UG626: SixG301 Explorer Kit User's Guide

The SixG301 Explorer Kit is an ultra-low cost, small form factor development and evaluation platform for the SixG301 Wireless System-on-Chip.

The SixG301 Explorer Kit is focused on rapid prototyping and concept creation of IoT applications. It is designed around the SixG301 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 Studio.

TARGET DEVICE

- SixG301 Wireless System-on-Chip (SiMG301M104LILB0)
- High-performance 2.4 GHz radio
- 32-bit ARM® Cortex®-M33 with 150 MHz maximum operating frequency
- 4 MB flash and 512 kB RAM

KIT FEATURES

- User LED and push button
- 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

- SixG301-EK2719A

Table of Contents

1. Introduction

The SixG301 Explorer Kit has been designed to inspire customers to make IoT devices with the Silicon Labs SixG301 Wireless 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 SixG301 Explorer Kit is easy using a USB Micro-B 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 SixG301 Explorer Kit is supported in Simplicity Studio™ and a Board Support Package (BSP) is provided to give application developers a flying start.

To connect external hardware to the SixG301 Explorer Kit, use the 20 breakout pads which present peripherals from the SixG301 Wireless such as I^2C, SPI, UART, and GPIOs. The mikroBUS socket allows inserting mikroBUS add-on boards which interface with the SixG301 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 SixG301 Explorer Kit board (BRD2719A)

1.2 Getting Started

Refer to the Silicon Labs webpage, https://www.silabs.com/dev-tools, for detailed instructions on how to get started with your new SixG301 Explorer Kit.

1.3 Hardware Content

The following key hardware elements are included on the SixG301 Explorer Kit:

- SixG301 Wireless SoC with 150 MHz operating frequency, 4 MB kB flash, and 512 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 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

SixG301 Explorer Kit layout is shown in the following figure.

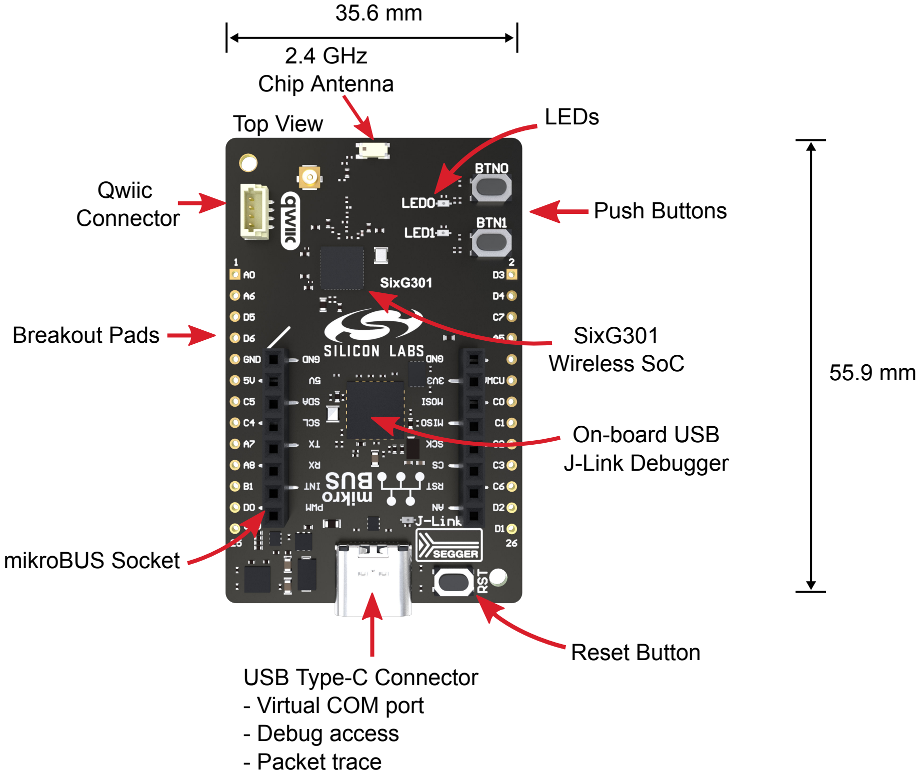

Figure 1.1. SixG301 Explorer Kit Hardware Layout

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[1]		V
Operating Temperature	T_{OP}	–	+20	–	˚C

Note: [1]The typical supply voltage to the SixG301 is 3.0 V, but the maximum voltage is a function of temperature and average lifetime current load. Over a 10-year lifespan, the average lifetime current load should not exceed 60 mA when the supply voltage is 3.3 V. See the SixG301 data sheet for more information.

2.2 Current Consumption

The operating current of the board greatly depends on the application and the amount of external hardware connected. The following table attempts to give some indication of typical current consumptions for the SixG301 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
SixG301 Current Consumption[1]	I_{MG22}	MCU current consumption in EM0 mode, execution from cache, with all peripherals disabled (supply voltage = 3.0 V, 150 MHz SOCPLL, referenced to HFXO with 38.4 MHz crystal, running CoreMark at 25 °C)	62	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 = 38.4 MHz, 1 Mbit/s, 2GFSK, f = 2.44 GHz at 25 °C)	8.1	mA
		Radio system current consumption in transmit mode (VDD = 3.0 V, MCU in EM1 and all MCU peripherals disabled, HCLK = 38.4 MHz, f = 2.44 GHz, CW, 10 dBm output power at 25 °C)	28.6	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 SixG301 data sheet

2 From EFM32GG12 data sheet

3. Hardware

The core of the SixG301 Explorer Kit is the SixG301 Wireless 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 SixG301 Explorer Kit is illustrated in the following figure.

