

Edgecore ECW5410

Wireless Access Point Specification

Revision 1.3



OPEN
Compute Project

Revision History

Revision	Date	Author	Description
.01	2/21/2016	Jeff Catlin	Initial Draft
1.0	3/6/2017	Jeff Catlin	Initial release
1.1	8/4/2017	Jeff Catlin	Minor edits to license text
1.2	3/7/2018	Jeff Catlin	Added additional content
1.3	3/13/2018	Jeff Catlin	Added information on Flash programming

Contents

Revision History.....	2
Licenses	5
Scope.....	7
Overview	7
System Specifications.....	7
Physical Overview	9
Dimensions.....	9
Top View.....	10
LEDs.....	11
Front View	11
System Overview:	13
Main PCB Block Diagram	13
PCB Board mechanical outline	14
PCB	14
PCB Dimensions.....	14
PCB Top view.....	15
PCB bottom view.....	16
CPU Subsystem	16
Console Port.....	17
Thermal Monitoring	17
Current Monitoring.....	17
TPM	17
Detailed Block Diagram.....	18
2.4 GHz Radio Block Diagram.....	19
5 GHz Radio Block Diagram.....	20
Clock Tree.....	21
Power Tree.....	22
Reset Tree	23

I2C Interface	24
Software Support	25
U-Boot	25
ONIE	25
Flash Programming	25
Specifications	26
Power Consumption	26
Regulatory Compliances	26
Radio Regulatory Compliance	26
EMC	26
Safety & ESD	26
Environmental	27
ROHS	27

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Description	Manufacturer	Part Number
CPU	Qualcomm	IPQ8068
RF 5G	Qualcomm	QCA9994
RF 2.4G	Qualcomm	QCA9994
DDR III	Winbond	2x W631GU6KB-12 64Mb x 16 SDRAM
NOR Flash	Macronix	MX25U12835FMI-10G
NAND Flash	Spansion	S34MS01G200BHV000
PHY	Qualcomm	2 x QCA8033
TPM	Atmel	AT97SC3204T
PoE Power Converter	TI	TPS23751
Bluetooth Radio (optional)	TI	CC2540/1BLE

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Scope

This document outlines the technical specifications for the Edgecore ECW5410 Open Wireless Access Point submitted to the Open Compute Foundation.

Overview

The ECW5410 is an indoor 802.11ac Wave 2 4x4 802.11 a/b/g/n/ac dual-band, dual-radio Enterprise Access Point.

Through its two Gigabit Ethernet ports the 802.11ac dual-band wireless Access Point can connect to the backbone network. The ECW5410 supports 802.3at/af PoE which enables the Access Point to be powered remotely by a PoE switch. An AC power adapter option is also available for locations where PoE is not available.

The ECW5410 is designed so that it can easily be wall mounted or ceiling mounted to T-Bars.

System Specifications

ECW5410 Hardware System Specifications	
Processor	Qualcomm IPQ8068 Akronite Krait host processor for enterprise access point 1. Dual-core 1.4GHz 2. 1MB L2 cache
Giga Ethernet	Two RJ45 ports 1Gbps Full/Half Duplex Ethernet; with one Power over Ethernet.(PoE) support
Console Interface	One RS232 console in RJ45 connector
TPM	Stuff optional TPM
SPI Flash	MX25U12835FMI-10G 128Mb
Power over Ethernet (PoE)	802.3at PD compliant
USB	Support 1x USB2.0 host port with type-A connector
LED	1. [Power], [Eth1], [Eth2] : Green & Red dual-color LEDs ; 2. [5G-WiFi], [2.4G-WiFi]: Green & orange dual-color LEDs
RESET BUTTON	1. Connected to GPIO for SW reset 2. MOM tactile switch

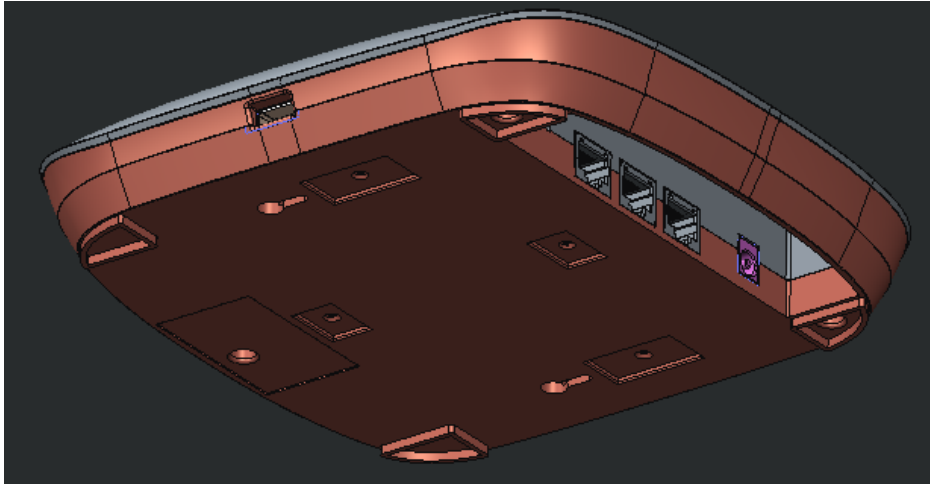
WiFi Radios	2x Qualcomm QCA9994 Cascade 1. Traffic Radio. 4x4 WLAN SoC for 5 GHz 802.11ac or 2.4 GHz 802.11n 2. 20/40 MHz at 2.4 GHz 3. 20/40/80/160 MHz at 5 GHz 4. MU-MIMO with beam-forming support
WiFi Antenna	4x internal 2.4/5GHz dual-band WiFi omni-directional antennas (through diplexer circuits to combine 2.4GHz & 5GHz radios) 1.
BLE/Bluetooth Radio	1x Texas Instruments CC2540/1BLE (stuff option)
BLE/Bluetooth Antenna	1x internal 2.4GHz single band BLE antenna (option when BLE radio is populated)
System Power	
POE Power Required	PoE 802.3at compliant, 37VDC to 57VDC, 22.5W Maximum power consumption.
DC Power Adapter	DC 12V input through external AC-DC power adapter

