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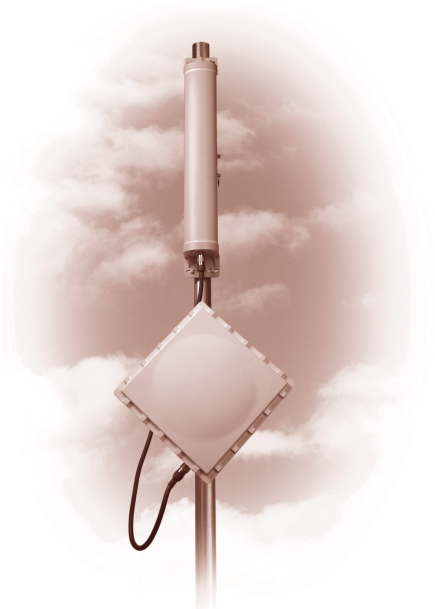
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APPLICATIONS

- **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 2454-R Base Station Unit** • 2454-BSUR-US-WORLD — Tsunami MP.11 Model 2454-R Base Station Unit with Type-N Connector – US PSU -WORLD **Subscriber Unit** • 2454-SUA-US-WORLD — Tsunami MP.11 Model 2454-R Subscriber Unit with Type-N Connector – US PSU -WORLD • 2454-SUR-US-WORLD — Tsunami MP.11 Model 2454-R Subscriber Unit with Integrated 18-dBi Antenna – US PSU -WORLD **Model 5054-R Base Station Unit** • 5054-BSUR-US — Tsunami MP.11 Model 5054-R Base Station Unit with Type-N Connector – US PSU **Subscriber Unit** • 5054-SUA-US — Tsunami MP.11 Model 5054-R Subscriber Unit with Type-N Connector – US PSU • 5054-SUR-US — Tsunami MP.11 Model 5054-R Subscriber Unit with Integrated 23-dBi Antenna – US PSU
Part Numbers **(Europe and Middle East regions)**	**Model 2454-R Base Station Unit** • 2454-BSUR-EU — Tsunami MP.11 Model 2454-R Base Station Unit with Type-N Connector – Europe PSU • 2454-BSUR-UK — Tsunami MP.11 Model 2454-R Base Station Unit with Type-N Connector – UK PSU **Subscriber Unit** • 2454-SUA-EU — Tsunami MP.11 Model 2454-R Subscriber Unit with Type-N Connector – Europe PSU • 2454-SUA-UK — Tsunami MP.11 Model 2454-R Subscriber Unit with Type-N Connector – UK PSU • 2454-SUR-EU — Tsunami MP.11 Model 2454-R Subscriber Unit with Integrated 18-dBi Antenna – Europe PSU • 2454-SUR-UK — Tsunami MP.11 Model 2454-R Subscriber Unit with Integrated 18-dBi Antenna – UK PSU **Model 5054-R Base Station Unit** • 5054-BSUR-EU — Tsunami MP.11 Model 5054-R Base Station Unit with Type-N Connector – Europe PSU • 5054-BSUR-UK — Tsunami MP.11 Model 5054-R Base Station Unit with Type-N Connector – UK PSU **Subscriber Unit** • 5054-SUA-EU — Tsunami MP.11 Model 5054-R Subscriber Unit with Type-N Connector – Europe PSU • 5054-SUA-UK — Tsunami MP.11 Model 5054-R Subscriber Unit with Type-N Connector – UK PSU • 5054-SUR-EU — Tsunami MP.11 Model 5054-R Subscriber Unit with Integrated 23-dBi Antenna – Europe PSU • 5054-SUR-UK — Tsunami MP.11 Model 5054-R Subscriber Unit with Integrated 23-dBi Antenna – UK PSU

Part Numbers

(Asia Pacific region)

Model 2454-R Base Station Unit

- 2454-BSUR-AU — Tsunami MP.11 Model 2454-R Base Station Unit with Type-N Connector – Australia PSU
- 2454-BSUR-UK — Tsunami MP.11 Model 2454-R Base Station Unit with Type-N Connector – UK PSU
- 2454-BSUR-US — Tsunami MP.11 Model 2454-R Base Station Unit with Type-N Connector – US PSU
- 2454-BSUR-EU — Tsunami MP.11 Model 2454-R Base Station Unit with Type-N Connector – Europe PSU
- 2454-BSUR-CN — Tsunami MP.11 Model 2454-R Base Station Unit with Type-N Connector – China PSU
- 2454-BSUR-SK — Tsunami MP.11 Model 2454-R Base Station Unit with Type-N Connector – South Korea PSU
- 2454-BSUR-US-WORLD — Tsunami MP.11 Model 2454-R Base Station Unit with Type-N Connector – US/CAN PSU – WORLD