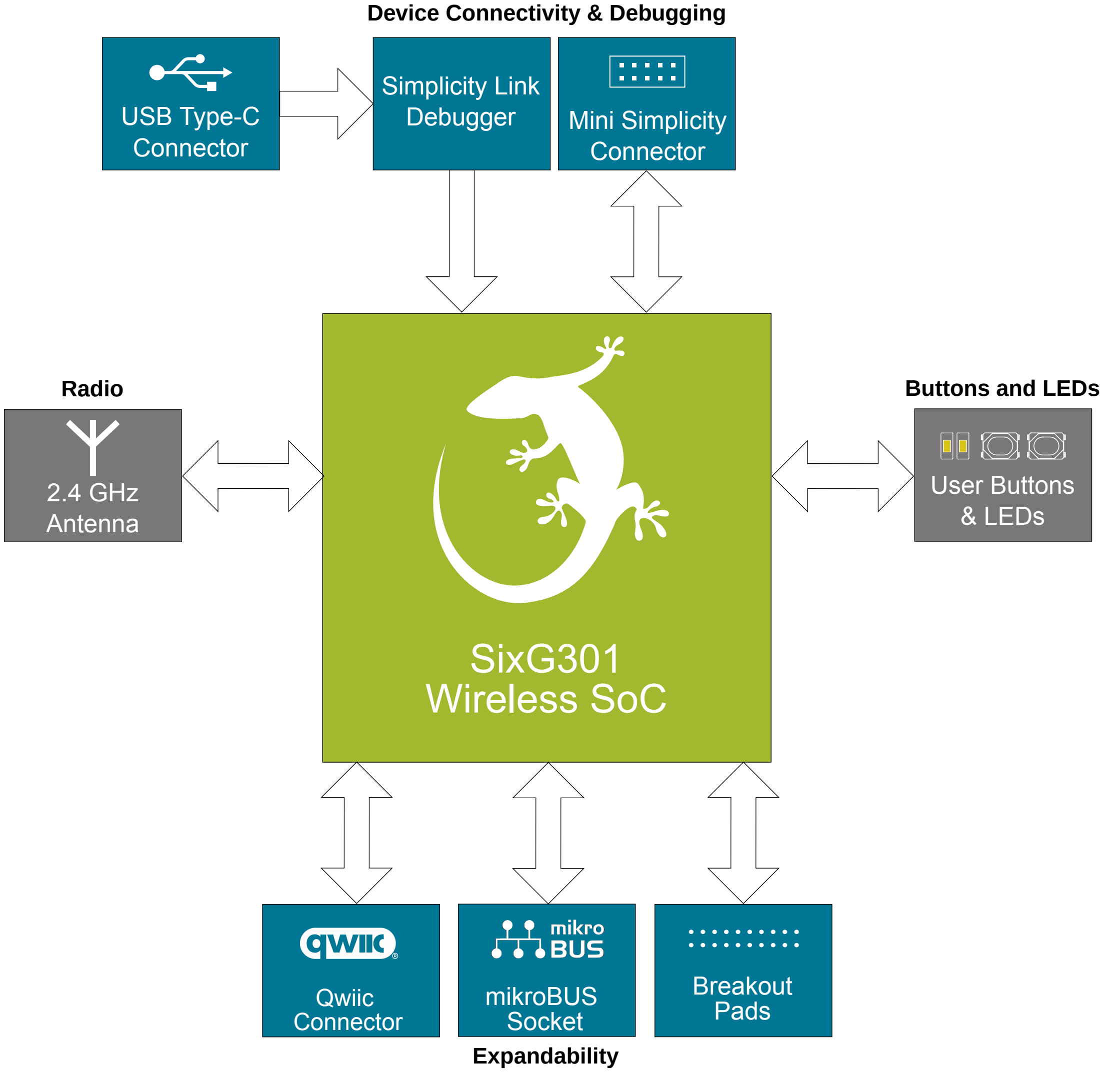

Figure 3.1. Kit Block Diagram

3.2 Power Supply

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

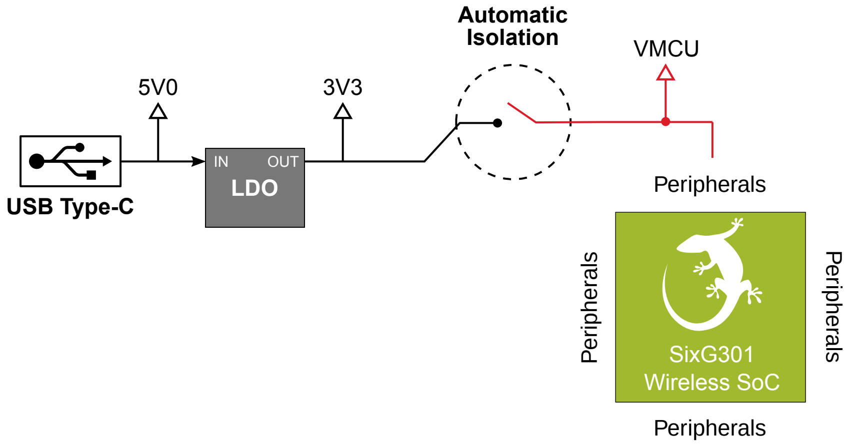

Figure 3.2. SixG301 Explorer Kit Power Topology

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 SixG301 Reset

The SixG301 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 two user push buttons, marked BTN0 and BTN1, that are connected to GPIOs on the SixG301. The buttons are connected to pin PC07 and PA05, respectively, and they are debounced by an RC filter with a time constant of 1 ms. The logic state of a button is high while that button is not being pressed, and low when it is pressed.

The kit also features two yellow LEDs, marked LED0 and LED1, that are controlled by GPIO pins on the SixG301. The LEDs are connected to pin PD03 and PD04, respectively, in an active-high configuration.