Physical Overview

Dimensions

	Inches	Millimeters
Length	7.7	195
Width	7.7	195
Height	1.4	35.5





Top View

The top view of the ECW5410 shows the following



LEDs

PWR	AP power / ready status	Off	No power to AP
		Red	Initial power-up condition
		Flashing – Green	Device booting, not ready
		On – Green	Device ready
ENET0	Ethernet Network Link Status / Activity	Off	Ethernet link unavailable
		On – Red	10/100/1000Mbps Ethernet Link /Active
		On – Green	10/100/1000Mbps Ethernet blinking
ENET1	Ethernet Network Link Status / Activity	Off	Ethernet link unavailable
		On – Red	10/100/1000Mbps Ethernet Link /Active
		On – Green	10/100/1000Mbps Ethernet blinking
11b/g/n	2.4GHz Radio Status	Off	2.4GHz radio disabled
		On –Orange	2.4GHz radio enabled in non-HT WLAN mode
		On – Green	2.4GHz radio enabled in HT WLAN mode
		Flashing – Green	2.4GHz Air Monitor
11a/n/ac	5GHz Radio Status	Off	5GHz radio disabled
		On –Orange	5GHz radio enabled in non-HT WLAN mode
		On – Green	5GHz radio enabled in HT WLAN mode
		Flashing – Green	5GHz Air Monitor

Front View



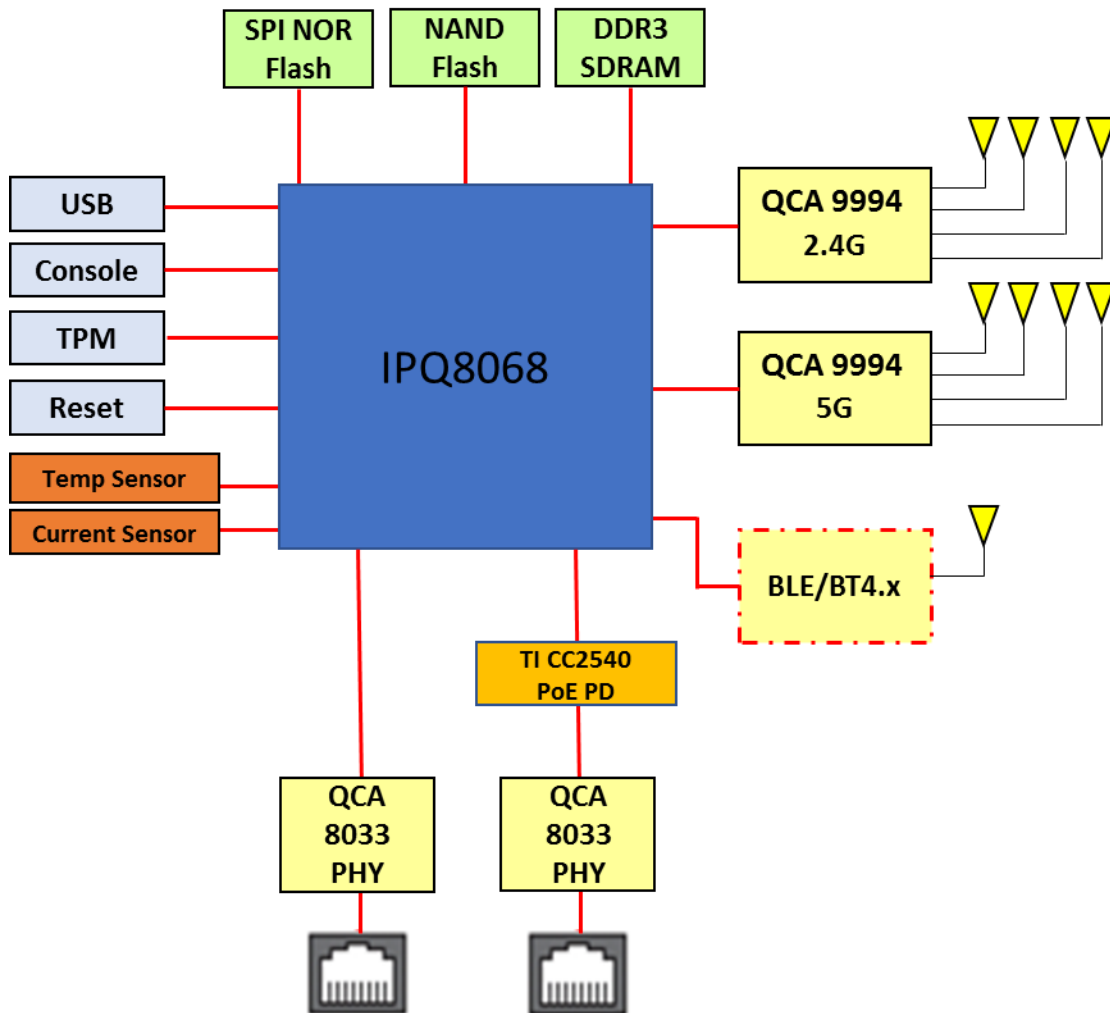
The front panel view of the ECW5410 includes the following key components:

- Reset button
 - Used to reset the CPU and associated components
- 12V power jack
 - Used with optional external 12V power module
- Eth0/PoE Gb Ethernet port

