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APPLICATIONS

- **Emergency First Responders**
  Critical information delivery such as medical data and video feeds during in-progress events
- **Enterprise Campus Connectivity**
  Extend main network to remote branch offices, warehouses or other out buildings without leased line
- **Mobile Hot Spot**
  On-demand entertainment and broadband access solutions for ferry, transit busses and railway system commuters
- **Security and Surveillance**
  Wireless solutions for bandwidth-intensive and high-definition IP-surveillance cameras located at important city and transportation infrastructure such as airports, bridges and trains
- **Business and Residential Last Mile Access**
  Competitive broadband service alternative to DSL or cable modems for residences and T1 or Ethernet for businesses
- **Metropolitan Area Networks**
  Secure and reliable connectivity between city buildings

Part Numbers (North America region)

Model 5054-R-LR Base Station Unit

- 5054-BSUR-LR-US — Tsunami MP.11 Model 5054-R-LR High Power Base Station Unit with Type-N Connector – US PSU

Subscriber Unit

- 5054-SUA-LR-US — Tsunami MP.11 Model 5054-R-LR High Power Subscriber Unit with Type-N Connector – US PSU
- 5054-SUR-LR-US — Tsunami MP.11 Model 5054-R-LR High Power Subscriber Unit with Integrated 23-dBi Antenna – US PSU

Part Numbers (Universal)

Accessories

- 5054-SURGE — Surge Arrestor 5 GHz - Standard-N Female to Female
- 848 274 171 — 20 ft Low Loss Antenna Cable St-N - Male-Male LMR 200
- 848 332 789 — 20 ft Low Loss Antenna Cable St-N - Male-Male LMR 400
- 5054-ULA400-50 — 50 ft Low Loss Antenna Cable St-N - Male-Male LMR 400
- 848 274 205 — 75 ft Low Loss Antenna Cable St-N - Male-Male LMR 400
- 69828 — 6 ft Low Loss Antenna Cable St-N - Male-Male LMR 600
- 5054-LMR600-50 — 50 ft Low Loss Antenna Cable St-N - Male-Male LMR 600
- 70251 — PoE (Power over Ethernet) Surge Arrestor for Tsunami MP.11 and QuickBridge.11

Outdoor Ethernet Cables

- 69819 — 25m outdoor, terminated CAT5 cable for Tsunami MP.11 or QB.11 with three RJ-45 and one weather-proof Ethernet port cap
- 69820 — 50m outdoor, terminated CAT5 cable for Tsunami MP.11 or QB.11 with three RJ-45 and one weather-proof Ethernet port cap
- 69821 — 75m outdoor, terminated CAT5 cable for Tsunami MP.11 or QB.11 with three RJ-45 and one weather-proof Ethernet port cap

Power Injector

- 69823 — Spare Power DC Injector for Tsunami MP.11 or QB.11 (-R model ONLY)

5 GHz Antennas

- 5054-PA-18 — 18 dBi Panel Antenna - St-N Female - 5.25 - 5.875 GHz
- 5054-PA-23 — 23 dBi Panel Antenna - St-N Female - 5.725 - 5.875 GHz
- 5054-OA-8 — 8 dBi Omni Directional Antenna - St-N Female - 5.47-5.850 GHz
- 5054-OA-10 — 10 dBi Omni Directional Antenna - St-N Female - 5.47-5.850 GHz
- 5054-SA120-14 — 14 dBi Sector Antenna - St-N Female - 5.25-5.850 GHz - 120 degrees
- 5054-SA60-17 — 17 dBi Sector Antenna - St-N Female - 5.25-5.850 GHz - 60 degrees

Regulatory Approvals and Frequency Ranges for 5054-R-LR [1]

