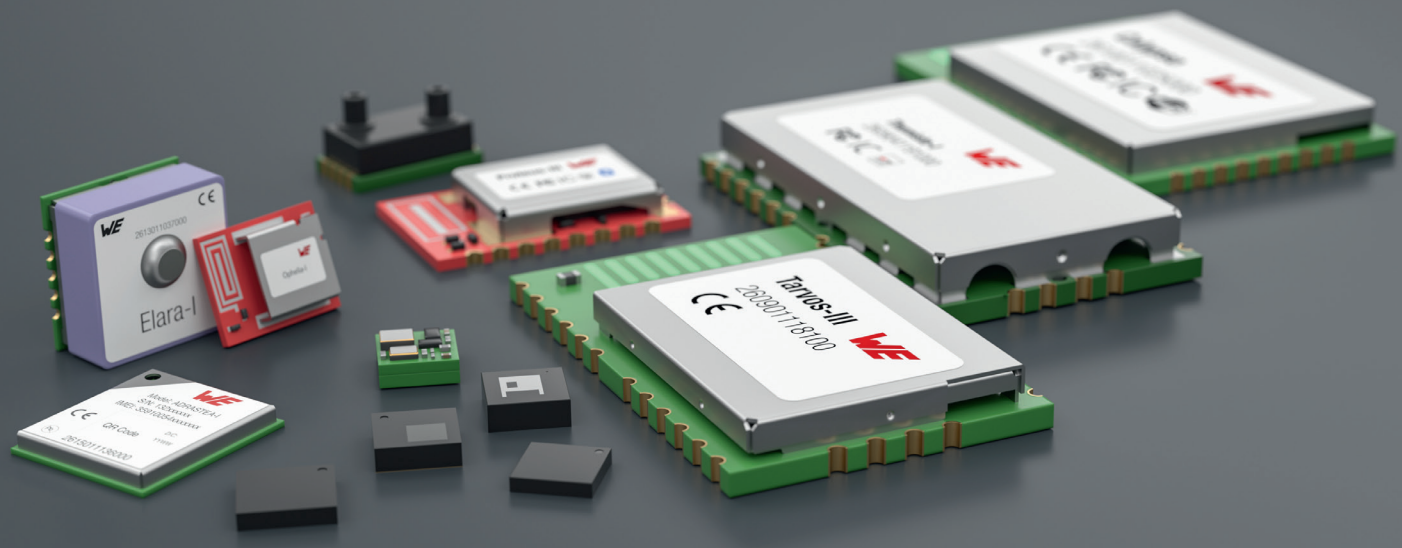

User manual

Mini EV-Board for radio modules Stephano-I / Orthosie-I

2617039025001

Version 1.1

December 1, 2025

WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

****

MUST READ

Check for firmware updates

Before using the product, make sure you use the most recent firmware version, data sheet, and user manual. This is especially important for Wireless Connectivity products that were not purchased directly from Würth Elektronik eiSos. A firmware update on these respective products may be required.

We strongly recommend including the possibility of a firmware update in the customer system design.

Contents

1 Abbreviations

Abbreviation	Name	Description
Bluetooth® LE	Bluetooth Low Energy	
BYOF	Build Your Own Firmware	Radio module without firmware, to be used to develop customized firmware
COM port	Communication port	
EV	Evaluation	
ESD	Electro Static Discharge	
FTDI	Future Technology Devices International	USB to UART converter chipset
GND	Ground	Ground signal level that corresponds to 0 V
HIGH	High signal level	Digital voltage level that is detected as high by the module
I/O	Input &Output	
LED	Light Emitting Diode	
LFCLK	Low Frequency Clock	
LFXO	Low Frequency crystal Oscillator	
LOW	Low signal level	Digital voltage level that is detected as low by the module
NFC	Near Field Communication	
PCB	Printed Circuit Board	
RF	Radio Frequency	Describes everything related to the wireless transmission
SMA	SubMiniature version A	Connector for radio signals
SWD	Serial Wire Debug	Debugging interface
THT	Through-Hole Technology	
UART	Universal Asynchronous Receiver Transmitter	Allows communicating with the module of a specific interface
USB	Universal Serial Bus	
VDD	Voltage Drain Drain	Supply voltage

2 Revision history

Manual version	HW version	Notes	Date
1.0	1.0	• Initial version.	June 2025
1.1	1.0	• Update chapter `Terms of Use for Würth Elektronik eiSos GmbH & Co. KG EV-Boards, evaluation kits and evaluation modules.`	November 2025

3 Supported radio modules

The EV-Board described in this manual can be used to evaluate the following products:

WE order code	Description
2617011022000	BYOF radio module Orthosie-I [1]
2617011025000	WiFi and Bluetooth® LE combo module Stephano-I [2]

Table 3: Compatibility

The EV-Kit can be ordered using the following order code:

WE order code	Description
2617039025001	Mini EV-Board Stephano-I. The same mini EV board shall be used to evaluate Orthosie-I.

Table 4: Order codes

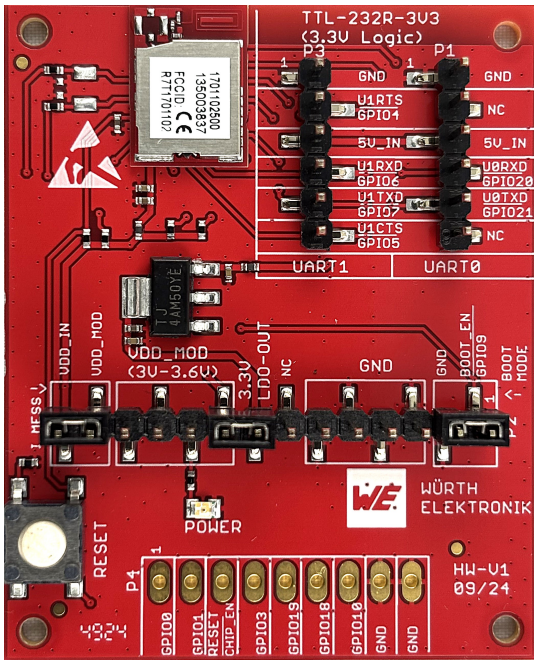

Figure 1: Stephano-I/Orthosie-I mini-EV-Board

Content 2617039025001	Quantity
Mini EV-Board Stephano-I / Orthosie-I integrated PCB antenna	1

Table 5: Content mini EV-Board

4 Functional description

The mini EV-Board is an application oriented, cost effective and minimalistic device to evaluate the supported Würth Elektronik eiSos radio modules. It offers the user the possibility to develop hardware and software for the corresponding radio module.

By default, the mini EV-Board is assembled with the minimum required headers to take the module into operation. Additional components may be required to evaluate further functionalities. These must be assembled by the user and require soldering competence.

Accessories required to test full scope of the radio module are:

- Additional assembly components listed in table 6 and soldering equipment
- TTL-232R-3V3 FTDI cable [3]

All pins are available on pads where a pin header can be soldered in. The pins that are needed for minimal pin configuration are available on already equipped headers, e.g. to connect a microcontroller or a PC and to set jumpers to choose operating modes of the radio module.

Default jumper placement of P2 pin (1-2) sets the radio module to boot mode. In this mode, the Orthosie-I module can be programmed. To evaluate the Stephano-I module, the P2 pin (1-2) shall be removed and the module needs to be reset.

4.1 Taking into operation - PC

To use the TTL-232R-3V3 FTDI cable [3], the corresponding FTDI driver package [4] must be installed on the PC following the installation guidelines [5].

The TTL-232R-3V3 FTDI cable shall be connected to the pin header P1 or P3 of the mini EV-Board, depending on the application. The UART0 is accessible through pin header P1 for flashing and debugging. The UART1 is accessible through pin header P3 for application firmware. For more details, see the corresponding radio module user manual [1, 2].

It is important that the VDD is stable and able to reliably supply the module's static and peak current consumption, as specified by the module manual. A minimum board supply current of 200 mA is necessary, so that the peak transmission current of the module is supported.

Incorrect orientation of the TTL-232R-3V3 FTDI cable may damage the radio module. For easy orientation, the pin number 1 and signals are labeled.

The next step is to connect the mini EV-Board to the PC using the TTL-232R-3V3 FTDI cable. In that way, a COM port can be detected and installed on the PC. In the device manager, the

COM port name of the TTL-232R-3V3 FTDI cable can be found. A COM port shall appear for example: "COM12" in Windows systems or "/dev/ttyUSB0" in Linux systems.

The WE UART Terminal PC tool [6] or any other serial terminal program (like hterm [7] for Windows) has to be run and the corresponding COM port has to be opened using the default settings of the mounted radio module.

After the module is powered through the TTL-232R-3V3 FTDI cable or an alternative power supply, the reset button should be pressed to ensure the correct functionality of the module.

The detailed module specific quick start instructions can be found in the corresponding radio module user manuals [1, 2].

4.2 Taking into operation - Host controller

To take the mini EV-Board into operation using a host controller, an external power supply shall be connected to the mini EV-Board. The power supply option 3, 4 or 5 from table 14 shall be used. It is important that the VDD is stable and able to reliably supply the module's static and peak current consumption, as specified by the module manual. A minimum board supply current of 200 mA is necessary, so that the peak transmission current of the module is supported.

The next step is to connect the communication lines of the module to the host controller. The headers P1, P2, P3 and P4 can be used to connect the module pins and host.

The detailed module specific quick start instructions can be found in the corresponding radio module user manuals [1, 2].