- Used for network connectivity and to power device through PoE
- Eth 1Gb Ethernet port
 - Used for network connectivity
- Console port
 - Used for serial communication to the device
- USB 2.0 Host port (side of unit)

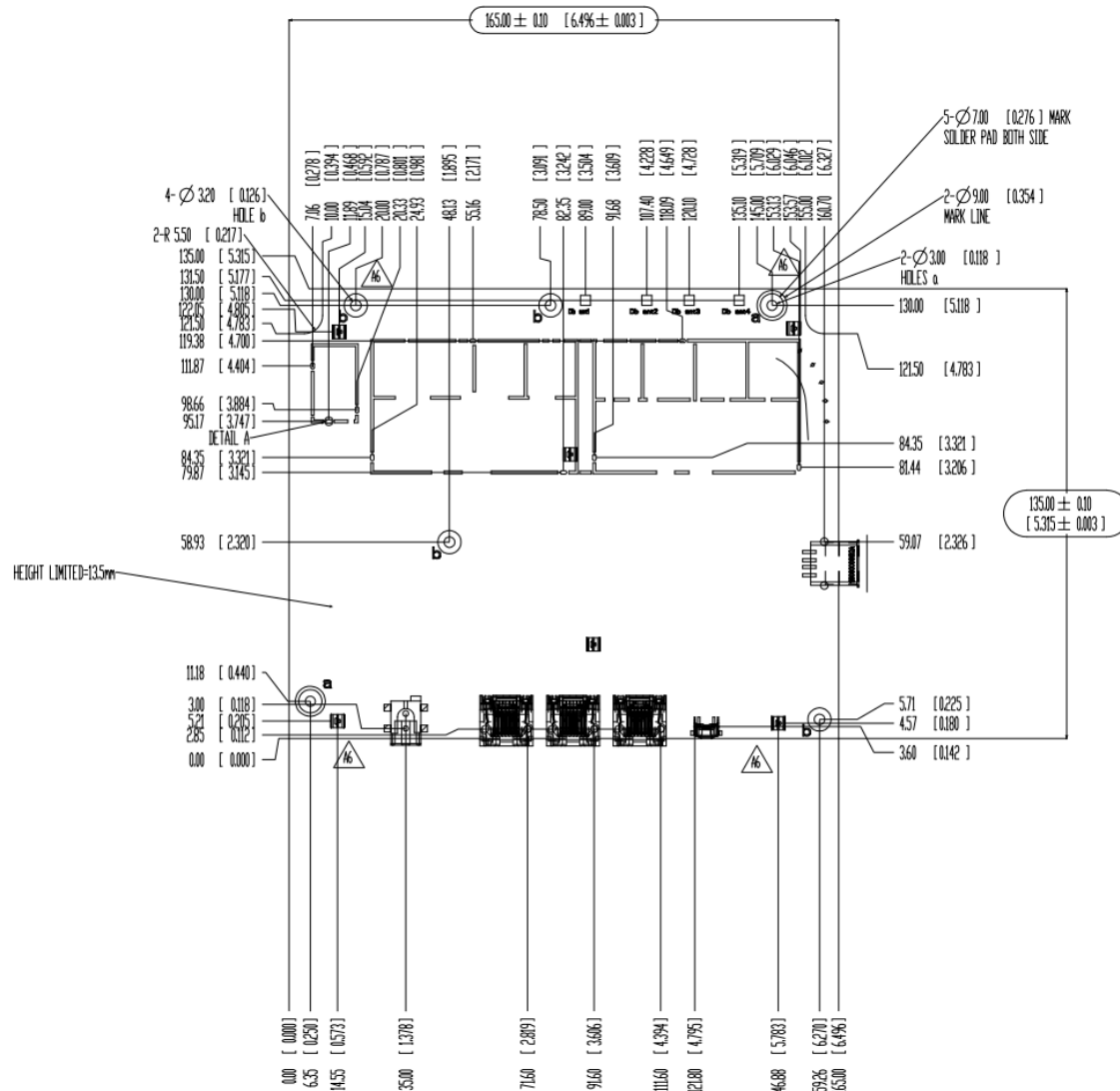
System Overview:

Main PCB Block Diagram



PCB Board mechanical outline

The ECW5410 is composed of 8 layer PCB assembly:



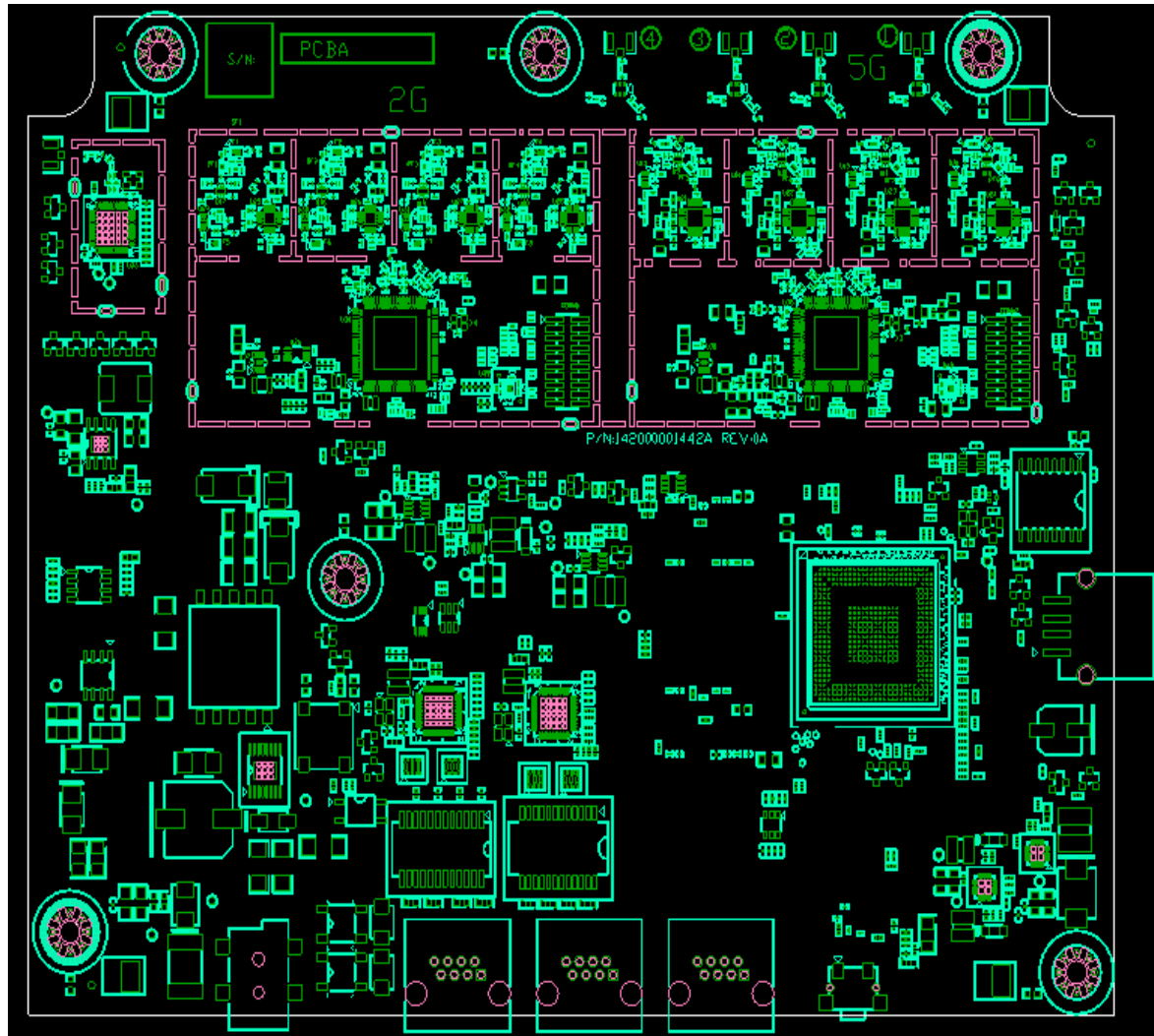
PCB

The ECW5410 PCB is an eight layer board supporting the CPU and radio silicon, front panel networking and management ports, and LEDs.

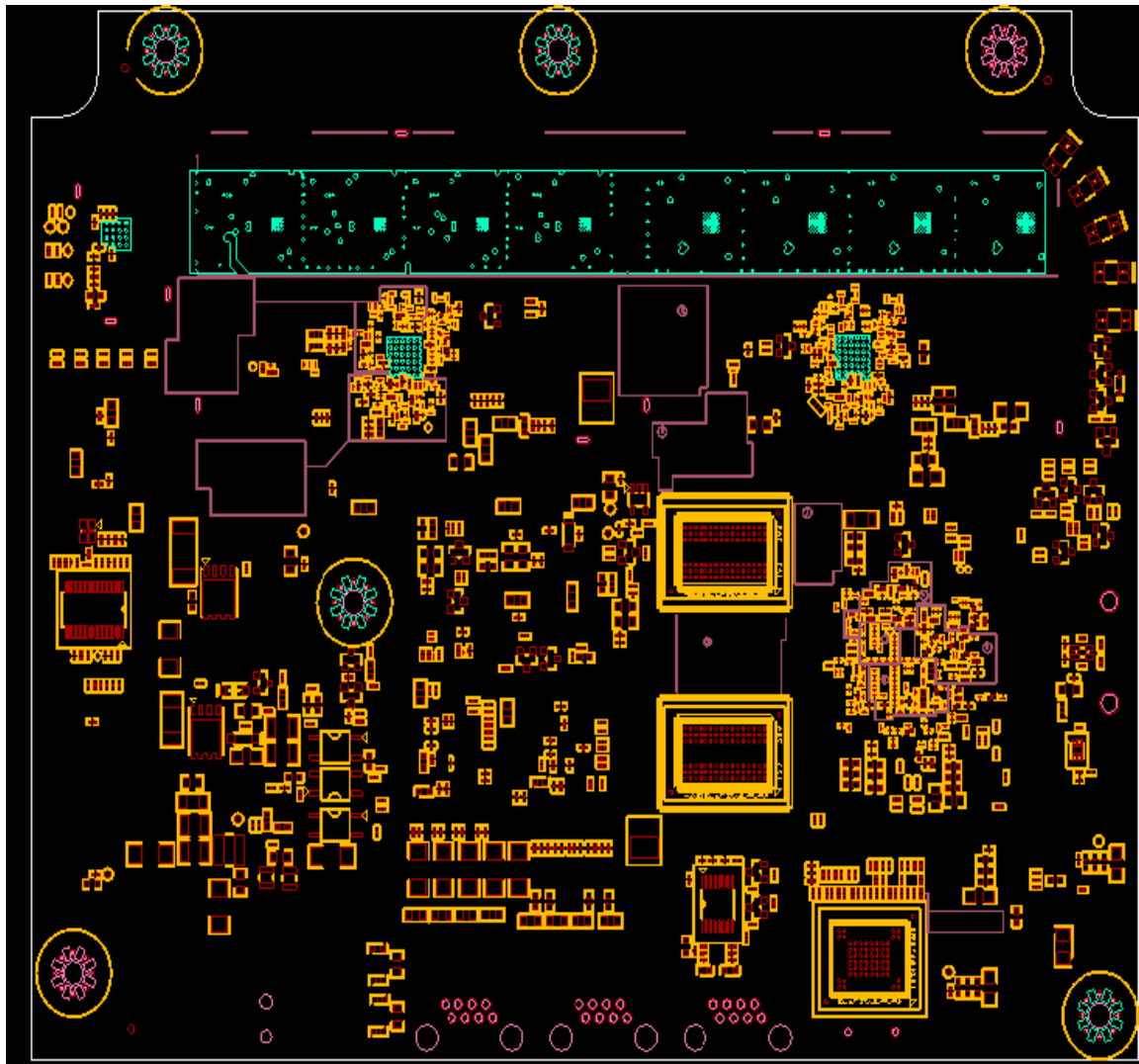
PCB Dimensions

	Inches	Millimeters
Length	5.3	135
Width	6.5	165

PCB Top view



PCB bottom view



CPU Subsystem

The ECW5410 utilizes the Qualcomm IPQ48068 communications processor supporting the following:

- NOR Flash 16Mbytes
- NAND Flash 128Mbytes
- DDR III 256Mbytes

Console Port

A RJ45 connector is located on the front panel equips with DTE configuration for console usage. A special cable to translate the RJ45 to DB9 is used with the pin out is shown below. In the list below, the directions 'IN' and 'OUT' are relative to the board. (i.e. 'IN' means input to the board)

RJ45 Pin#	DB9 Pin#	Mnemonic	Detail	Direction
7	1	DCD	Data Carrier Detect	IN
6	2	RXD	Receive Data	IN
3	3	TXD	Transmit Data	OUT
2	4	DTR	Data Terminal Ready	OUT
4,5	5	Sig. GND	Signal Ground	–
-	6	DSR	Data Set Ready	IN
1	7	RTS	Request To Send	OUT
8	8	CTS	Clear To Send	IN

Thermal Monitoring

The ECW5410 supports a Texas instruments TMP423AID thermal sensor used to monitor system temperature.

Current Monitoring

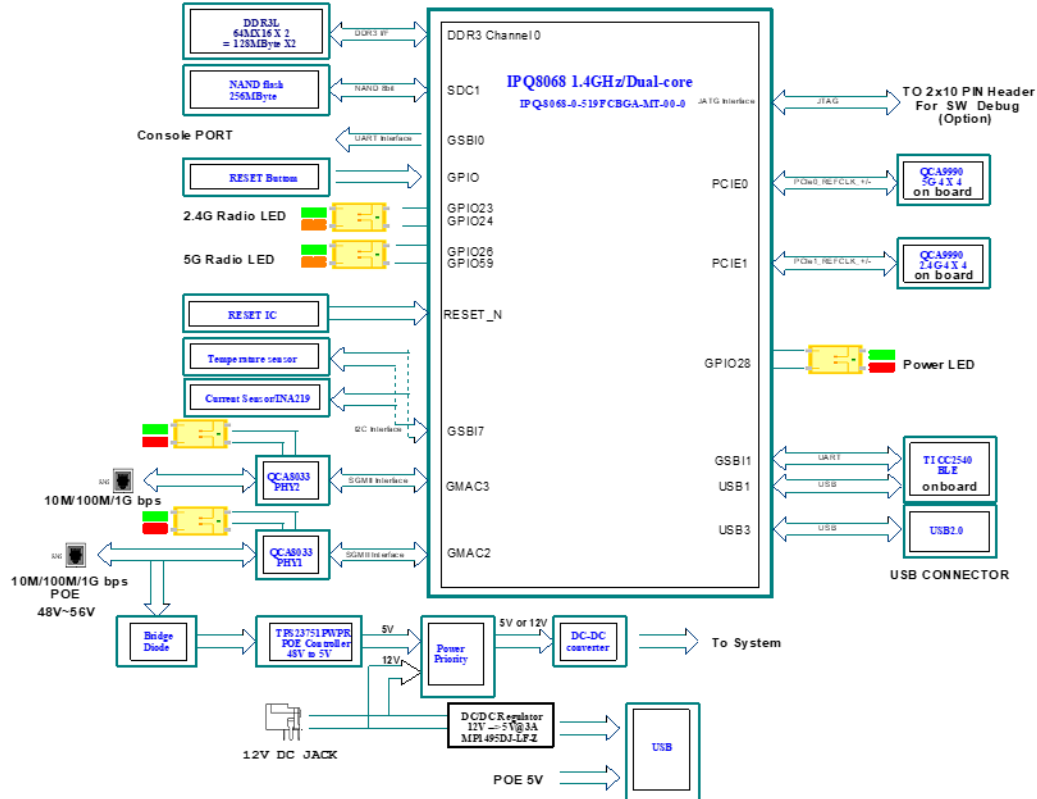
The ECW5410 supports a Texas Instruments INA219 for monitoring system current.

TPM

The ECW5410 supports the AT97SC3205T which is a fully integrated security module designed to be integrated into embedded systems and implements version 1.2 of the Trusted computing Group (TCG) specification.

