UG533: EFR32xG24 Explorer Kit User's Guide

The EFR32xG24 Explorer Kit is an ultra-low-cost, small form factor development and evaluation platform for the EFR32MG24 Wireless Gecko System-on-Chip.

The EFR32xG24 Explorer Kit is focused on rapid prototyping and concept creation of IoT applications. It is designed around the EFR32MG24 SoC, which is an ideal device family for developing energy-friendly connected IoT applications.

The kit features a USB interface, an on-board SEGGER J-Link debugger, one user-LED and button, and support for hardware add-on boards via a mikroBus socket and a Qwiic connector. The hardware add-on support allows developers to create and prototype applications using a virtually endless combination of off-the-shelf boards from mikroE, sparkfun, AdaFruit, and Seeed Studios.

TARGET DEVICE

- EFR32MG24 Wireless Gecko System-on-Chip (EFR32MG24B210F1536IM48)
- High-performance 2.4 GHz radio
- 32-bit ARM® Cortex®-M33 with 78 MHz maximum operating frequency
- 1536 kB flash and 256 kB RAM

KIT FEATURES

- User LEDs and push buttons
- 20-pin 2.54 mm breakout pads
- mikroBUS™ socket
- Qwiic® connector
- SEGGER J-Link on-board debugger
- Virtual COM port
- Packet Trace Interface (PTI)
- USB-powered

SOFTWARE SUPPORT

- Simplicity Studio

ORDERING INFORMATION

- xG24-EK2703A

Table of Contents

1. Introduction

The EFR32xG24 Explorer Kit has been designed to inspire customers to make IoT devices with the Silicon Labs EFR32MG24 Wireless Gecko System-on-Chip. The kit includes a mikroBUS™ socket and Qwiic® connector, allowing users to add features to the kit with a large selection of off-the-shelf boards.

Programming the EFR32xG24 Explorer Kit is easy with a USB Type-C cable and the on-board J-Link debugger. A USB virtual COM port provides a serial connection to the target application, and the Packet Trace Interface (PTI) offers invaluable debug information about transmitted and received packets in wireless links. The EFR32xG24 Explorer Kit is supported in Simplicity Studio and a Board Support Package (BSP) is provided to give application developers a flying start.

Connecting external hardware to the EFR32xG24 Explorer Kit can be done using the 20 breakout pads, which present peripherals from the EFR32MG24 Wireless Gecko such as I^2C, SPI, UART, and GPIOs. The mikroBUS socket allows inserting mikroBUS add-on boards which interface with the EFR32MG24 through SPI, UART, or I^2C. The Qwiic connector can be used to connect hardware from the Qwiic Connect System through I^2C.

1.1 Kit Contents

The following items are included in the box:

- 1x xG24 Explorer Kit board (BRD2703A)

1.2 Getting Started

Detailed instructions for how to get started with your new EFR32xG24 Explorer Kit can be found on the Silicon Labs web page:

https://www.silabs.com/dev-tools

1.3 Hardware Content

The following key hardware elements are included on the EFR32xG24 Explorer Kit:

- EFR32MG24 Wireless Gecko SoC with 78 MHz operating frequency, 1536 kB kB flash, and 256 kB RAM
- 2.4 GHz matching network and ceramic antenna for wireless transmission
- Two LEDs and two push buttons
- On-board SEGGER J-Link debugger for easy programming and debugging, which includes a USB virtual COM port and Packet Trace Interface (PTI)
- MikroBUS socket for connecting MIKROE Click boards™ and other mikroBUS add-on boards
- Qwiic connector for connecting Qwiic Connect System hardware
- Breakout pads for GPIO access and connection to external hardware
- Reset button

1.4 Kit Hardware Layout

EFR32xG24 Explorer Kit layout is shown below.

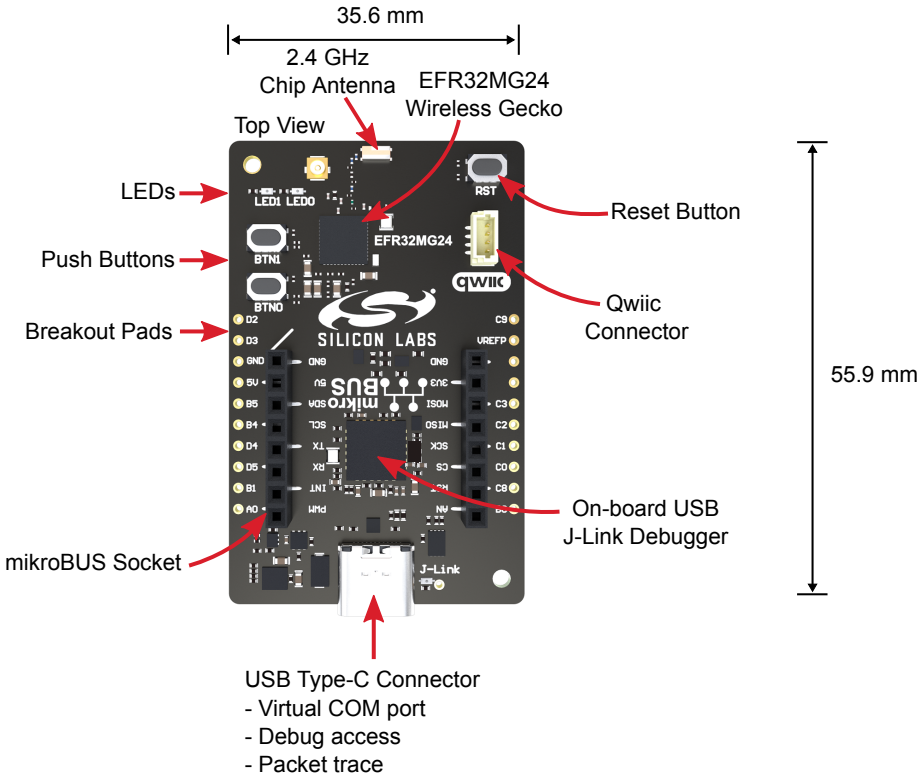

Figure 1.1. EFR32xG24 Explorer Kit Hardware Layout

2. Specifications

2.1 Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
USB Supply Input Voltage	V_{USB}	–	+5.0	–	V
Supply Input Voltage (VMCU supplied externally)	V_{VMCU}		+3.3		V
Operating Temperature	T_{OP}	–	+20	–	˚C

2.2 Current Consumption

The operating current of the board greatly depends on the application and the amount of external hardware connected. The table below attempts to give some indication of typical current consumptions for the EFR32MG24 and the on-board debugger. Note that the numbers are taken from the data sheets for the devices. For a full overview of the conditions that apply for a specific number from a data sheet, the reader is encouraged to read the specific data sheet.

Table 2.1. Current Consumption

Parameter	Symbol	Condition	Typ	Unit
EFR32MG24 Current Consumption[1]	I_{BG22}	MCU current consumption in EM0 mode with all peripherals disabled (module supply voltage = 3.0 V, VSCALE2, 39 MHz crystal, CPU running Prime from flash at 25 °C)	33.3	µA/MHz
		Radio system current consumption in receive mode, active packet reception (VDD = 3.0 V, MCU in EM1 and all MCU peripherals disabled, HCLK = 39 MHz, 1Mbit/s, 2GFSK, f = 2.4 GHz at 25 °C)	7.1	mA
		Radio system current consumption in transmit mode (VDD = 3.0 V, MCU in EM1 and all MCU peripherals disabled, HCLK = 39 MHz, f = 2.4 GHz, CW, 10 dBm output power at 25 °C)	28.2	mA
On-board Debugger Sleep Current Consumption [2]	I_{DBG}	On-board debugger current consumption when USB cable is not inserted (EFM32GG12 EM4S mode current consumption)	80	nA

1 From EFR32MG24 data sheet
2 From EFM32GG12 data sheet

3. Hardware

The core of the EFR32xG24 Explorer Kit is the EFR32MG24 Wireless Gecko System-on-Chip. Refer to section 1.4 Kit Hardware Layout for placement and layout of the hardware components.