5 Development board

5.1 Block diagram

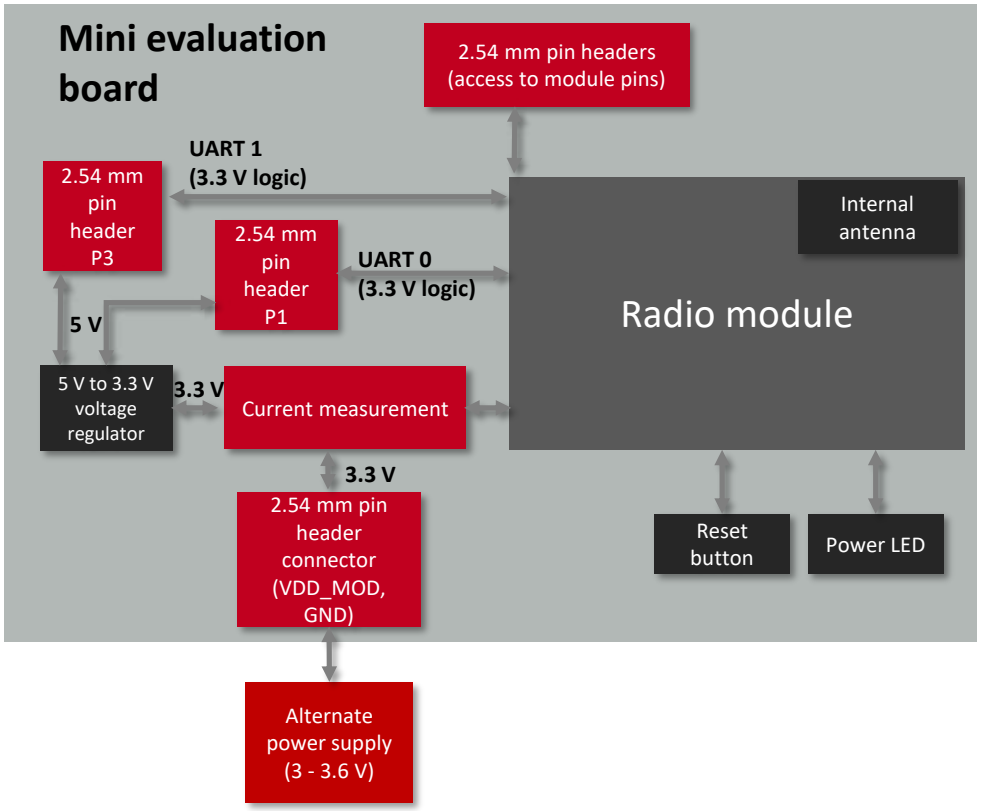

Figure 2: Block diagram

5.2 Additional assembly

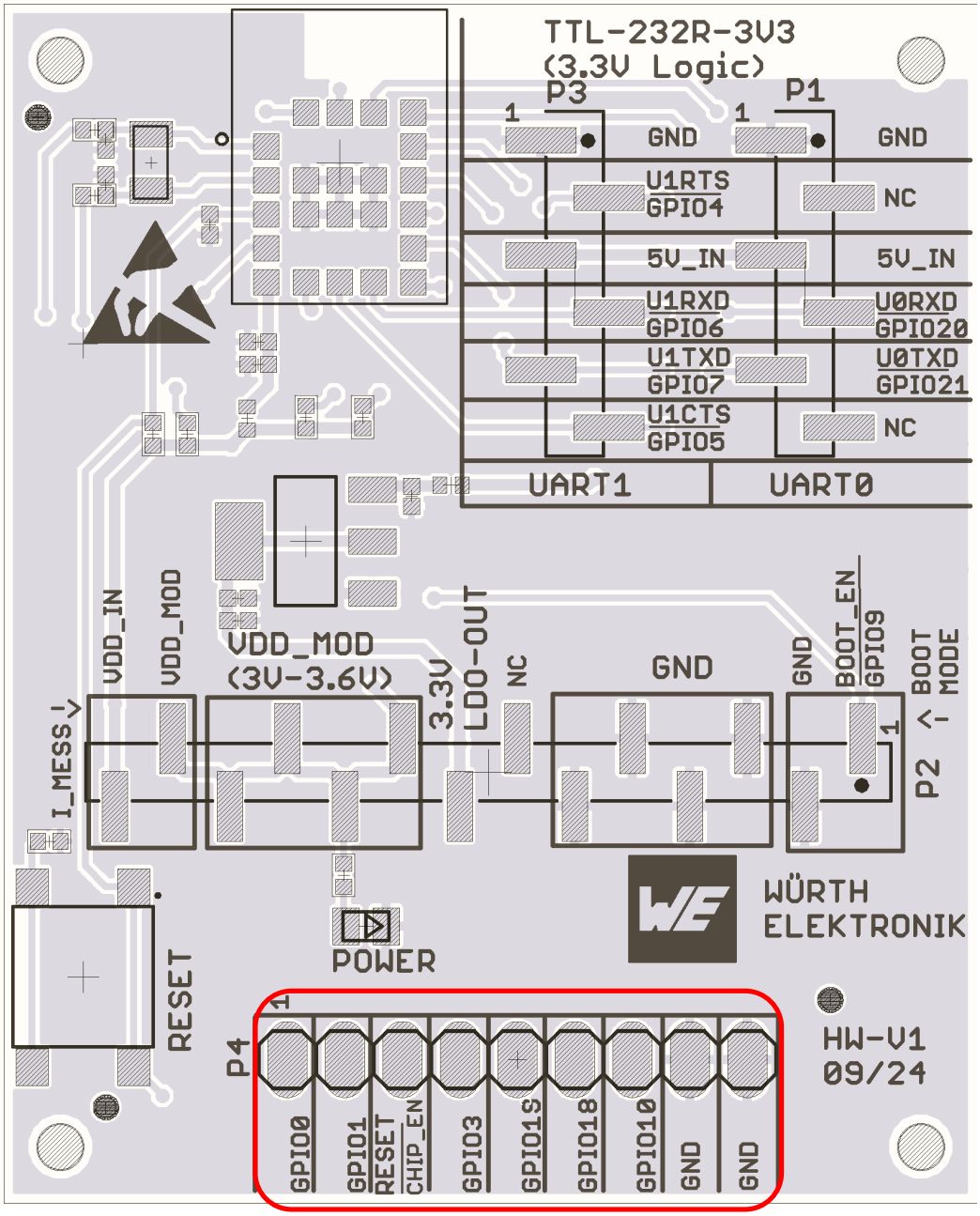

Figure 3: Additional assembly

Table 6 shows the additional assembly component for the mini EV-Board.

Placeholder	Function	Pins	WE Article Number
P4	Module GPIO access pins	1X9	*61300911121*

Table 6: Additional assembly component

Holes with 2 mm diameter on all the four corners are available for spacer or standoff connections.

