

About this document

Scope and purpose

This document is a user guide for the WLC1150 MP-A2 50-W wireless power transmitter reference solution (REF_WLC_TX50W_N1). It supports high-power proprietary protocol up to 50-W charging with the Infineon 50 W Rx board (REF_WLC_RX50W_N1) and is compatible with the Qi EPP 15 W protocol. The reference board demonstrates the capabilities and features of the Infineon WLC1150 wireless charging transmitter controller. WLC1150 is a highly integrated wireless power transmitter with an integrated USB Type-C Power Delivery (PD) controller, compliant with the USB PD 3.1 specification.

You can see the relevant sections based on your requirement:

- Introduction Provides basic information on the reference board, including details about the interfaces.
- WLC1150 software tool Provides an overview of the Wireless Charging Configuration Utility software.
- WLC1150 wireless power transmitter system design Explains the reference board architecture and system design details.
- **Reference board operation** Describes operating the reference board as a wireless power transmitter, configuring the system-level parameters, downloading the firmware, and capturing the debug log.

Intended audience

The document is intended for the users of the WLC1150 50-W wireless power transmitter reference board (REF_WLC_TX50W_N1).



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Safety information

Safety information

The REF_WLC_TX50W_N1 reference board is intended for use as an evaluation platform for hardware or software in a laboratory environment. The board is an open-system design, which does not include a shielded enclosure. Because of this reason, the board may cause interference with other electrical or electronic devices in close proximity. In such cases, take adequate preventive measures. Also, do not use this board near any medical equipment or RF devices.

Attaching additional wiring to this product or modifying the product operation from the factory default may affect its performance and cause interference with other apparatus in the immediate vicinity. If such interference is detected, suitable mitigating measures must be taken.



The REF_WLC_TX50W_N1 reference board contains ESD-sensitive devices. Electrostatic charges readily accumulate on the human body and any equipment, which can cause a discharge without detection. Permanent damage may occur to devices subjected to high-energy discharges. Proper ESD precautions are recommended to avoid performance degradation or loss of functionality. Store unused REF_WLC_TX50W_N1 reference boards in the protective shipping package.

General safety instructions

ESD protection

ESD can damage boards and associated components. Infineon recommends that the user perform procedures only at an ESD workstation. If an ESD workstation is unavailable, use appropriate ESD protection by wearing an antistatic wrist strap attached to the chassis ground (any unpainted metal surface) on the board when handling parts.

Handling boards

The boards provided with the REF_WLC_TX50W_N1 reference board are sensitive to ESD. When removed from the casing, this applies to the boards supplied with a plastic casing. Hold the boards only by the edges. Place it on a grounded, static-free surface after removing a board from the box/casing. Use a conductive foam pad, if available. Do not slide the board over any surface.

Do's and don'ts



• Do not touch the inverter output area marked below while the reference board is in use. The components in this area may operate at a voltage higher than 30 V.



- Keep the coil area of the reference board clear from any metallic debris.
- Monitor the coil interface's surface temperature during prolonged usage.



Safety information

- Ensure that there are no foreign metallic objects on the REF_WLC_TX50W_N1 board's charging interface surface soon after the phone/receiver is placed to avoid miscalibration and overheating.
- Do not remove the fan connections anytime as it is required for cooling the receiver surface during high power transfer.
- Ensure that the fan air inlet area located at bottom of the REF_WLC_TX50W_N1 board is not blocked.





Introduction

1 Introduction

This document is a user guide for the WLC1150 MP-A2 50-W wireless power transmitter reference solution (REF_WLC_TX50W_N1). This solution consists of the reference board, firmware, and software utility called the Wireless Charging Configuration Utility.

Infineon's WLC1150-based 50-W wireless power transmitter reference board REF_WLC_TX50W_N1 is a highly integrated, Qi-compatible transmitter design with an MP-A2 type transmitter coil.

The REF_WLC_TX50W_N1 board delivers a maximum output power of 50 W with the high-power Infineon Wireless Rx (REF_WLC_RX50W_N1) and 15 W maximum power with WPC-compliant wireless Rx.

The REF_WLC_TX50W_N1 board works with high-power Infineon Wireless Rx (REF_WLC_RX50W_N1) by taking power from a Type-C PD adapter and delivering up to 50 W power. The input voltage will be automatically configured to 20 V. It can also be powered up with fixed input DC supply of 20 V/4 A. Input supply is used to power up the full-bridge inverter driving the resonance tank (resonance capacitor and transmitter coil). The inverter controls the output power flow by changing the switching frequency and duty.

The REF_WLC_TX50W_N1 board also works with Qi-compliant wireless receivers by taking power from a Type-C PD adapter and delivering up to 15 W power. The input voltage is automatically configured to 12 V or 15 V based on Type-C PPS/PD contract capability. Input supply is used to power up the full-bridge inverter driving the resonance tank (resonance capacitor and transmitter coil). The inverter controls the output power flow by varying the switching frequency and duty cycle.

WLC1150 has integrated gate drivers for the buck and inverter power supplies necessary for wireless transmitter applications. Buck controller is being used to control the fan integrated with REF_WLC_TX50W. WLC1150 supports a wide input voltage range and offers many programmable features for creating distinct wireless transmitter solutions.

The REF_WLC_TX50W_N1 is also compatible to charge iPhones, where the inverter operates at a fixed frequency of 127.7 kHz and 50% duty by taking power from a Type-C PPS adapter. It requires a Type-C PPS adapter. The input voltage supplied by the PPS adapter will be controlled by WLC1150, by input voltage configuration to control the output power flow.

1.1 Contents

The WLC1150 50-W wireless power transmitter reference board package contains the following:

- REF WLC TX50W N1 reference board
- 65 W PPS compatible USB Type-C power adapter
- USB Type-C cable
- Infineon 50-W demo Rx board (REF_WLC_RX50W_N1)
- HPI dongle (HPI_DONGLE) for programming/debugging
- USB Micro-B cable
- Jumper wires (x4)
- Quick start guide

The following items may be required for evaluating the wireless power transmitter capabilities of the reference board. Note that these are not included in the reference board package.

- Qi- compliant phone
- Windows PC running Windows OS 10 or higher to run the Wireless Charging Configuration Utility
- DC power supply (Minimum 24 V, 4 A rated)

User guide



Introduction

1.2 REF_WLC_TX50W_N1 release package

Contact **Infineon technical support** to get the release package. The release package includes the following items:

1.2.1 Documentation

The documents include:

- Quick start guide
- Test report
- User guide (this document)
- WLC1150 datasheet
- Release notes

The hardware design files package includes:

- Schematics
- Bill of materials (BOM)
- Layout files

1.2.2 Downloading the kit document and hardware design file

Download the documents and the hardware design files for REF_WLC_TX50W_N1 from the REF_WLC_TX50W_N1 reference board webpage [1]. The documents include a quick start guide, test report, and user guide (this document). The hardware design files package includes a schematic, bill of materials (BOM), and layout files.

