

Theory of Operation/Technical Description

FCC ID: HZB-MEGA5

IC: 1856A-MEGA5

The EdgeAX 5 GHz radio module is based on Qualcomm QCN6102, 802.11ax WiFi radio chipset operating in 2x2 MIMO mode. It is designed to be used in Proxim Stratum X3 or Stratum X1 host device.

Both Stratum X3 and X1 are based on Qualcomm IPQ5018 Dual Core ARM Cortex 64-bit A53 1.0GHz processor 'Maple Series. IPQ5018 is an SoC for 11ax Wi-Fi Access Points, Retail Routers and Carrier Gateways. The chip consists of a networking subsystem, and a CPU subsystem.

Differences between Stratum X3 and Stratum X1 are based on the Ethernet controller and number of available ethernet ports:

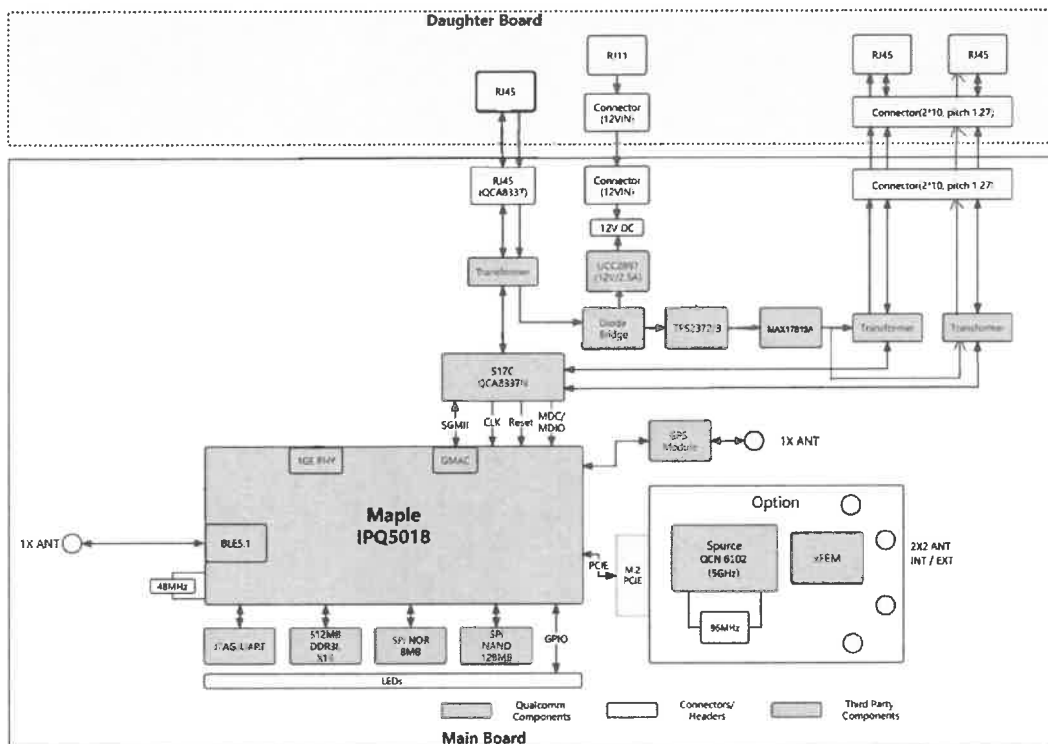
Stratum X3 uses Qualcomm QCA8337N ethernet controller and provides three 1Gbps ports

Stratum X1 uses Qualcomm IPQ5018 built in ethernet controller and provides one 1Gbps port