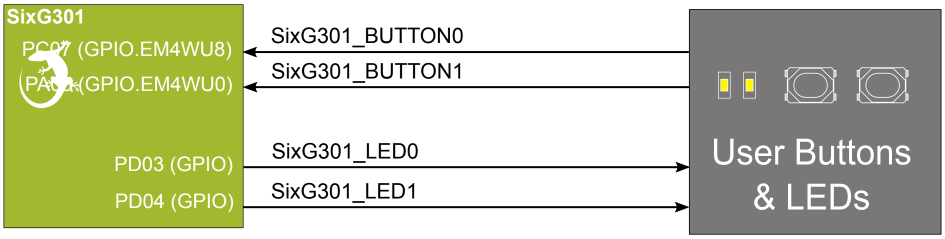

Figure 3.3. Buttons and LEDs

3.5 On-board Debugger

The SixG301 Explorer Kit contains a microcontroller separate from the SixG301 Wireless 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 following figure shows the connections between the target SixG301 device and the on-board debugger.

Refer to section 4. Debugging for more details on debugging.

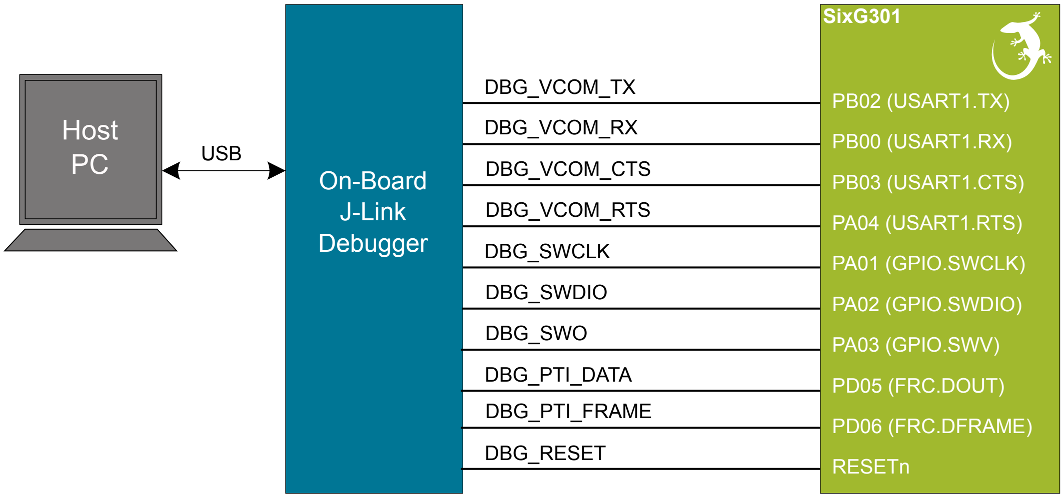

Figure 3.4. On-Board Debugger Connections

3.6 Connectors

The SixG301 Explorer Kit features a USB Type-C connector, 26 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 following figure. For additional information on the connectors, see the following sub chapters.

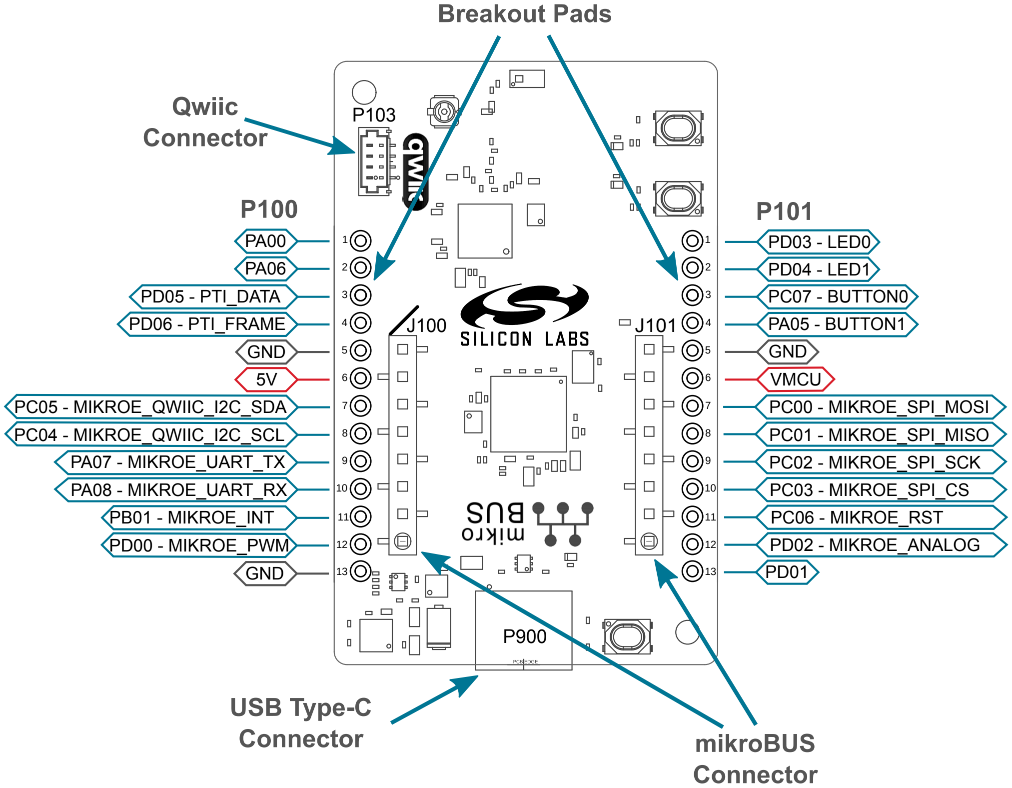

Figure 3.5. SixG301 Explorer Kit Connectors

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 SixG301 Wireless's features. Additionally, the VMCU (main board power rail), 3V3 (LDO regulator output), and 5V power rails are also exposed on the pads.