1.2.3 Wireless Charging Configuration Utility

Wireless Charging Configuration Utility supports the following key features:

- 1. Downloading firmware onto the 50 W Tx reference board
- 2. Configure the firmware parameters and download the updated configuration onto the 50 W Tx reference board
- 3. Monitor and configure the firmware parameters dynamically while the 50 W Tx reference board is operational

The REF_WLC_TX50W_N1 release package includes the installer for this utility. Install the utility on a Windows PC (Windows 10 or higher) and see the Utility user guide to get more details.



Introduction

1.3 Board details

The key interfaces of the WLC1150 50 W Tx reference board are marked in Figure 1.







WLC1150 software tool

2 WLC1150 software tool

2.1 Wireless Charging Configuration Utility

The WLC1150 controller is a fully programmable controller allowing users to configure the firmware parameters and store them in its internal flash memory. The Wireless Charging Configuration Utility is a Microsoft Windows application developed by Infineon to guide the WLC1150 user through the process of configuring and programming the WLC1150 device. The utility allows users to:

- 1. To read the firmware configuration data from the REF_WLC_TX50W_N1 reference board and modify it or create a new configuration from the scratch.
- 2. Program the resulting configuration data onto the target WLC1 device or program the complete firmware.
- 3. Monitor and configure the firmware parameters dynamically while the 50 W Tx reference board is operational

The WLC1150 controller supports programming over the CC and I2C interface. Usage of the Wireless Charging Configuration Utility requires the HPI dongle hardware, which is included in the reference design package.

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	Device family:	
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vice Liscovery failed.		

Figure 2 Wireless Charging Configuration Utility



WLC1150 wireless power transmitter system design

3 WLC1150 wireless power transmitter system design

The WLC1150 wireless transmitter implements 50-W wireless power transfer using the Infineon high-power protocol. The transmitter also supports BPP and EPP types of wireless receivers and is compliant with Qi 1.3.2 specification.

The interconnection of REF_WLC_TX50W_N1 with source and receivers is shown in **Figure 3**. The recommended DC input source configurations are listed in **Table 1**.



Figure 3 WLC1150 kit interconnection

Table 1	Input source for the reference b	oard
	input source for the reference by	Juin

DC input source	REF_WLC_TX50W_N1 requirement
DC power supply	DC voltage type
	24 V, 4 A output capacity
USB Type-C and PD/PPS adapter	5 V, 3 A
	9 V, 3 A
	15 V, 3 A
	20 V, 3.25 A

Note: The kit is configured to operate with 50 W Rx (REF_WLC_RX50W_N1) with USB PD input by default.



WLC1150 wireless power transmitter system design

3.1 REF_WLC_TX50W_N1 MP-A2 50W power transmitter board

The REF_WLC_TX50W_N1 MP-A2 50-W transmitter board implements the power stage and control of wireless power transfer system. The transmitter board architecture is shown in **Figure 4**.



Figure 4 REF_WLC_TX50W_N1 power transmitter reference board architecture

The key features of the reference board are as follows:

- 1. Qi 1.3.2 compatible
- 2. Robust ASK and FSK in-band communication between transmitter and receiver
- 3. Integrated foreign object detection based on system parameters such as Q-factor and power loss
- 4. Type-C PD Input with PD compliance
- 5. Wide input voltage ranges from 4.5 V to 24 V $\,$
- 6. Integrated buck converter gate drive and control, operating at a switching frequency of 400 kHz
- 7. Integrated gate drive for full-bridge inverter operating range of 110 kHz -145 kHz switching frequency
- 8. MP-A2 coil with variable inverter frequency and duty control
- 9. Peak efficiency of greater than 83% at full load of 15 W with WRM483265-10F5-12V-G
- 10. Peak efficiency of greater than 89% at full load of 50 W with REF_WLC_RX50W board

The reference board contains the following key sections:

1. **Input connector** – The Tx board supports two sources of input power (USB PD and DC input) to support different use cases. The board can be powered using a USB-C power adapter over the USB Type-C connector (J1). There is also an option for a DC power supply connection (J3) to deliver power with a High Power



WLC1150 wireless power transmitter system design

Infineon receiver board (REF_WLC_RX50W_N1). Note that at any point in time, only one input power source can be active.

- 2. **Fan regulator for powering the fan** The fan regulator is having buck converter stage to regulate VFAN voltage to 5 V for powering the fan.
- 3. **Fan for thermal management** The fan is operated for thermal management of the interface surface. It operates when power transfer by Tx is more than 40 W or Tx interface surface temperature is more than 45°C, which is measured by NTC on the Tx board. The fan will turn off after the Tx- power falls below 35 W or coil temperature falls below 40°C.
- 4. **Inverter stage** The full-bridge inverter (Q4 to Q7) is operated at a frequency range of 110 kHz 145 kHz to drive the resonant tank formed by the transmitter coil (Lr) and resonant capacitors (Cr). The coil voltage feedback (COIL-SNS) is used for Q-factor estimation and ASK demodulator circuits.
- 5. **Transmitter coil assembly** The transmitter coil is MP-A2 type with specifications per Qi standards. The coil is mounted on a separate coil PCB. A set of PCB shield (Shield PCB TOP and Shield PCB BOT) is mounted on top of the coil and an acrylic sheet form the interface surface of the transmitter. The coil mounting adhesive, spacers, and acrylic thickness are selected such that the distance between the coil top surface and to interface surface is approximately 3.1 mm (Qi specification: 3 mm + 0.5 mm/-0.25 mm). See Figure 5 for coil assembly details.



Figure 5 MP-A2 transmitter coil assembly

- 5. WLC1150-68LQXQ The WLC1150 is a single controller unit to control the transmitter coil and USB PD interface. The WLC1150 simplifies the transmitter board architecture with inbuilt gate drivers for the auxiliary buck and inverter stage, inbuilt LDO for logic and core power, and more features. With an on-chip 32-bit Arm[®] Cortex[®]-M0 processor, 128-KB flash, 16-KB RAM, and 32-KB ROM, the firmware supporting the complete high-power proprietary protocol and USB PD state machine logic can be programmed onto the WLC1150 controller.
- 6. **ASK demodulator** The ASK demodulator is based on coil voltage and bridge current. The demodulated signal from both paths is processed through a dual opamp-based gain stage and a comparator and decoded by the WLC1150 controller.
- 7. **Q-factor and resonance frequency estimation** The Q-factor estimation from coil voltage is performed by WLC1150 through the signal at Q_COMP. The coil voltage is processed through a blocking capacitor, voltage divider, and clamping diode to feed to the WLC1150 controller for Q-factor and resonance frequency estimation.
- 8. **Status indication** The firmware indicates the various system states or events using the dual-color (red and blue) status LED (LED1). See the **Reference board operation** to understand more details.



WLC1150 wireless power transmitter system design

3.1.1 Board connectors

The transmitter board has power and signal connectors for operating and monitoring the wireless power transfer. The function of each connector is listed in **Figure 6**.