3.1 Block Diagram

An overview of the EFR32xG24 Explorer Kit is illustrated in the figure below.

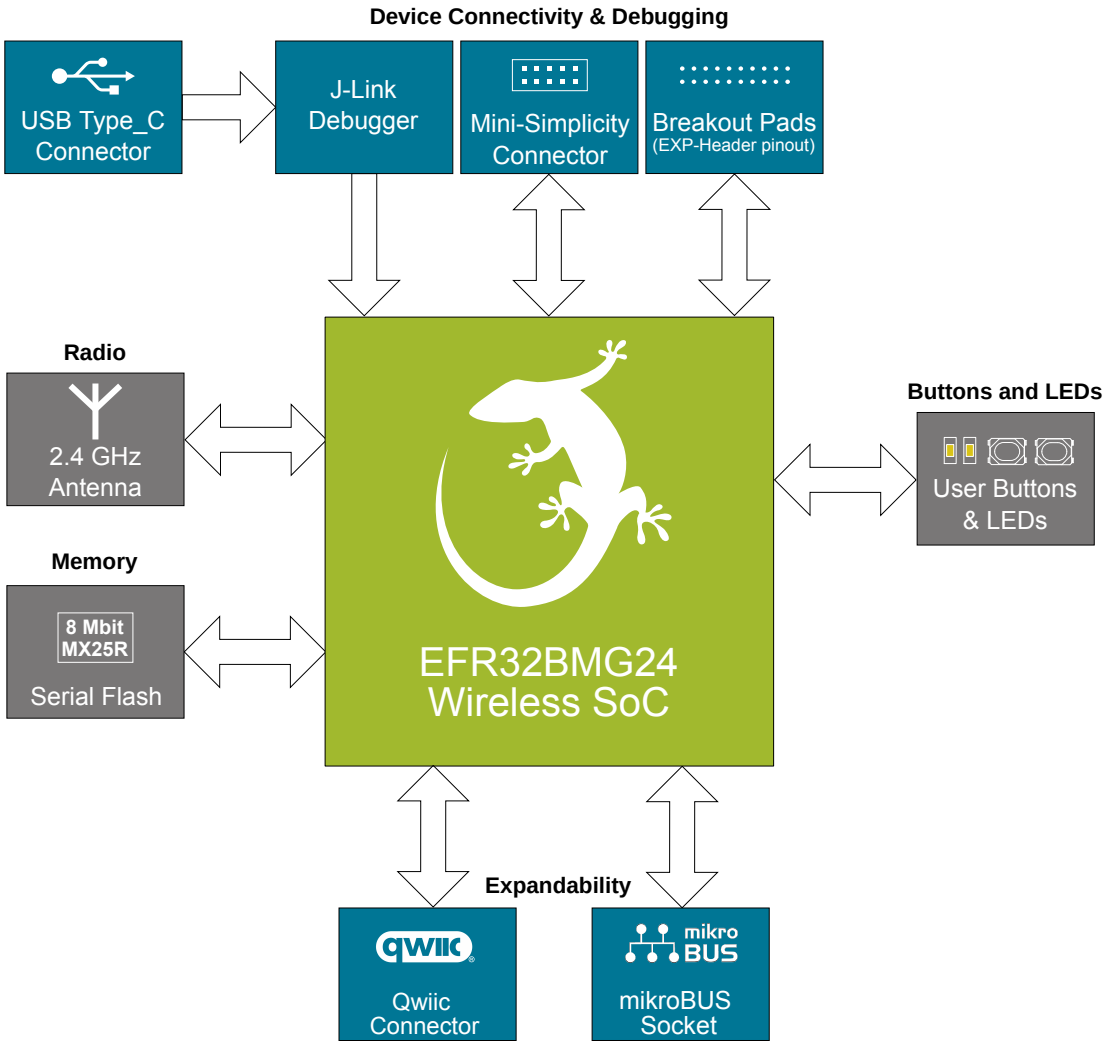

Figure 3.1. Kit Block Diagram

3.2 Power Supply

The kit is powered by the debug USB cable as illustrated in the figure below.

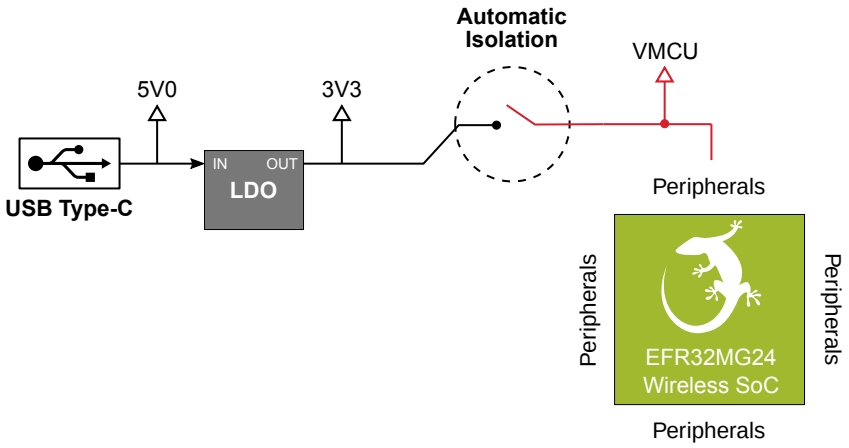

Figure 3.2. EFR32xG24 Explorer Kit Power Topology

The 5 V power net on the USB bus is regulated down to 3.3 V using a low-dropout regulator (LDO). An automatic isolation circuit isolates the LDO when the USB cable is not plugged in.

Power can be injected externally on the VMCU net if the USB cable is removed and no other power sources are present on the kit. Failure to follow this guideline can cause power conflicts and damage the LDO.

3.3 EFR32MG24 Reset

The EFR32MG24 can be reset by a few different sources:

- A user pressing the RESET button.
- The on-board debugger pulling the #RESET pin low.

3.4 Push Button and LED

The kit has one user push button, marked BTN0, that is connected to a GPIO on the EFR32MG24. The button is connected to pin PB02 and it is debounced by an RC filter with a time constant of 1 ms. The logic state of the button is high while the button is not being pressed, and low when the button is pressed.

The kit also features one yellow LED, marked LED0, that is controlled by a GPIO pin on the EFR32MG24. The LED is connected to pin PA04 in an active-high configuration.

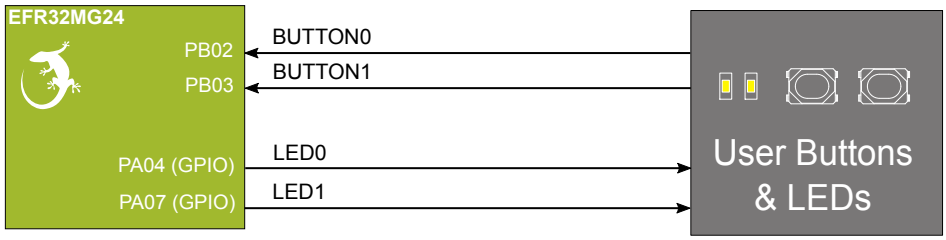

Figure 3.3. Button and LED

3.5 On-board Debugger

The EFR32xG24 Explorer Kit contains a microcontroller separate from the EFR32MG24 Wireless Gecko that provides the user with an on-board J-Link debugger through the USB Type-C port. This microcontroller is referred to as the "on-board debugger", and is not programmable by the user. When the USB cable is removed, the on-board debugger goes into a very low power shutoff mode (EM4S), consuming around 80 nA typically (EFM32GG12 data sheet number).

In addition to providing code download and debug features, the on-board debugger also presents a virtual COM port for general purpose application serial data transfer. The Packet Trace Interface (PTI) is also supported, which offers invaluable debug information about transmitted and received packets in wireless links.

