

Hardware Specification	
Configuration	Triple-radio 2x2 802.11n Mesh Node
Design License	Open-source Hardware
Firmware	LibreMesh (based on OpenWrt 18.06.1)
Main chip	MCU: Atheros QCA9558 RF: QCA9558 2T2R GE PHY: QCA8337N (10/100/1000)
RF	Radio 1: 2.4G 802.11b/g/n + LNA + PA, 2T2R (QCA9558) Radio 2: 5G 802.11a/n + LNA + PA, 2T2R (AR9582 mPCI) Radio 3: 5G 802.11a/n + LNA + PA, 2T2R (AR9582 mPCI)
Memory	128MB RAM DDR2
Flash	16MB NOR Flash
Hardware Watchdog	ATTiny13 available via GPIO
Physical Interface	2 x Gigabit Ethernet RJ-45 2 x Gigabit Ethernet ports available (internal) 1 x USB 2.0 connector 1 x USB 2.0 connector (internal, inside enclosure) 1 x serial console 3.3V 115200 8N1 (internal header on the board) 1 x push button (reset) 1 x 2.4 RF Tx header (2.4GHz Ant_A, 2.4GHz Ant_B, GND) 1 x GPIO pin header 8 x Status LEDs, software controllable through GPIO

Radio Specification			
Radio 1			
Frequency Band	802.11b/g/n 2412-2472 MHz		
Supported Data Rate	802.11b: 1, 2, 5.5, 11 Mbps		
	802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps		
	802.11n: 6.5 Mbps - 130 Mbps (20MHz), 13.5 - 300 Mbps (40MHz)		
RF Shield	Included, to block cross-interference with other radios		
Mode	Data Rate	Typical AVG. TX Power Per-Chain (dBm) Tolerance = +/- 2dB At board connector @chan 11	Typical RX Sensitivity Per-Chain (dBm) Tolerance = +/- 2dB
	802.11b	1 Mbps	-95
		11 Mbps	-87
	802.11g	6 Mbps	-88
802.11n_HT20		54 Mbps	-73
	MCS 0/8 (BPSK)	19	-88
	MCS 1/9 (QPSK)	19	-85
	MCS 2/10 (QPSK)	19	-83
	MCS 3/11 (16-QAM)	19	-79
	MCS 4/12 (16-QAM)	19	-76
	MCS 5/13 (64-QAM)	19	-72
	MCS 6/14 (64-QAM)	19	-70
802.11n_HT40	MCS 7/15 (64-QAM)	19	-68
	MCS 0/8 (BPSK)	19	-85
	MCS 1/9 (QPSK)	19	-83
	MCS 2/10 (QPSK)	19	-80
	MCS 3/11 (16-QAM)	19	-79
	MCS 4/12 (16-QAM)	19	-74
	MCS 5/13 (64-QAM)	19	-70
	MCS 6/14 (64-QAM)	19	-69
	MCS 7/15 (64-QAM)	19	-68