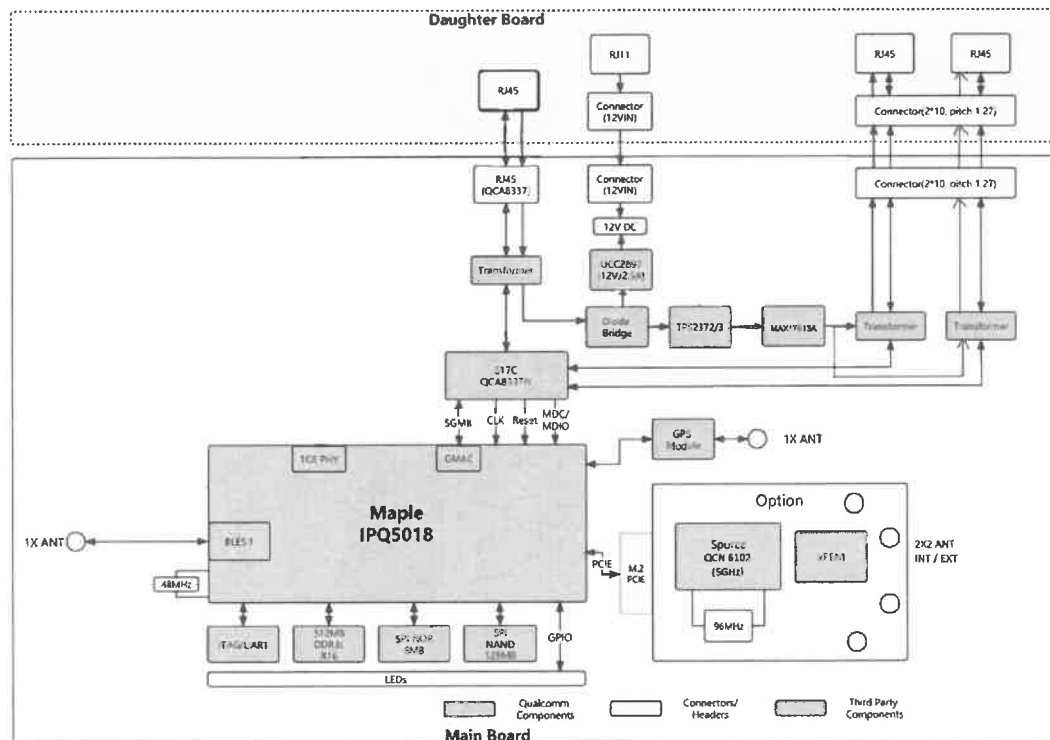
The Stratum™ X3 and X1 are highly efficient radio endpoints that deliver up to one gigabit throughput in both point-to-point and multipoint wide area network configurations. Able to operate in MIMO 2x2, with either integrated or external antenna (software switchable on some variant), the Stratum™ X3 and X1 are ideally suited to backhaul, video surveillance, or multipoint deployments.

Powered by Proxim Worp® (Wireless Outdoor Router Protocol), managed via web GUI, CLI, Bluetooth-enabled Proxim BlueConnect™ and SNMP for ProximVision® Advanced, these platform offer advanced Quality of Service, granular service level management, and very secure networking.