The figure below shows the connections between the target EFR32MG24 device and the on-board debugger.

Refer to chapter for more details on debugging.

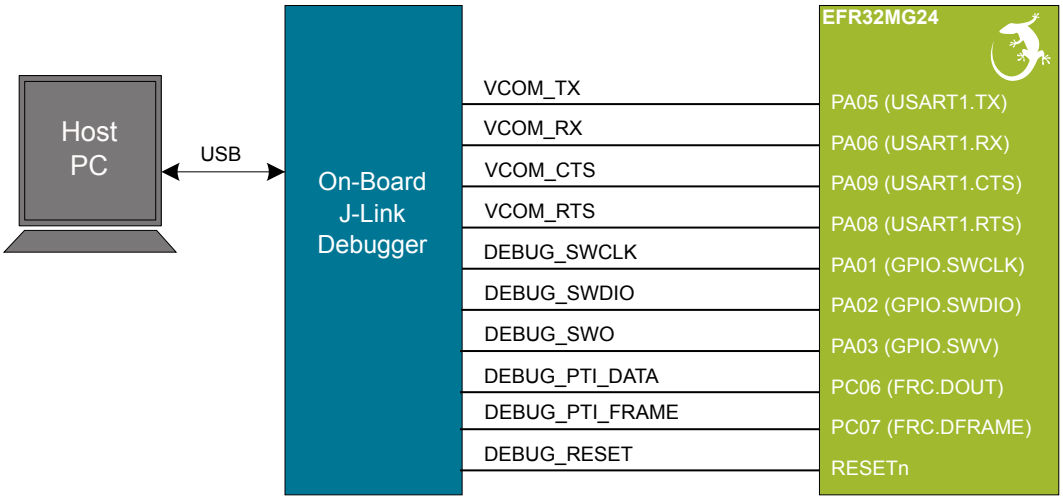

Figure 3.4. On-Board Debugger Connections

3.6 Connectors

The EFR32xG24 Explorer Kit features a USB Type-C connector, 20 breakout pads, a mikroBUS connector for connecting mikroBUS add-on boards, and a Qwiic connector for connecting Qwiic Connect System hardware. The connectors are placed on the top side of the board, and their placement and pinout are shown in the figure below. For additional information on the connectors, see the following sub-chapters.

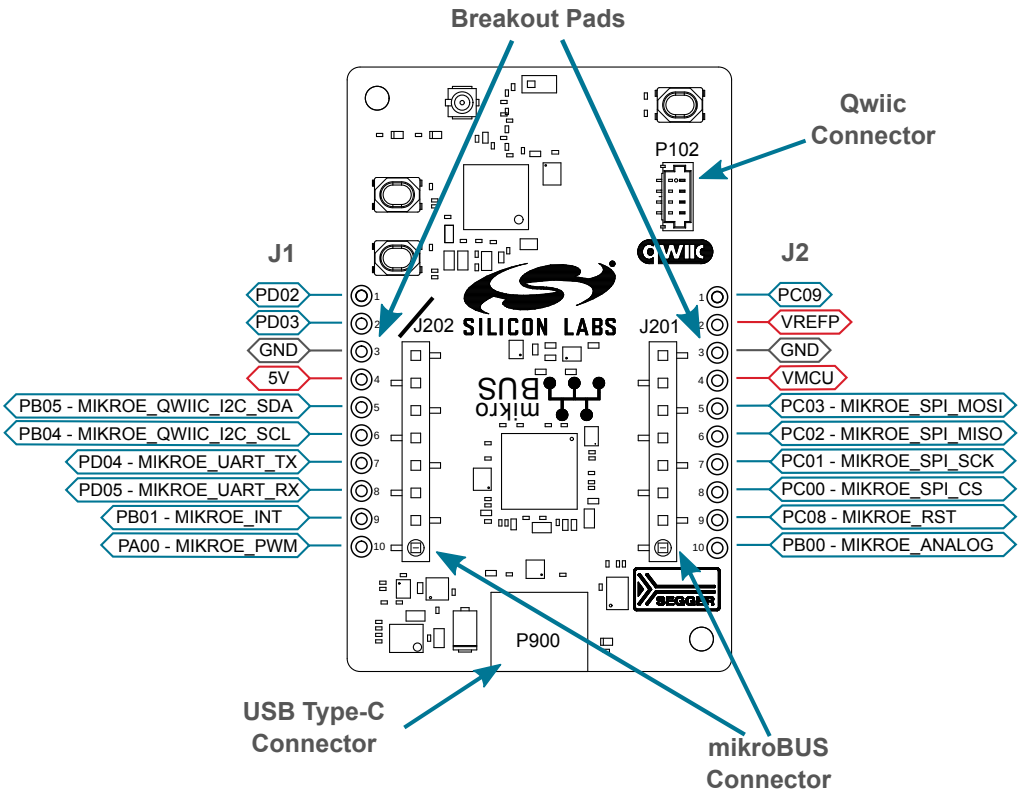

Figure 3.5. EFR32xG24 Explorer Kit Connectors

3.6.1 Breakout Pads

Twenty breakout pads are provided and allow connection of external peripherals. There are 10 pads on the left side of the board, and 10 pads on the right. The breakout pads contain a number of I/O pins that can be used with most of the EFR32MG24 Wireless Gecko's features. Additionally, the VMCU (main board power rail), 3V3 (LDO regulator output), VREFP (ADC positive reference voltage input), and 5V power rails are also exposed on the pads.

The pin-routing on the Wireless Gecko is very flexible, so most peripherals can be routed to any pin. However, pins may be shared between the breakout pads and other functions on the EFR32xG24 Explorer Kit. The table below includes an overview of the breakout pads and functionality that is shared with the kit.

Table 3.1. Breakout Pads Pinout

Pin	Connection	Shared Feature
Left-side Breakout Pins		
1	PD02	
2	PD03	
3	GND	Ground
4	5V	Board USB voltage
5	PB05	
6	PB04	
7	PD04	MikroBUS UART_TX
8	PD05	MikroBUS UART_RX
9	PB01	MikroBUS INT
10	PA00	MikroBUS PWM
Right-side Breakout Pins		
1	PC09	
2	VREFP	External Reference Voltage
3	GND	Ground
4	VMCU	EFR32MG24 voltage domain
5	PC03	MikroBUS SPI_MOSI
6	PC02	MikroBUS SPI_MISO
7	PC01	MikroBUS SPI_SCK
8	PC00	MikroBUS SPI_CS
9	PC08	MikroBUS RST
10	PB00	MikroBUS Analog

3.6.2 MikroBUS Socket

The EFR32xG24 Explorer Kit features a mikroBUS socket compatible with mikroBUS add-on boards. MikroBUS add-on boards can expand the functionality of the kit with peripherals such as sensors and LCDs. Add-on boards follow the mikroBUS socket pin mapping and communicate with the on-kit EFR32MG24 through UART, SPI, or I^2C. Several GPIOs are exposed on the mikroBUS socket. MikroBUS add-on boards can be powered by the 5V or VMCU power rails, which are available on the mikroBUS socket.

The pinout of the EFR32MG24 on the kit is made such that all required peripherals are available on the mikroBUS socket. The I^2C signals are, however, shared with the Qwiic connector, and all mikroBUS signals are also routed to adjacent breakout pads.

When inserting a mikroBUS add-on board, refer to the orientation notch on the EFR32xG24 Explorer Kit, shown in the figure below, to ensure correct orientation. Add-on boards have a similar notch that needs to be lined up with the one shown below.

