IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
TYLER DIVISION

LUCIO DEVELOPMENT LLC,	§	
	§	
Plaintiff,	§	Case No:
	§	
vs.	§	PATENT CASE
	§	
QORVO, INC.	§	
	§	
Defendant.	§	
	§	

COMPLAINT

Plaintiff Lucio Development LLC ("Plaintiff" or "Lucio") files this Complaint against Qorvo, Inc. ("Defendant" or "Qorvo") for infringement of United States Patent No. 7,069,546 (hereinafter "the '546 Patent").

PARTIES AND JURISDICTION

1.   This is an action for patent infringement under Title 35 of the United States Code. Plaintiff is seeking injunctive relief as well as damages.

2.   Jurisdiction is proper in this Court pursuant to 28 U.S.C. §§ 1331 (Federal Question) and 1338(a) (Patents) because this is a civil action for patent infringement arising under the United States patent statutes.

3.   Plaintiff is a Texas limited liability company with its office address at 555 Republic Dr., Suite 200, Plano, Texas 75074.

4.   On information and belief, Defendant is a Delaware corporation with a principal place of business at 7628 Thorndike Rd., Greensboro, NC 27409. On information and belief, Defendant may be served through its registered agent, The Corporation Trust Company, at

1209 N. Orange St., Wilmington, DE.

5.   This Court has personal jurisdiction over Defendant because Defendant has committed, and continues to commit, acts of infringement in this District, has conducted business in this District, and/or has engaged in continuous and systematic activities in this District.

6.   On information and belief, Defendant's instrumentalities that are alleged herein to infringe were and continue to be used, imported, offered for sale, and/or sold in this District.

VENUE

7.   Venue is proper in this District pursuant to 28 U.S.C. §1400(b) because acts of infringement are occurring in this District and Defendant has a regular and established place of business in this District. For instance, on information and belief, Defendant has a regular and established place of business at 500 W. Renner Road, Richardson, TX 75080.

COUNT I
(INFRINGEMENT OF UNITED STATES PATENT NO. 7,069,546)

8.   Plaintiff incorporates paragraphs 1 through 7 herein by reference.

9.   This cause of action arises under the patent laws of the United States and, in particular, under 35 U.S.C. §§ 271, *et seq*.

10.   Plaintiff is the owner by assignment of the '546 Patent with sole rights to enforce the '546 Patent and sue infringers.

11.   A copy of the '546 Patent, titled "Generic Framework for Embedded Software Development," is attached hereto as Exhibit A.

12.   The '546 Patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code.

13.   On information and belief, Defendant has infringed and continues to infringe

one or more claims, including at least Claim 1, of the '546 Patent by making, using, importing, selling, and/or offering for sale a software platform for embedded software development, which is covered by at least Claim 1 of the '546 Patent. Defendant has infringed and continues to infringe the '546 Patent directly in violation of 35 U.S.C. § 271.

14.   Defendant, sells, offers to sell, and/or uses embedded software development packages including, without limitation, the QPG6095 Software Development Kit (SDK), and any similar products ("Product"), which infringe at least Claim 1 of the '546 Patent.

15.   QPG6095 SDK is a software development kit which is used for building innovative and new software applications for smart home communications controllers. QPG6095 SDK provides one or more generic application handler programs, each such program comprising computer program code for performing generic application functions common to multiple types of hardware modules used in a communication system. For example, QPG6095 SDK uses an Embedded Software Environment which includes a Hardware Abstraction Layer (HAL). The HAL further includes files such as Zigbee Cluster Library ("generic application handler") which provides source code comprising functions and data structures, which are common and uniform across Zigbee 3.0, Bluetooth LE, THREAD and other supported hardware modules. Certain elements of this limitation are illustrated in the screenshots below and in the screenshots referenced in connection with other elements herein.

QOYVO®

QPG6095 SDK
Product Brief

The QPG6095 Software Development Kit (SDK) enables customers to build innovative and new software applications using the Qorvo QPG6095 Zigbee / Thread / BLE Smart Home Communications Controller.