5.3 Connectors and ports

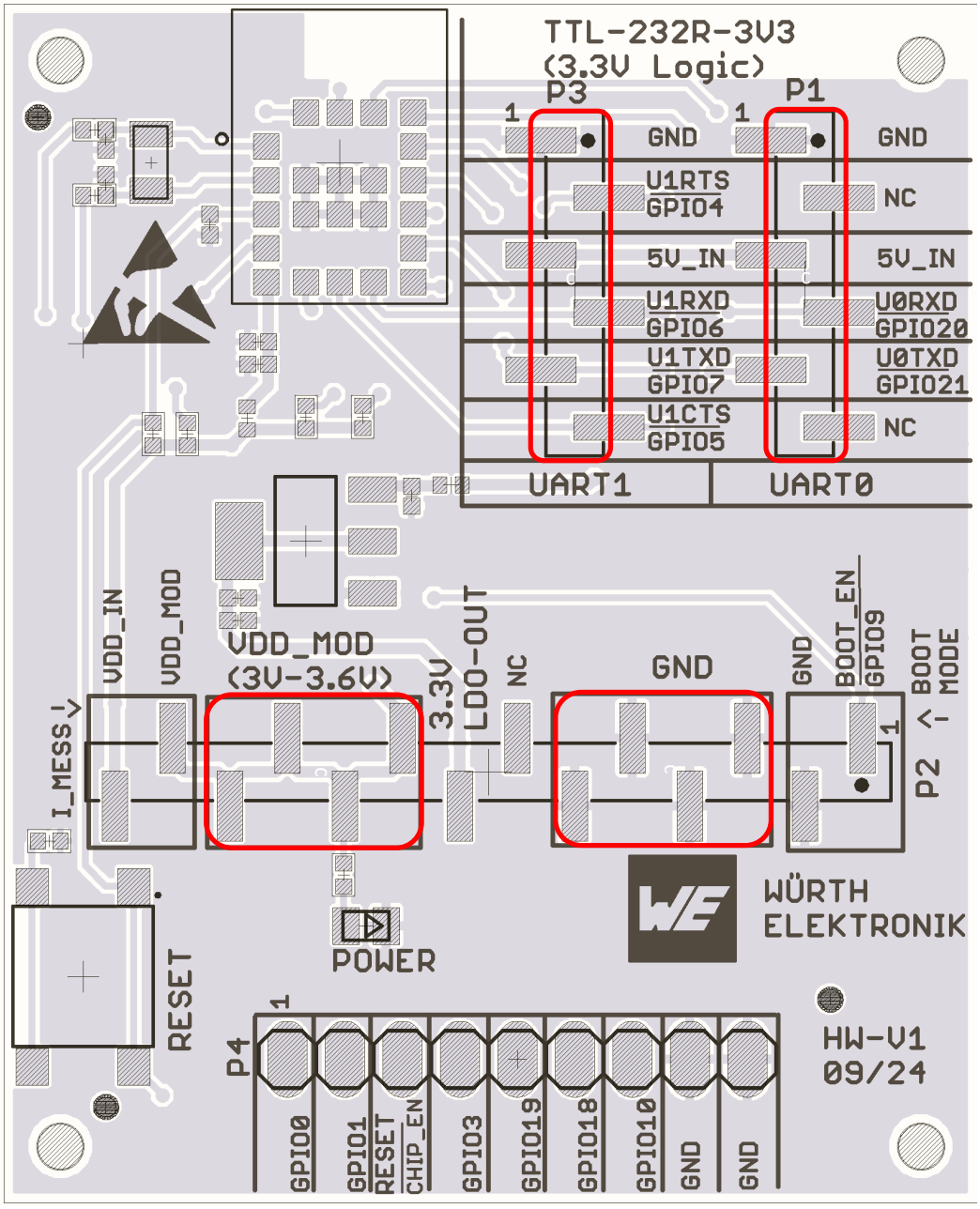

Figure 4: Connectors and ports

5.3.1 P1, P3: Module communication access pins / TTL-232R-3V3 FTDI cable connector

P1	ESP32-C3FH4	Board connection	Stephano-I
1	GND	GND	GND
2	-	NC	NC
3	-	5 V (Board power supply)	-
4	GPIO20	Module pin 15	U0RXD
5	GPIO21	Module pin 14	U0TXD
6	-	NC	NC

Table 7: Pin header P1

P3	ESP32-C3FH4	Board connection	Stephano-I
1	GND	GND	GND
2	GPIO4	Module pin 6	U1RTS
3	-	5 V (Board power supply)	-
4	GPIO6	Module pin 8	U1RXD
5	GPIO7	Module pin 10	U1TXD
6	GPIO5	Module pin 7	U1CTS

Table 8: Pin header P3

Do not connect the TTL-232R-3V3 cable on pin header P1 and P3 at the same time.

5.3.2 P2: Power supply / Current Measurement

P2	Board connection	Function
1	GPIO9	BOOT_EN
2	GND	GND
3	GND	GND
4	GND	GND
5	GND	GND
6	GND	GND
7	NC	NC
8	On-board LDO Output	3.3 V Output
9	VDD_MOD	Connector for external power supply (3 V - 3.6 V)
10	VDD_MOD	Connector for external power supply (3 V - 3.6 V)
11	VDD_MOD	Connector for external power supply (3 V - 3.6 V)
12	VDD_MOD	Connector for external power supply (3 V - 3.6 V)
13	VDD_MOD	Connector for external power supply (3 V - 3.6 V)
14	VDD_IN	Module power supply (VDD)

Table 9: Pin header P2

All the information related to the power supply is described in chapter 5.6.1.

5.3.3 P4: Module GPIO access pins

P4	ESP32-C3FH4	Board connection	Stephano-I
1	GPIO0	Module pin 1	XTAL_P
2	GPIO1	Module pin 2	XTAL_N
3	CHIP_EN	Module pin 3	RESET
4	GPIO3	Module pin 4	GPIO3
5	GPIO19	Module pin 16	USBD+
6	GPIO18	Module pin 12	USBD-
7	GPIO10	Module pin 13	GPIO10
8	GND	GND	GND
9	GND	GND	GND

Table 10: Pin header P4

5.4 Jumpers

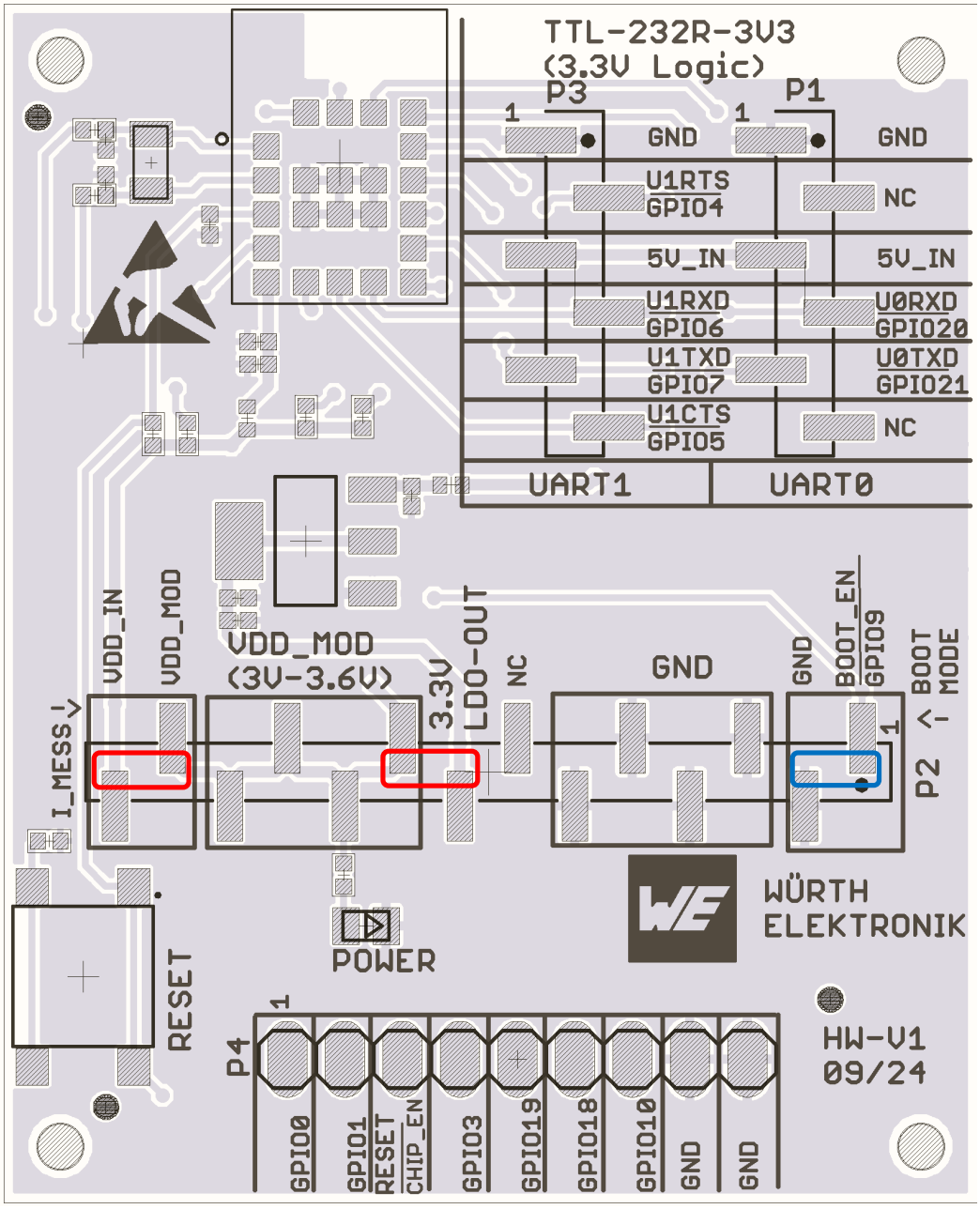

Figure 5: Jumpers

Pins	Function	Default state
P2 Pin (1-2)	Boot	Set
P2 Pin (8-9)	Internal LDO power supplied	Set
P2 Pin (13-14)	Current measurement	Set

Table 11: Jumpers

If the on board LDO is not used, the pin header P2 pin (8-9) jumper shall not be set.

5.4.1 Current measurement

By default, a jumper is set on pin (13-14) of pin header P2. For current measurement, the jumper can be removed and a current meter can be connected instead.

P2	Function
13	VDD_MOD
14	VDD_IN

Table 12: Pin header P2

5.4.2 Boot mode

By default, P2 pin (1-2) jumper is set. If P2 pin (1-2) jumper is set during power up and reset button is pressed, the module starts in boot mode to be ready for firmware flash/update. For application start-up, the jumper shall not be set during power up.