Connector	Туре	Description	
J1	Power	USB Type-C connector for DC input through a USB-C power adaptor or QC/AFC type AC/DC adaptor.*	
		This connector is also used to download configuration data/firmware from the Wireless Configuration Utility through HPI dongle over the Type-C CC lines. For more information, see section 4.2.1 .	
J3	Power	Wire-to-board connector option for DC input through a variable DC power supply *	
J4	Power	Jumper connection to power up the board either with USB PD or DC power supply.	
		Jumper connection Pin 1-2 for PD adapter input.	
		Jumper connection Pin 2-3 for DC power supply.	
J5	Signal	Debug serial port. Connect to an HPI dongle (which is provided as part of the reference board package) to view system status on PC using a terminal emulator software (Tera Term, Putty, and so on). The data is sent at a 1-M baud rate.	
J2	Signal	SWD connector. This connector is used to monitor, log, and dynamically configure the firmware parameters from the Wireless Configuration Utility through an HPI dongle over I2C lines. For more information, see section 4.2.2 .	
J8	Power	A J8 connector is needed to connect with the fan connector. This connector is used to supply power to the fan.	
L3	Power	Terminals for transmitter coil connection.	

 Table 2
 REF_WLC_TX50W_N1 board connectors

* Do not power the transmitter board from both J1 and J3 simultaneously.



WLC1150 wireless power transmitter system design



Figure 6 REF_WLC_TX50W_N1 power transmitter board power and signal connections

3.1.2 Test points

The test points in the REF_WLC_TX50W_N1 MP-A2 power transmitter board assist in monitoring and debugging the wireless power transfer system. The list of test points and their functionality is covered in **Table 3**.

Test point name	Section	Description	
USB-IN	Power	Input power positive rail	
USB-GND	Power	Input power ground rail	
PVIN_0	Power – Buck/Inverter	Input positive rail to buck converter and inverter	
FAN_VDDD	Power – Buck	Buck stage output for Fan power supply	
SW1_0	Power – Buck	Buck stage switching node	
HG1_0	Signal – Buck	Buck stage high side MOSFET (Q3) gate signal	
LG1_0	Signal – Buck	Buck stage low side MOSFET (Q3) gate signal	
VBB_1	Power – Inverter	Input inverter power after the current sense resistor	
COIL_SNS	Power – Inverter	Coil voltage; transmitter coil, and resonant capacitor junction point	
PWM_OUT	Signal – Inverter	Inverter stage PWM signal	
PWM_IN1	Signal – Inverter	PWM logic circuit O/P for inverter MOSFET Leg (Q4, Q5)	
PWM_IN2	Signal – Inverter	PWM logic circuit O/P for inverter MOSFET Leg (Q6, Q7)	

Table 3	List of test points on REF_WLC_TX50W_P	N1
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WLC1150 wireless power transmitter system design

Test point name	Section	Description	
HG1_1	Signal – Inverter	Inverter bank 1 high side MOSFET (Q4) gate signal	
LG1_1	Signal – Inverter	Inverter bank 1 low side MOSFET (Q5) gate signal	
HG2_1	Signal – Inverter	Inverter bank 2 high side MOSFET (Q6) gate signal	
LG2_1	Signal – Inverter	Inverter bank 2 high side MOSFET (Q7) gate signal	
Q_COMP	Signal – Q-factor	Scaled coil voltage (for Q-factor measurement)	
ASK_OUT Signal – ASK demodulator ASK demodulator output from WLC1150 to am stage		ASK demodulator output from WLC1150 to amplification stage	
OPAMP_GAIN Signal – ASK demodulator ASK demodulator		ASK demodulator gain stage amplifier output	
CMP_REF Signal – ASK demodulator ASK demodulator comparator reference signal		ASK demodulator comparator reference signal	
OPAMP_CMP Signal – ASK demodulator ASK demodulator WLC1150		ASK demodulator comparator output; digital signal to WLC1150	
VIN	Power – WLC1150	Power input to WLC1150	
VDDD	Power – WLC1150	WLC1150 internal 5-V LDO output	
VCCD Power – WLC1150 W		WLC1150 internal 1.8 V core LDO output	
Q_COMP Signal – WLC1150 Signal used by WLC1150 for Q-factor estimation		Signal used by WLC1150 for Q-factor estimation	
GND1, GND2	GND1, GND2 Power Power side ground points		
GND	Signal	Control side ground point	

Note:

For more information, see the reference board's schematic in the REF_WLC_TX50W_N1 release package.



4 Reference board operation

This section explains the procedure to operate the REF_WLC_TX50W_N1 reference board. It also explains the procedure to configure the firmware in a static or dynamic manner and the procedure to download the configuration or firmware onto the WLC1150-68LQXQ controller.

4.1 Wireless charging operation

The firmware supporting power transfer using USB PD input power is pre-programmed at the time of shipment. The following procedure explains the steps required to do a power transfer using the USB PD input.

4.1.1 Wireless power transfer using Infineon high power protocol mode (50W)

- 1. Ensure that a jumper shunt is placed at positions 1 and 2 of the power mode selection jumper (J4) of the Tx reference board.
- 2. Connect the USB Type-C power adapter provided as part of the REF_WLC_TX50W_N1 package to the USB Type-C connector (J1) of the Tx reference board.
- 3. Confirm that the status LED (LED1) blinks five times in blue and red. Now the board is ready for use.



Figure 7 Powering the WLC reference board

- 4. Place the Infineon 50-W Rx board on the Tx interface of the Tx reference board as shown in **Figure 8**.
- 5. Attach a load of up to 50W to the terminals of the Rx board. Ensure that the load is in the off state. The status LED (LED1) of the Tx board glows blue when the power transfer is in progress.



Reference board operation





Note: Ensure that the DC load is connected to the Rx board as per the polarity marked on the Rx board.

- 6. Increase the load in the maximum step of 20 W to exceed 40 W. Observe that the fan located on the bottom side of the Tx board turns on when the power transferred exceeds 40 W or when the Tx interface surface temperature sensed by the thermistor on the Tx board exceed 45°C to cool the temperature of the Tx interface.
- 7. During the power transfer the load on the Rx board can be varied up to 50-W. However, the maximum step size for load change (application or removal) should not exceed 20-W.
- 8. Remove the Infineon Rx board from the Tx interface surface of the Tx reference board. Observe that the status LED (LED1) turns off.
- 9. Disconnect the USB Type-C power adapter once the high-power transfer operation is complete.
- *Note:* Avoid short circuits of the output load terminal of the Rx board. This may result in damage to the Rx board.

4.1.2 Wireless power transfer using Qi protocol

The following procedure explains the steps to charging using the Qi protocol.

- 1. Repeat steps 1 to 3 of section **4.1.1** to exercise the power up the transmitter board.
- 2. Place the Qi phone/receiver on the Tx interface surface of the Tx reference board as shown in Figure 9.
- 3. The status LED (LED1) of the Tx board glows blue when the power transfer is in progress.
- 4. Observe that the status LED turns OFF when the phone/receiver is removed from the Tx interface surface or once the phone is fully charged (100%).
- 5. Disconnect the USB Type-C power adapter once the power transfer operation is complete.