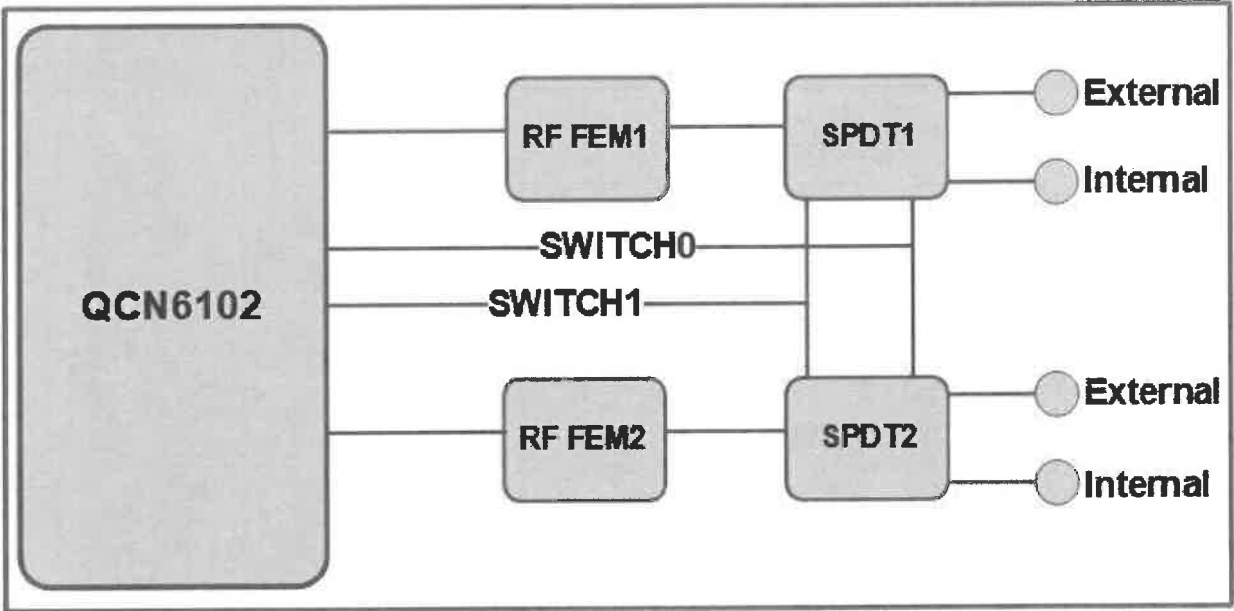
Stratum X3 Block Diagram:



Stratum X1 Block Diagram:



EdgeAX Radio module Block Diagram:



RF circuit function:

The RF circuit in this device has two major functional blocks, one is transmitter, and another is receiver. The transmitter transmits the signal through antenna and the receiver receives the signal through antenna in 5.15 to 5.85 GHz frequency band. Each time only one function should work, that means it is operated in half duplex mode while in transmission the receiver is in silent and while in reception the transmitter is in silent.

RF signal flow:

Transmission flow:

1. Processor generates the base band signal
2. RF transceiver converts the base band signal into RF signal with lower amplitude.
3. The lower amplitude RF signal should be boosted by using RF power amplifier.
4. RF switch connects to Power amplifier side.
5. Band pass filter allows the required band of RF signals and rejects remaining unwanted signals.
6. RF switch allows connecting one way to antenna that is integrated or external.
7. Antenna radiates the signal in air.

Receiver flow:

1. Antenna receives the radiated signal from the air
2. RF switch allows connecting one way to antenna that is integrated or external.
3. Band pass filter allows the required band of RF signals and rejects remaining unwanted signals.
4. RF switch connects to LNA to boost the signal level to a higher level.
5. Balanced to unbalanced circuit converts single end signal into differential pair to reach information to RF transceiver chipset.
6. RF transceiver chip converts the RF signal into base band signal.
7. Processor generates base band information from the base band signal which is received

Antenna system:

Stratum X3 and X1 are equipped with nonstandard Reverse Polarity SMA connectors for external antenna connection. As specified in the Safety and Regulatory Guide. The system must be professionally installed and can be used with the following type of antennas.

Frequency Band	Antenna Type	Maximum Gain (dBi)
5.150 – 5.250 GHz / 5.745 - 5.825 GHz	Panel	28
	Omni Directional	12
	Sector	21
5.745 - 5.825 GHz	Parabolic Dish	35

Stratum X3 and X1 are also equipped with integrated antenna with pigtail U.FL connector directly connected on the onboard radio of the mother board

Stratum X3.

Frequency Band	Antenna Type	Maximum Gain (dBi)
5.150 – 5.250 GHz / 5.745 - 5.825 GHz	Panel	23

Stratum X1.

Frequency Band	Antenna Type	Maximum Gain (dBi)
5.150 – 5.250 GHz / 5.745 - 5.825 GHz	Panel	15

Stratum X3 and X1 includes BLE (IPQ5018 main chipset itself supports) with PFA antenna on the mother board.

Modulation schemes:

EdgeAX module supports OFDMA modulation type.

It supports OFDMA: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM modulation schemes.