P2	Board connection	Stephano-I
1	GPIO9	BOOT
2	GND	GND

Table 13: Pin header P2

5.5 Reset button

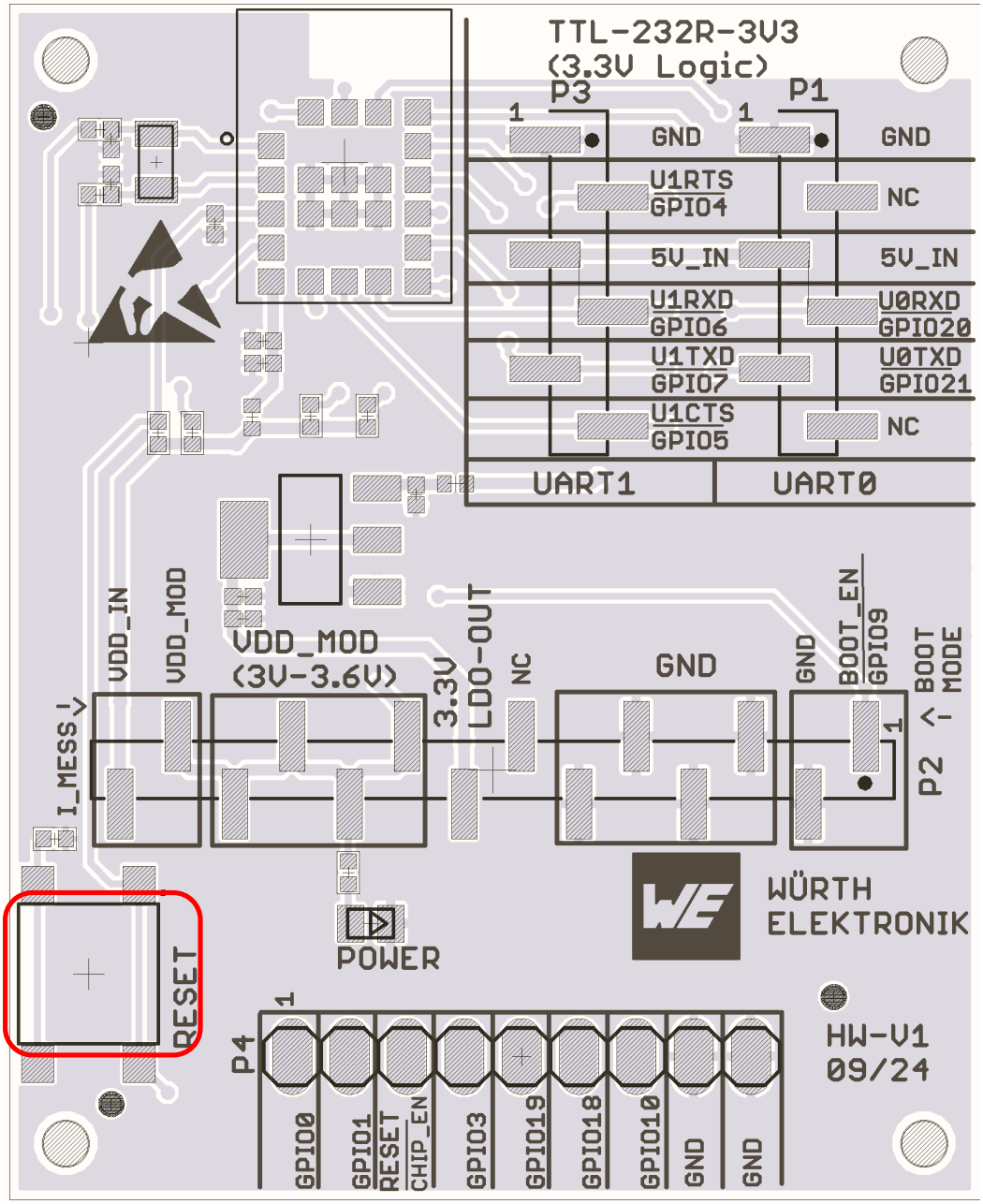

Figure 6: Buttons

On mini EV-Board level, the active low reset input is configured with a pull-up resistor. The module provides a */RESET* pin that is connected to this button, so that the module can be restarted properly. Refer to the module specific manual for detailed information [1, 2].

5.6 Function blocks

5.6.1 Power supply

The mini EV-Board can be powered either by TTL-232R-3V3 cable or by an external power supply. Table 14 lists the connection for different power supply options.

No	Power supply	Supply @	Multimeter or jumper	Jumper
1	TTL-232R-3V3 cable	P1	P2 Pin 13-14	P2 Pin 8-9 set
2	TTL-232R-3V3 cable	P3	P2 Pin 13-14	P2 Pin 8-9 set
3	External supply	P1 dedicated pins Pin 3: 5 V, Pin 1: GND	P2 Pin 13-14	P2 pin 8-9 set
4	External supply	P3 dedicated pins Pin 3: 5 V, Pin 1: GND	P2 Pin 13-14	P2 pin 8-9 set
5	External supply	P2 dedicated pins Pin 3, 4, 5 or 6: GND Pin 9, 10, 11 or 12: 3 V - 3.6 V	P2 Pin 13-14	P2 pin 8-9 not set

Table 14: Power supply option

5.6.1.1 Pin header P1 or P3, power supply through TTL-232R-3V3

The mini EV-Board can be powered by TTL-232R-3V3 cable through P1 or P3 connector. TTL-232R-3V3 cable powers the board with 5 V supply. The integrated voltage regulator regulates the connected 5 V down to 3.3 V and supplies the remaining parts of the circuit. For current measurement, the device is connected to header P2, pin 13 to pin 14.

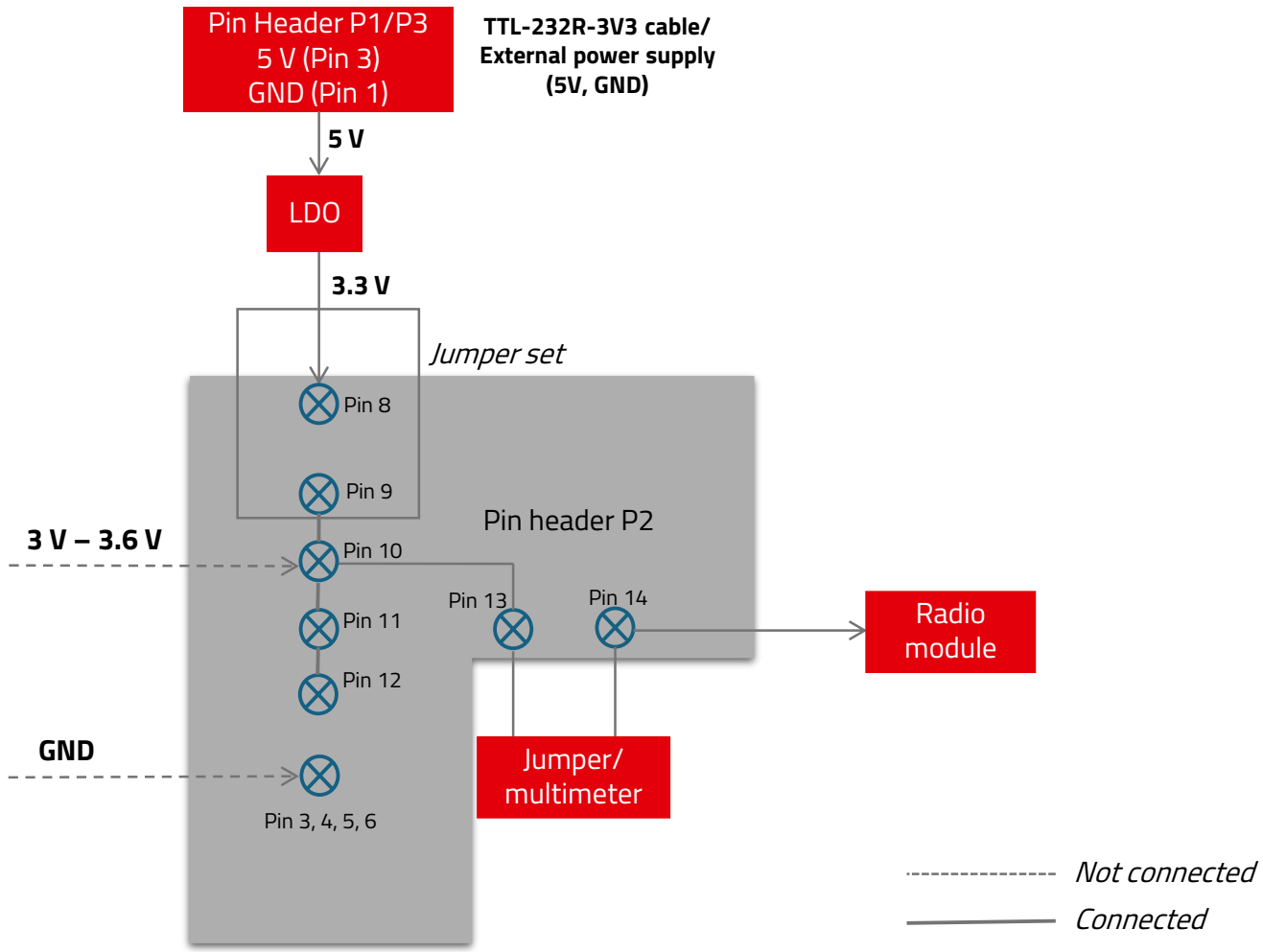

Figure 7: Block diagram of power supply through TTL-232R-3V3 cable

STOP

Do not connect the TTL-232R-3V3 cable on pin header P1 and P3 at the same time.

5.6.1.2 Pin header P1 or P3, power supply through dedicated pins

The mini EV-Board can be powered by an external power supply through connector P1 or P3, pin 3 and pin 1. The integrated voltage regulator, regulates the connected 5 V down to 3.3 V and supplies the remaining parts of the circuit. For current measurement, the device is connected to header P2, pin 13 to pin 14.

5.6.1.3 Pin header P2, power supply through dedicated pins

The mini EV-Board can be powered by an external power supply through connector P2, pin 9, 10, 11, 12 (*VDD_MOD 3 V - 3.6 V*) and pin 3, 4, 5, 6 (*GND*).