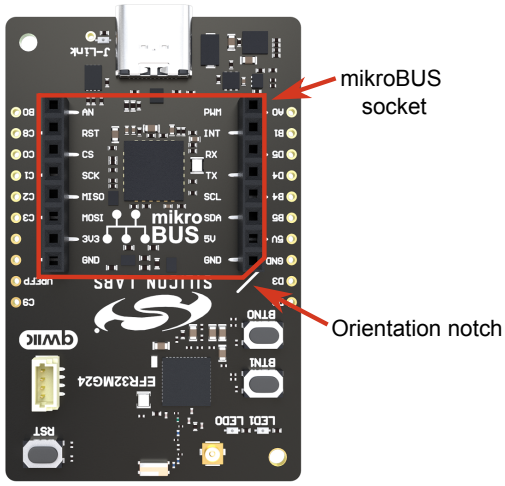

Figure 3.6. mikroBUS Add-on Board Orientation

The table below gives an overview of the mikroBUS socket pin connections to the EFR32MG24.

Table 3.2. mikroBUS Socket Pinout

mikro-BUS Pin Name	mikroBUS Pin Function	Connection	Shared Feature	Suggested Peripheral Mapping
AN	Analog	PB00	BREAKOUT_RIGHT10	IADC0
RST	Reset	PC08	BREAKOUT_RIGHT9	
CS	SPI Chip Select	PC00	BREAKOUT_RIGHT8	USARTx.CS
SCK	SPI Clock	PC01	BREAKOUT_RIGHT7	USARTx.CLK
MISO	SPI Main Input Secondary Output	PC02	BREAKOUT_RIGHT6	USARTx.RX
MOSI	SPI Main Output Secondary Input	PC03	BREAKOUT_RIGHT5	USARTx.TX
PWM	PWM output	PA00	BREAKOUT_LEFT10	TIMER0.CCx
INT	Hardware Interrupt	PB01	BREAKOUT_LEFT9	
RX	UART Receive	PD05	BREAKOUT_LEFT8	USARTx.RX
TX	UART Transmit	PD04	BREAKOUT_LEFT7	USARTx.TX
SCL	I2C Clock	PB04	BREAKOUT_LEFT6	I2Cx.SCL
SDA	I2C Data	PB05	BREAKOUT_LEFT5	I2Cx.SDA

mikro-BUS Pin Name	mikroBUS Pin Function	Connection	Shared Feature	Suggested Peripheral Mapping
3V3	VCC 3.3V power	VMCU	EFR32MG24 voltage domain	
5V	VCC 5V power	5V	Board USB voltage	
GND	Reference Ground	GND	Ground	

3.6.3 Qwiic Connector

The EFR32xG24 Explorer Kit features a Qwiic connector compatible with Qwiic Connect System hardware. The Qwiic connector provides an easy way to expand the functionality of the EFR32xG24 Explorer Kit with sensors, LCDs, and other peripherals over the I^2C interface. The Qwiic connector is a 4-pin polarized JST connector, which ensures the cable is inserted the right way.

Qwiic Connect System hardware is daisy chain-able as long as each I^2C device in the chain has a unique I^2C address.

Note: The Qwiic I^2C connections on the EFR32xG24 Explorer Kit are shared with the mikroBUS I^2C signals.

The Qwiic connector and its connections to Qwiic cables and the EFR32MG24 are illustrated in the figure below.

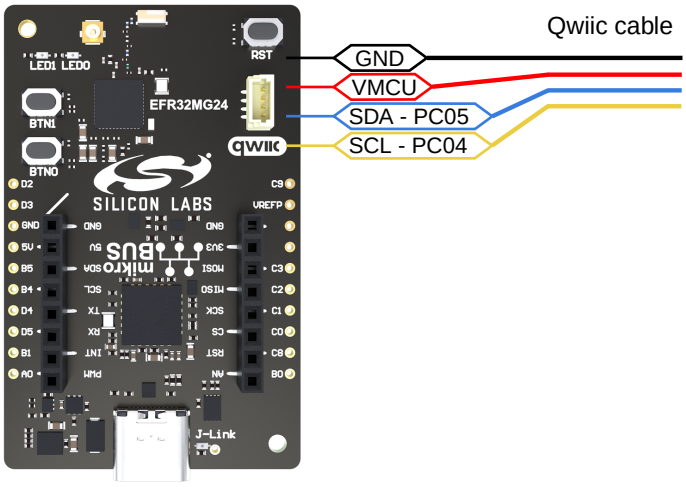

Figure 3.7. Qwiic Connector

The table below gives an overview of the Qwiic connections to the EFR32MG24.

Table 3.3. Qwiic Connector Pinout

Qwiic Pin	Connection	Shared Feature	Suggested Peripheral Mapping
Ground	GND	Ground	
3.3V	VMCU	EFR32MG24 voltage domain	
SDA	PC05		I2Cx.SDA
SCL	PC04		I2Cx.SCL

3.6.4 Debug USB Type-C Connector

The debug USB port can be used for uploading code, and debugging, and as a Virtual COM port. More information is available in section 4. Debugging.

4. Debugging

The EFR32xG24 Explorer Kit contains an on-board SEGGER J-Link Debugger that interfaces to the target EFR32MG24 using the Serial Wire Debug (SWD) interface. The debugger allows the user to download code and debug applications running in the target EFR32MG24. Additionally, it provides a virtual COM port (VCOM) to the host computer that is connected to the target device's serial port for general purpose communication between the running application and the host computer. The Packet Trace Interface (PTI) is also supported by the on-board debugger, which offers invaluable debug information about transmitted and received packets in wireless links. The on-board debugger is accessible through the USB Type-C connector.

4.1 On-board Debugger

The on-board debugger is a SEGGER J-Link debugger running on an EFM32 Giant Gecko. The debugger is directly connected to the debug and VCOM pins of the target EFR32MG24.

When the debug USB cable is inserted, the on-board debugger is automatically activated and takes control of the debug and VCOM interfaces. This means that debug and communication will **not** work with an external debugger connected at the same time. The on-board LDO is also activated, providing power to the board.

4.2 Virtual COM Port

The virtual COM port is a connection to a UART of the target EFR32MG24 and allows serial data to be sent and received from the device. The on-board debugger presents this as a virtual COM port on the host computer that shows up when the USB cable is inserted.

Data is transferred between the host computer and the debugger through the USB connection, which emulates a serial port using the USB Communication Device Class (CDC). From the debugger, the data is passed on to the target device through a physical UART connection.

The serial format is 115200 bps, 8 bits, no parity, and 1 stop bit by default.

Note: Changing the baud rate for the COM port on the PC side does not influence the UART baud rate between the debugger and the target device.

5. Radio

5.1 RF Section

This section gives a short introduction to the RF section of the BRD2703A board.

The schematic of the RF section is shown in the figure below.

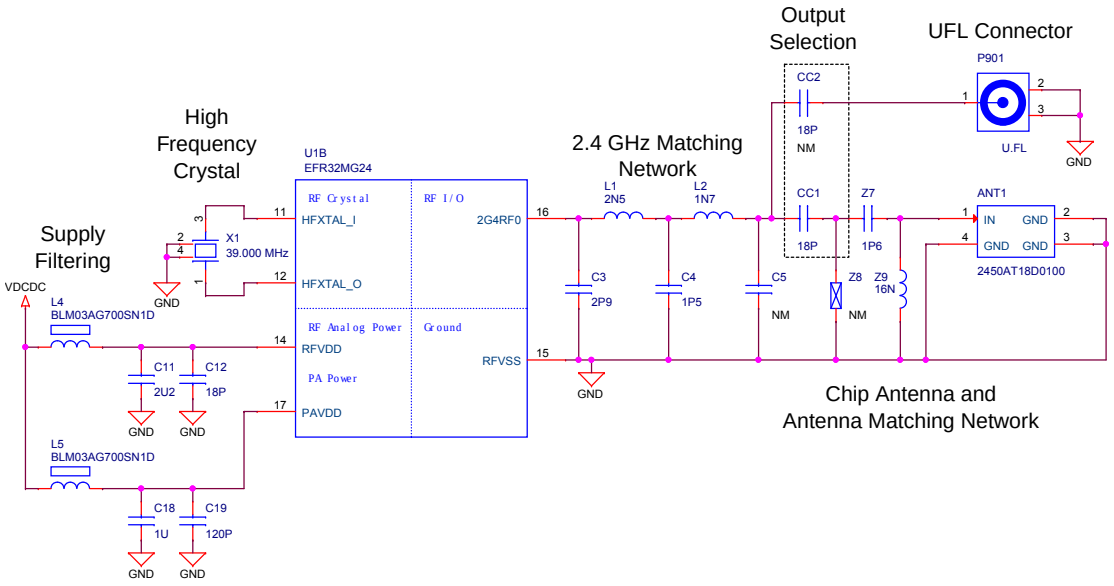

Figure 5.1. Schematic of the RF Section

5.1.1 Description of the RF Matching

The EFR32MG24 RF port impedance is matched to 50 Ohm. The 2G4RF0 pin is connected to a five-element impedance matching and harmonic filter circuitry (the fifth element is not mounted) and a DC blocking capacitor, which also acts as an output path selector.