Model 5054-R-LR

Country	Number of Channels				Certification
North America					
USA	(GHz)	5MHz	10MHz	20MHz	Yes
	5.25 - 5.35	Up to 15	Up to 7	Up to 3	
	5.725 - 5.85	Up to 21	Up to 11	Up to 5	
Canada	(GHz)	5MHz	10MHz	20MHz	Yes
	5.25 - 5.35	Up to 15	Up to 7	Up to 3	
	5.725 - 5.85	Up to 21	Up to 11	Up to 5	
Mexico	(GHz)	5MHz	10MHz	20MHz	Pending
	5.25 - 5.35	Up to 15	Up to 7	Up to 3	
	5.725 - 5.85	Up to 21	Up to 11	Up to 5	

Integrated Antenna Specification

Model 5054-R-LR Subscriber Unit with Integrated 23-dBi Antenna

- Part Number — 5054-SUR-LR-US
- Frequency range — 5250 - 5875 MHz
- Nominal Impedance — 50 ohms
- Gain — 23 dBi
- Front-to-Back Ratio — 35 dB
- HPBW/vertical — 9 degrees
- HPBW/horizontal — 9 degrees
- Cross Polarization — 23 dB
- Power handling — 1 W (cw)
- VSWR — 2.0 : 1 Max

RF Modulation and over-the-air rates

Model 5054-R
OFDM (Orthogonal Frequency Division Multiplexing)

	20 MHz Channels	10 MHz Channels	5 MHz Channels
• BPSK	6 and 9 Mbps	3 and 4.5 Mbps	2.25 and 1.5 Mbps
• QPSK	12 and 18 Mbps	6 and 9 Mbps	3 and 4.5 Mbps
• 16-QAM	24 and 36 Mbps	12 and 18 Mbps	6 and 9 Mbps
• 64-QAM	48 and 54 Mbps	24 and 36 Mbps	12 and 18 Mbps
• Maximum Packet Size	1522 Bytes		

Wireless Protocol

- WORP (Wireless Outdoor Router Protocol)

Device Interface

Ethernet

- Auto-sensing 10/100BASE-TX Ethernet

Antenna Connector for BSU and SU with Type-N Connector

- Standard Type-N Female

Network Architecture Type

- Infrastructure

Receive Sensitivity

Model 5054-R-LR

Modulation	40 MHz Channels Turbo Mode	20 MHz Channels Standard Mode	10 MHz Channels Standard Mode	5 MHz Channels Standard Mode
64QAM ¾	-70dBm @108Mbps	-73 dBm @54Mbps	-73 dBm @36Mbps	-76 dBm @18Mbps
64QAM ½	-72dBm @96Mbps	-75 dBm @48Mbps	-76 dBm @24Mbps	-79 dBm @12Mbps
16QAM ¾	-74dBm @72Mbps	-84 dBm @36Mbps	-81 dBm @18Mbps	-83 dBm @9Mbps
16QAM ½	-78dBm @48Mbps	-85 dBm @24Mbps	-84 dBm @12Mbps	-86 dBm @6Mbps
QPSK ¾	-81dBm @36Mbps	-89 dBm @18Mbps	-87 dBm @9Mbps	-89 dBm @4.5Mbps
QPSK ½	-83 dBm @24Mbps	-90 dBm @12Mbps	-90 dBm @6Mbps	-92 dBm @3Mbps
BPSK ¾	-84 dBm @18Mbps	-93 dBm @9Mbps	-81 dBm @4.5Mbps	-93 dBm @2.25Mbps
BPSK ½	-85 dBm @12Mbps	-94 dBm @6Mbps	-91 dBm @3Mbps	-95 dBm @1.5Mbps

NOTE: All receiver sensitivities are +/- 2 dB

Maximum Throughput (Mbps)