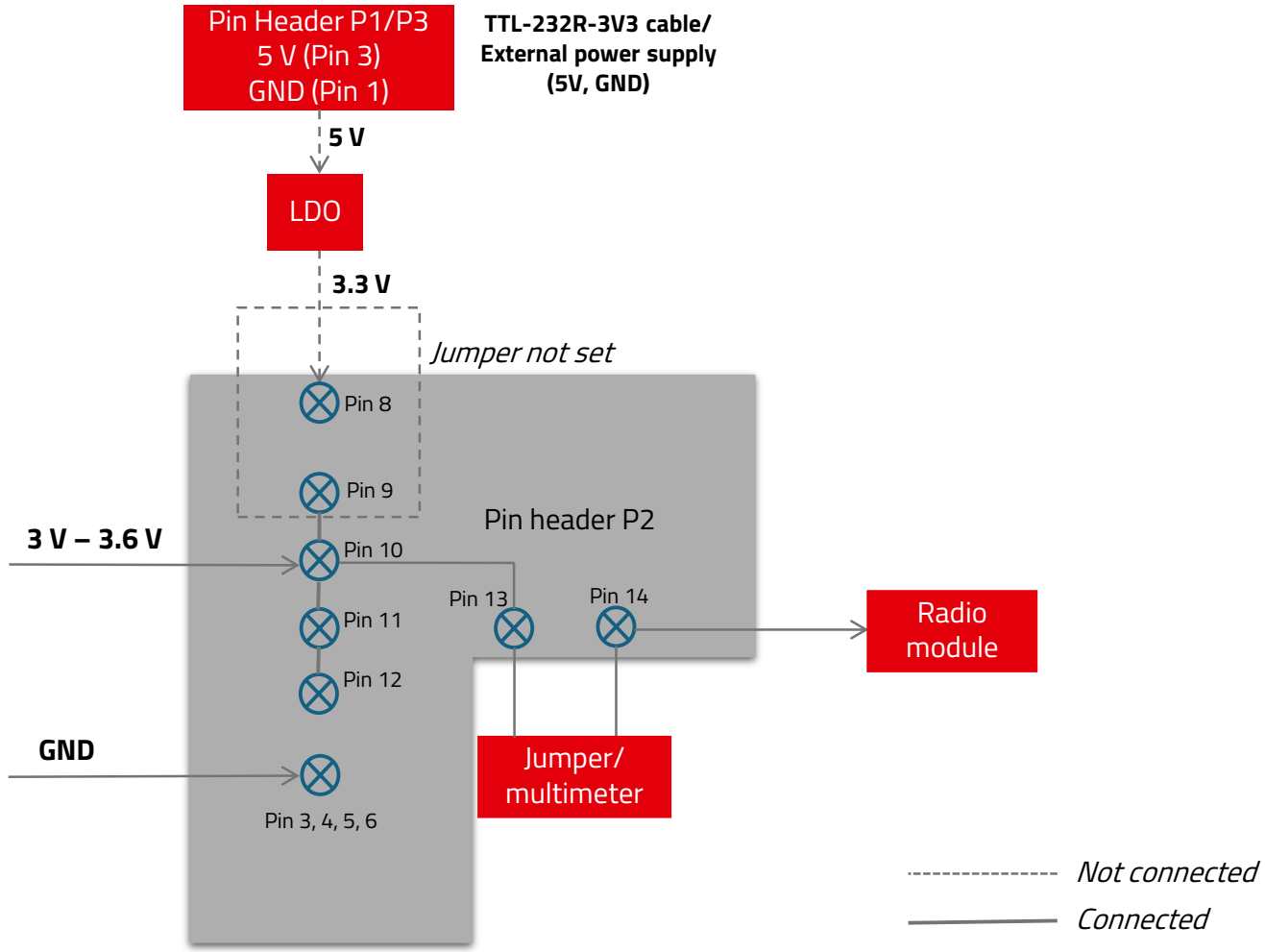

Figure 8: Block diagram of power supply through dedicated pins

If external power supply option through pin header P2, (option 5 from table 14) is used, the jumper on pin 8-9 of pin header P2 is not set.

5.6.2 UART0 / USB

The TTL-232R-3V3 cable, which contains a FTDI USB to UART converter chipset, is used for USB/UART connection between PC and mini EV-Board. The I/O level of the TTL-232R-3V3 cable is 3.3 V. Using the FTDI-driver, the PC will show a virtual COM-Port, which can be used to communicate with the module. For Orthosie-I, UART0 is accessible through pin header P1 for flashing and debugging.

5.6.3 UART1 / USB

The TTL-232R-3V3 cable, which contains a FTDI USB to UART converter chipset, is used for USB/UART connection between PC and mini EV-Board. The I/O level of the TTL-232R-3V3 cable is 3.3 V. Using the FTDI-driver, the PC will show a virtual COM-Port, which can be used to communicate with the module. For Stephano-I, UART1 is accessible through pin header P3 for application firmware.

STOP

Do not connect the TTL-232R-3V3 cable on pin header P1 and P3 at the same time.

5.6.4 Supported UART baudrates

In order to establish a stable UART communication between the FTDI USB to UART converter and the radio module's chipset, the difference between the baud rates of each entity must not exceed the respective immunity level. Both devices use an internal clock to generate the configured UART baud rate. Due to the fixed clock frequency, only specific baud rates can be run without frequency error.
To figure out which baud rates of the radio module can be evaluated using the FTDI USB to UART converter (FT232R or FT231X), it is important to know the real baud rate B with its introduced error. To get them, the FTDI's clock of 3000 kHz must be divided by the respective prescaler P:

$$B = \frac{3000}{P} \text{ [kBaud]}$$

The supported prescalers P can be chosen as:

$$P \in \{1, 1.5\} \text{ or } P = 2 + (N \cdot 0.125) \text{ with } N \in \{0, 1, 2, 3, 4, \ldots\}$$

When a baud rate is configured in the FTDI USB to UART converter, the prescaler is chosen that meets the closest baud rate. In that case, the real baud rate differs from the configured one, introducing a UART clock error, which may lead to UART communication issues.

Example: In case the desired baud rate $B_{desired} = 1250$ kBaud, the desired prescaler is $P_{desired} = \frac{3000}{1250} = 2.4$. The closest prescaler P is determined by $P = 2 + (N \cdot 0.125) = 2.375$ with $N = 3$. This results in a real baud rate $B = \frac{3000}{2.375} = 1263$ kBaud, which introduces an error of $\frac{B - B_{desired}}{B_{desired}} = 1.04$ % with respect to the desired baud rate.

Desired baud rate [kBaud]	Closest prescaler P	Real baud rate B [kBaud]	Error [%]
3000	1	3000	0
2500	1.5	2000	-20
2000	1.5	2000	0
1500	2	1500	0
1250	2.375	1263	1.04
1411.764706	2.125	1411.764706	0
⋮	⋮	⋮	⋮
1000	3	1000	0
921.6	3.25	923.0769231	0.16
⋮	⋮	⋮	⋮
230.4	13	230.7692308	0.16
⋮	⋮	⋮	⋮
115.2	26	115.3846154	0.15
⋮	⋮	⋮	⋮
38.4	78.125	38.4	0
⋮	⋮	⋮	⋮
19.2	156.25	19.2	0
⋮	⋮	⋮	⋮
9.6	312.5	9.6	0
⋮	⋮	⋮	⋮

Table 15: Example baud rates

5.6.5 UART direct

If a microcontroller is to be connected to the module, use the pin header P1 or P3 connector. The UART of the host can be directly connected to P1 or P3. Beware of I/O level compatibility. The host must obey the values stated in the module's manual. Especially the I/O level restrictions must be implemented by a host system (i.e. using a level shifter to use the allowed I/O levels).

5.6.6 Programming interface

The radio modules can be programmed using the UART0 interface, which is available on pin header P1 of the mini EV-Board. TTL-232R-3V3 cable shall be used to connect the mini EV-Board to the PC. Correct orientation of the TTL-232R-3V3 cable connector shall be taken care of.