Detailed Block Diagram

FMA-HW01008-01 R01

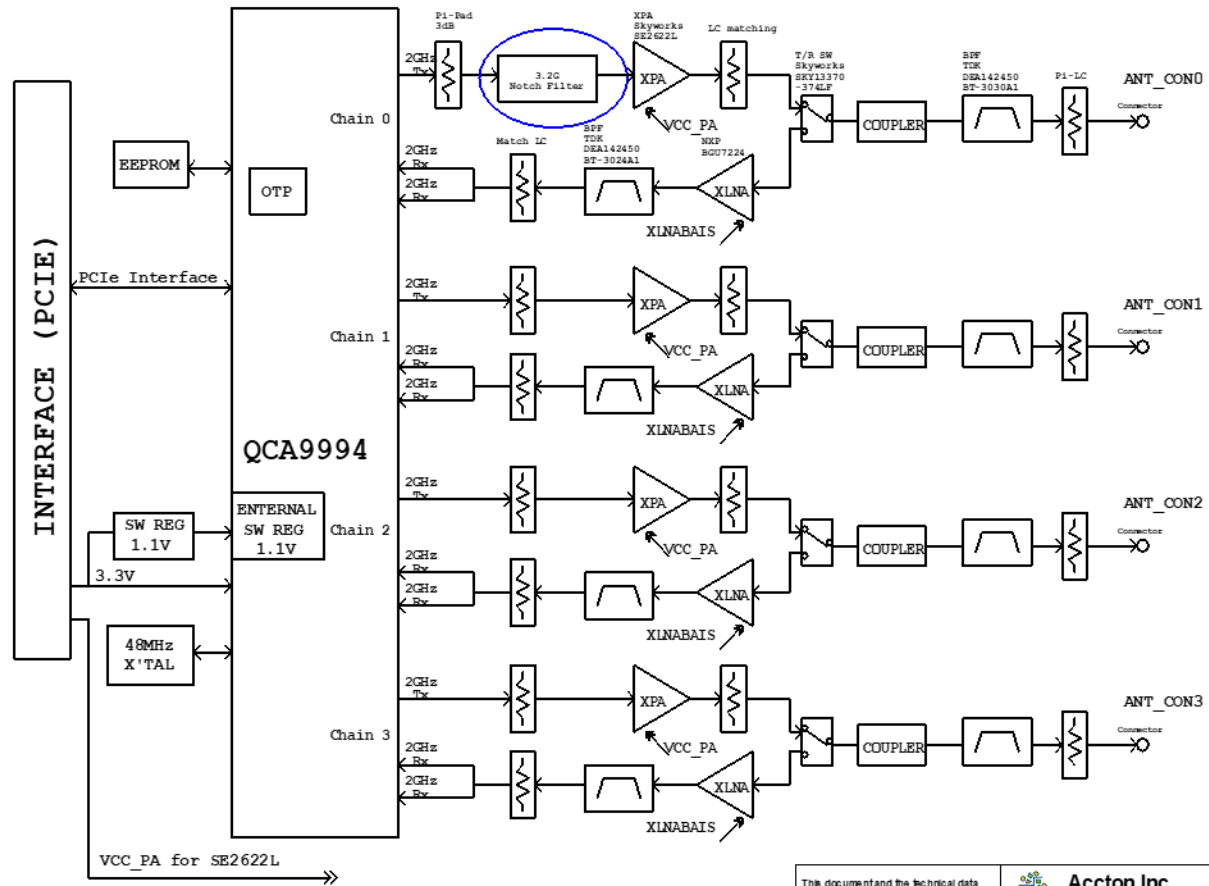


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 Accton Inc. Making Partnership Work		Rev. PGA
Model Name EAP1024A-V2-2015-ZZ		
File C	Page Name 02 System Block Diagram	Engineer Yin Lee