Note: The status LED continues to glow blue if the phone remains in trickle charging mode after the battery is fully charged.



Reference board operation



Figure 9 Powering the WLC reference board for Qi Rx/Phone

4.1.3 System Status and Status LED indication

Table 4 describes the status LED indications for various system states.

System state	Status LED indication		
Idle state	No LED indication		
Digital ping phase	Blinks blue		
Power delivery in progress	Glows blue		
Power Delivery/charge complete	No LED indication		
Foreign object (FO) detected	Glows red until FO is removed		
Fault during power transfer	Blinks red until the fault is cleared		
Abrupt end of power transfer (EPT) initiated by the receiver	Blinks red		

Table 4 System states and status LED indications

Note: The REF_WLC_TX50W_N1 reference board with factory default firmware may exhibit timeoutbound retry of Qi power contract under extremely noisy ASK modulated signal conditions with a few phones/receivers. Such behavior does not affect wireless charging performance. See the REF_WLC_TX50W_N1 reference board's test report for more details about the phone charging cycle, ASK demodulation, and Qi 1.3.2 compliance test results. Download this report from the REF_WLC_TX50W_N1 reference board webpage [1].



4.1.4 Troubleshooting

See **Table 5** for troubleshooting the potential issues faced while operating the WLC 50 W Tx reference board.

#	Issue	Possible cause	Fix
1	The power transfer between the transmitter and receiver stops soon after it begins and the status LED (LED1) glows red.	There might be a foreign object (FO) present on the interface surface	Remove the receiver from the interface surface and verify for any FO presence and retry placing the receiver on the interface surface.
2	The receiver reference board REF_WLC_RX50W_N1 does not provide output power and debug logs show EPT121.	The receiver has terminated the power transfer because of a potential fault in the receiver	Power recycle the transmitter and retry. In case the issue persists, contact Infineon technical support.
3	The phone is not charging when placed on the interface surface of the WLC reference board.	The phone may not be a Qi-compliant phone.	Check with the phone manufacturer on Qi compatibility. Get a Qi-compliant phone.
4	The phone is charging at a slow rate.	The phone may not support Qi EPP capability.	Check with the phone manufacturer on support for EPP capability. Get a phone which can support EPP to charge at 15 W.
5	During high power transfer (> 15W), there is a momentary power reset during start of the power transfer at the load side on the receiver (REF_WLC_RX_50W_N1).	The transmitter (REF_WLC_TX_50W_N1) may have observed higher power loss compared to the estimated loss. So, the transmitter shall check the possibility of FO presence by measuring the Q-factor. If no FO is detected, the transmitter enters the power delivery mode, calibrates for high power loss, and proceeds with charging. This process is repeated every time the receiver is placed on the charging area.	Ensure that no FO is present on the charging surface of the transmitter Ensure the receiver is well-aligned on the transmitter's charging surface and try again. If the issue is persistent, calibrate the system for power loss FOD (Foreign Object Detection). Follow the instructions given in Appendix B: Procedure to do calibration for power loss FOD to complete the power loss FOD calibration.

Table 5	Troubleshooting of the WIC 50W Tx reference board operation
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Note:

By default, the REF_WLC_TX50W_N1 reference board is loaded with firmware that supports USB PD-based power input. However, the reference board can be used for wireless power transfer with high power protocol (50 W) using a DC supply, requiring a different firmware. See Appendix A to understand the procedure for Wireless power transfer by using High power protocol (50 W) mode with a DC input power supply.



4.2 Firmware download, configuration (static/dynamic), and monitoring/debugging

WLC1150 IC is a programmable controller, which supports downloading the updated/modified configuration data and downloading the firmware. It also supports monitoring the firmware parameters and dynamic tuning of the firmware parameters. The WLC1150 controller supports these features through CC and/or I2C interfaces based on the input power type supported in the current firmware, which is stored in the flash. See **Table 6** to understand the communication interface (CC/I2C) to use based on the current firmware type.

Table 6 Communication interface (CC/I2C) to use for firmware download and configuration

Scenario #	Input power type supported by the current firmware stored in flash	Communication interface for downloading firmware/ configuration data	Communication interface for monitoring firmware parameters and dynamically configuring them
1	USB PD	CC /I2C	12C
2	DC		12C

4.2.1 USB CC communication-based set-up

Figure 10 describes the set-up to download configuration data or firmware over the USB CC interface of the WLC1150 controller.



Figure 10 USB CC communication-based setup

Execute the following procedure to create the setup:

- 1. Ensure that a jumper shunt is placed at positions 1 and 2 of the power mode selection jumper (J4) of the Tx reference board.
- 2. Connect the HPI dongle to the Tx reference board using the USB Type-C cable.
- 3. Connect the HPI dongle to the PC using a USB micro-B cable.
- 4. The Power LED (LED1) on the HPI dongle glows blue, and the status LED (LED1) on the WLC1150 reference board blinks in blue and red five times.
- 5. Open the Wireless Charging Configuration Utility from the Start menu in Windows.
- 6. Confirm that the reference board is selected under the **Device Selection** tab, as shown in **Figure 11**.



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	Device family:	WLC1		
	Application type:	High Power Transmitter		
	Running mode:	Firmware		
	Bootloader base version:	1.0.1.221		
	Bootloader app version:	0.0		
	Firmware base version:	1.0.0.290		
	Firmware app version:	0.0		
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/LC1150-68L0XQ3WLC1\$7768\$Firmware\$100100dd00007768\$1000012200007768\$\$Yes\$1\$3 et firmware version completed.				

Figure 11 Selecting WLC1150 device in Wireless Charging Configuration Utility

7. Go to **Tools** > **Firmware Update** or select the Firmware Update option from the Home panel. Specify the path for the firmware as shown in **Figure 12** and click **Program**.

Firmware path: Diptyaji\mtw276\WLC1_HiPP_Power_Transmitter\build\APP_WLC1150-68LQXQ\Release\binaries\mtb-ex	example-wic1-ptx-hipp c	1
	and the sure i burnish	cyacd4

Figure 12 Selecting firmware for download



Reference board operation

8. Wait for the firmware download to complete, as shown in **Figure 13**. This operation may take around one minute.

Devices WLC-UFP-1	Part number.	WLC1150-68LQXQ
	Device family:	WLC1
	Application type:	High Power Transmitter
	Running mode:	Firmware
	Bootloader base ver Wirel	ess Charging Configuration Utility X
	Bootloader app vers	h updated successfully
	Firmware base version:	1.0.290
	Firmware app version:	0.0
	Programmable:	Yes
elp Message		Clear Save loo
astarting the target device		

Figure 13 Downloading firmware to WLC1150 controller

9. Dismantle the hardware connection between HPI Dongle, PC, and Tx reference board.



4.2.2 I2C communication-based setup

Figure 14 describes the setup to download firmware/configuration or monitor firmware parameters or dynamically tune the firmware parameters over the I2C interface of the WLC1150 controller.