5.7 Schematic - Stephano-I, Orthosie-I

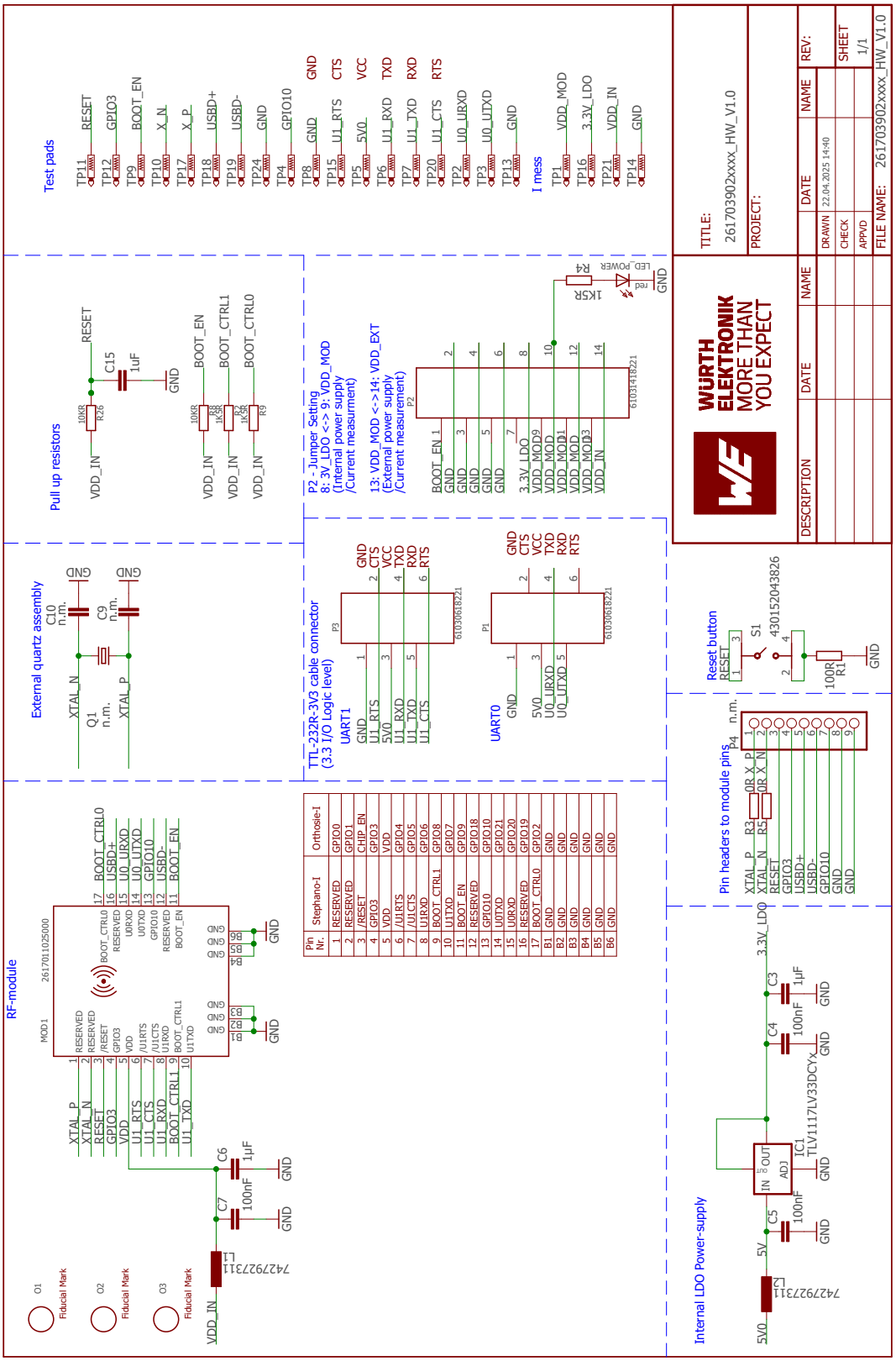

Figure 9: Schematic sheet

5.8 Layout

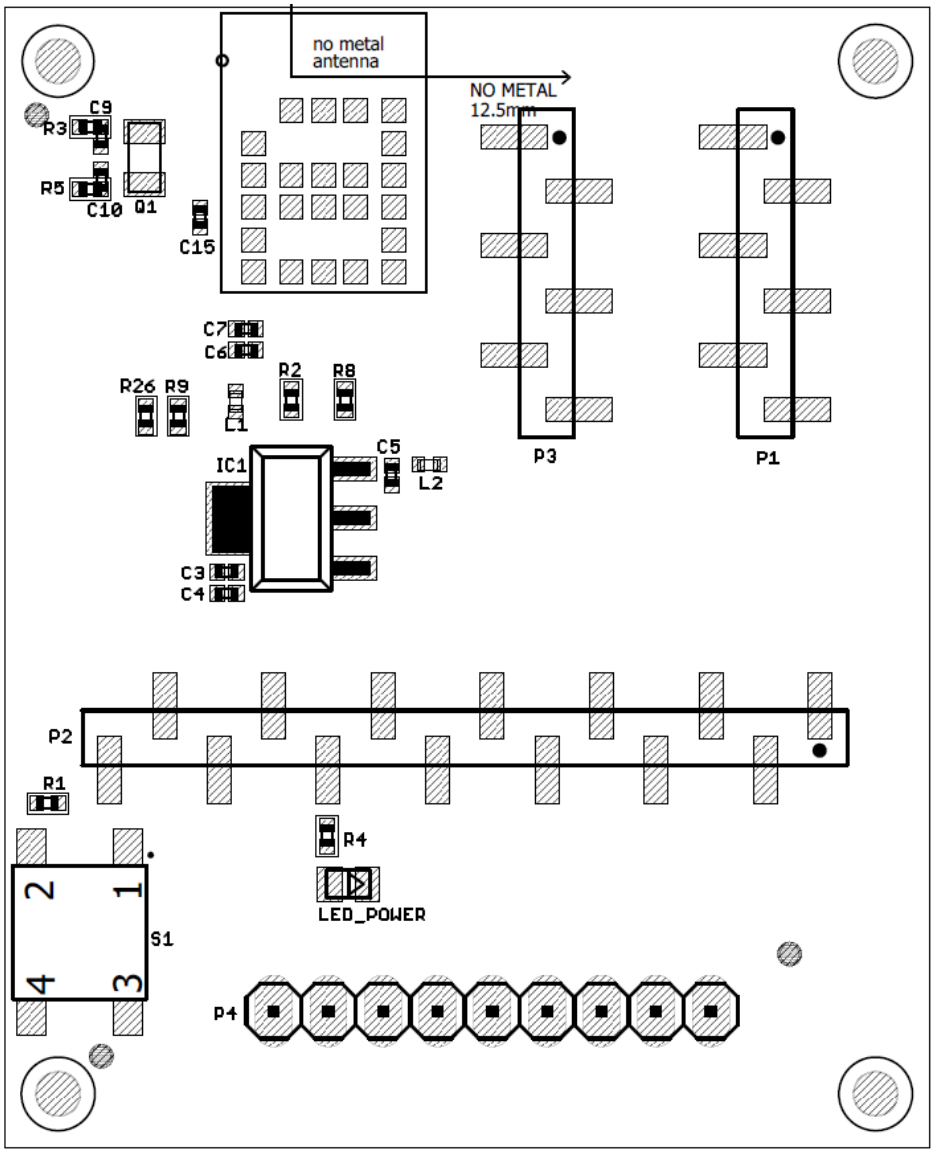

Figure 10: Assembly diagram

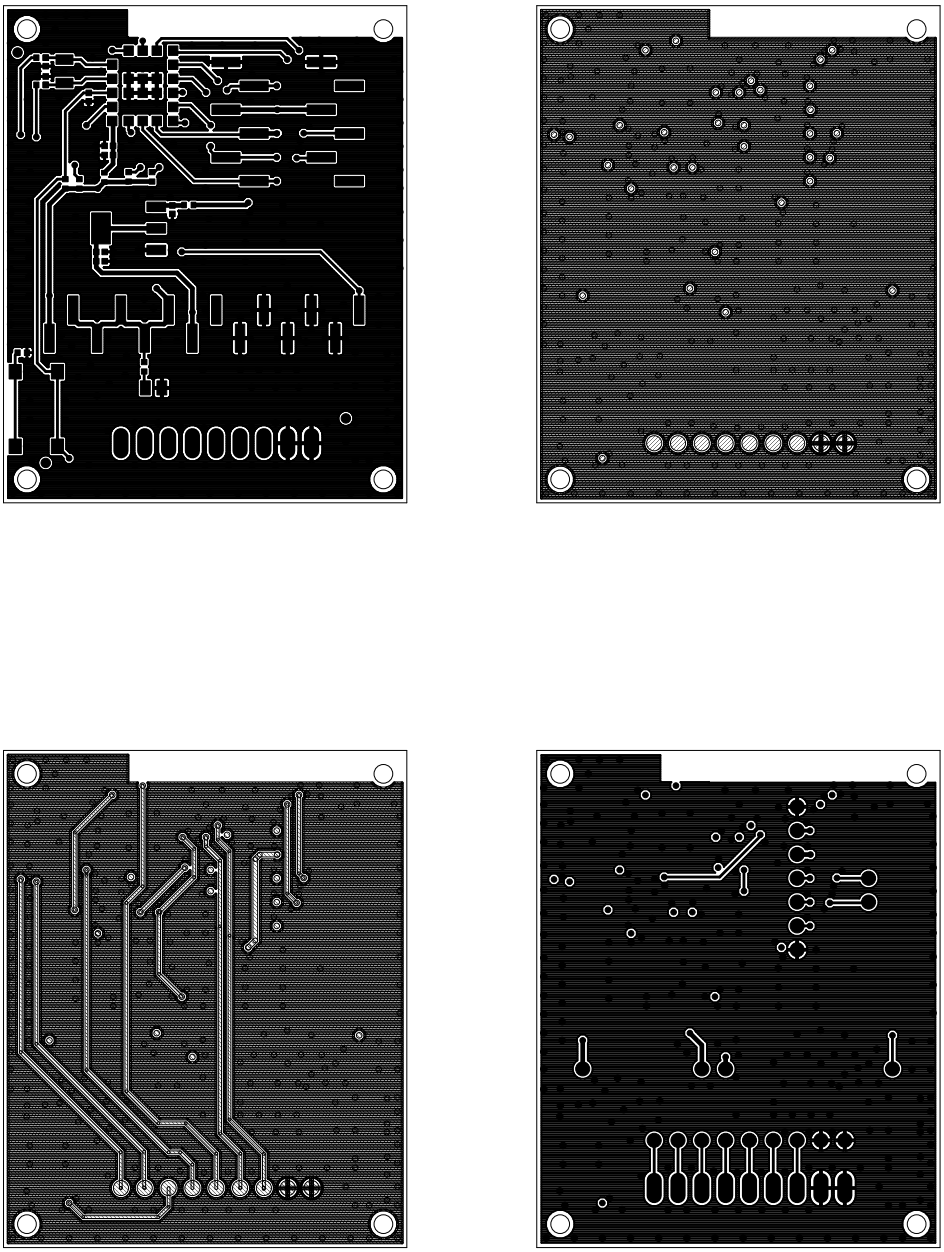

Figure 11: Top, bottom & internal layers

5.9 Bill of materials

Part	Value	Package	HEIGHT	MANUFACTURER	NR
C3	1µF	C0402_IPC	0.5mm	Würth Elektronik	885012105012
C4	100nF	C0402_IPC	0.5mm	Würth Elektronik	885012205037
C5	100nF	C0402_IPC	0.5mm	Würth Elektronik	885012205037
C6	1µF	C0402_IPC	0.5mm	Würth Elektronik	885012105012
C7	100nF	C0402_IPC	0.5mm	Würth Elektronik	885012205037
C9	n.m.	C0402_IPC	0.5mm		
C10	n.m.	C0402_IPC	0.5mm		
C15	1uF	C0402_IPC	0.5mm	Würth Elektronik	885012105012
IC1	TLV1117LV33DCYx	SOT223-4	1.8mm	TI	TLV1117LV33DCYR
L1	7427927311	L0402_WE_FERRIT	0.5mm	Würth Elektronik	7427927311
L2	7427927311	L0402_WE_FERRIT	0.5mm	Würth Elektronik	7427927311
LED_POWER	red	C0805_IPC	0.75mm	Würth Elektronik	150080RS75000
MOD1	2617011025000	WE-FP-7	2.0mm	Würth Elektronik	2617011025000
P1	61030618221	61030618221	9.9mm	Würth Elektronik	61030618221
P2	61031418221	61031418221	9.9mm	Würth Elektronik	61031418221
P3	61030618221	61030618221	9.9mm	Würth Elektronik	61030618221
P4	n.m.	1X09			
Q1	n.m.	CC7V-T1A			
R1	100R	R0402_IPC	0.35mm	Yageo	RC0402FR-07100RL
R2	1K5R	R0402_IPC	0.35mm	Yageo	RC0402FR-071K5L
R3	0R	R0402_IPC	0.35mm	Yageo	RC0402FR-070RL
R4	1K5R	R0402_IPC	0.35mm	Yageo	RC0402FR-071K5L
R5	0R	R0402_IPC	0.35mm	Yageo	RC0402FR-070RL
R8	10KR	R0402_IPC	0.35mm	Yageo	RC0402FR-0710KL
R9	1K5R	R0402_IPC	0.35mm	Yageo	RC0402FR-071K5L
R26	10KR	R0402_IPC	0.35mm	Yageo	RC0402FR-0710KL
S1	430152043826	430152043826	4.3mm	Würth Elektronik	430152043826

6 Regulatory compliance information

6.1 European Conformity

Pursuant to Article 1 (2.) of the EU directive 2014/53/EU, Article 1 (2.) the directive does not apply to equipment listed in Annex I (4.): custom-built EV-Kits designed for professionals to be used solely at research and development facilities for such purposes.

6.2 FCC

Pursuant to §2.803 (c) of Title 47 Chapter I Subchapter A Part 2 Subpart I, the EV-Kit falls under the FCC exception. Therefore it is marked as "For evaluation only; not FCC approved for resale".

6.3 Exemption clause

Relevant regulation requirements are subject to change. Würth Elektronik eiSos does not guarantee the accuracy of the before mentioned information. Directives, technical standards, procedural descriptions and the like may be interpreted differently by the national authorities. Equally, the national laws and restrictions may vary with the country. In case of doubt or uncertainty, we recommend that you consult with the authorities or official certification organizations of the relevant countries. Würth Elektronik eiSos is exempt from any responsibilities or liabilities related to regulatory compliance.

Notwithstanding the above, Würth Elektronik eiSos makes no representations and warranties of any kind related to their accuracy, correctness, completeness and/or usability for customer applications. No responsibility is assumed for inaccuracies or incompleteness.

7 References

[1] Würth Elektronik. Orthosie-I user manual. https://www.we-online.de/katalog/de/manual/2617011022000.

[2] Würth Elektronik. Stephano-I user manual. https://www.we-online.de/katalog/de/manual/2617011025000.

[3] TTL-232R-3V3 FTDI cable. https://www.ftdichip.com/Support/Documents/DataSheets/Cables/DS_TTL-232R_CABLES.pdf.

[4] FTDI virtual COM port driver. https://ftdichip.com/drivers/vcp-drivers/.

[5] FTDI driver installation guidelines. https://www.ftdichip.com/Support/Documents/InstallGuides.htm.

[6] Würth Elektronik. WE UART Terminal PC tool (Smart Commander). https://www.we-online.de/wcs-software.

[7] hterm. Terminal program. https://www.der-hammer.info/pages/terminal.html.

8 Important notes

The following conditions apply to all goods within the wireless connectivity and sensors product range of Würth Elektronik eiSos GmbH & Co. KG:

General customer responsibility
Some goods within the product range of Würth Elektronik eiSos GmbH & Co. KG contain statements regarding general suitability for certain application areas. These statements about suitability are based on our knowledge and experience of typical requirements concerning the areas, serve as general guidance and cannot be estimated as binding statements about the suitability for a customer application. The responsibility for the applicability and use in a particular customer design is always solely within the authority of the customer. Due to this fact, it is up to the customer to evaluate, where appropriate to investigate and to decide whether the device with the specific product characteristics described in the product specification is valid and suitable for the respective customer application or not. Accordingly, the customer is cautioned to verify that the documentation is current before placing orders.

Customer responsibility related to specific, in particular safety-relevant applications
It has to be clearly pointed out that the possibility of a malfunction of electronic components or failure before the end of the usual lifetime cannot be completely eliminated in the current state of the art, even if the products are operated within the range of the specifications. The same statement is valid for all software source code and firmware parts contained in or used with or for products in the wireless connectivity and sensor product range of Würth Elektronik eiSos GmbH & Co. KG. In certain customer applications requiring a high level of safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health, it must be ensured by most advanced technological aid of suitable design of the customer application that no injury or damage is caused to third parties in the event of malfunction or failure of an electronic component.