The pin-routing on the Wireless 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 SixG301 Explorer Kit. The following table 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	PA00	GPIO
2	PA06	GPIO
3	PD05	PTI_DATA
4	PD06	PTI_FRAME
5	GND	Ground
6	5V	Board USB voltage
7	PC05	MikroBUS I2C_SDA, Qwiic I2C_SDA
8	PC04	MikroBUS I2C_SCL, Qwiic I2C_SCL
9	PA07	MikroBUS UART_TX
10	PA08	MikroBUS UART_RX
11	PB01	MikroBUS INT
12	PD00	MikroBUS PWM
13	GND	Ground
Right-side Breakout Pins		
1	PD03	LED0
2	PD04	LED1
3	PC07	BUTTON0
4	PA05	BUTTON1
5	GND	Ground
6	VMCU	SixG301 voltage domain
7	PC00	MikroBUS SPI_MOSI
8	PC01	MikroBUS SPI_MISO
9	PC02	MikroBUS SPI_SCKT
10	PC03	MikroBUS SPI_CS
11	PC06	MikroBUS RST
12	PD02	MikroBUS Analog
13	PD01	GPIO

3.6.2 MikroBUS Socket

The SixG301 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 SixG301 through UART, SPI or I^{2}C. 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 SixG301 on the kit is made such that all required peripherals are available on the mikroBUS socket. The I^{2}C 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 SixG301 Explorer Kit, shown in the following figure, to ensure correct orientation. Add-on boards have a similar notch that needs to be lined up with the one shown below.

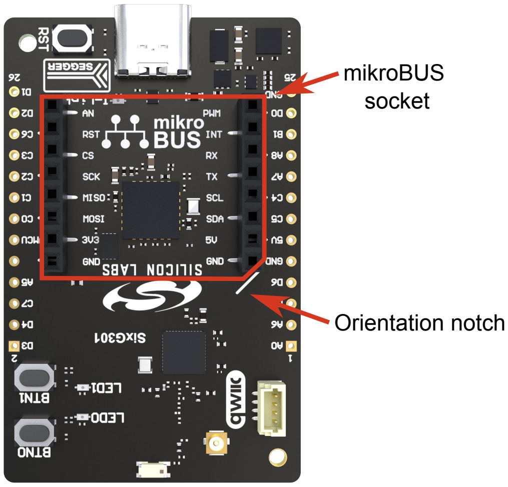

Figure 3.6. mikroBUS Add-on Board Orientation

The following table gives an overview of the mikroBUS socket pin connections to the SixG301.

Table 3.2. mikroBUS Socket Pinout

mikroBUS Pin Name	mikroBUS Pin Function	Connection	Shared Feature	Suggested Peripheral Mapping
AN	Analog	PB00	BREAKOUT_RIGHT12	IADC0
RST	Reset	PC06	BREAKOUT_RIGHT11	
CS	SPI Chip Select	PC03	BREAKOUT_RIGHT10	USARTx.CS
SCK	SPI Clock	PC02	BREAKOUT_RIGHT9	USARTx.CLK
MISO	SPI Main Input Secondary Output	PC01	BREAKOUT_RIGHT8	USARTx.RX
MOSI	SPI Main Output Secondary Input	PC00	BREAKOUT_RIGHT7	USARTx.TX
PWM	PWM Output	PD00	BREAKOUT_LEFT12	TIMER0.CCx
INT	Hardware Interrupt	PB01	BREAKOUT_LEFT11	
RX	UART Receive	PA08	BREAKOUT_LEFT10	USARTx.RX
TX	UART Transmit	PA07	BREAKOUT_LEFT9	USARTx.TX
SCL	I2C Clock	PC04	QWIIC_I2C_SCL, BREAKOUT_LEFT8	I2Cx.SCL
SDA	I2C Data	PC05	QWIIC_I2C_SDA, BREAKOUT_LEFT7	I2Cx.SDA

mikro-BUS Pin Name	mikroBUS Pin Function	Connection	Shared Feature	Suggested Peripheral Mapping
3V3	VCC 3.3V power	VMCU	SixG301 voltage domain	
5V	VCC 5V power	5V	Board USB voltage	
GND	Reference Ground	GND	Ground	

3.6.3 Qwiic Connector

The SixG301 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 SixG301 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 lines are shared with the on-board I^2C sensors, and are also exposed on the breakout pads.

The Qwiic connector and its connections to Qwiic cables and the SixG301 are illustrated in the following figure.

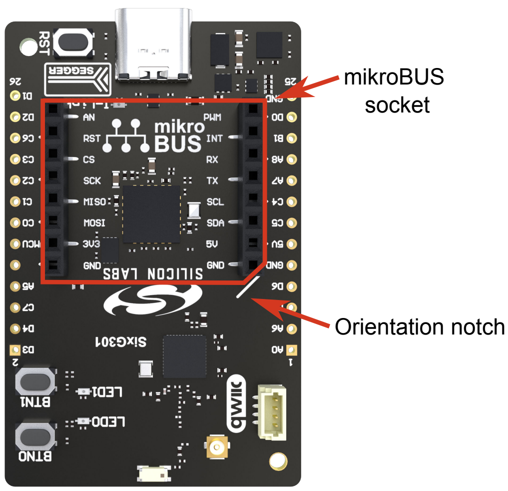

Figure 3.7. Qwiic Connector

The following table gives an overview of the Qwiic connections to the SixG301.

Table 3.3. Qwiic Connector Pinout

Qwiic Pin	Connection	Shared Feature	Suggested Peripheral Mapping
Ground	GND	Ground	
3.3V	VMCU	SixG301 voltage domain	
SDA	PC05	MIKROE_I2C_SDA, BREAKOUT_LEFT7	I2Cx.SDA
SCL	PC04	MIKROE_I2C_SCL, BREAKOUT_LEFT8	I2Cx.SCL

3.6.4 Debug USB Type-C Connector

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

4. Debugging

The SixG301 Explorer Kit contains an on-board SEGGER J-Link Debugger that interfaces to the target SixG301 using the Serial Wire Debug (SWD) interface. The debugger allows the user to download code and debug applications running in the target SixG301. 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 SixG301.

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 SixG301 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 provides a short introduction to the RF section of the BRD2719A board.