Subscriber Unit

- 2454-SUA-AU — Tsunami MP.11 Model 2454-R Subscriber Unit with Type-N Connector – Australia PSU
- 2454-SUA-UK — Tsunami MP.11 Model 2454-R Subscriber Unit with Type-N Connector – UK PSU
- 2454-SUA-US — Tsunami MP.11 Model 2454-R Subscriber Unit with Type-N Connector – US PSU
- 2454-SUA-EU — Tsunami MP.11 Model 2454-R Subscriber Unit with Type-N Connector – EU PSU
- 2454-SUA-CN — Tsunami MP.11 Model 2454-R Subscriber Unit with Type-N Connector – China PSU
- 2454-SUA-SK — Tsunami MP.11 Model 2454-R Subscriber Unit with Type-N Connector – South Korea PSU
- 2454-SUA-US WORLD — Tsunami MP.11 Model 2454-R Subscriber Unit with Type-N Connector – US/CAN PSU – WORLD
- 2454-SUR-AU — Tsunami MP.11 Model 2454-R Subscr iber Unit with Integrated 18-dBi Antenna – Australia PSU
- 2454-SUR-UK — Tsunami MP.11 Model 2454-R Subscriber Unit with Integrated 18-dBi Antenna – UK PSU
- 2454-SUR-US — Tsunami MP.11 Model 2454-R Subscriber Unit with Integrated 18-dBi Antenna – US PSU
- 2454-SUR-EU — Tsunami MP.11 Model 2454-R Subscr iber Unit with Integrated 18-dBi Antenna – EU PSU
- 2454-SUR-CN — Tsunami MP.11 Model 2454-R Subscriber Unit with Integrated 18-dBi Antenna – China PSU
- 2454-SUR-SK — Tsunami MP.11 Model 2454-R Subscr iber Unit with Integrated 18-dBi Antenna – South Korea PSU
- 2454-SUR-US-WORLD — Tsunami MP.11 Model 2454-R Subscriber Unit with Integrated 18-dBi Antenna – US/CAN PSU - WORLD

Model 5054-R Base Station Unit

- 5054-BSUR-AU — Tsunami MP.11 Model 5054-R Base Station Unit with Type-N Connector – Australia PSU
- 5054-BSUR-UK — Tsunami MP.11 Model 5054-R Base Station Unit with Type-N Connector – UK PSU
- 5054-BSUR-US — Tsunami MP.11 Model 5054-R Base Station Unit with Type-N Connector – US PSU
- 5054-BSUR-EU — Tsunami MP.11 Model 5054-R Base Station Unit with Type-N Connector – Europe PSU
- 5054-BSUR-CN — Tsunami MP.11 Model 5054-R Base Station Unit with Type-N Connector – China PSU
- 5054-BSUR-SK — Tsunami MP.11 Model 5054-R Base Station Unit with Type-N Connector – South Korea PSU
- 5054-BSUR-US-WORLD — Tsunami MP.11 Model 5054-R Base Station Unit with Type-N Connector – US/CAN PSU - WORLD

