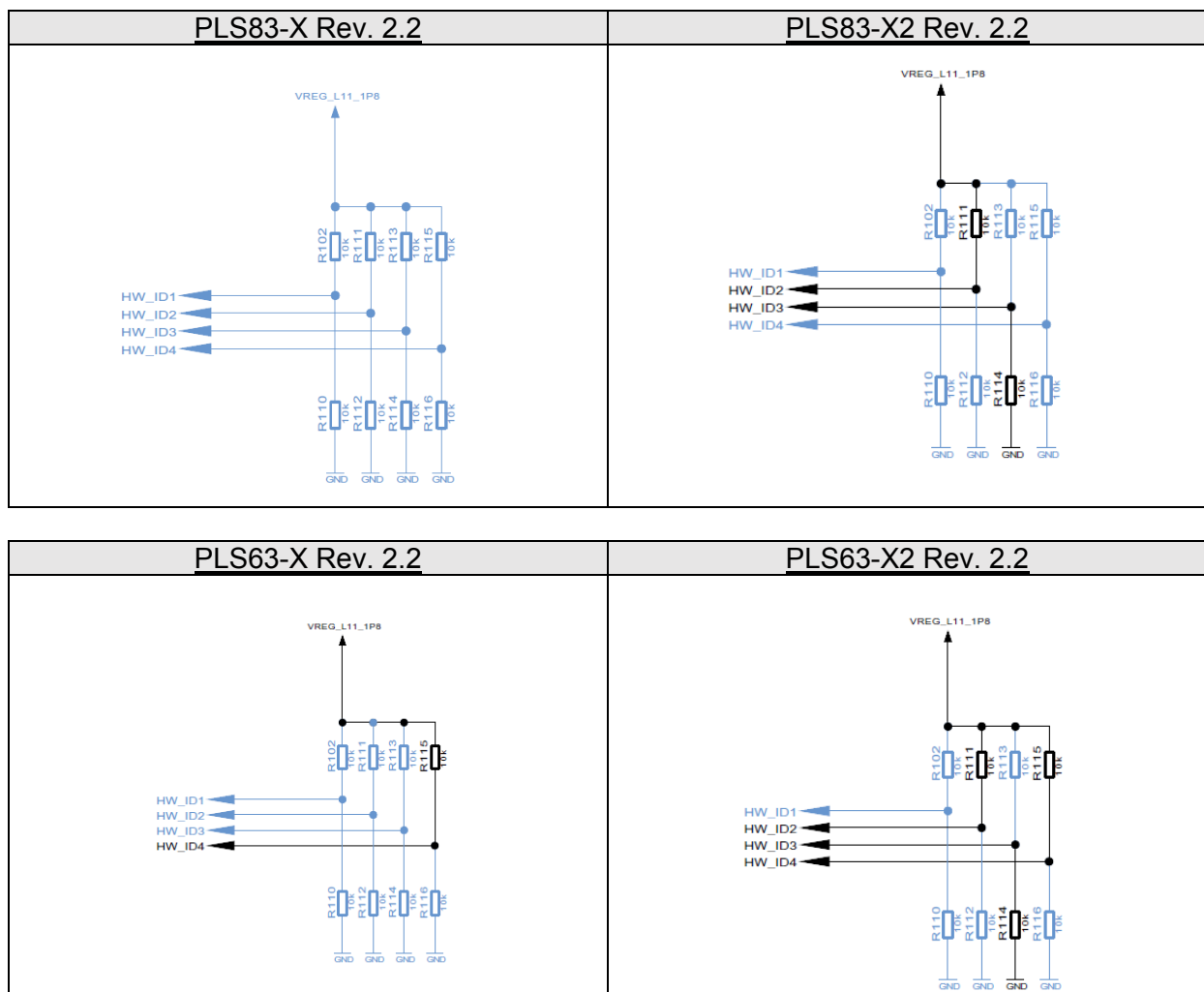
2 Baseband Hardware Differences between PLSx3-X Rev. 2.2 and PLSx3-X2 Rev. 2.2

This section describes the differences on the baseband part.

Schematic Differences

The following section highlights the schematic differences on baseband between PLSx3-X Rev. 2.2 and PLSx3-X2 Rev. 2.2. Different hardware IDs are implemented to identify different variants.