Note: Due to the thicker PCB stack-up, the radiated level of the 5th harmonic has been increased. Therefore, compared to the matching networks presented in the AN930.2: EFR32 Series 2 2.4 GHz Matching Guide application note, the matching applied on the BRD2703A board has the values of its parallel capacitors modified. With these changes, the suppression of the radiated 5th harmonic was improved, and so its level is under the relevant regulation limit.

The on-board ceramic antenna is also matched to 50 Ohm by its impedance matching components and connected to the EFR32MG24.

5.1.2 RF Section Power Supply

On the BRD2703A, the supply for the radio (RFVDD) and the power amplifier (PAVDD) is connected to the on-chip DC-DC converter. By default, the DC-DC converter provides 1.8 V for the entire RF section (for details, see the BRD2703A schematic).

5.1.3 RF Matching Bill of Materials

The BRD2703A RF matching network bill of materials is shown in the following table.

Table 5.1. BRD2703A RF Matching Network Bill of Materials

Component Name	Value	Manufacturer	Part Number
L1	2.5 nH	Murata	LQP03HQ2N5B02
L2	1.7 nH	Murata	LQP03HQ1N7B02
CC1	18 pF	Murata	GJM0335C1E180GB01D
C3	2.9 pF	Murata	GRM0335C1H2R9BA01D
C4	1.5 pF	Murata	GRM0335C1H1R5WA01D
C5	NM	–	–

5.1.4 Antenna

The BRD2703A has an on-board ceramic antenna.

The land pattern for the antenna on the PCB layout was designed based on the recommendations of the antenna data sheet. Because there is a significant difference between the layout (practically the board size) of the BRD2703A and the antenna evaluation board, the applied antenna matching network deviates from the recommendation.

The values of the antenna matching network components were fine-tuned to match the antenna impedance close to 50 Ohm on the BRD2703A PCB. The resulting antenna impedance and reflection are shown in the figure below.

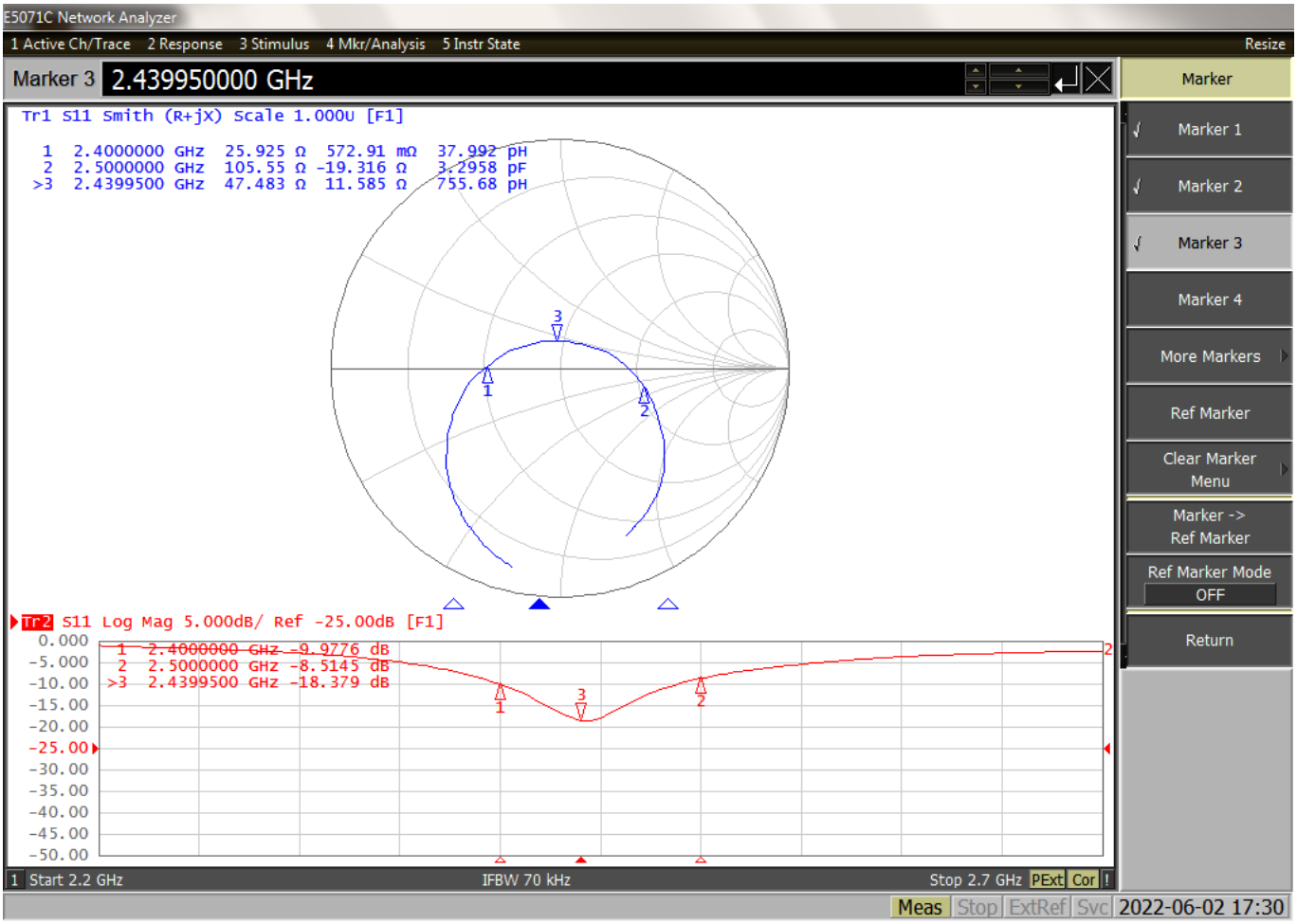

Figure 5.2. Fine-tuned Antenna Impedance (Blue Curve) and Reflection (Red Curve)

5.1.5 Antenna Matching Bill of Materials

The BRD2703A antenna matching network bill of materials is shown in the following table.

Table 5.2. BRD2703A Antenna Matching Network Bill of Materials

Component Name	Value	Manufacturer	Part Number
ANT1	–	Johanson	2450AT18D0100
Z7	16 nH	Murata	LQP03TN16NJ02D
Z9	1.6 pF	Murata	GRM0335C1H1R6BA01D

5.2 EMC Regulations for 2.4 GHz

5.2.1 ETSI EN 300-328 Emission Limits for the 2400-2483.5 MHz Band

Based on ETSI EN 300-328, the allowed maximum fundamental power for the 2400-2483.5 MHz band is 20 dBm EIRP. For the unwanted emissions in the 1 GHz to 12.75 GHz domain, the specified limit is -30 dBm EIRP.