Subscriber Unit

- 5054-SUA-AU — Tsunami MP.11 Model 5054-R Subscriber Unit with Type-N Connector – Australia PSU
- 5054-SUA-UK — Tsunami MP.11 Model 5054-R Subscriber Unit with Type-N Connector – UK PSU
- 5054-SUA-US — Tsunami MP.11 Model 5054-R Subscriber Unit with Type-N Connector – US PSU
- 5054-SUA-EU — Tsunami MP.11 Model 5054-R Subscriber Unit with Type-N Connector – EU PSU
- 5054-SUA-CN — Tsunami MP.11 Model 5054-R Subscriber Unit with Type-N Connector – China PSU
- 5054-SUA-SK — Tsunami MP.11 Model 5054-R Subscriber Unit with Type-N Connector – South Korea PSU
- 5054-SUA-US-WORLD — Tsunami MP.11 Model 5054-R Subscriber Unit with Type-N Connector – US/CAN PSU - WORLD
- 5054-SUR-AU — Tsunami MP.11 Model 5054-R Subscr iber Unit with Integrated 23-dBi Antenna – Australia PSU
- 5054-SUR-UK — Tsunami MP.11 Model 5054-R Subscriber Unit with Integrated 23-dBi Antenna – UK PSU
- 5054-SUR-US — Tsunami MP.11 Model 5054-R Subscriber Unit with Integrated 23-dBi Antenna – US PSU
- 5054-SUR-EU — Tsunami MP.11 Model 5054-R Subscriber Unit with Integrated 23-dBi Antenna – EU PSU
- 5054-SUR-CN — Tsunami MP.11 Model 5054-R Subscriber Unit with Integrated 23-dBi Antenna – China PSU
- 5054-SUR-SK — Tsunami MP.11 Model 5054-R Subscriber Unit with Integrated 23-dBi Antenna – South Korea PSU
- 5054-SUR-US-WORLD — Tsunami MP.11 Model 5054-R Subscriber Unit with Integrated 23-dBi Antenna – US/CAN PSU - WORLD

Part Numbers (Caribbean and Latin America region)

Model 2454-R Base Station Unit

- 2454-BSUR-US-WORLD — Tsunami MP.11 Model 2454-R Base Station Unit with Type-N Connector – US PSU - WORLD
- 2451-BSUR-BR — Tsunami MP.11 Model 2454-R Base Station Unit with Type-N Connector – Brazil PSU

Subscriber Unit

- 2454-SUA-US-WORLD — Tsunami MP.11 Model 2454-R Subscriber Unit with Type-N Connector – US PSU - WORLD
- 2454-SUA-BR — Tsunami MP.11 Model 2454-R Subscriber Unit with Type-N Connector – Brazil PSU
- 2454-SUR-US-WORLD — Tsunami MP.11 Model 2454-R Subscriber Unit with Integrated 18-dBi Antenna – US PSU - WORLD
- 2454-SUR-BR — Tsunami MP.11 Model 2454-R Subscriber Unit with Integrated 18-dBi Antenna – US PSU

Model 5054-R Base Station Unit

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

Subscriber Unit

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

2.4 GHz Antennas

- 848 515 722 — 5 dBi Omni-Directional Vehicle Antenna w/Integrated 250 cm cable
- 848 312 591 — 7 dBi Omni-Directional Base Station Antenna - St-N Female
- 848 515 698 — 10 dBi Omni-Directional Base Station Antenna - St-N Female
- 848 515 706 — 12 dBi Directional Wide Angle Antenna (120 degrees) - St-N Female
- 848 515 714 — 24 dBi Directional Antenna (Parabolic Grid) - St-N Female
- 2400-SA60-14 — 14 dBi Directional Sector Antenna (60 degrees) 2.4GHz St-N Female
- 1086-PA24-14 — 14 dBi Panel Antenna - St-N Female

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 2454-R[1]

Model 2454-R

Country	Number of Channels				Certification
North America					
USA	(GHz)	5MHz	10MHz	20MHz	Yes
Canada	2.40 - 2.4835	11	Up to 11	Up to 11	
Mexico	2.40 - 2.472	13	Up to 13	Up to 13	
EU Countries					
Austria	(GHz)	5MHz	10MHz	20MHz	Yes
Belgium	• 2.40 - 2.4835	13	Up to 13	Up to 13	
Cyprus					
Czech Republic					
Denmark					
Estonia					
Finland					
France					
Germany					
Greece					
Hungary					
Ireland					
Italy					
Latvia					
Luxemburg					
Lithuania					
Malta					
Netherlands					
Poland					
Portugal					
Spain					
Sweden					
Slovakia					
Slovenia					
United Kingdom	(GHz)	5MHz	10MHz	20MHz	Yes
	2.40 - 2.4835	13	Up to 13	Up to 13	
Other European Countries					
Iceland	(GHz)	5MHz	10MHz	20MHz	Yes
Liechtenstein	2.40 - 2.4835	13	Up to 13	Up to 13	
Norway					
Switzerland					
South America					
Brazil	(GHz)	5MHz	10MHz	20MHz	Yes
	2.40 - 2.4835	13	Up to 13	Up to 13	
APAC					
Australia	(GHz)	5MHz	10MHz	20MHz	Yes
New Zealand	2.40 - 2.4835	13	Up to 13	Up to 13	
Japan					
Hong Kong					
S. Korea					
China					
Taiwan					

