



Tsunami MP.11 954-R Model

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						
	Base Station Unit						
	954-BSUR-US	Tsunami MP.11 Model 954-R Base Station Unit with Type-N Connector – US PSU					
	954-SUA-US	Tsunami MP.11 Model 954-R Subscriber Unit with Type-N Connector – US PSU					
	Accessories						
	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					
	5054-LMR600-50	50 ft Low Loss Antenna Cable St-N - Male-Male LMR 600					
	70251 PoE	PoE (Power over Ethernet) Surge Arrestor for Tsunami MP.11 and QuickBridge.11					
	69828	6 ft Low Loss Antenna Cable St-N - Male-Male LMR 600					
	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)						
REGULATORY APPROVALS, FREQUENCY RANGE AND CHANNELS	Region/ Country	Coun try	GHZ	Number of Channels			Certificati on
				5 MHz	10 MHz	20 MHz	
	North America	USA	902-928	4	4	Up to 2	Yes
RF MODULATION & OVER-THE-AIR RATES	OFDM (Orthogonal Frequency Division Multiplexing)						
		20 MHz	10 MHz	5 MHz			
	BPSK	6 and 9 Mbps	3 and 4.5 Mbps	1.5 and 2.25 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			
Max Packet Size	1522 Bytes						
WIRELESS PROTOCOL	WORP (Wireless Outdoor Router Protocol)						
DEVICE INTERFACE ETHERNET	Auto-sensing 10/100BASE-TX Ethernet						
ANTENNA CONNECTOR FOR BSU & SU WITH TYPE-N CONNECTOR	Standard Type-N Female						
NETWORK ARCHITECTURE TYPE	Infrastructure						

RECEIVE SENSITIVITY (BER=10 ⁻⁶)	Receiver Sensitivity, Minimum SNR, and Recommended SNR for a 20 MHz bandwidth Link			
	Modulation	Receiver Sensitivity (dBm)	Minimum SNR	Recommended SNR
	64 QAM 3/4	-65 dBm @ 54 Mbps	21	31
	64 QAM 2/3	-68 dBm @ 48 Mbps	20	30
	16 QAM 3/4	-73 dBm @ 36 Mbps	16	26
	16 QAM 1/2	-77 dBm @ 24 Mbps	12	22
	QPSK 3/4	-81 dBm @ 18 Mbps	9	17
	QPSK 1/2	-82 dBm @ 12 Mbps	7	15
	BPSK 3/4	-84 dBm @ 9 Mbps	5	15
	BPSK 1/2	-85 dBm @ 6 Mbps	4	14
	Receiver Sensitivity, Minimum SNR, and Recommended SNR for a 10 MHz bandwidth Link			
	Modulation	Receiver Sensitivity (dBm)	Minimum SNR	Recommended SNR
	64 QAM 3/4	-68 dBm @ 27 Mbps	21	31
	64 QAM 2/3	-71 dBm @ 24 Mbps	20	30
	16 QAM 3/4	-76 dBm @ 18 Mbps	16	26
	16 QAM 1/2	-80 dBm @ 12 Mbps	12	22
	QPSK 3/4	-84 dBm @ 9 Mbps	9	19
	QPSK 1/2	-85 dBm @ 6 Mbps	7	17
	BPSK 3/4	-87 dBm @ 4.5 Mbps	5	15
	BPSK 1/2	-88 dBm @ 3 Mbps	4	14
	Receiver Sensitivity, Minimum SNR, and Recommended SNR for a 5 MHz bandwidth Link			
	Modulation	Receiver Sensitivity (dBm)	Minimum SNR	Recommended SNR
	64 QAM 3/4	-71 dBm @ 13.5 Mbps	21	31
	64 QAM 2/3	-74 dBm @ 12 Mbps	20	30
	16 QAM 3/4	-79 dBm @ 9 Mbps	16	26
	16 QAM 1/2	-83 dBm @ 6 Mbps	12	22
	QPSK 3/4	-87 dBm @ 4.5 Mbps	9	19
	QPSK 1/2	-88 dBm @ 3 Mbps	7	17
	BPSK 3/4	-90 dBm @ 2.25 Mbps	5	15
	BPSK 1/2	-91 dBm @ 1.5 Mbps	4	14
	All receiver sensitivity numbers are +/- 2dB accurate.			