The RF section schematic is shown in the following figure.

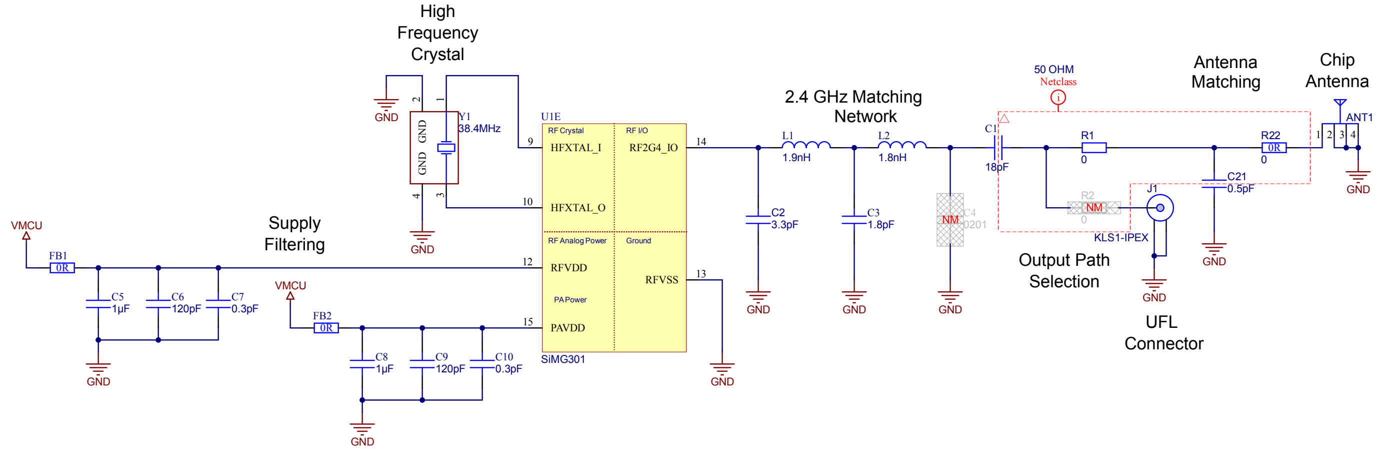

Figure 5.1. RF Section Schematic

5.1.1 RF Matching Description

The impedance of the SixG301 RF port is matched to 50 Ohm. The RF2G4_IO pin is connected to a four-element impedance matching and harmonic filter circuitry and a DC blocking capacitor.

Note: Due to the thicker PCB stack-up, the output power of the fundamental was decreased. 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 BRD2719A board has a change in the value of the C2 capacitor. With this change, the suppression of the power of the fundamental has been improved.

The on-board ceramic antenna is also matched to 50 Ohm by its impedance matching components and connected to the SixG301.

5.1.2 RF Section Power Supply

On the BRD2719A, the supply for the radio (RFVDD) and the power amplifier (PAVDD) is connected to the on-board regulator. By default, the regulator provides 3.3 V for the entire RF section (for details, see the BRD2719A schematic).

5.1.3 RF Matching Bill of Materials

The BRD2719A RF matching network bill of materials is shown in the following table.

Table 5.1. BRD2719A RF Matching Network Bill of Materials

Component name	Value	Manufacturer	Part Number
L1	1.9 nH	Murata	LQP03HQ1N9W02D
L2	1.8 nH	Murata	LQP03HQ1N8W02D
CC1	18 pF	Murata	GJM0335C1E180GB01D
C2	3.3 pF	Murata	GRM0335C1H3R3WA01D
C3	1.8 pF	Murata	GRM0335C1H1R8WA01D
C4	NM	–	–

5.1.4 Antenna

The BRD2719A 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 (the board size) of the BRD2719A 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 BRD2719A PCB. The resulting antenna impedance and reflection are shown in the following figure.