Figure 14 I2C communication-based setup

Execute the following procedure to create the setup:

- 1. Establish an I2C connection between the WLC1150 reference board and the HPI dongle by connecting the three jumper wires.
 - a) Connect a jumper wire between the SCL pin of the HPI dongle (pin no. 5 of the J2 header) and the HPI_I2C_SCL pin of the WLC1150 reference board (pin no. 4 of the J2 header).
 - b) Connect a jumper wire between the SDA pin of the HPI dongle (pin no. 6 of the J2 header) and the HPI_I2C_SDA pin of the WLC1150 reference board (pin no. 5 of the J2 header).
 - c) Connect a jumper wire between the GND pin of the HPI dongle (pin no. 3 of the J2 header) and the GND pin of the WLC1150 reference board (pin no. 2 of the J2 header).
- 2. Ensure that a jumper shunt is placed at positions 1 and 2 of the power mode selection jumper (J4) of the Tx reference board
- 3. Connect the HPI dongle to the PC using a USB micro-B cable.
- 4. The Power LED (LED1) on the HPI dongle glows blue.
- 5. Connect the 65 W USB Type-C power adapter to the Tx reference board using the USB Type-C cable. The status LED (LED1) on the WLC1150 reference board blinks in blue and red five times.
- 6. Now the setup is ready for use by the Wireless Charging Configuration Utility.
- 7. See the Wireless Charging Utility user guide to understand the procedure to monitor firmware parameters, dynamically tune the firmware parameters, and download firmware/configuration data/monitor and dubbing. The utility user guide can be accessed from the Help menu of the utility.
- 8. Dismantle the hardware connection between the HPI dongle, PC, and Tx reference board.



4.3 Capturing debug logs on the WLC reference board

This section explains the procedure to capture the debug logs sent on the serial port of the REF_WLC_TX50W_N1 reference board at various stages of the operation. This feature helps to understand the internal operation of the firmware in addition to the status LED indication available on the board.

To capture the debug log, follow these steps:

1. Install data logging software on the PC.

a) Download a data logging tool, such as Tera Term, and install it on the PC.

- 2. Enable the debug log in the firmware.
 - a) Download the Wireless Charging Utility package from the REF_WLC_TX50W_N1 release package and install it on the PC.
 - b) Create the USB CC communication-based (**Figure 10**) or I2C communication-based (**Figure 14**) hardware set-up to configure the firmware using Wireless Charging Configuration Utility.
 - c) Open the Wireless Charging Configuration Utility from the Start menu in Windows.
 - d) Confirm that the reference board is selected under the **Device Selection** tab, as shown in **Figure 15**.

Figure 15 Selective device in Wireless Charging Configuration Utility

- e) Click **Tools** > **Read from Device** or select the **Read from Device** option from the Home panel. This enables the user to read the configuration from the device.
- f) The debug log can be enabled by configuring the following parameters in the transmitter Profile page in the Wireless Charging Configuration Utility, see **Figure 16**.
 - Enable Critical log enable
 - Enable Message log enable
 - Set **Debug log** to **Level 1**





Figure 16 Profile page settings for enabling debug log

- g) Select the device in the **Device Selection** tab and select **Tools** > **Configure Device** or click on the **Configure device** icon present in the Home panel. Save the updated configuration to a file.
- h) In the **Configure Device** dialog box, specify the path of the updated configuration file and click **Program**, as shown in **Figure 17**.

	Wireless Charoing Configuration Litility	×]
File	e Tools Help	H A	
F			
Dev	vice Selection WLC1:Wireless Charging Transmitt	er	
C	Add a node Remove	This is the root node encapsulating all the configuration settings for WLCx controller	
	VILCs Configuration Orderse Charger Standard Orderse Charger Configuration Orderse Charger Configuration Orderse Configuration Parket Orderse Configuration Optical ping Optical	X Degran (or fry test konfiguration of solif) - Program Cancel	
Hel	p Message		
Th	is the root node encapsulating all the configuration	settings for WLCx controller	
Devi	ices connected: 1	WLC1: Wireless Charging Transmitter	

Figure 17 Device configuration dialog

i) Wait until the updated configuration file gets downloaded, as shown in Figure 18.



Reference board operation

WLC-I2C-1	Partnumber	WI C1150.591 OVO
	Partioniber.	WECTSUPOLEAU
	Device family:	WLC1
	Application type:	High Power Transmitter
	Running mode:	Firmware
	Bootloader base ver Wi	reless Charging Configuration Utility X
	Bootloader app vers	ash updated successfully
	Firmware base version:	1.0.0.276
	Firmware app version:	00
	Programmable:	Yes
] I	

Figure 18 Successful download of configuration file

- j) Dismantle the hardware setup.
- 3. Debug log capture setup.
 - a) Do the following connections using jumper wires to establish a serial connection between the REF WLC TX50W N1 board and the HPI dongle:
 - Connect a jumper wire between the UART_Tx pin of J5 of the REF_WLC_TX50W_N1 board and the Rx pin of the J2 header on the HPI dongle board.
 - Connect a jumper wire between the GND pin of J5 of the REF_WLC_TX50W_N1 board and the GND pin of the J2 header on the HPI dongle board.

b) Connect REF_WLC_TX50W_N1, HPI dongle, and PC as shown in Figure 19.



Reference board operation



Figure 19 Setup for capturing debug log

4. Capture debug logs.

a) Open the Tera Term on the Windows PC and select the virtual serial port listed on the Tera Term tool.

b) Set the baud rate to 1000000. Set the remaining settings as default, as shown in Figure 20.

Figure 20 Tera Term settings

c) Supply power to the REF_WLC_TX50W_N1 board using the USB-C power adapter and recreate the usage condition during which the debug logs need to be captured. Displays the log data on the Tera Term as shown in Figure 21.



Tera Term - [disconnected] VT	×
File Edit Setup Control Window Help	
NTC TEHP = 29 °C	^
DIE TEHP = 35 °C	
ASK = PASS	
RP8	
PRX = 820nH PTX = 1889nH URBC 1 = 170nH calling FD Logic PLOSS_THRES = 325nH	
F0_DETECTED = 1	
PLOSS = 547лн нН, PTx = 1489 нН, PTx_calib = 942 нН, PRx = 820 нН, Threshold = 463 нН, calcPurLoss = 547bppOffset = 138	
ASK = PASS	
CEP = 23	
ASK = PASS	
CEP = 1	
ROK = PRSS	
CEP = 1	
ASX = PRSS	~

Figure 21 Debug log output

- d) Save the log into a file from Tera Term.
- e) Contact Infineon technical support with the captured log files if additional support is required.
- Note: If the temperature around the NTC goes below 25°C, it is not required to monitor as the transmitter is working in a safe operating region. Therefore, the debug log shows the value of NTC TEMP as 25°C until the temperature around the NTC does not exceed 25°C.
- 5. Disable debug log in the firmware.

Revert these changes in firmware to default on completion of the process. The debug log consumes the processor resource, and it is recommended to disable the debug log for optimal performance of the WLC power transmitter.