Note: Components in black are populated, components in blue are not populated.



PLS83-X/X2 Rev. 2.2 are designed with a Cat. 4 processor, while PLS63-X/X2 is based on a Cat. 1 processor. The two processors are pin-pin compatible.

<u>PLS83-X/X2 Rev. 2.2</u>	<u>PLS63-X/X2 Rev. 2.2</u>
Cat. 4 processor	Cat. 1 processor
U100: 600000001376	U100: 600000001377

3 RF Hardware Differences between PLSx3-X Rev. 2.2 and PLSx3-X2 Rev. 2.2

This section describes the differences on the RF part.

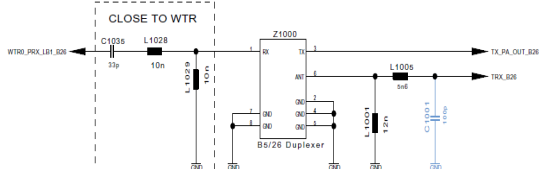
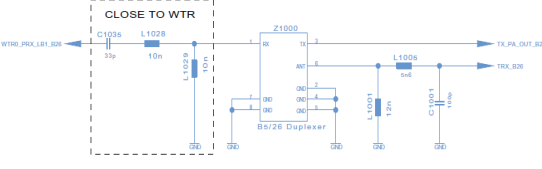
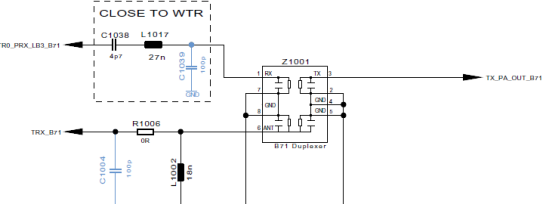
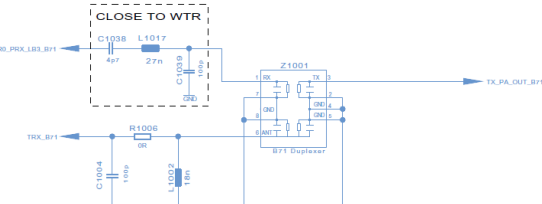
Schematic Differences

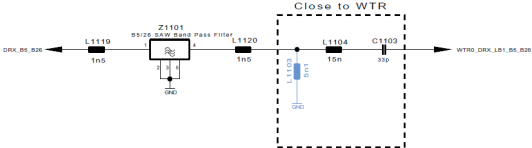
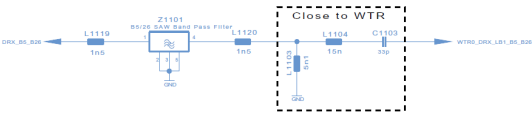
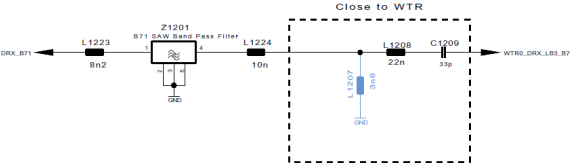
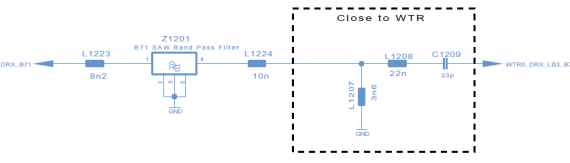
The following section highlights the schematic differences on RF part between PLSx3-X Rev. 2.2 and PLSx3-X2 Rev. 2.2. The non-supporting bands are disabled in schematic RF part.

Note: Components in black are populated, components in blue are not populated.