5.2.2 FCC15.247 Emission Limits for the 2400-2483.5 MHz Band

FCC 15.247 allows conducted output power up to 1 Watt (30 dBm) in the 2400-2483.5 MHz band. For spurious emissions, the limit is -20 dBc based on either conducted or radiated measurement if the emission is not in a restricted band. The restricted bands are specified in FCC 15.205. In these bands the spurious emission levels must meet the levels set out in FCC 15.209. In the range from 960 MHz to the frequency of the 5th harmonic, it is defined as 0.5 mV/m at 3 m distance (equals to -41.2 dBm in EIRP).

If operating in the 2400-2483.5 MHz band, the 2nd, 3rd, and 5th harmonics can fall into restricted bands, so for those the -41.2 dBm limit should be applied. For the 4th harmonic, the -20 dBc limit should be applied.

5.2.3 Applied Emission Limits

The overall applied limits are shown in the table below. For the harmonics that fall into the FCC restricted bands, the FCC 15.209 limit is applied, and the ETSI EN 300-328 limit is applied for the rest.

Table 5.3. Applied Limits for Spurious Emissions

Harmonic	Frequency	Limit
2nd	4800~4967 MHz	-41.2 dBm
3rd	7200~7450.5 MHz	-41.2 dBm
4th	9600~9934 MHz	-30 dBm
5th	12000~12417.5 MHz	-41.2 dBm

5.3 Conducted Power Measurements

During measurements, the BRD2703A was supplied by USB. The voltage supply for the RF section (VMCU) was 3.3 V, and for the power amlifier (PAVDD) it was 1.8 V.

5.3.1 Conducted Power Measurements with Unmodulated Carrier

The transceiver was operated in unmodulated carrier transmission mode. The output power of the radio was set to 10 dBm. The typical output spectrums are shown in the following figure.

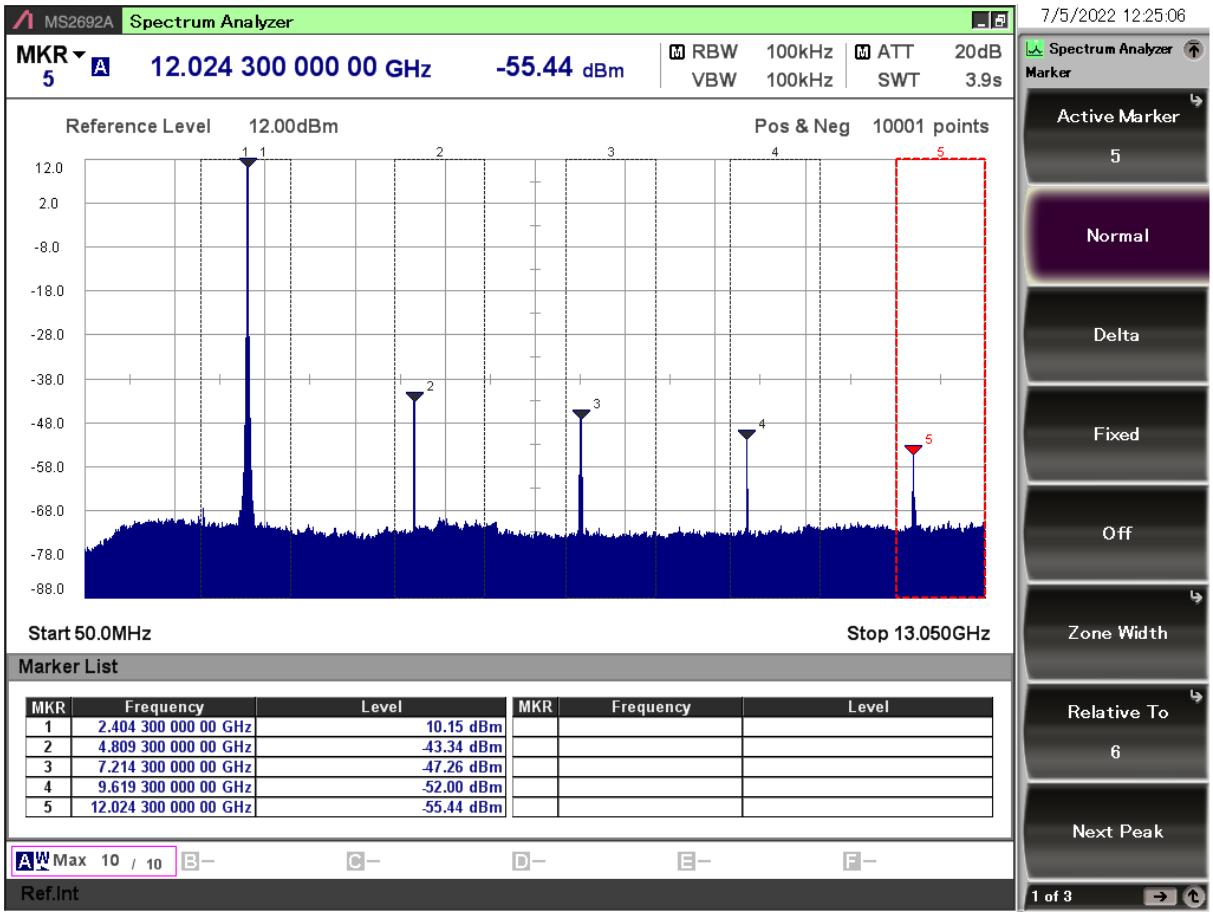

Figure 5.3. Typical Output Spectrum of the BRD2703A; PAVDD = 1.8 V

As shown in the figure, the fundamental is slightly above 10 dBm and all of the unwanted emissions are under the -41.2 dBm limit.

Note: The conducted measurement is performed by connecting the on-board UFL connector to a spectrum analyzer through an SMA conversion adapter (P/N: HRMJ-U.FLP(40)). This connection itself introduces approximately 0.3 dB insertion loss.

5.3.2 Relaxation with Modulated Carrier

Depending on the applied modulation scheme and the Spectrum Analyzer settings specified by the relevant EMC regulations, the measured power levels are usually lower compared to the results with unmodulated carrier. These differences have been measured and used as relaxation factors on the results of the radiated measurement performed with unmodulated carrier. This way, the radiated compliance with modulated transmission can be evaluated.

In this case, both the ETSI EN 300-328 and the FCC 15.247 regulations define the following Spectrum Analyzer settings for measuring the unwanted emissions above 1 GHz:

- Detector: Average
- RBW: 1 MHz

The table below shows the relative levels of the measured modulated signals compared to the unmodulated levels with the above Spectrum Analyzer settings in case of the supported modulation schemes.

Table 5.4. Measured Relaxation Factors for the Supported Modulation Schemes

Applied Modulation (Packet Length: 255 bytes)	BLE Coded PHY: 125 Kb/s (PRBS9) [dB]	BLE Coded PHY: 500 Kb/s (PRBS9) [dB]	BLE 1M PHY: 1 Mb/s (PRBS9) [dB]	BLE 2M PHY: 2 Mb/s (PRBS9) [dB]
2nd harmonic	-2.7	-3.1	-3.3	-9.1
3rd harmonic	-4.8	-5.2	-5.2	-10.7
4th harmonic	-5.5	-6.5	-6.7	-11.9
5th harmonic	-6.3	-6.5	-6.7	-11.4

As it can be observed, the BLE 125 Kb/s coded modulation scheme has the lowest relaxation factors. These values will be used as the worst-case relaxation factors for the radiated measurements.

5.4 Radiated Power Measurements

The output power of the EFR32MG24 was set to 10 dBm. The board was supplied through its USB connector by connecting to a PC through a USB cable.

During the measurements, the board was rotated in three cuts. See the reference plane illustration in the figure below. The radiated powers of the fundamental and the harmonics were measured with horizontal and vertical reference antenna polarizations.