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

Model 5054-R

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	
	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	
	5.725 - 5.85	Up to 21	Up to 11	Up to 5	
EU Countries					
Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Luxemburg, Lithuania, Malta, Netherlands, Poland, Portugal, Spain, Sweden, Slovakia, Slovenia	(GHz)	5MHz	10MHz	20MHz	Yes
	5.47 - 5.70	Up to 46	Up to 23	Up to 11	
United Kingdom, Ireland	(GHz)	5MHz	10MHz	20MHz	Yes
	5.47 - 5.70	Up to 46	Up to 23	Up to 11	
	5.725 - 5.85	Up to 23	Up to 11	Up to 4	
Other European Countries					
Iceland, Liechtenstein, Norway, Switzerland	(GHz)	5MHz	10MHz	20MHz	Yes
	5.47 - 5.70	Up to 46	Up to 23	Up to 11	
Russia	(GHz)	5MHz	10MHz	20MHz	Yes
	5.15 - 5.85	Up to 141	Up to 71	Up to 36	
South America					
Brazil	(GHz)	5MHz	10MHz	20MHz	Yes
	5.47-5.70	Up to 46	Up to 23	Up to 11	
	5.725 - 5.85	Up to 19	Up to 10	Up to 5	
Argentina	(GHz)	5MHz	10MHz	20MHz	Yes
	5.25-5.35	Up to 9	Up to 5	Up to 3	
	5.725 - 5.85	Up to 13	Up to 7	Up to 4	
Colombia	(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	
APAC					
Australia, New Zealand, Hong Kong	(GHz)	5MHz	10MHz	20MHz	Yes
	5.725 - 5.85	Up to 21	Up to 11	Up to 5	
S. Korea, China	(GHz)	5MHz	10MHz	20MHz	Yes
	5.725-5.85	Up to 17	Up to 9	Up to 5	
Taiwan	(GHz)	5MHz	10MHz	20MHz	Yes
	5.25-5.35	Up to 15	Up to 7	Up to 3	
	5.725-5.85	Up to 17	Up to 9	Up to 5	
Singapore	(GHz)	5MHz	10MHz	20MHz	In Process
	5.15-5.25	Up to 13	Up to 7	Up to 4	
	5.725-5.825	Up to 17	Up to 9	Up to 5	
India	(GHz)	5MHz	10MHz	20MHz	In Process
	5.15-5.35	Up to 32	Up to 16	Up to 7	
	5.725-5.825	Up to 17	Up to 9	Up to 5	

Integrated Antenna Specification	**Model 2454-R** **Subscriber Unit with Integrated 18-dBi Antenna** • Part Number 2454-SUR-xx • Frequency range 2.4 to 2.5 GHz • Nominal Impedance 50 Ohms • Gain 18 dBi • Front-to-Back Ratio 25 dB • HPBW/vertical 22 degrees • HPBW/horizontal 15 degrees • Cross Polarization 20 dB • Power handling 1 W • VSWR 1.5 : 1 Max **Model 5054-R** **Subscriber Unit with Integrated 23-dBi Antenna** • Part Number 5054-SUR-xx • 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 2454-R and 5054-R** **OFDM (Orthogonal Frequency Division Multiplexing)** • BPSK: 6 and 9 Mbps (20 MHz Channels); 3 and 4.5 Mbps (10 MHz Channels); 2.25 and 1.5 Mbps (5 MHz Channels) • 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 (BER=10-6)

Model 2454-R

Modulation	40 MHz Channels Turbo Mode	20 MHz Channels Standard Mode	10 MHz Channels Standard Mode	5 MHz Channels Standard Mode
64QAM ¾	N/A	-71 dBm @54 Mbps	-74 dBm @36 Mbps	-77 dBm @18 Mbps
64QAM ½		-74 dBm @48 Mbps	-77 dBm @24 Mbps	-80 dBm @12 Mbps
16QAM ¾		-79 dBm @36 Mbps	-82 dBm @18 Mbps	-85 dBm @9 Mbps
16QAM ½		-84 dBm @24 Mbps	-87 dBm @12 Mbps	-90 dBm @6 Mbps
QPSK ¾		-87 dBm @18 Mbps	-90 dBm @9 Mbps	-93 dBm @4.5 Mbps
QPSK ½		-89 dBm @12 Mbps	-92 dBm @6 Mbps	-95 dBm @3 Mbps
BPSK ¾		-91 dBm @9 Mbps	-94 dBm @4.5 Mbps	-97 dBm @2.25 Mbps
BPSK ½		-91 dBm @6 Mbps	-94 dBm @3 Mbps	-97 dBm @1.5 Mbps