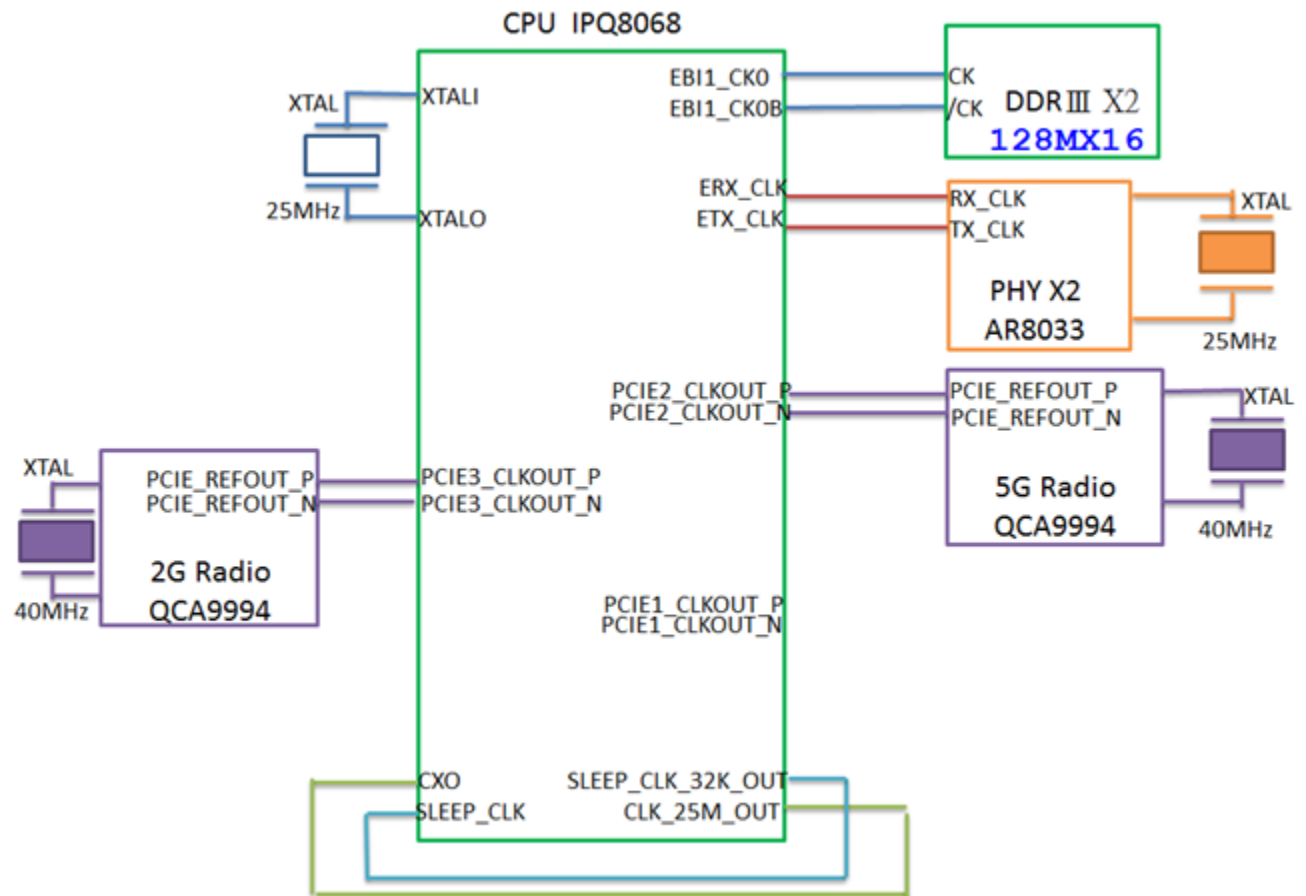
2.4 GHz Radio Block Diagram

FMA-HW01008-01 R01

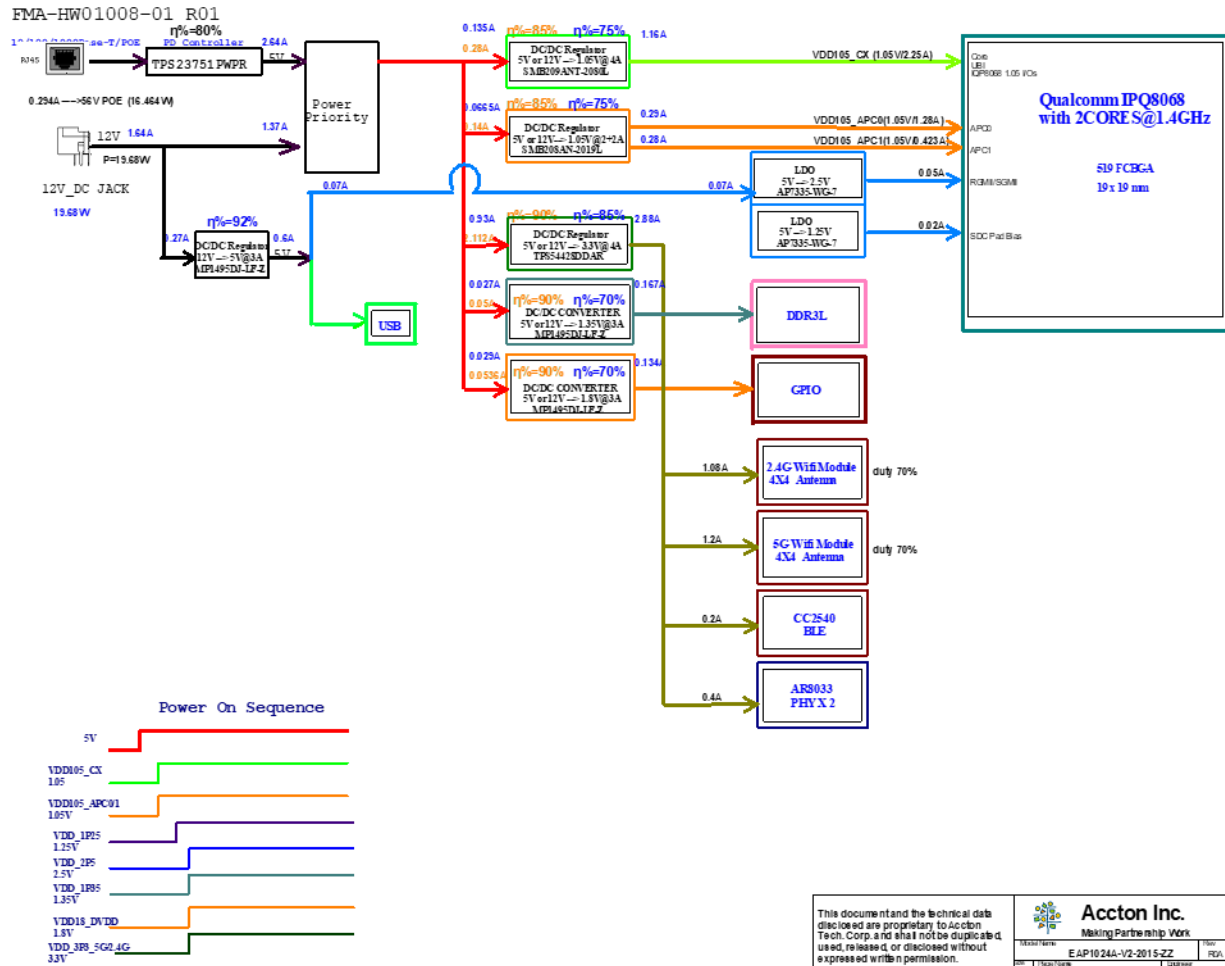


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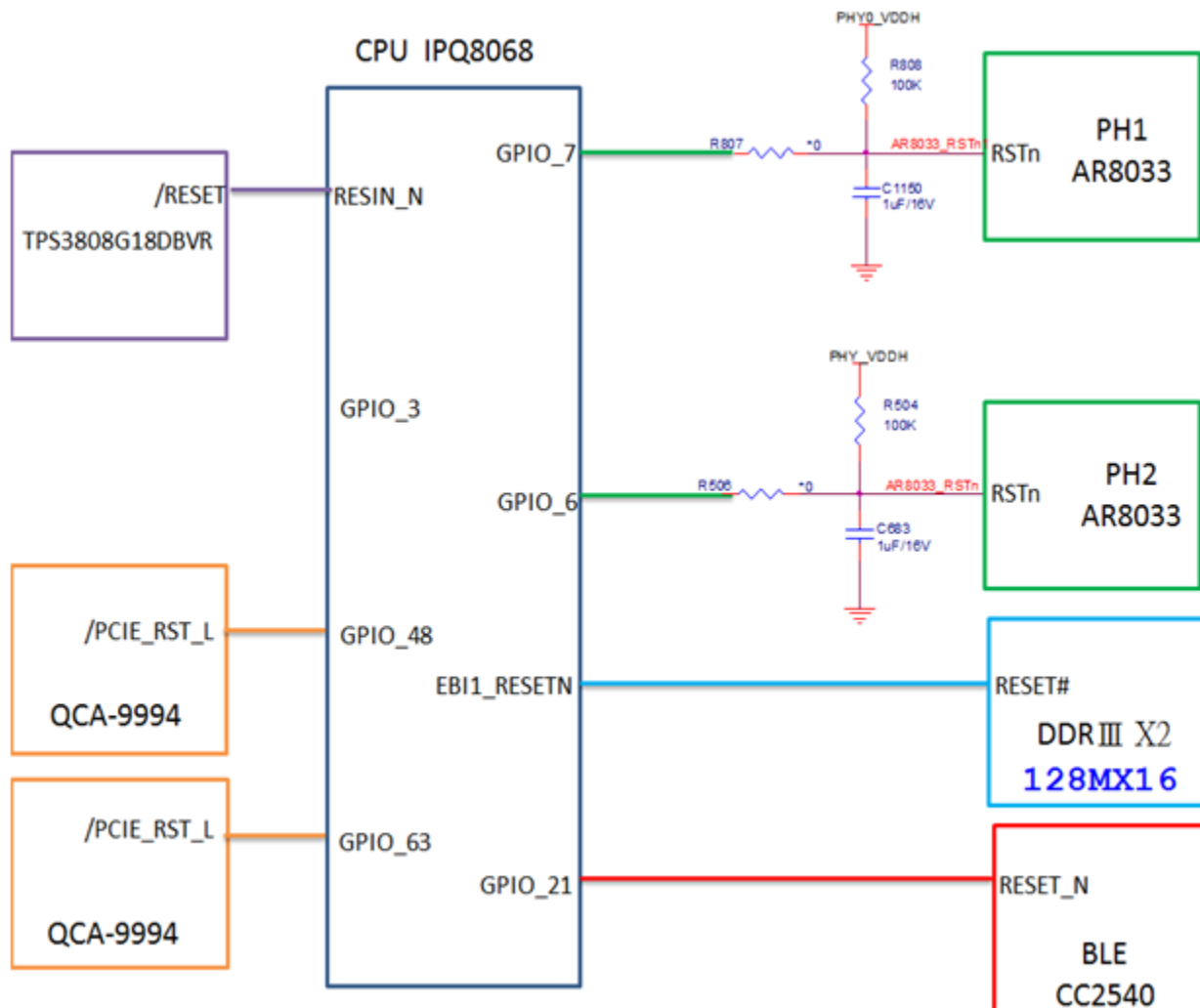
Clock Tree



FMA-HW01008-01 R01



Reset Tree





Software Support

The ECW5410 supports a base software package composed of the following components:

U-Boot

The EC5410 supports U-Boot version U-Boot 2012.07 or newer

ONIE

The ECW5410 supports ONIE version 2017.02-rc1

Please check <http://onie.org/> for the latest supported version

Flash Programming

The NOR Flash is pre-programmed before shipment and includes the basic boot-up software for the device. The Flash is programmed with a programming tool such as the one listed below:

Vendor - Advantech

Model - Lab Tool-848 Model ALL-100A

<http://www.aec.com.tw/LT-848XP.htm>

Specifications

Power Consumption

The total estimated system power consumption of the ECW5410 is ~20.14 Watts. This is based upon worst case power assumptions for traffic and environmental conditions. Typical power consumption will be less.

Regulatory Compliances

The ECW5410 is designed and validated to comply with the following standards

- FCC part 15B, 15C, and 15E
- CE EN 300 328, EN 301 489-1&-17, CE EN 301 893, EN60601-1-2