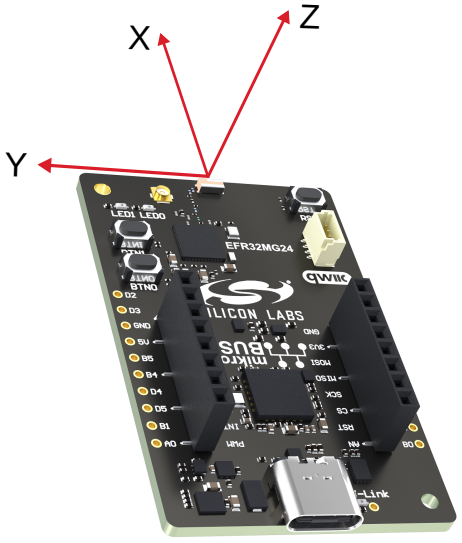

Figure 5.4. DUT Reference Planes

5.4.1 Maximum Radiated Power Measurement

The transceiver was operated in unmodulated carrier transmission mode and the output power of the radio was set to 10 dBm. The results are shown in the table below.

The correction factors are applied based on the BLE 125 Kb/s coded modulation, shown in section 5.3.2 Relaxation with Modulated Carrier. For the rest of the supported modulation schemes the correction factors are larger, thus the related calculated margins would be higher compared to the ones shown in the table below. Therefore, the margins below can be considered as worst-case margins.

Table 5.5. Maximums of the Measured Radiated Powers of BRD2703A

Frequency (2440 MHz)	Measured Un-modulated EIRP [dBm]	Orientation	BLE 125 Kb/s Coded Modulation			Limit in EIRP [dBm]
			Correction Factor [dB]	Calculated Modulated EIRP [dBm]	Modulated Margin [dB]	
Fund	11.1	XZ/V	NA (0 is used)	11.1	18.9	30.0
2nd	-53.3	XZ/V	-2.7	-56.0	14.8	-41.2
3rd	-38.8	YZ/H	-4.8	-43.6	2.4	-41.2
4th	-48.8	YZ/H	-5.5	-54.3	24.3	-30.0
5th	-38.9	YZ/H	-6.3	-45.2	4.0	-41.2

As shown in the table, with 10 dBm output power, the radiated power of the fundamental is higher than 10 dBm due to the antenna gain. The 3rd and the 5th harmonics are above the limit in case of the unmodulated carrier transmission. But with the relaxation of the supported modulation schemes, the margin is at least 2.4 dB.

5.4.2 Antenna Pattern Measurement

The measured typical antenna patterns are shown in the figures below.