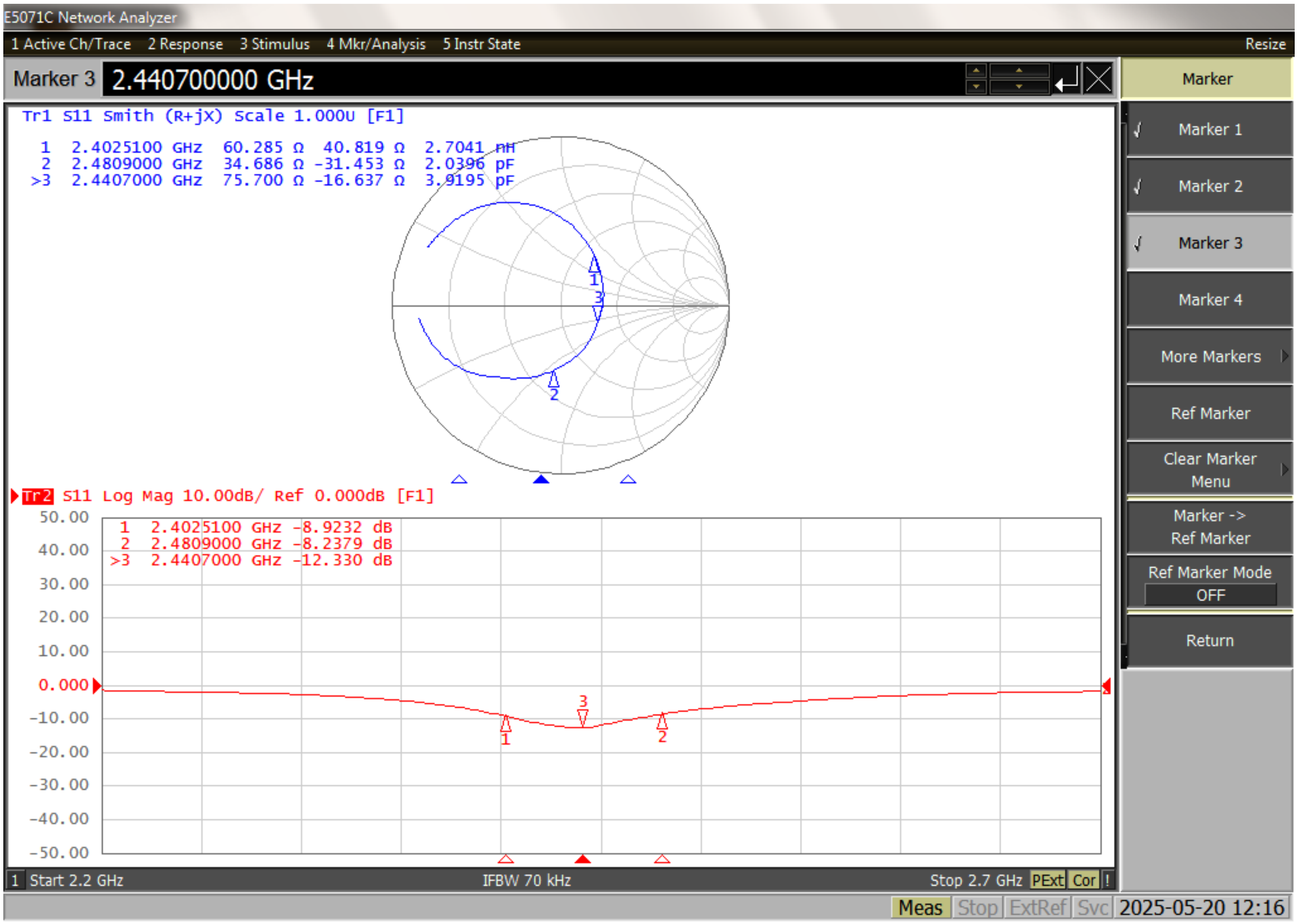

Figure 5.2. Fine-tuned Antenna Impedance (Blue Curve) and Reflection (Red Curve)

5.1.5 Antenna Matching Bill of Materials

The BRD2719A antenna matching network bill of materials is shown in the following table.

Table 5.2. BRD2719A Antenna Matching Network Bill of Materials

Component name	Value	Manufacturer	Part Number
ANT1	–	Johanson	2450AT18D0100
C22	0.5 pF	Murata	GRM0335C1HR50WA01D

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).

In case of 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 following table. 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 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 following table 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 shown, 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 Conducted Power Measurements with Unmodulated Carrier

During the conducted measurements, the BRD2719A board was supplied through its USB connector by connecting to a PC through a USB cable. The supply for the RF section (RFVDD) and the power amplifier (PAVDD) was 3.3 V provided by the on-board regulator.

The RF output of the board was connected directly to a Spectrum Analyzer. The transceiver was operated in continuous carrier transmission mode, the output power was set to 10 dBm.

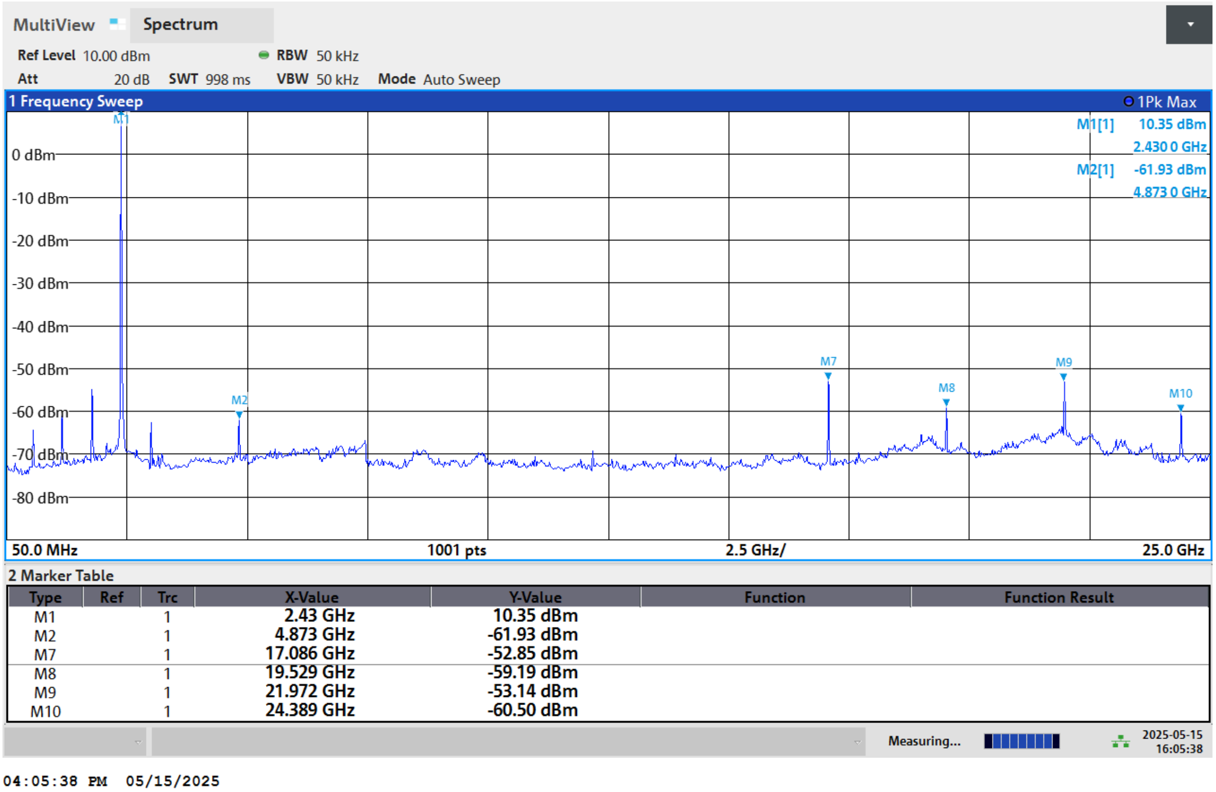

Figure 5.3. Typical Output Spectrum of the BRD2719A; PAVDD = 1.8 V

As shown in the figure, the fundamental is a bit above 10 dBm. The harmonics are under their corresponding limits.