Key Features

HW Based Dynamic Multi-Protocol Support

The QPG6095 runs the stack and applications for Zigbee 3.0, Thread and/or Bluetooth Low Energy (BLE) devices. Integrated, HW based / OS independent, dynamic multi-protocol support enables stacks to operate concurrently, and on different channels, enabling innovative new applications combining Zigbee, Thread and/or BLE in one product.

Small Form Factor Designs

With the QPG6095, the product only needs a single radio to run all required IoT protocols through the same antenna(s), versus a single radio and antenna per protocol, which will significantly simplify the product design. Additionally, coexistence is inherently provided as the chip will take care of avoiding collisions and using the medium optimally.
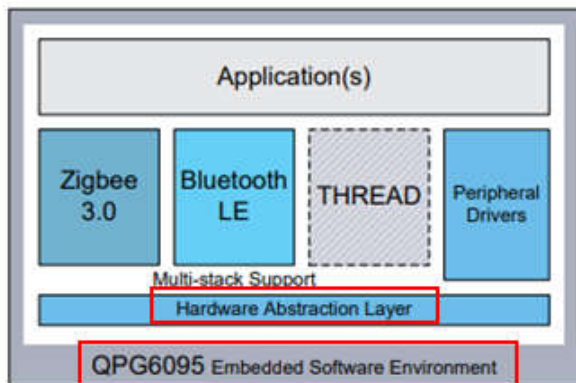
SDK Kit Contents

The SDK contains:

Source: https://www.qorvo.com/products/d/da006565, page 1.

Protocol Support

SDK Zigbee Cluster Library

Cluster ID	Server/ Client	Cluster
0x0000	S	Basic
0x0001	S	Power Configuration
0x0002	S	Device Temperature Configuration
0x0003	S C	Identify
0x0004	S	Groups
0x0005	S	Scenes
0x0006	S C	On / Off
0x0007	S	On/Off Switch Configuration
0x0008	S C	Level Control
0x000A	S	Time
0x000B	S	RSSI Location
0x0015	S	Commissioning
0x0019	C	OTA Upgrade
0x0020	S	Poll Control
0x0101	S	Door lock
0x0102	S	Window Covering
0x0201	S	Thermostat
0x0202	S	Fan Control
0x0203	S	Dehumidification Control
0x0300	S C	Color Control
0x0301	S	Ballast Configuration

Zigbee 3.0

This stack is fully compliant with the Zigbee 3.0 specification and is Zigbee 3.0 certified. It includes all commonly required Zigbee stack components; namely Zigbee Network Layer (NWK), Zigbee Application Support Layer (APS), Zigbee Device Object (ZDO), including the ZDO management plane and Zigbee Cluster Library.

- Supports EZ-mode and Touchlink commissioning
- Supports Zigbee Green Power Basic Functionality Set
- Includes Zigbee Green Power Proxy

See the table on the right for the list of clusters supported to facilitate customer application development.

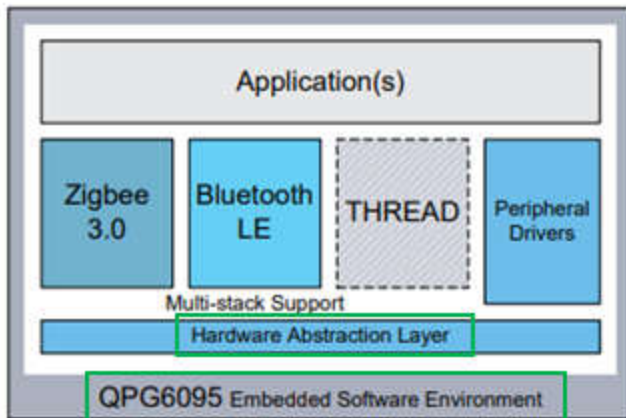Source: https://www.qorvo.com/products/d/da006565, page 2.

The SDK contains:

- Three (3) development boards, each containing:
  - The QPG6095 and RF circuitry
  - Flexible peripheral configuration to emulate various kinds of end products, with peripherals typically found on a Smart Home sensor device: buttons, LEDs, SPI Flash memory, temperature / humidity sensor, PIR sensor, etc.
  - Arm CMSIS-DAP debug and programming interface, supporting drag and drop.
  - USB interface for power, programming and serial interface
- Software, including:
  - Zigbee 3.0 and Bluetooth LE protocol stacks
  - Peripheral drivers
  - Various reference applications.
  - Tools for programming and debugging

Source: https://www.qorvo.com/products/d/da006565, page 1.