Radio 2			
Frequency Band	802.11a/n 5150-5875 MHz		
Supported Data Rate	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: 6.5 Mbps - 130 Mbps (20MHz), 13.5 - 300 Mbps (40MHz)		
RF Shield	Included, to block cross-interference with other radios		
Mode	Data Rate	Typical AVG. TX Power	Typical RX Sensitivity
		Per-Chain (dBm)	Per-Chain (dBm)
		Tolerance = +/- 2dB	Tolerance = +/- 2dB
		At board connector @chan 48	
802.11a	6 Mbps	24	-88
	54 Mbps	24	-73
802.11n_HT20	MCS 0/8 (BPSK)	24	-88
	MCS 1/9 (QPSK)	24	-85
	MCS 2/10 (QPSK)	24	-83
	MCS 3/11 (16-QAM)	24	-80
	MCS 4/12 (16-QAM)	24	-76
	MCS 5/13 (64-QAM)	24	-72
	MCS 6/14 (64-QAM)	24	-70
	MCS 7/15 (64-QAM)	24	-69
802.11n_HT40	MCS 0/8 (BPSK)	24	-85
	MCS 1/9 (QPSK)	24	-82
	MCS 2/10 (QPSK)	24	-78
	MCS 3/11 (16-QAM)	24	-76
	MCS 4/12 (16-QAM)	24	-73
	MCS 5/13 (64-QAM)	24	-69
	MCS 6/14 (64-QAM)	24	-68
	MCS 7/15 (64-QAM)	24	-67
Radio 3			
Frequency Band	802.11a/n 5150-5875 MHz		
Supported Data Rate	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: 6.5 Mbps - 130 Mbps (20MHz), 13.5 - 300 Mbps (40MHz)		
RF Shield	Included, to block cross-interference with other radios		
Mode	Data Rate	Typical AVG. TX Power	Typical RX Sensitivity
		Per-Chain (dBm)	Per-Chain (dBm)
		Tolerance = +/- 2dB	Tolerance = +/- 2dB
		At board connector @chan 48	
802.11a	6 Mbps	24	-88
	54 Mbps	24	-73
802.11n_HT20	MCS 0/8 (BPSK)	24	-88
	MCS 1/9 (QPSK)	24	-85
	MCS 2/10 (QPSK)	24	-83
	MCS 3/11 (16-QAM)	24	-80
	MCS 4/12 (16-QAM)	24	-76
	MCS 5/13 (64-QAM)	24	-72
	MCS 6/14 (64-QAM)	24	-70
	MCS 7/15 (64-QAM)	24	-69
802.11n_HT40	MCS 0/8 (BPSK)	24	-85
	MCS 1/9 (QPSK)	24	-82
	MCS 2/10 (QPSK)	24	-78
	MCS 3/11 (16-QAM)	24	-76
	MCS 4/12 (16-QAM)	24	-73
	MCS 5/13 (64-QAM)	24	-69
	MCS 6/14 (64-QAM)	24	-68
	MCS 7/15 (64-QAM)	24	-67

Antenna		
Connectors	4 x external antenna connectors (RP-SMA female) for 5GHz	
	2 x internal UFL antenna connectors for 2.4Ghz	
Pigtails	4 x pigtails for 5ghz, 1m long each, RP-SMA male to RP-SMA female connectors	
2.4ghz	1 x antenna MIMO 2x2, 14dB gain, integrated inside enclosure	
5ghz	2 x antenna MIMO 2x2, 12dB gain, 10x10cm, weatherproof casing, RP-SMA male	

Power		
Input	PoE: 12v ~ 32v Passive PoE. 2-Pairs powering pins 4, 5 (+) and pins 7, 8 (-)	
	Standard DC Power Jack 2.1mm (internal diam) 5.5mm (external diam): 9v ~ 32v	
PoE passthrough	Software controllable, over 2 nd Ethernet port, supporting up to 16W consumption	
Earthing / Grounding	Screw for earth cable	
Power consumption	Idle: three radios on + 1 GETH	4.5W
	Typical: all radios in moderate use + 1 GETH	5-8W
	Max: all radios in full use + full CPU + 2x GETH	14W
	Max + PoE passthrough	30W

Environment & Mechanical		
Temperature Range	Operating: 0°C~40°C	
	Storage: -40°C to 70°C	
Humidity	5%~90% typical	
Dimensions	Enclosure: 300 mm x 205 mm x 76 mm	
Weight	Main device 0.8kg, antennas 0.35kg each (with pigtails). 1.5kg total	

Reliability		
ESD	Conductive: 4kV; Air: 8kV	
Surge protection	8 x gas discharge arrestors, four per Ethernet port	
MTBF	Over 20000hrs	

Compliance Standard		
IC	Canada RF Approval	
	Canada RF Report	
RCM	AS/NZS 4268	
	RCM	

Package content		
Contents	1 x Device	
Power adapter	None	
Enclosure	CPE-75 Weatherproof box with integrated 2.4ghz antenna	
Pigtails	4 x pigtails for 5ghz, 80cm long each, RP-SMA male to RP-SMA female connectors	
External antennas	2 x antennas 5ghz MIMO 2x2	

LED Indicators		
LEDs	1 x Power	
	1 x System status	
	1 x USB	
	3 x WiFi activity (one for each radio)	
	2 x Ethernet activity (one for each port)	