Model 5054-R

Modulation	40 MHz Channels Turbo Mode	20 MHz Channels Standard Mode	10 MHz Channels Standard Mode	5 MHz Channels Standard Mode
64QAM ¾	-66 dBm @108 Mbps	-69 dBm @54 Mbps	-72 dBm @36 Mbps	-75 dBm @18 Mbps
64QAM ½	-68 dBm @96 Mbps	-72 dBm @48 Mbps	-75 dBm @24 Mbps	-78 dBm @12 Mbps
16QAM ¾	-75 dBm @72 Mbps	-77 dBm @36 Mbps	-80 dBm @18 Mbps	-83 dBm @9 Mbps
16QAM ½	-78 dBm @48 Mbps	-80 dBm @24 Mbps	-83 dBm @12 Mbps	-86 dBm @6 Mbps
QPSK ¾	-81 dBm @36 Mbps	-83 dBm @18 Mbps	-86 dBm @9 Mbps	-89 dBm @4.5 Mbps
QPSK ½	-83 dBm @24 Mbps	-86 dBm @12 Mbps	-89 dBm @6 Mbps	-92 dBm @3 Mbps
BPSK ¾	-84 dBm @18 Mbps	-87 dBm @9 Mbps	-90 dBm @4.5 Mbps	-93 dBm @2.25 Mbps
BPSK ½	-85 dBm @12 Mbps	-88 dBm @6 Mbps	-91 dBm @3 Mbps	-94 dBm @1.5 Mbps

Maximum Throughput (Mbps)

Model 2454-R

Data rate	20 MHz Channels	10 MHz Channels	5 MHz Channels Standard Mode
54Mbps	30 Mbps		
48Mbps	28 Mbps		
36Mbps	18 Mbps		
24Mbps	14 Mbps		
18Mbps	12 Mbps	12 Mbps	
12Mbps	9 Mbps	9 Mbps	
9Mbps	7 Mbps	7 Mbps	6.8 Mbps
6Mbps	5 Mbps	5 Mbps	5 Mbps
4.5Mbps		4 Mbps	4 Mbps
3Mbps		2 Mbps	2.7 Mbps
2.25Mbps			2 Mbps
1Mbps			1.4 Mbps

Model 5054-R

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		5 Mbps	5 Mbps	4.7 Mbps
4.5Mbps			3.6 Mbps	3.8 Mbps
3Mbps			2.4 Mbps	2.7 Mbps
2.25Mbps				2.7 Mbps
1Mbps				1.2 Mbps

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

Latency

< 10ms typical at maximum throughput*

*under throughput test cconditions indicated above.

Transmit Power Settings

Model 2454-R

	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
2.400-2.483 GHz	16 dBm	16 dBm	14 dBm	13 dBm

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

Model 5054-R

	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
5.15-5.35 GHz 5.47-5.725 GHz 5.725-5.850 GHz	15 dBm 16 dBm 16 dBm	13 dBm 13 dBm 13 dBm	12 dBm	11 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[2]

Integrated Antenna	54 Mbps - Line of Sight	36 Mbps - Line of Sight	6 Mbps - Near Line of Sight
5.15-5.35 GHz (US)	3mi/4.8km	6mi/9.6km	3mi/4.8km
5.47-5.7 GHz (ETSI)	3mi/4.8km	6mi/9.6km	2.1mi/3.8km
5.725-5.850 GHz (US)	3mi/4.8km	6mi/9.6km	3mi/4.8km
External Antenna	**54 Mbps - Line of Sight**	**36 Mbps - Line of Sight**	**6 Mbps - Near Line of Sight**
5.15-5.35 GHz (US)	5mi/8.05km	10mi/16.1km	2.1mi/3.8km
5.47-5.7 GHz (ETSI)	5mi/8.05km	10mi/16.1km	1.1mi/1.8km
5.725-5.850 GHz (US)	5mi/8.05km	10mi/16.1km	2.1mi/3.8km

Minimum fade margin; 99.995% or better availability; average terrain/climate; no unusual multipath; proper path clearance (0.6F1).