Appendix A: Wireless power transfer by using high power protocol (50W) mode with DC input power supply

5

Appendix A: Wireless power transfer by using high power protocol (50W) mode with DC input power supply

This section explains the procedure to enable DC input power-based wireless charging operation for high power protocol (50W) mode.

Do the following procedure to update the reference board and download the firmware which supports DC input power-based operation, and exercise the wireless charging operation for high power protocol (50W) mode:

- 1. Identify the firmware intended for the DC power supply from the README file in the REF_WLC_TX50W_N1 release package.
- 2. Download the firmware using the procedure mentioned in section **4.2**.
- 3. Install the jumper shunt at positions 2 and 3 of the power mode selection jumper (J4) of the Tx reference board.
- 4. Connect the DC supply to the DC input connector (J1) of the Tx reference board. Ensure that the DC input is connected according to the polarity marked on the Tx reference board.
- 5. Confirm that the status LED (LED1) blinks five times in blue and red. Now the board is ready for use.
- 6. Repeat Steps 4 to 7 of section **4.1.1** to exercise 50 W power transfer capability.
- 7. Disconnect the DC supply once the high-power transfer operation is complete.



Appendix B: Procedure to do calibration for power loss FOD

6 Appendix B: Procedure to do calibration for power loss FOD

This section explains the calibration procedure for power loss FOD.

1. Connect the device over the I2C interface and power up the device using the Type C power adapter. Place the jumper for the J4 connector between Pin1 and Pin2 (see Figure 22).



Figure 22 I2C interface connection set up

2. Open the Wireless Charging Configuration utility and select the device (WLC-I2C-1) from the device selection tab (see **Figure 23**).

WLC-I2C-1	Part number:	WLC1150-68LQXQ
	Device family:	WLC1
	Application type:	High Power Transmitter
	Running mode:	Firmware
	Bootloader base version:	1.0.1.221
	Bootloader app version:	0.0
	Firmware base version:	1.0.0.290
	Firmware app version:	0.0
	Programmable:	Yes
Message		

Figure 23 Invoking Wireless Charing Configuration utility



Appendix B: Procedure to do calibration for power loss FOD

3 Go to **Tools** > **Option**, and check the box for "Enable advanced configuration parameters" and click **Save** (see **Figure 24)**.

WLC-I2C-1	Part number: WLC1150-68LQXQ
	Devise family
	Enable verbose device logs: Allow multiple PDOs of the same voltage: Soft PDOs: Enable advanced configuration parameters: UFP restat finaeting (sec): HPI slave address (0x): Default flashing VID (0x): Default flashing mode index: 1
	Programmable: Yes
	a) Click on Sava

Figure 24 Enabling advanced configuration parameters

4 Click on the "Read from device" icon, select FOD Power Loss, and disable the power loss FOD by selecting **Disable** under the drop-down menu (refer to **Figure 25**).

Wireless Charging Configuration Utility	a) Select "Read"	from device" icon	-	٥	×
	a) Select Read				
Elevice Selection Silb: 31610000					V
	Provention	Value			_
Add a node Remove	Enable power loss FOD	Disable			
Optial Ping Ask Demod PID Buck PiD Buck PiD Buck PiD Buck PiD Discorriguration PiD Q Factor FOD Resonant Frequency Discorriguration PoD Configuration PoD Configuration Pot Information PoD Sink PD0 Sink PD Sink P	b) Select "FOD Power Los	c) Select "Disable"			
Help Message					
This node shows the power loss FOD configuration	parameters of Qi FOD configuration table				
2020-09-28 restricted Devices connected: 1	Copyright (6)	Infineon Technologies AG 2020. All rights reserved.	WLC1: High Pow	2 ver Transr	nitter

Figure 25 Disabling power loss FOD

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Appendix B: Procedure to do calibration for power loss FOD

5. Go to Tools and select "Configure Device" (refer to Figure 26).

Tool	Is Help		
	Configure Device Ctrl+Shift+W		
	Read from Device		
ē	System Loss Calibration	ters Value	
	Monitor and Debug	bower loss FOD Disable	
คมค	Dynamic Parameter Tuning		
•0	Options		
PD	Operation Analog Prig Digital Prig Digital Prig Digital Prig Ask Demod PID Buck Regulation Configuration Inverter Bridge Configuration Inverter Bridge Configuration FOD O Factor FOD Resonant Frequency FOD re		
Me	ssage		
node sh	hows the power loss FOD configuration parameters of Qi FOI	onfiguration table	

Figure 26 Selecting configure device

A pop-up window will appear prompting you to save the configuration. Select "Yes" and save the file with an appropriate name, such as "FOD Disable" (refer to Figure 27).

Add a node Remove	Parameters	Value	
Packet Timeout EPT Counters Collocation Operation O	Fruible power loss FOD Wireless Charging Confi	Disable	
- Investe Budge Configuration - FOD Q Factor - FOD Q Factor - FOD Resonant Frequency - Vin Configuration - Four Resonant Frequency - Vin Configuration - Pot Information - Pot Information - Pot Information - Sink PDO	Do you want	Tes No	
- Sink PDO 0			

Figure 27 Disabling the FOD



Appendix B: Procedure to do calibration for power loss FOD

7. After saving the configuration file, the "Configure device" dialog box pops up. Click on "Program". After the program completion, the message "Flash updated successfully" is displayed.

Add a node Remove Add a node Remove WLCx Configuration - Device Parameters Wucless Charger Configuration - Profile - Mode - Packet Timeout _ EPT Courters - Colls - Colls - Colls - Colls - Colls - Analog Prog - Digital Prog - Digital Prog - Digital Prog - Digital Prog - SK Demod - PID Buck - Regulation Configuration - FOD @ Factor - FOD @ Factor - FOD @ Factor - FOD Power Loss - Vin Configuration - Four Present Prequency - Four Present Present Present - Fault Protection Configuration - Four Present - Fault Protection Configuration - Four Present - Fault Protection Configuration - Fault Protection	This is the root node encapsulating all the configuration Configure Device Configuration file:	on settings for WLCx controller njvntb example wile Tyte http://iobD.aobied.cy.acd/ Program Ca	X B	
lelp Message				
				Clear Save I
lead device configuration succeeded				

Figure 28 Saving the configuration setting

8. Place the receiver on the transmitter coil interface at a well-aligned position. Do not move the receiver during the entire calibration process. Connect the electronic load (minimum of 24V and 3A rated) to the receiver load connector terminal. Ensure that the receiver board has powered-up which is indicated by the status LED that glows blue (refer to **Figure 29**).



Figure 29 Set up for power loss calibration



Appendix B: Procedure to do calibration for power loss FOD

9. Go to the "System Loss Calibration" tab and select the "High power proprietary protocol calibration" from the "Test power receiver type" drop-down menu (refer to **Figure 30**).