PLS83/63-X Rev. 2.2	PLS83/63-X2 Rev. 2.2
WTR_TX_DA1_B12_B13_B14_B71 WTR0_TX_DA4_B25_2_B66_4	WTR_TX_DA1_B12_B13_B14_B71 -X2/-X3 no B71 -X3 no B13 WTR0_TX_DA4_B25_2_B66_4 -X2/-X3 no B25 -X3 no B66
WTR0_DRX_MB1_B25_B2 WTR0_DRX_MB3_B1_B4_B66 WTR0_DRX_LB1_B5_B26 WTR0_DRX_LB2_B12_B13_B14 WTR0_DRX_LB3_B71 WTR0_PRX_MB1_B25_B2 WTR0_PRX_MB3_B4_B66 WTR0_PRX_LB1_B26 WTR0_PRX_LB2_B12_B13_B14 WTR0_PRX_LB3_B71	WTR0_DRX_MB1_B25_B2 -X2/-X3 no B25 WTR0_DRX_MB3_B1_B4_B66 -X3 no B66 WTR0_DRX_LB1_B5_B26 -X2/-X3 no B5/B26 WTR0_DRX_LB2_B12_B13_B14 -X3 no B13 WTR0_DRX_LB3_B71 -X2/-X3 no B71 WTR0_DRX_MB1_B25_B2 -X2/-X3 no B25 WTR0_DRX_MB3_B1_B4_B66 -X3 no B66 WTR0_DRX_LB1_B5_B26 -X2/-X3 no B5/B26 WTR0_DRX_LB2_B12_B13_B14 -X3 no B13 WTR0_DRX_LB3_B71 -X2/-X3 no B71
BAND_SEL_B25_B66 TRX_B2_B25 TRX_B4_B66	BAND_SEL_B25_B66 -X2/-X3: no B25 -X3 no B2/B4 TRX_B2_B25 -X2/-X3: no B25 TRX_B4_B66 -X3: no B66

TRX_B26 TRX_B71 TRX_B13	TRX_B26 TRX_B71 TRX_B13
B26/B5 TX	B26/B5 TX -X2/-X3 no B26/B5
B71 TX	B71 TX -X2/-X3 no B71
B25/B2 TX B66/B4 TX B13 TX	B25/B2 TX -X2/-X3 no B25 B66/B4 TX -X3 no B66 B13 TX -X3 no B13
WTR0_TX_DA4_B25_2_B66_4 WTR0_TX_DA2_B26 WTR_TX_DA1_B12_B13_B14_B71	WTR0_TX_DA4_B25_2_B66_4 WTR0_TX_DA2_B26 WTR_TX_DA1_B12_B13_B14_B71
WTR0_PRX_LB2_B12_B13_B14 PRX_B12 PRX_B14 PRX_B13	WTR0_PRX_LB2_B12_B13_B14 PRX_B12 PRX_B14 PRX_B13

B5 / B26 	-X: B5 / B26 -X2/-X3: no B5/B26 
B71 	-X: B71 -X2/-X3: no B71 
WTR0_PRX_MB1_B25_B2 TRX_B2_B25	WTR0_PRX_MB1_B25_B2 -X2/-X3 no B25 TRX_B2_B25 -X2/-X3 no B25
WTR0_PRX_MB3_B4_B66 TX_PA_OUT_B4_B66	WTR0_PRX_MB3_B4_B66 -X3: no B66 TX_PA_OUT_B4_B66 -X3: no B66
DRX_B71 DRX_B12_B13_B14 DRX_B5_B26 DRX_B4_B66 DRX_B2_B25	DRX_B71 -X2/-X3 no B71 DRX_B12_B13_B14 -X3 no B13 DRX_B5_B26 -X2/-X3 no B5/26 DRX_B4_B66 -X3 no B66 DRX_B2_B25 -X2/-X3 no B25

B5 / B26 DRX 	B5 / B26 DRX -X2/-X3: no B5/B26 
DRX_B12_B13_B14 WTR0_DRX_LB2_B12_B13_B14	DRX_B12_B13_B14 -X3: no B13 WTR0_DRX_LB2_B12_B13_B14 -X3: no B13
B71 DRX 	B71 DRX -X2/-X3: no B71 
DRX_B4_B66 WTR0_DRX_MB3_B1_B4_B66	DRX_B4_B66 -X3: no B66 WTR0_DRX_MB3_B1_B4_B66 -X3: no B66
DRX_B2_B25 WTR0_DRX_MB1_B25_B2	DRX_B2_B25 -X2/-X3 no B25 WTR0_DRX_MB1_B25_B2 -X2/-X3 no B25



THALES DIS AIS Deutschland GmbH
Werinherstrasse 81
81541 Munich
Germany

THALES