Protocol Support

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See the table on the right for the list of clusters supported to facilitate customer application development.

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SDK Zigbee Cluster Library

Cluster ID	Server/ Client	Cluster
0x0000	S	Basic
0x0001	S	Power Configuration
0x0002	S	Device Temperature Configuration
0x0003	S C	Identify
0x0004	S	Groups
0x0005	S	Scenes
0x0006	S C	On / Off
0x0007	S	On/Off Switch Configuration
0x0008	S C	Level Control
0x000A	S	Time
0x000B	S	RSSI Location
0x0015	S	Commissioning
0x0019	C	OTA Upgrade
0x0020	S	Poll Control
0x0101	S	Door lock
0x0102	S	Window Covering
0x0201	S	Thermostat
0x0202	S	Fan Control
0x0203	S	Dehumidification Control
0x0300	S C	Color Control
0x0301	S	Ballast Configuration
0x0400	S	Illuminance Measurement
0x0402	S	Temperature Measurement
0x0405	S C	Relative Humidity Measurement
0x0406	S C	Occupancy Sensing
0x040C	S	Carbon Monoxide (CO)

Source: https://www.qorvo.com/products/d/da006565, page 2.

16.   QPG6095 SDK generates specific application handler code to associate the generic application functions with specific functions of a device driver for at least one of the types of the hardware modules. For example, in addition to the generic drivers and HAL, QPG6095 SDK also includes specific application handler code, such as Bluetooth LE (BLE) peripheral functions, that is specific to the application and specific to particular microcontroller families such as Arm Cortex-M4 microprocessor with DSP functionality. Certain elements of this limitation are illustrated in the screenshots below and in the screenshots referenced in connection with other elements herein.

Peripheral Drivers

Various peripheral drivers are provided. Examples showing how to use the driver APIs are included.

- GPIO configuration and control
- ADC
- PWM (LED color)
- LED control (fading)
- SPI Master
- I²C Master
- UART

Integration and Test Components

- Zigbee coordinator test application
- BLE Central test application

Operating Environment

- C / C++ code
- IAR Embedded Workbench® projects. The SDK requires IAR version 7.40.1. IAR license required.
- Arm® Cortex®-M4 microprocessor with DSP functionality
- Arm CMSIS-DAP debug and programming interface, supporting drag and drop. SEGGER J-link debug probe.
- ASCII-based input/output encapsulated in a Qorvo frame format. Tools to decode the output and show as human readable text are available in the SDK.

Source: https://www.qorvo.com/products/d/da006565, page 3.

Reference Applications

The SDK provides the reference applications listed below.

Certain applications passed Zigbee 3.0 product certification, reducing risk of implementation and time to market for products integrating the QPG6095.

Certain Zigbee applications are extended with BLE peripheral functionality, allowing the device to be connected to a BLE central (i.e. a smartphone or tablet), enabling control of the Zigbee device over the BLE link.

Door/Window Sensor

- Sleepy End Device
- Power optimized
- IAS Zone
- Temperature Measurement
- OTA Upgrade
- Zigbee 3.0 product certified; see zigbee.org

Light

- Router
- Color Light
- Dimmable Light
- Turn key solution supporting simple product specific PWM driver integration
- OTA Upgrade
- Zigbee 3.0 product certified
  - Color Light: see zigbee.org
  - Touchlink enabled Dimmable Light: see zigbee.org
- BLE enabled control