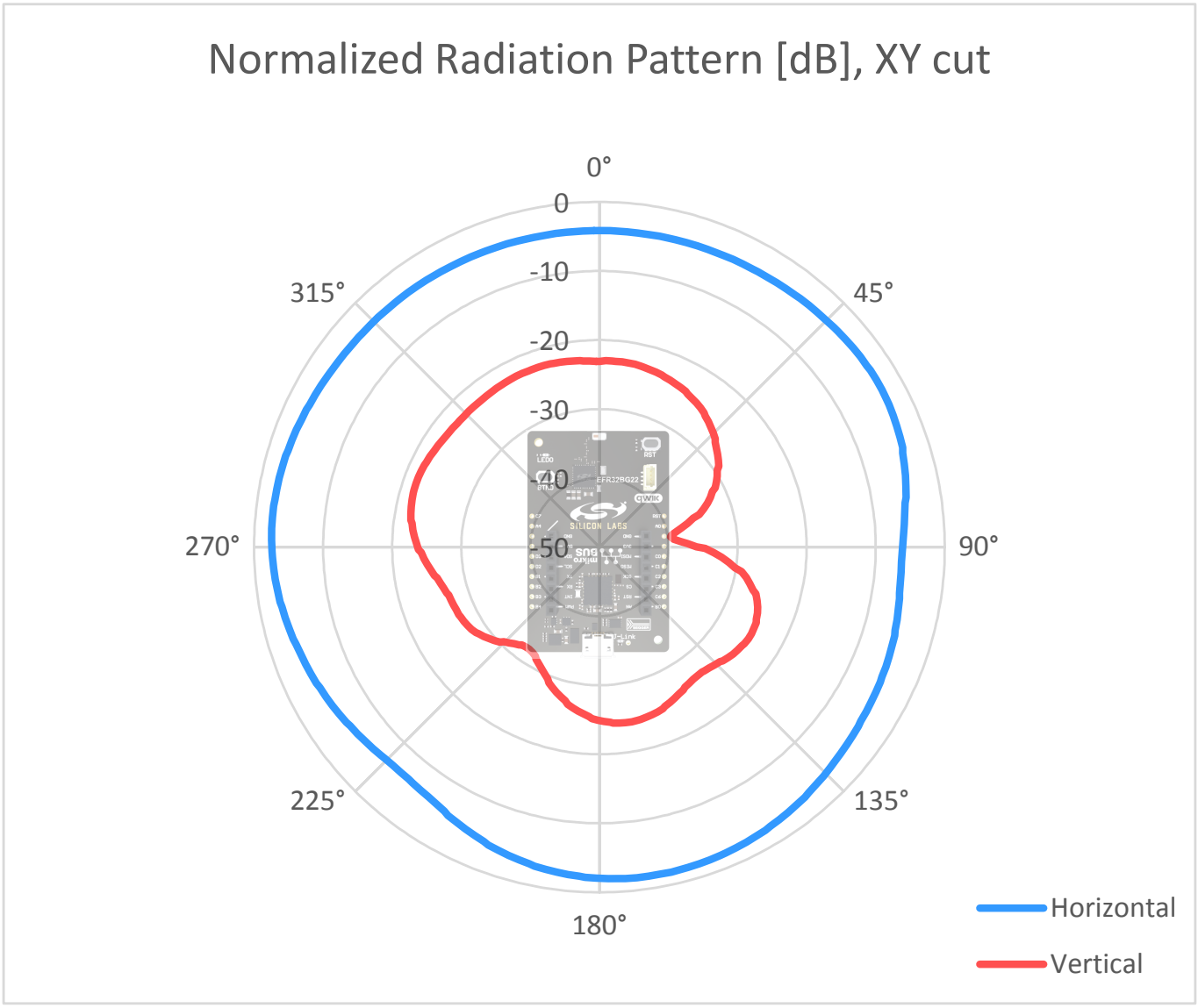

Figure 5.5. Antenna Pattern - XY

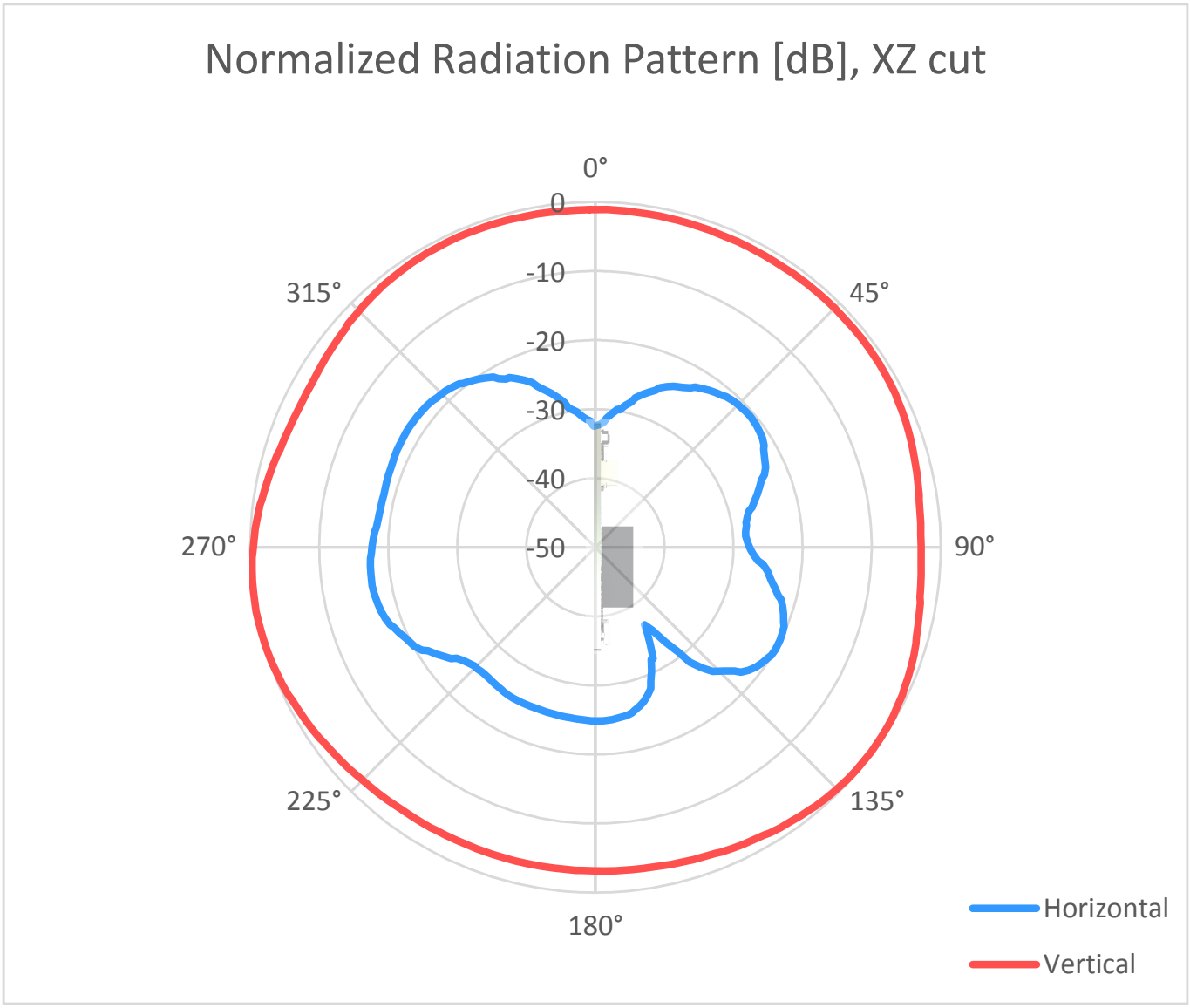

Figure 5.6. Antenna Pattern - XZ

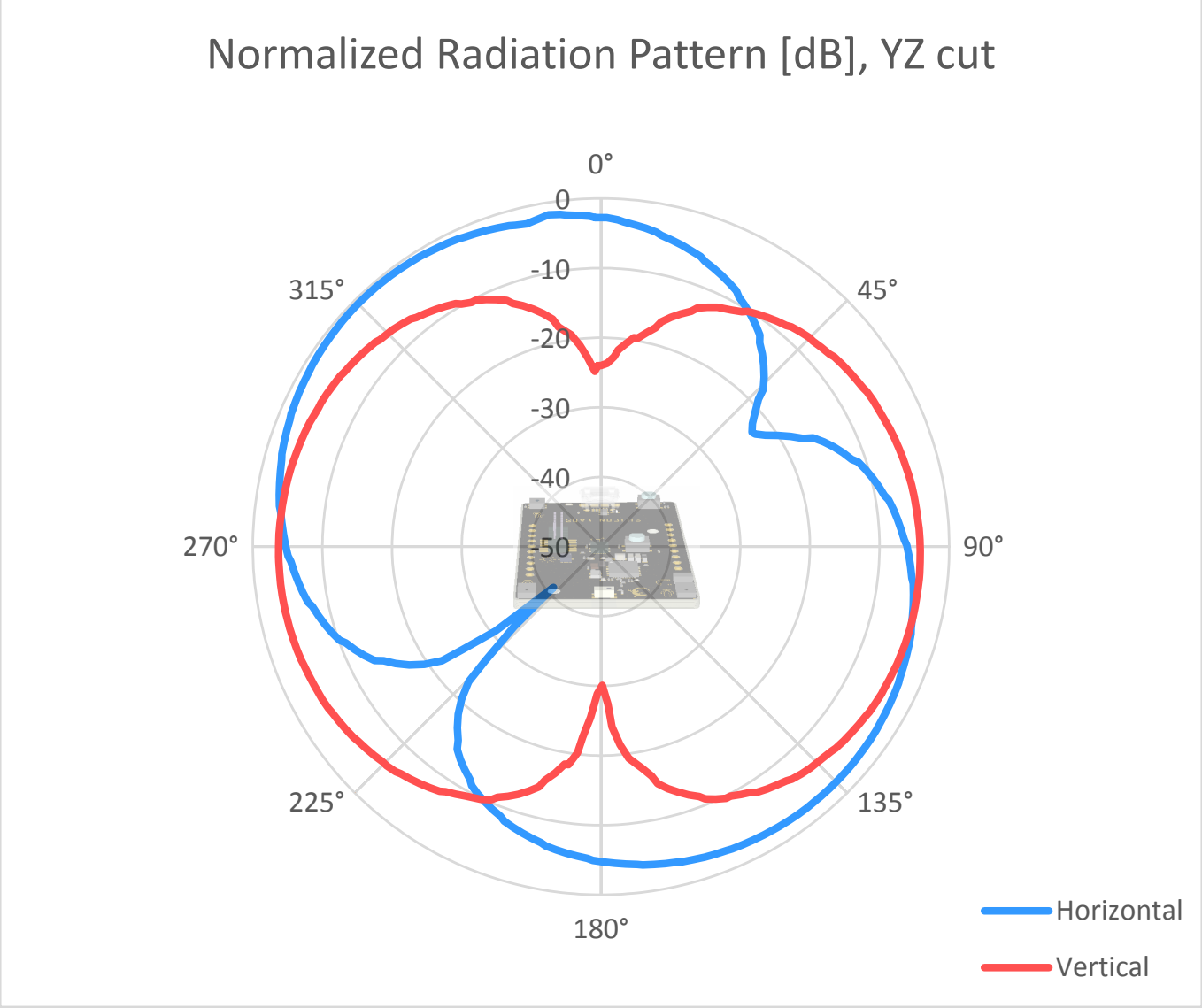

Figure 5.7. Antenna Pattern - YZ

5.5 EMC Compliance Recommendations

5.5.1 Recommendations for 2.4 GHz ETSI EN 300-328 Compliance

As shown in the previous chapter, with the EFR32MG24 output power set to 10 dBm, the radiated power of the BRD2703A fundamental complies with the 20 dBm limit of the ETSI EN 300-328. With the supported modulation schemes, the harmonics are also compliant with the relevant limits.

5.5.2 Recommendations for 2.4 GHz FCC 15.247 Compliance

As shown in the previous chapter, with the EFR32MG24 output power set to 10 dBm, the radiated power of the BRD2703A fundamental complies with the 30 dBm limit of the FCC 15.247. With the supported modulation schemes, the harmonics are also compliant with the relevant limits.

6. Schematics, Assembly Drawings, and BOM

Schematics, assembly drawings, and bill of materials (BOM) are available through Simplicity Studio when the kit documentation package is installed. They are also available from the kit page on the Silicon Labs website: silabs.com.

7. Kit Revision History and Errata

7.1 Revision History

The kit revision can be found printed on the box label of the kit, as outlined in the figure below. The kit revision history is summarized in the table below.

Figure 7.1. Revision Info

Table 7.1. Kit Revision History

Kit Revision	Released	Description
A01	5 August 2022	Kit revised due to BRD2703A upped to A02.
A00	28 July 2022	New kit introduction of xG24-EK2703A

7.2 Errata

There are no known errata at present.

8. Board Revision History and Errata

8.1 Revision History

The board revision can be found laser printed on the board, and the board revision history is summarized in the following table.

Table 8.1. Board Revision History

Revision	Released	Description
A02	22 July 2022	RF filter components valus change (C3, C4)
A01	9 June 2022	Silk screen change for J2, PIN#10
A00	8 April 2022	Initial version.

8.2 Errata

There are no known errata at present.

9. Document Revision History

Revision 1.0

August 2022

- Initial document release.