- EMI: FCC/CE class B,
- DFS (software dependent)
- R&TTE Directive 1995/5/EC
- Low Voltage Directive 72/23/EEC
- EN 300 328
- EN 301 489
- EN 301 893
- UL/IEC/EN 60950
- EN 60601-1-1, EN60601-1-2

Radio Regulatory Compliance

- FCC
 - 2.4GHz: FCC part 15C 15.247
 - 5GHz: FCC part 15C 15.247 + part 15E 15.407
 - Band-2 & Band-3 DFS: option (software dependent)
- CE
 - 2.4GHz: EN 300 328 V1.8.1
 - 5GHz: EN301 893 V1.7.1

EMC

- FCC
 - FCC Part 15, Subpart B
- CE
 - EN55022+24:2010 Class B
 - EN 301 489-1 V1.9.2
 - EN 301 489-17 V2.2.1

Safety & ESD

- UL/IEC/EN 60950
- EN 60601-1-1, EN60601-1-2

Environmental

- Weight .98 g (2.16 lb)
- Temperature: IEC 68-2-14
 - +0 to +50 degrees C (Operating)
 - -20 to 70 degree C (Non-operating)
- Humidity: 5% to 95% (Non-condensing)
- Climatic: IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-14, IEC 60068-2-30, IEC 60068-2-40, IEC 60068-2-41
- Vibration and Shock Test: IEC 60068-2-64, IEC 60068-2-6, IEC 60068-2-27
- Bump Test: IEC 68-2-29
- Drop Test: IEC 60068-2-31

ROHS

Restriction of Hazardous Substances (6/6)

Compliance with Environmental procedure 020499-00 primarily focused on Restriction of Hazardous Substances (ROHS Directive 2002/95/EC) and Waste and Electrical and Electronic Equipment (WEEE)