Best care and attention
Any product-specific data sheets, manuals, application notes, PCNs, warnings and cautions must be strictly observed in the most recent versions and matching to the products revisions. These documents can be downloaded from the product specific sections on the wireless connectivity and sensors homepage.

Customer support for product specifications
Some products within the product range may contain substances, which are subject to restrictions in certain jurisdictions in order to serve specific technical requirements. Necessary information is available on request. In this case, the Business Development Engineer (BDM) or the internal sales person in charge should be contacted who will be happy to support in this matter.

Product improvements
Due to constant product improvement, product specifications may change from time to time. As a standard reporting procedure of the Product Change Notification (PCN) according to the JEDEC-Standard, we inform about major changes. In case of further queries regarding the PCN, the Business Development Engineer (BDM), the internal sales person or the technical support team in charge should be contacted. The basic responsibility of the customer as per section 8 and 8 remains unaffected.
All software like ¨wireless connectivity SDK¨, ¨Sensor SDK¨ or other source codes as well as all PC software tools are not subject to the Product Change Notification information process.

Product life cycle
Due to technical progress and economical evaluation, we also reserve the right to discontinue production and delivery of products. As a standard reporting procedure of the Product Termination Notification (PTN) according to the JEDEC-Standard we will inform at an early stage about inevitable product discontinuance. According to this, we cannot ensure that all products within our product range will always be available. Therefore, it needs to be verified with the Business Development Engineer (BDM) or the internal sales person in charge about the current product availability expectancy before or when the product for application design-in disposal is considered. The approach named above does not apply in the case of individual agreements deviating from the foregoing for customer-specific products. The approach named above does not apply in the case of EV-Boards. EV-Boards may be changed without any notification.

Property rights
All the rights for contractual products produced by Würth Elektronik eiSos GmbH & Co. KG on the basis of ideas, development contracts as well as models or templates that are subject to copyright, patent or commercial protection supplied to the customer will remain with Würth Elektronik eiSos GmbH & Co. KG. Würth Elektronik eiSos GmbH & Co. KG does not warrant or represent that any license, either expressed or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, application, or process in which Würth Elektronik eiSos GmbH & Co. KG components or services are used.

General terms and conditions
Unless otherwise agreed in individual contracts, all orders are subject to the current version of the "General Terms and Conditions of Würth Elektronik eiSos Group", last version available at *www.we-online.com*.

9 Terms of Use for Würth Elektronik eiSos GmbH & Co. KG EV-Boards, evaluation kits and evaluation modules

Würth Elektronik eiSos GmbH & Co. KG provide you as a user with technical data (including data sheets), design resources (including reference designs), recommendations for use or other design recommendations, web tools, safety information and other information in the form of evaluation-boards, -kits or -modules (hereinafter jointly referred to as "EVB") in accordance with the terms and conditions contained here. The EVB is provided in the "as is" state. WE disclaims all express and implied warranties, in particular those concerning the suitability for a certain purpose, the absence of defects or non-violation of third-party rights. The EVB is intended for experienced developers to develop

their application with WE components. As a user, you are solely responsible for: (1) selection of the appropriate WE components for the application, (2) design, validation and testing the application, and (3) assurance that the application meets the applicable standards and all other safety requirements and other applicable requirements. WE may change the EVB without prior notice. WE grants you permission to use the EVB only for developing an application suitable for using WE components. Any other duplication, representation or transfer of the EVB is expressly prohibited. WE does not grant any licenses for the use of the intellectual property rights from WE or third parties. WE is fully indemnified from all claims, damages, costs, losses and liabilities arising from the misuse of this EVB The WE components are provided in accordance with WE's conditions of sale or other applicable conditions available either at *https://katalog.we-online.com* or in conjunction with such WE components. WE's provision of the EVB does not constitute an extended warranty in relation to the WE components.