Distance calculations for 5 and 10 MHz channels are comparable for ETSI regulatory domains. Proper TPC settings (-9dB@20MHz, -12dB@10MHz, -15dB@5MHz), should be set to meet power density rules. Increased distances are possible in the US with proper engineering.

Range information for 2454-R[2]

Integrated Antenna	54 Mbps - Line of Sight	36 Mbps - Line of Sight	6 Mbps - Near Line of Sight
2.4-2.4835 GHz (US)	3mi/4.8km	5mi/8.05km	3mi/4.8km
2.4 - 2.8 GHz (ETSI)	1mi/1.6km	2.6mi/4.2km	2.6mi/4.2km
External Antenna	**54 Mbps - Line of Sight**	**36 Mbps - Line of Sight**	**6 Mbps - Near Line of Sight**
2.4-2.4835 GHz (US)	5mi/8.05km	7mi/11.2km	3.1mi/5km
2.4 - 2.8 GHz (ETSI)	2.6mi/4.2km	3.1mi/5km	2.6mi/4.2km

Minimum fade margin; 99.995% or better availability; average terrain/climate; no unusual multipath; proper path clearance (0.6F1).

System Processor and Memory

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

Software Specification

Base Station and Subscriber Units

- Key Features
  - WORP protocol
  - 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 handoff times
  - QoS Support; up to 8 classes of service, up to 8 service flows per class*

*Available with version 2.5 software release

	• 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)
	• 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** • UL 60950, UL50 • CSA 22.2 No. 60950-00 • IEC 60950 3rd Ed (1999) **Radio Approvals** • USA FCC 15.107, 15-109; 15-203-15.205, 15.207, 15.209; 15.247; 15.401-15.407 • Canada RSS-102; RSS-210; ICES-003 • Europe (ETSI) EN 301.893; EN 300.328; EN 301.489-1; EN 301.489-17; EN 300-440; EN50371 • ARIB STD-T71, STD 33, STD 66 **EMI and Susceptibility (Class B)** • USA FCC Part 15.107 • Canada ICES-003 **Water and Dust Proof** • NEMA4/IP56
Electrical	**5054-R / 2454-R 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 / 2454-R 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** • -33º to 60ºC (-27.5º to 140º Fahrenheit) • 100% humidity • Wind loading: 125mph **Storage** • -55º to 80ºC (-41º to 176º Fahrenheit) • 100% humidity
Packaging Contents	**Base Station or Subscriber Unit** • One Tsunami MP.11 Model 2454-R or 5054-R Base Station or Subscriber Unit • One wall/ pole mounting bracket • One Power-Over-Ethernet injector for Model 2454-R or 5054-R • One country specific 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

2 PMP configuration (1BS to 4 SU) using USA regulations for L and U bands, ETSI regulations for M bands
- Base Station Antenna (60-degrees Sector, 17dBi) with short 1dB jumper cable
- Subscriber Antenna, external 5Ghz (23dB Directional Patch antenna) with short 1dB jumper cable
- Subscriber Antenna, external 2.4Ghz (12dB Directional Patch antenna) with short 1dB jumper cable

PTP - (1BS to 1 SU) using USA regulations for L and U bands, ETSI regulations for M bands
- Base Station external Antenna (Parabolic Grid 29dB)
- Subscriber Antenna, external 5Ghz (29dB Parabolic Grid antenna) with short 1dB jumper cable
- Subscriber Antenna, external 2.4Ghz (24dB Parabolic Grid antenna) with short 1dB jumper cable

Clear LOS (Line of Sight)
- 99.995% availability
- Fade margin minimum of 10dB to 2 miles, 0.2dB additional fade margin for every 0.1 mile to 15dB
- Predicted availability >99.990% (one-way) for all configurations
- Distance calculations for 5 and 10 MHz channels are comparable for ETSI regulatory domains. Proper TPC settings (3 and 6dB) respectively, should be set to meet power density rules. Increased distances are possible in the US with proper link engineering

Near LOS (Line of Sight)
- 40-50% visibility
- Distance, Typically <2.5miles

Proxim Wireless Corporation
www.proxim.com

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

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