Model 5054-R-LR

Data rate	40 MHz Channels Turbo Mode (US Only)	20 MHz Channels Standard Mode	10 MHz Channels Standard Mode	5 MHz Channels Standard Mode
108Mbps Turbo 54	35 Mbps			
96Mbps Turbo 48	35 Mbps			
72Mbps Turbo 36	35 Mbps			
48Mbps Turbo 24	27 Mbps			
36Mbps Turbo 18	22 Mbps			
24Mbps Turbo 12	16 Mbps			
54Mbps		29 Mbps		
48Mbps		27 Mbps		
36Mbps		22 Mbps		
24Mbps		16 Mbps	16 Mbps	
18Mbps		13 Mbps	13 Mbps	
12Mbps		9 Mbps	9 Mbps	
9Mbps		7 Mbps	7 Mbps	7 Mbps
6Mbps		2 Mbps	5 Mbps	4.7 Mbps
4.5Mbps			3.6 Mbps	3.8 Mbps
3Mbps			2.4 Mbps	2.7 Mbps
2.25Mbps				2 Mbps
1Mbps				1.2 Mbps

**Maximum-throughput data with release 2.3, as measured with test equipment under controlled lab conditions and best performing packet size. In some instances, data compression yields throughput equal to the configured data rate. Actual throughput performance in the field may vary.*

Latency

<10ms typical at maximum throughput*

*under throughput test conditions above

Proxim wireless

Transmit Power Settings

Model 5054-R-LR

	6-24 Mbps @ 20 MHz 16QAM ½ QPSK ¾ QPSK ½ BPSK ¾ BPSK ½	36 Mbps @ 20 MHz 16QAM ¾	48 Mbps @ 20 MHz 64QAM ½	54 Mbps @ 20 MHz 64QAM ¾
•5.25-5.35 GHz •5.725-5.850 GHz	•20 dBm •25 dBm	•20 dBm •23 dBm	•20 dBm •22 dBm	•20 dBm •20 dBm

Output Power Attenuation: 0 - 18dB, in 3dB steps
Output Power Values will have a tolerance of -1.5 dB

Range Information for 5054-R-LR

	54 Mbps	36 Mbps	6 Mbps
5.25-5.35 GHz (US)	5mi/8.05km	6mi/9.6km	5mi/8.05km
5.725-5.850 GHz (US)	5mi/8.05km	10mi/32km	20mi/32km

**Distance calculations assumes base station sector antenna with 16 dBi gain and 23 dBi client antenna Minimum fade margin; 99.995% or better availability; average terrain/climate; no unusual multipath; proper path clearance (0.6F1)*

System Processor and Memory

- 166 MHz Motorola 8241 processor
- 16 Mbytes RAM
- 8 Mbytes FLASH

Software Specification

Base Station and Subscriber Units

- Key Features
  - WORP protocol
  - QoS Support; up to 8 classes of service, up to 8 services flows per class*
  - Dynamic Data Rate Selection
  - Transmit Power Control
  - Antenna Alignment
  - Integrity Check for Software Upload
  - 5, 10, and 20MHz channels
  - Mobility with auto-scanning, 40 ms hand-off times
- Satellite Density
  - Dynamic Frequency Selection
- Redundancy
  - Spanning Tree (802.1D)
- Bridging and Routing
  - Bridge (802.1d)
  - IP/ RIPv1 (RFC 1058)
  - IP/ RIPv2 (RFC 1388)
  - CIDR (RFC 1519)
  - ICMP (RFC 792)
  - IP (RFC 791)
  - ARP (RFC 826)
- Filtering
  - Ethernet protocol (Ethertype)
  - Static MAC
  - Storm threshold
  - IP address
  - Broadcast protocol
- Services
  - DHCP Server (RFC 2131)
  - DHCP Client (RFC 2131)
  - Bi-Directional Bandwidth Control
- VLAN
  - 802.1Q
- Security Features
  - MAC Authentication
  - Radius MAC Access Control
  - WEP/AES-OCB encryption
  - RADIUS (RFC 2138)

*Available with version 2.5 software release

	• Mobility
	  – Subscriber Unit Roaming
	
	Base Station Unit
	• Filtering
	  – Intra Cell Blocking
	
	Subscriber Unit
	• Services
	  – NAT (RFC 3022)
	  – DHCP Relay (RFC 2131)