Note: The conducted measurement is performed by connecting the on-board UFL connector to a spectrum analyzer through an SMA conversion adapter (P/N: L-KLS1-IPEX-20279-001E-01). This connection itself introduces approximately 0.3 dB insertion loss.

5.5 Radiated Power Measurements

The output power of the SixG301 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 following figure. The radiated powers of the fundamental and the harmonics were measured with horizontal and vertical reference antenna polarizations.

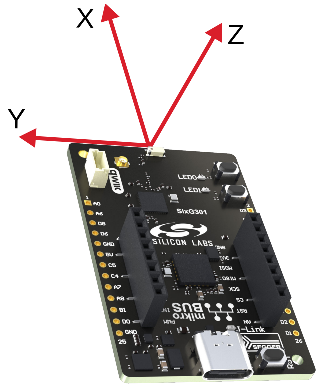

Figure 5.4. DUT Reference Planes

5.5.1 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 following table.

The correction factors are applied based on the BLE 125 Kb/s coded modulation, shown in section 5.3 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 following table. Thus, the below margins can be considered as worst case margins.

Table 5.5. Maximums of the Measured Radiated Powers of BRD2719A

Frequency (2440 MHz)	Measured Unmodulated EIRP [dBm]	Orientation	BLE 125 Kb/s Coded Modulation			Limit in EIRP [dBm]
			Correction Factor [dB]	Calculated Modulated EIRP [dBm]	Modulated Margin [dB]	
Fund	106	XZ/V	NA (0 is used)	10.6	19.4	30.0
2nd	-53.7	XY/H	-2.7	-56.4	14.2	-41.2
3rd	-41.4	YZ/V	-4.8	-46.2	5.0	-41.2
4th	<-50.0	- / -	-5.5	<-50.0	>20.0	-30.0
5th	<-50.0	- / -	-6.3	<-50.0	>10.0	-41.2

As is 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 harmonics are under the applied limits with margin.

5.5.2 Antenna Pattern Measurements

The measured normalized antenna patterns are shown in the following figures.