Occupancy Sensor

- Sleepy End Device
- IAS Zone
- Temperature Measurement
- OTA Upgrade

Shutter Control

- Router
- Window Covering
- Temperature Measurement
- OTA Upgrade

Indoor Environment Sensor

- Green Power Device
- Temperature Measurement
- Illuminance Measurement
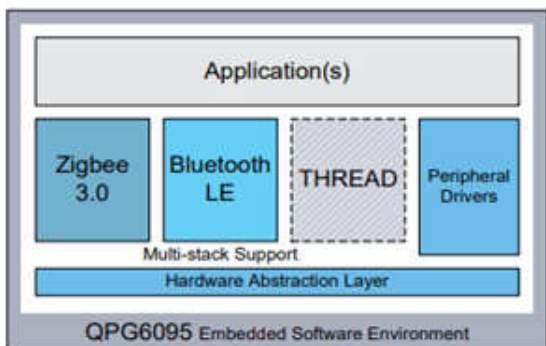- Relative Humidity Measurement

Peripheral Drivers

Various peripheral drivers are provided. Examples showing how to use the driver APIs are included.

- GPIO configuration and control
- ADC
- PWM (LED color)
- LED control (fading)
- SPI Master
- I^{2}C Master
- UART

Source: https://www.qorvo.com/products/d/da006565, page 3.

17.   QPG6095 SDK generates specific application handler code and defines a specific element in the specific code to be handled by one of the generic application functions for that hardware module.   For example, QPG6095 SDK includes Zigbee Cluster Library (ZCL) comprising defined ZCL functions corresponding to specific hardware modules (such as Arm Cortex-M4 microprocessor) that extend or otherwise connect the system-specific application handler code and data structures made available by the generic application handler code of the SDK. Certain elements of this limitation are illustrated in the screenshots below and in the screenshots referenced in connection with other elements herein.

Protocol Support

SDK Zigbee Cluster Library

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See the table on the right for the list of clusters supported to facilitate customer application development.

Source: https://www.qorvo.com/products/d/da006565, page 2.

18.   QPG6095 SDK compiles the generic application handler programs together with the specific application handler code to produce machine-readable code to be executed by an embedded processor in the at least one of the types of the hardware modules. For example, when a specific application is needed for a particular hardware, the generic functions and the specific functions are compiled together to yield a machine readable code. Qorvo and/or its customers compile the generic functions and the specific functions using QPG6095 SDK and/or any other compiling SDK supported by Qorvo. Certain elements of this limitation are illustrated in the screenshots below and in the screenshots referenced in connection with other elements herein.

Integration and Test Components

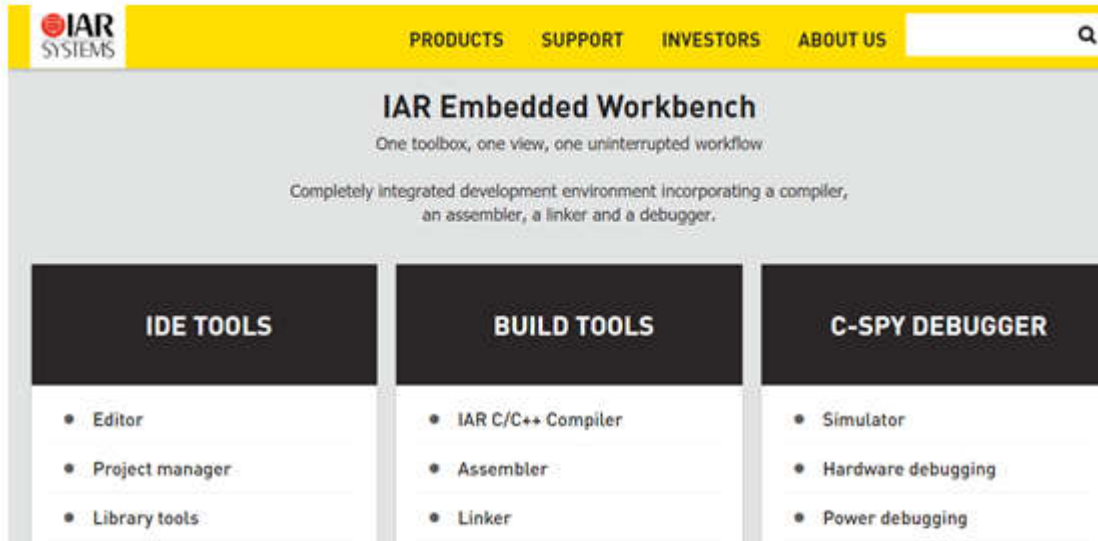- Zigbee coordinator test application
- BLE Central test application

Operating Environment

- C / C++ code
- IAR Embedded Workbench® projects. The SDK requires IAR version 7.40.1. IAR license required.
- Arm® Cortex®-M4 microprocessor with DSP functionality
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- ASCII-based input/output encapsulated in a Qorvo frame format. Tools to decode the output and show as human readable text are available in the SDK.