General warnings
Do not touch the EVB when it is live, and allow charged components, such as capacitors, to discharge completely before handling the EVB. Depending on the individual application, high voltages can occur on the EVB and some components can reach temperatures above 50 °C. Even after disconnecting the EVB from the power source, these conditions remain for a significant time. Please ensure that the appropriate safety precautions are taken when installing and operating this EVB, as one of the following may occur if you handle or use this EVB without observing the relevant safety precautions: - Death - Serious injury - Electric shock - Electric burns - Severe heat burns -
When using the EVB, you undertake to read the instructions for use in full together with the relevant information supplied and/or available on the homepage *www.we-online.de/wcs-manuals* before putting this EVB into operation. The following points have to be observed in particular:
- Do not touch the EVB while it is live.
- The EVB must be fully assembled and all devices to be tested must be connected before voltage is applied to the EVB.
- The EVB should never be left unattended during operation.
- Capacitors must be completely discharged. The capacitors must be actively discharged using a suitable resistor.

Protection against static electricity
Use the unpackaged product only in ESD protected areas. Wear the ESD personal protective equipment prescribed for these areas. Ground all conductive components, including personnel, as prescribed in ESD protected areas. Ensure that the product is only used by trained personnel.

Purpose and use
The EVB is not a finished product and is not intended for general use by the consumer. The EVB is intended exclusively for use in the evaluation of WE components in the lab or in development environments by highly qualified technicians or engineers, familiar with the risks involved in handling electrical or mechanical components, systems and subsystems. The use of the EVB is your full and independent responsibility. The EVB is expressly not intended to be installed in a terminal device or to be part of a terminal device in whole or in part. WE reserves the right, at its own discretion, to make corrections, improvements, adjustments or other changes to the EVB or to discontinue the EVB. The EVB is not intended for use in devices and applications for which a higher safety and reliability standard is prescribed. It is also not approved for use in safety-relevant applications or where personal injury or fatal consequences must be expected in the event of failure.

Operation of the EVB
The EVB may only be operated within the specifications and environmental parameters recommended by WE, as described in the instructions for use. Exceeding the specified parameters (including, but not limited to, input and output voltage, current, power, and ambient conditions) may result in damage to property. If you have questions about these electrical parameters, please contact WE at (regulatory-compliance@we-online.com) prior to connecting peripheral electronics (including the input voltage and intended loads). Any load outside a certain power range may lead to negative consequences, including, but not limited to, unintended or inaccurate evaluations or possibly permanent damage to the EVB or the electronics connected to it. Please ensure that the appropriate safety precautions are taken when working with the EVB, as serious injuries, including severe or even fatal injuries from electric shock or electric burns, may occur if you do not follow the appropriate safety precautions. Under no circumstances should the EVB be touched while live. When the EVB is connected to a power source, some of its components are electrically charged and/or have temperatures above 50 °C. This condition also applies for a short time after disconnecting from the supply voltage until the capacitors are completely discharged and hot components have cooled down. These components include connectors, linear regulators, switching transistors, heat sinks, resistors, diodes, inductors and other components, which can be identified from the documentation in the instructions for use. As with all electronic lab work, only qualified persons with knowledge of electronic performance evaluation, measurement and diagnostic tools, should use the EVB.

Hazards and warnings
Before putting the EVB into operation, please read the instructions for use and especially the various hazards and warnings described therein. The instructions for use contain important safety information on voltages and temperatures. You take full responsibility and liability for the proper and safe handling of the EVB. You agree to comply with all safety requirements, rules and regulations related to the use of the EVB. You also take full responsibility for: (1) establishing safeguards to ensure that the use of the EVB does not cause damage to property, personal injury or death, even if the EVB does not function as described, intended or expected, (2) the test setup in which the EVB is integrated, all safety requirements, rules and regulations and also that no damage to property, personal injury or other hazardous situation occurs even if the EVB fails, and (3) ensuring the safety of all activities performed by you or your employees when using the EVB. In particular, this means that the technical rules VDE [German Electrical Engineering, Electronic and Information Technology Association] 0105-100 and BGI [German trade association information] 891 (or corresponding applicable safety regulations outside Germany) for the operation of electrical test setups must be observed, the test area is protected against unauthorized access or accidental touching, current limitations, and emergency stop mechanisms are functional and test setups are never operated unattended. If you have any questions about the safe use of the EVB, please contact WE at *regulatory-compliance@we-online.com* for more information.

Your responsibility with regard to the applicable laws
- You are responsible for being sufficiently informed about and complying with all international, national, state and local applicable laws, rules and regulations that apply to the handling or use of the EVB by you or your employees.
- The EVB generates, uses and radiates radio frequency energy, but has not been tested for conformity with the limits applicable to the product category, which are applicable according to the European Union regulations for protection against radio frequency interference. Operation of the EVB may cause interference with radio communication. In this case, the costs incurred for necessary measures to remedy the interference are to be borne by the user.

As the EVB is not a finished product, it may not comply with applicable regulatory, safety or certification standards that are normally as-

sociated with other products, such as Directive 2011/65/EC of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of hazardous substances and Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). You take full responsibility for compliance with such standards that apply to the EVB. You also take responsibility for the proper disposal of the components and materials of the EVB.

Exclusion of further rights and rights of use for intellectual property of EVB
The sale of an EVB does not constitute the granting by WE of any license or other right of any kind - expressly or implicitly - including, but not limited to, any patent, copyright, trademark or other proprietary rights. All rights from such patent, copyright, trademark or other proprietary rights are expressly reserved by WE. The EVB must not be used in any manner that directly or indirectly infringes any patent, copyright, trademark or other proprietary rights of WE.

Warranty of EVB
WE ensures that the EVB meets the specifications given in the instructions for use (within the deviations stated therein) for a period of 12 months from the date of purchase and functions in accordance with the instructions for use. On the basis of the underlying statutory provisions, WE shall rectify defects or offer free replacement of the EVB to which damage occurs that is evidently attributable to a defect for which WE is responsible and is at fault. A warranty claim is subject to the user having complied with the statutory duties of inspection and notification of defects and that the EVB has been received by WE no later than ten (10) days after expiry of the warranty period. This warranty is not transferable to others. This warranty does not apply to defects or impairments in performance resulting from incorrect use, use contrary to WE's instructions, improper installation, improper operation or misuse. WE accepts no liability whatsoever for the failure of equipment or other items not manufactured by or for WE, including, but not limited to, equipment or items to which the EVB is attached or for which the EVB is used. WE DOES NOT GRANT ANY WARRANTIES OR ASSURANCES WHATSOEVER, EXPRESS OR IMPLIED, WITH RESPECT TO THE EVB, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MARKETABILITY OR SUITABILITY FOR A PARTICULAR PURPOSE.

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The customer bears the responsibility for compliance of systems or units, in which Würth Elektronik eiSos GmbH & Co. KG products are integrated, with applicable legal regulations. Customer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of Würth Elektronik eiSos GmbH & Co. KG components in its applications, notwithstanding any applications-related information or support that may be provided by Würth Elektronik eiSos GmbH & Co. KG. Customer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences lessen the likelihood of failures that might cause harm and take appropriate remedial actions. The customer will fully indemnify Würth Elektronik eiSos GmbH & Co. KG and its representatives against any damages arising out of the use of any Würth Elektronik eiSos GmbH & Co. KG components in safety-critical applications.

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11 License terms

These License terms will take effect upon the purchase and usage of the Würth Elektronik eiSos GmbH & Co. KG wireless connectivity products. You hereby agree that these license terms are applicable to the product and the incorporated software, firmware and source codes (collectively, "Software") made available by Würth Elektronik eiSos in any form, including but not limited to binary, executable or source code form. The software included in any Würth Elektronik eiSos wireless connectivity product is purchased to you on the condition that you accept the terms and conditions of these license terms. You agree to comply with all provisions under these license terms.

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You are responsible for using the Würth Elektronik eiSos wireless connectivity product with the incorporated firmware in compliance with all applicable product liability and product safety laws. You acknowledge to minimize the risk of loss and harm to individuals and bear the risk for failure leading to personal injury or death due to your usage of the product.
Würth Elektronik eiSos' products with the incorporated firmware are not authorized for use in safety-critical applications, or where a failure of the product is reasonably expected to cause severe personal injury or death. Moreover, Würth Elektronik eiSos' products with the incorporated firmware are neither designed nor intended for use in areas such as military, aerospace, aviation, nuclear control, submarine, transportation (automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network etc. You shall inform Würth Elektronik eiSos about the intent of such usage before design-in stage. In certain customer applications requiring a very high level of safety and in which the malfunction or failure of an electronic component could endanger human life or health, you must ensure to have all necessary expertise in the safety and regulatory ramifications of your applications. You acknowledge and agree that you are solely responsible for all legal, regulatory and safety-related requirements concerning your products and any use of Würth Elektronik eiSos' products with the incorporated firmware in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by Würth Elektronik eiSos. YOU SHALL INDEMNIFY WÜRTH ELEKTRONIK EISOS AGAINST ANY DAMAGES ARISING OUT OF THE USE OF WÜRTH ELEKTRONIK EISOS' PRODUCTS WITH THE INCORPORATED FIRMWARE IN SUCH SAFETY-CRITICAL APPLICATIONS.

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You have the opportunity to request the current and actual firmware for a bought wireless connectivity product within the time of warranty. However, Würth Elektronik eiSos has no obligation to update a modules firmware in their production facilities, but can offer this as a service on request. The upload of firmware updates falls within your responsibility, e.g. via ACC or another software for firmware updates. Firmware updates will not be communicated automatically. It is within your responsibility to check the current version of a firmware in the latest version of the product manual on our website. The revision table in the product manual provides all necessary information about firmware updates. There is no right to be provided with binary files, so called "firmware images", those could be flashed through JTAG, SWD, Spi-Bi-Wire, SPI or similar interfaces.

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We recommend you to be updated about the status of new firmware and software, which is available on our website or in our data sheet and manual, and to implement new software in your device where appropriate.
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