Security	• WORP provides critical feature support for secure long-range wireless deployments in unlicensed frequency spectrum. • MD5 (embedded in WORP) authentication between BSU and SU. • Filter based on packet information such as unicast/multicast/ broadcast MAC or IP. • Secure "over the air encryption" with WEP, WEP+, and AES, and AES-CCB. • Authentication via Radius • Intracell blocking allows the BSU to act as the central policy enforcer for SU to SU communications.
Management	• SU/BSU statistics • Link Test • Temperature logging • SNMPv1/v2 RFC 1157 • SNMP v2c RFC 1907 • HTTP Server RFC 2616 • Telnet RFC 855 • TFTP client RFC 783 • CLI • MIB-II RFC 1213 • Ethernet-like MIB RFC 1643 • Bridge MIB RFC 1493 • 802.3MAU RFC 2668 • 802.11 MIB • Remote reboot (reload) or reset to factory default via power injector • Private MIB • Orinoco MIB
Antenna Alignment Tools	• Audible Tone • CLI output
Status LEDs	• Two indicators on the RJ-45 connector to indicate power, wireless traffic, and Ethernet traffic
Local Configuration Support	**RS-232 Serial port** • RJ11 port built-into the unit • DB9 Female via a converter (included)
Compliance and Standards	**Safety** • IEC 60950 3rd Ed (1999) **Radio** • USA FCC 15.247; 15.407 • Canada RSS-102; RSS-210; ICES-003

Electrical	**5054-R-LR POE Power Injector** • Custom Power over Ethernet (802.3af compatible) • Input: Voltage 110 to 250 VAC (47-63Hz) • Output: 48V @ 420mA MAX (injected into the Cat-5 Cable) • Pin for Remote reboot (reload) or reset to factory default **5054-R-LR Outdoor Radio Unit** • Power Consumption: 7.5W typical. Up to 20 Watts across full operating temperature range. • Input: Voltage 42 to 60 VDC
Dimensions	**Base Station and Subscriber Unit** • Packaged: 14.57 in x 13.70 in x 8.19 in (370 mm x 348 mm x 208 mm) **Base Station and Subscriber Unit with Type-N Connector** • Unpackaged: 10.5 in x 10.5 in x 3.25 in (267 mm x 267 mm x 83 mm) **Subscriber Unit with Integrated 23-dBi Antenna** • Unpackaged: 12.60 in x 12.60 in x 3.50 in (320 mm x 320 mm x 89 mm)
Weight	**Base Station and Subscriber Unit with Type-N Connector** • Packaged weight: 9.2 lbs (4.2 kg) • Unpackaged weight: 5.5 lbs (2.49 kg) Unit-only, .45 lbs (.20 kg) for power supply **Subscriber Unit with Integrated 23-dBi or 16-dBi Antenna** • Packaged weight: 10.1 lbs (4.6 kg) • Unpackaged weight: 6.0 lbs (2.72 kg) Unit-only, .45 lbs (.20 kg) for power supply
Environmental	**Operating** • -33° to 60°C (-27.5° to 140° Fahrenheit) • 100% humidity • Wind loading: 125mph **Storage** • -55° to 80°C (-41° to 176° Fahrenheit) • 100% humidity
Packaging Contents	**Base Station or Subscriber Unit** • One Tsunami MP.11 Model 5054-R-LR Base Station or Subscriber Unit • One wall/ pole mounting bracket • One Power-Over-Ethernet injector for Model 5054-R-LR • One US power cord • One Ethernet cable weather-proof plug • One Documentation and Software CD-ROM
MTBF	• 100,000 hrs
Warranty	• One year

[1] Check with the local regulatory agency for certain restrictions

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For detailed technical specifications, please go to **http://www.proxim.com/products/bwa/multipoint/mp11**

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