		остебениет туре а	s nigi	power proprietary protoct		
RPP Calibration						~
EPP 5W Calibration	1					
EPP 15W Calibration High power proprietary protocol cal	ibration					
					Clear Data Start Calibrat	tion
Transmitter pow	ver (mW)	Reported power (mW)	^	FOD coefficient & BPP		14
				FOD coefficient B BPP		-11
				FOD coefficient C BPP		
					Calculate coefficients	
				FOD coefficient A 5W EPP		-
				FOD coefficient C 5W EPP		-11
						-
				FOD coefficient A 15W EPP		
				FOD coefficient B 15W EPP		
				FOD coefficient C 15W EPP		
			~		Calculate coefficients	
	3PP Calibration EPP SW Calibration EPP 15W Calibration Transmitter power proposed by protocol col Transmitter power EXPLOSING Colored by the second s	PP Calbration PP SW Calbration PP SW Calbration Transmitter power (mW)	PP Calbration PP SW Calbration PP SW Calbration PP SW Calbration Transmitter power (mW)	PP Calibration PP SW Calibration PP SW Calibration PP SW Calibration Transmitter power (mW)	BPP Calibration PP SW Calibration PP SW Calibration PP SW Calibration Transmitter power (mW) Reported power (mW) FOD coefficient A BPP FOD coefficient & BPP FOD coefficient & BPP FOD coefficient & SW EPP FOD coefficient C SW EPP FOD coefficient C SW EPP	BPP Calbration PP SW Calbration PP SW Calbration PP SW Calbration Transmitter power (mW) Point Calculate coefficient A BPP PO Coefficient A BPP Point Calculate coefficients PO coefficient A SW EPP Point Calculate coefficients Point Calculate coefficients Po

Figure 30 Selecting power loss calibration

10. Select load (%) from the drop-down menu list (2% to 102%) under "Select load". Load the receiver by electronic load with the same % of load of 50W (that is, 2% of 50W is equal to 1W). After 10sec, when the load stabilizes, click on "Start Calibration" on the top right corner.

A power loss calibration table publishes the transmitter power and receiver power after calibration against each load. Therefore, ensure that the same is published before moving to the next load (%) (see **Figure 31**).

7 🗈 🔛 🕸 🖬 🕛 🕻	2 🖾 11 🤣			
Device Selection System Loss	Calibration			
		Coloct lood %	from the drop down list	X
Test power receiver type: Hig	h power proprietary protocol calibration	Select load %	from the drop down list	~
Salast land: 27				
Select load:		-		
				Clear Data Start Calibration
Load percentage @ power	Transmitter power (mW)	Reported power (mW)		
2%	3812	3164	FOD coefficient A BPP	
5%		•	FOD coefficient C BPP	
10%				Calculate coefficients
15%				Calculate Overholentis
	ansmitter power and	Reported power by R	FOD coefficient A 5W EPP	
20%			FOD coefficient B 5W EPP	
20%			FOD coefficient C SW EPP	
30%				
35%			FOD coefficient A 15W EPP	
40%			FOD coefficient B 15W EPP	
45%			FOD coefficient C 15W EPP	
50%			v	Calculate coefficients 🗸
Help Message				
ich				Clear Save log
	2 interface			

Figure 31 Starting the power loss calibration



Appendix B: Procedure to do calibration for power loss FOD

11. Repeat step 10 till 102% of the load is reached (refer to Figure 32).

Nevice Selection System	Loss Calibration			and the second second list.		
Test power receiver type:	High power proprietary protocol calibration	Select 102% I	oad fro	om the drop down list		
Select load:	102%					~
						Clear Data Start Calibration
Load percentage @ powe	er Transmitter power (mW)	Reported power (mW)	^	FOD coefficient B 5W EPP		'
2%	3812	3164		FOD coefficient C 5W EPP		
5%	5565	4571				Calmilate melliciente
10%	7810	7946				Calculate coerricients
15%	8316	7946		FOD coefficient A 15W EPP		
20%	12119	12265		FOD coefficient B 15W EPP		
25%	14537	15142		FOD coefficient C 15W EPP		
30%	17009	17875				Calculate coefficients
35%	19674	20646		High power organization protocol FOD coefficient A	0.000001042	
40%	22013	23374		High power proprietary protocol FOD coefficient B	0.859793269	
45%	24721	26087		High power proprietary protocol FOD coefficient C	1323.589096825	
50%	27206	28808				Calculate coefficients
Lite Message						
teip message						Class Stualo
and and a standard st	un I20 interface					Clear Save Io

Figure 32 Specifying power loss calibration values

12. Click on "Calculate coefficients" tab. Coefficient A, B, and C are published in the screen. Copy the same in your local file in a notepad (refer to **Figure 33**).

	r						_
Test power receiver type:	High power proprietary protocol calibration						
Select load:	102%						~
				[Clear Data	Start Calibration	n
Load percentage @ pow	er Transmitter power (mW)	Reported power (mW)	FOD coefficient A 5W EPP				1
*Untitled - Notepad	l .	- 🗆 X	FOD coefficient B 5W EPP				
File Edit Format View	v Help		TOD COBINCIENCE OW EFF				1112
High power propr	internet and the second s						
the second second	letary protocol FOD coefficient A	0.000001042			Calcula		
High power propr High power propr	rietary protocol FOD coefficient A rietary protocol FOD coefficient B rietary protocol FOD coefficient C	0.00001042 0.859793269 1323.589096825	FOD coefficient A 15W EPP		Calcula	te coefficients	1
High power propr High power propr	ietary protocol FOD coefficient A vietary protocol FOD coefficient B vietary protocol FOD coefficient C	0.00001042 0.859793269 1323.589096825	FOD coefficient A 15W EPP FOD coefficient B 15W EPP		Calcula	te coefficients	
High power propr High power propr	ietary protocol FOD coefficient A ietary protocol FOD coefficient B ietary protocol FOD coefficient C	0.00001042 0.859793269 1323.589096825	FOD coefficient A 15W EPP FOD coefficient B 15W EPP FOD coefficient C 15W EPP		Calcula	te coefficients	-
High power propr High power propr	ietary protocol FOD coefficient A ietary protocol FOD coefficient B ietary protocol FOD coefficient C	0.000001042 0.859793269 1323.589096825	FOD coefficient A 15W EPP FOD coefficient B 15W EPP FOD coefficient C 15W EPP	D coefficier	Calcula nt table	te coefficients	
High power propr High power propr	ietary protocol FOD coefficient A ietary protocol FOD coefficient B ietary protocol FOD coefficient C	0.000001042 0.859793269 1323.589096825	FOD coefficient A 15W EPP FOD coefficient B 15W EPP FOD coefficient C 15W EPP FOD coefficient C 15W EPP	DD coefficier	Calcula nt table	te coefficients te coefficients	
High power propr High power propr	ietary protocol FOD coefficient A ietary protocol FOD coefficient B ietary protocol FOD coefficient C	0.000001042 0.859793269 1323.589096825	FOD coefficient A 15W EPP FOD coefficient B 15W EPP FOD coefficient C 15W EPP FOD coefficient C 15W EPP FOD High power proprietary protocol FOD coefficient A High power proprietary protocol FOD coefficient R	DD coefficier 0.00001042 0.655753255	Calcula	te coefficients le coefficients	
High power propr High power propr	ietary protocol FOD coefficient A ietary protocol FOD coefficient B ietary protocol FOD coefficient C	0.000001042 0.859793269 1323.589096825	FOD coefficient A 15W EPP FOD coefficient B 15W EPP FOD coefficient C 15W EPP FOD coefficient C 15W EPP FOD coefficient C 15W EPP High power proprietary protocol FOD coefficient A High power proprietary protocol FOD coefficient A	DD coefficier 0.000001042 0.859793259 1323.589096825	Cakula	te coefficients e coefficients	
High power propr High power propr	the FOD coefficients A, B a	0.00001042 0.859793269 1323.589096825	FOD coefficient A 15W EPP FOD coefficient B 15W EPP FOD coefficient C 15W EPP FOD coefficient C 15W EPP FOD coefficient C High power proprietary protocol FOD coefficient B High power proprietary protocol FOD coefficient C	D coefficier 0 000001042 0 659793269 1323 589096825	Calcula nt table Calcula	te coefficients le coefficients te coefficients	