Source:
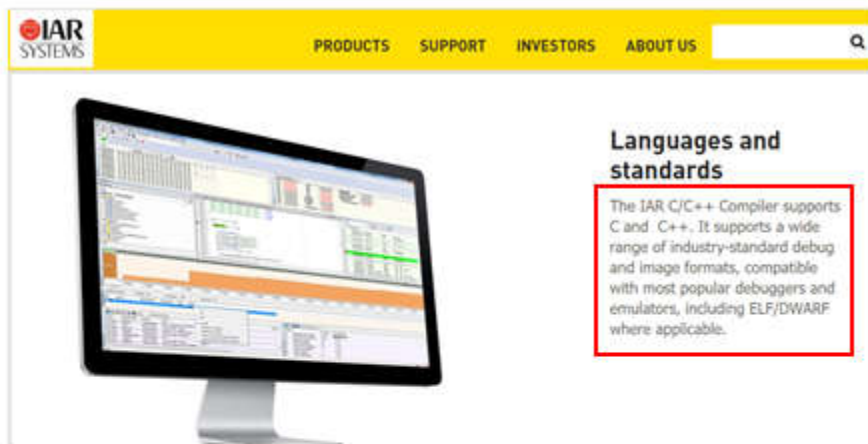https://www.qorvo.com/products/d/da0065
65, page 3

Source: https://www.iar.com/iar-embedded-workbench/#!?architecture=Arm&currentTab=features&readMoreBlock=Build%2520tools

Source: https://www.iar.com/iar-embedded-workbench/language-standards/

The IAR C/C++ compilers offer different dialects of the C and C++ programming languages, as well as different extensions specific for embedded programming (please note that not all language standards are supported for all target implementations). The compiler can be instructed to disable extensions for strict conformance to the standards.

A wide range of industry-standard debug and image formats compatible with most popular debuggers and emulators are supported. This includes ELF/DWARF where applicable.

ISO/ANSI C/C++ Compliance

The IAR C/C++ compilers adhere to a freestanding implementation of the following C programming language standards:

- ISO/IEC 14882:2015, known as C++14
- ISO/IEC 9899:2012, known as C11
- ANSI X3.159-1989, known as C89

IEEE 754 standard

IAR Embedded Workbench supports the IEEE 754 standard for floating-point arithmetic.

Source: https://www.iar.com/iar-embedded-workbench/language-standards/

19.   Defendant's actions complained of herein will continue unless Defendant is enjoined by this court.

20.   Defendant's actions complained of herein are causing irreparable harm and monetary damage to Plaintiff and will continue to do so unless and until Defendant is enjoined and restrained by this Court.

21.   Plaintiff is in compliance with 35 U.S.C. § 287.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff asks the Court to:

(a)   Enter judgment for Plaintiff on this Complaint on all causes of action asserted herein;

(b)   Enter an Order enjoining Defendant, its agents, officers, servants, employees, attorneys, and all persons in active concert or participation with Defendant who receive notice of the order from further infringement of United States Patent No. 7,069,546 (or, in the

alternative, awarding Plaintiff a running royalty from the time of judgment going forward);

(c)   Award Plaintiff damages resulting from Defendant's infringement in accordance with 35 U.S.C. § 284;

(d)   Award Plaintiff pre-judgment and post-judgment interest and costs; and

(e)   Award Plaintiff such further relief to which the Court finds Plaintiff entitled under law or equity.

Dated: January 31, 2019   Respectfully submitted,

                                           /s/ Jay Johnson
                                           JAY JOHNSON
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                                           ATTORNEYS FOR PLAINTIFF

EXHIBIT A