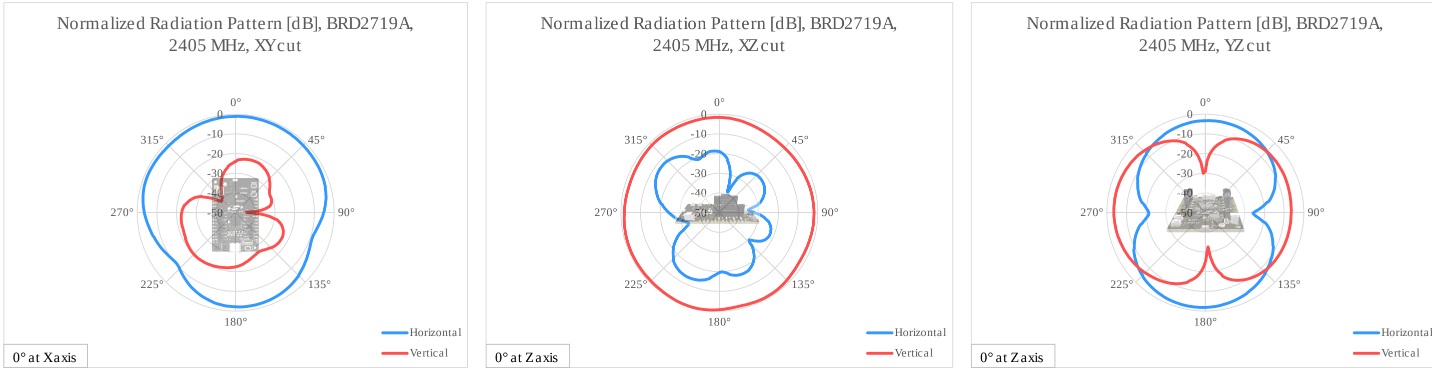

Figure 5.5. Normalized Antenna Pattern in the 2405 MHz Band

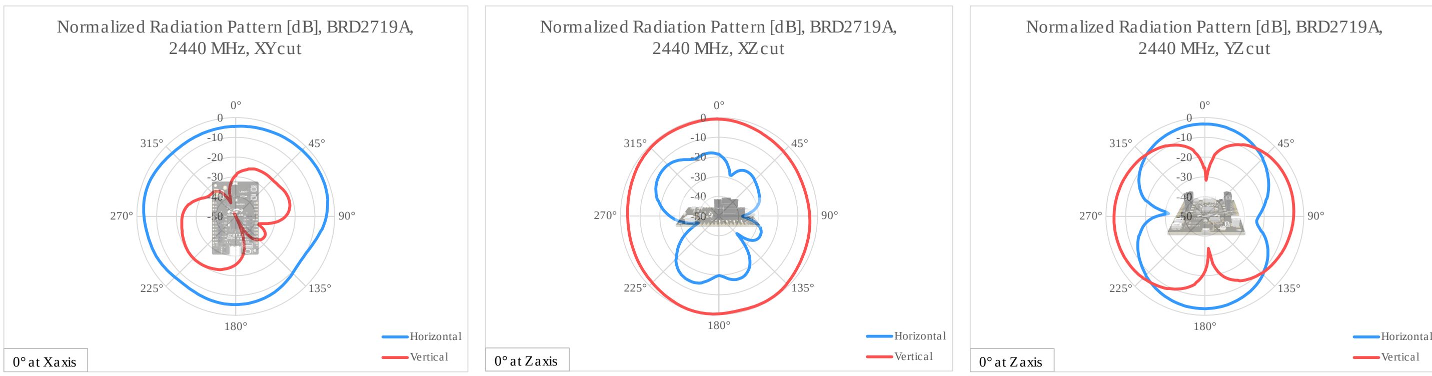

Figure 5.6. Normalized Antenna Pattern in the 2440 MHz Band

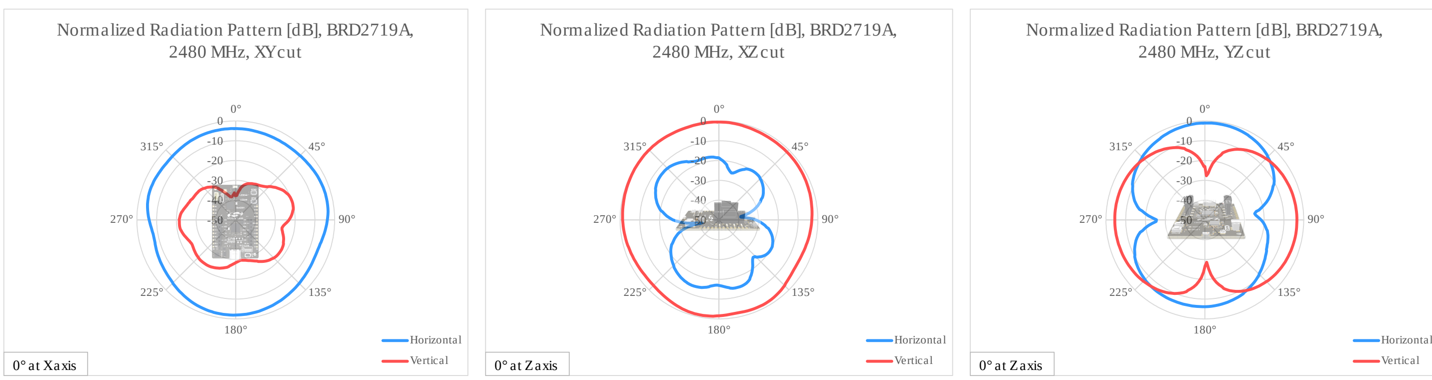

Figure 5.7. Normalized Antenna Pattern in the 2480 MHz Band

5.6 EMC Compliance Recommendations

5.6.1 Recommendations for 2.4 GHz ETSI EN 300-328 Compliance

As shown in the previous section, with the SixG301 output power set to 10 dBm, the radiated power of the BRD2719A fundamental complies with the 20 dBm limit of the ETSI EN 300-328. The harmonic emissions are under the applied limits with margin.

5.6.2 Recommendations for 2.4 GHz FCC 15.247 Compliance

As shown in the previous section, with the SixG301 output power set to 10 dBm, the radiated power of the BRD2719A fundamental complies with the 30 dBm limit of the FCC 15.247. The harmonic emissions are under the applied limits with margin.

6. Schematics, Assembly Drawings, and BOM

Schematics, assembly drawings, and Bill of Materials (BOM) are available through Simplicity Studio after the kit documentation package is installed. These resources are also available on the applicable kit pages on the Silicon Labs website at http://www.silabs.com/dev-tools.

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 following figure. The kit revision history is summarized in the following table.

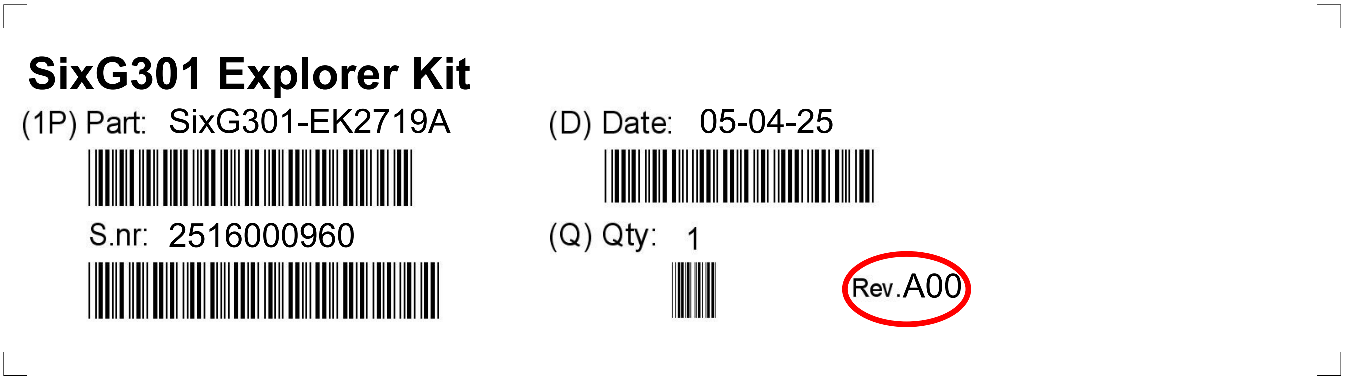

Figure 7.1. Revision Info

Table 7.1. Kit Revision History

Kit Revision	Released	Description
A01	22 May 2025	Kit revised due to BRD2719A upped to A03.
A00	6 May 2025	New kit introduction of SixG301-EK2719A.

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
A03	21 May 2025	Updated RF matching network.
A02	6 May 2025	Updated RF matching network and DVDD supply filtering.
A01	27 Feb 2025	Initial production release.

8.2 Errata

There are no known errata at present.

9. Document Revision History

Revision 1.0

June 2025

- Initial document release.

Simplicity Studio

One-click access to MCU and wireless tools, documentation, software, source code libraries & more. Available for Windows, Mac and Linux!

IoT Portfolio
www.silabs.com/IoT

SW/HW
www.silabs.com/simplicity

Quality
www.silabs.com/quality

Support & Community
www.silabs.com/community

SILICON LABS

Silicon Laboratories Inc.
400 West Cesar Chavez
Austin, TX 78701
USA

www.silabs.com