Figure 33 Calculating power loss co-efficient values



Appendix B: Procedure to do calibration for power loss FOD

13. Close the System loss calibration window and click on the "Read from device" icon, select "FOD Power Loss", and enable the FOD (refer to **Figure 34**).

Enable power loss FOD	Disable Disable Enable	
	Disable Enable	
	Enable	
	(c) Select "Enable"	
b) Click on "EOD Power Loss"		
D) Olick OIT TOD TOWCI LO33		
~		
	b) Click on "FOD Power Loss"	b) Click on "FOD Power Loss"

Figure 34 Selecting FOD power loss calibration

14 Change the FOD coefficients a	- h	and chuith	now calibrated	coofficiante	(roforto	Figure 2E
14. Change the FUD coefficients a	. D	. and c with	i new cambrared	coenicients	referito	Figure 331
	,~	,				

Add a node Remove	Parameters	Value		
Add a hode The Remove	EPP 5W loss characterisation coefficient c	-159.2609		
	 EPP 5W power loss FOD threshold (mW) 	325		
	EPP 5W power loss FOD threshold no retries and power latch (mW)	1000		
- Qi Main Configuration	EPP 5W FOD retry count	3		
- Profile	EPP 5W power delivery retry count before stopping power delivery	1		
Mode Packet Timerut	EPP loss characterisation coefficient a	0.00000318361		
- EPT Counters	EPP loss characterisation coefficient b	0.9422878		
⊖- Cols	EPP loss characterisation coefficient c	245.7924		
Gi Coll Configuration 0	EPP power loss FOD threshold (mW)	750		
- Operation	EPP power loss FOD threshold no retries and power latch (mW)	1500		
- Digital Ping	EPP FOD retry count	3		
ASK Demod	EPP power delivery retry count before stopping power delivery	1		
PID	PPDE power loss FOD threshold (mW)	750		
- Regulation Configuration	PPDE power loss FOD threshold no retries and power latch (mW)	1500		
 Inverter Bridge Configuration 	High power proprietary protocol loss characterisation coefficient a	0.000000165817		
Gi FOD Configuration	High power proprietary protocol loss characterisation coefficient b	0.9120731		
- FOD Q Factor	High power proprietary protocol loss characterisation coefficient c	1321,419		
FOD Power Loss	High power proprietary protocol power loss FOD threshold (mW)	750		
Vin Configuration	High power proprietary protocol power loss FOD threshold no retries and power latch (mW)	2000		
— Fault Protection Configuration	 High power proprietary protocol FOD retry count 	3		

Figure 35Specifying new power loss calibration coefficients



Appendix B: Procedure to do calibration for power loss FOD

15. Go to the "File" tab and select the "Save to firmware file" option (refer to **Figure 36**).

This allows the user to save the file in either ".CYACD2" or ".hex"* extension format. Select the ".CYACD2" extension and save the file.

Note: The I2C-based connection does not support the ".hex" extension file. If you save the file in the .hex format, it can be programmed by using MiniProg4.

Die		1			
F.	New Ctrl+N				
Ľ	Open Ctrl+O				
	Save As Ctrl+S				
匮	Read from Firmware File Ctrl+Shift+O	\vdash			
님	Save to Firmware File Ctrl+Shift+S		Parameters	Value	^
	F-3 Ab-F4		EPP 5W loss characterisation coefficient b	1.008133	
C	EXIT AIT+F4	1 📋	EPP 5W loss characterisation coefficient c	-159.2609	_
	- Wireless Charger Configuration		EPP 5W power loss FOD threshold (mW)	325	
	Gi Main Configuration		EPP 5W power loss FOD threshold no retries and power latch (mW)	1000	_
L	- Profile		EPP 5W FOD retry count	3	
	- Packet Timeout		EPP 5W power delivery retry count before stopping power delivery	1	
	- EPT Counters		EPP loss characterisation coefficient a	0.00000318361	
	⊡-Cols		EPP loss characterisation coefficient b	0.9422878	
	- Qi Coll Configuration 0 - Operation - Analog Ping		EPP loss characterisation coefficient c	245.7924	
			EPP power loss FOD threshold (mW)	750	
	- Digital Ping		EPP power loss FOD threshold no retries and power latch (mW)	1500	
	- ASK Demod		EPP FOD retry count	3	
	- PID		EPP power delivery retry count before stopping power delivery	1	
	Buck		PPDE power loss FOD threshold (mW)	750	
	 Inverter Bridge Configuration 		PPDE power loss FOD threshold no retries and power latch (mW)	1500	
	- Qi FOD Configuration		High power proprietary protocol loss characterisation coefficient a	0.000001042	
	- FOD Q Factor		High power proprietary protocol loss characterisation coefficient b	0.859793269	
	- FOD Resonant Frequency		High power proprietary protocol loss characterisation coefficient c	1323 589096825	
	- Vin Configuration		High power proprietary protocol power loss FOD threshold (mW)	950	
	Fault Protection Configuration	~	High power proprietary protocol power loss FOD threshold no retries and power latch (mW)	2000	~
Help	Message em power loss curve coefficient for High power prop	rietary p	otocol. Enter value in the range [-5000 - 5000]		

Figure 36 Saving the firmware with new calibration coefficients

16. Click on the "Firmware update" icon and program the updated file (.CYACD2) (refer to **Figure 37**). Wait for the "Flash uploaded successfully" pop-up window.



Figure 37 Programming the firmware with updated calibration coefficients

This completes the calibration procedure for power loss FOD on the REF_WLC_TX50W_N1 board.

References



References

[1] Evaluation board REF_WLC_TX50W_N1



Revision history

Revision history

Document revision	Date	Description of changes
**	2022-09-26	New user guide.
*A	2022-09-30	Added Qi specification for the distance between the coil top surface to interface surface in section 3.1
*В	2023-02-06	Revised to Rev 4.
*C	2023-04-19	Added power loss calibration procedure in Appendix B.

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