OUTPUT POWER TABLE					
		Modulation	Transmit power (dBm)	Rate for 20/10/5 MHz channel (Mbps)	
		64-QAM $\frac{3}{4}$	20	54 / 27 / 13.5	
		64-QAM $\frac{2}{3}$	22	48 / 24 / 12	
		16-QAM $\frac{3}{4}$	25	36 / 18 / 9	
		16-QAM $\frac{1}{2}$	27	24 / 12 / 6	
		QPSK $\frac{3}{4}$	27	18 / 9 / 4.5	
		QPSK $\frac{1}{2}$	27	12 / 6 / 3	
		BPSK $\frac{3}{4}$	27	9 / 4.5 / 2.25	
		BPSK $\frac{1}{2}$	27	6 / 3 / 1.5	
When the max output of the MP.11 radios (plus antenna gain, minus cable attenuation) results in a higher EIRP than allowed under the radio regulations, then TPC must be used to lower the output power from the radio to stay within regulatory limits.					
MAXIMUM THROUGHPUT (Mbps)	Data rate	20 MHz Channels	10 MHz Channels	5 MHz Channels Standard Mode	
	54Mbps	34Mbps			
	48Mbps	33 Mbps			
	36Mbps	27 Mbps			
	24Mbps	19 Mbps	19 Mbps		
	18Mbps	12 Mbps	12 Mbps		
	12Mbps	9 Mbps	9 Mbps	9 Mbps	
	9Mbps	7 Mbps	7 Mbps	7 Mbps	
	6Mbps	5 Mbps	5 Mbps	5 Mbps	
	4.5Mbps		4 Mbps	4 Mbps	
	3Mbps		2 Mbps	2 Mbps	
	2.25Mbps			2 Mbps	
1Mbps			1 Mbps		
<i>*Maximum-throughput data with release 4.0, 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.</i>					
LATENCY		6-24 Mbps @ 20 MHz	36 Mbps @ 20 MHz	48 Mbps @ 20 MHz	54 Mbps @ 20 MHz
< 10ms typical at maximum throughput*		16 QAM $\frac{1}{2}$	16 QAM $\frac{3}{4}$	64 QAM $\frac{1}{2}$	64 QAM $\frac{3}{4}$
*under throughput test conditions indicated above		,QPSK $\frac{3}{4}$, QPSK $\frac{1}{2}$, BPSK $\frac{3}{4}$, BPSK $\frac{1}{2}$			
Transmit Power Settings					
	902-928 MHz	27 dBm	25 dBm	22 dBm	20 dBm
Output Power Attenuation: 0 -18dB, in 1 dB steps					
Output Power Values will have a tolerance of +/- .5 dB					
RANGE INFORMATION	External Antenna				
	54 Mbps - Line of Sight	36 Mbps - Line of Sight		6 Mbps - Near Line of sight	
902.928 MHz (US)	4mi/6.4km	8mi/12.9km		12mi/19.3km	

Minimum fade margin; 99.995% or better availability; average terrain/climate; no unusual multipath; proper path clearance (0.6F1). Tests were conducted using Ubiquiti cavity filters CF912* and CF917* at the Base Station.

Typically 2 cavity filters (to be deployed in line with the radio) are required at the BS site. In environments around cell sites/pagers, 2 cavity filters (to be deployed in line with the radio) might be required at the SU site also. This requirement is entirely dependent and driven by the interference seen in the environment due to other 900 MHz appliances around.



* Proxim Wireless is not responsible for the content and accuracy of third party technical specifications.

SYSTEM PROCESSOR AND MEMORY	<ul style="list-style-type: none"> • 166MHz Motorola 8241 processor • 16 Mbytes RAM • 8 Mbytes FLASH 	
SOFTWARE SPECIFICATION	Base Station and Subscriber Units	
	Key Features	<ul style="list-style-type: none"> - 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
	Satellite Density	- Dynamic Frequency Selection
	Redundancy	- Spanning Tree (802.1D)
	Bridging and Routing	<ul style="list-style-type: none"> - Bridge (802.1d) - IP/ RIPv1 (RFC 1058) - IP/ RIPv2 (RFC 1388) - CIDR (RFC 1519) - ICMP (RFC 792) - IP (RFC 791) - ARP (RFC 826)
	Filtering	<ul style="list-style-type: none"> • Ethernet protocol (Ethertype) • Static MAC • Storm threshold • IP address • Broadcast protocol
	Services	<ul style="list-style-type: none"> • DHCP Server (RFC 2131) • DHCP Client (RFC 2131) • Bi-Directional Bandwidth Control
	VLAN	<ul style="list-style-type: none"> • 802.1Q
	Security Features	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • NAT (RFC 3022) • DHCP Relay (RFC 2131)
	SECURITY	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • RJ11 port built-into the unit • DB9 Female via a converter (included) 	
COMPLIANCE AND STANDARDS	Safety	<ul style="list-style-type: none"> • 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
	EMI and Susceptibility (Class B)	<ul style="list-style-type: none"> • USA FCC Part 15.107 • Canada ICES-003
	Water and Dust Proof	<ul style="list-style-type: none"> • NEMA4/IP56
ELECTRICAL	954-R POE Power Injector	<ul style="list-style-type: none"> • 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
	954-R Outdoor Radio Unit	<ul style="list-style-type: none"> • Power Consumption: 7.5W typical. Up to 20 Watts across full operating temperature range. • Input: Voltage 42 to 60 VDC • SU/BSU statistics
DIMENSIONS	Base Station and Subscriber Unit	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Unpackaged: 10.5 in x 10.5 in x 3.25 in (267 mm x 267 mm x 83 mm)

WEIGHT	Base Station and Subscriber Unit with Type-N Connector	<ul style="list-style-type: none"> • 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
ENVIRONMENTAL	Operating	<ul style="list-style-type: none"> • -33° to 60°C (-27.5° to 140° Fahrenheit) • 100% humidity • Wind loading: 125mph
	Storage	<ul style="list-style-type: none"> • -55° to 80°C (-41° to 176° Fahrenheit) • 100% humidity
PACKAGING CONTENTS	Base Station or Subscriber Unit	<ul style="list-style-type: none"> • One Tsunami MP.11 Base Station or Subscriber Unit (Model 954-R) • One wall/ pole mounting bracket • One Power-Over-Ethernet injector • One country specific power cord • One Ethernet cable weather-proof plug • One Documentation and Software CD-ROM
MTBF	100,000 hrs	
WARRANTY	1 year	

1. Check with the local regulatory agency for certain restrictions:

PTP - (1BS to 1 SU) using USA regulations

- Base Station External Antenna, 900 MHz (90 degree vertically polarized 12 dBi sector)
- Subscriber Antenna, External Antenna, 900 MHz (9 dBi Yagi) 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

Near LOS (Line of Sight)

- 40-50% visibility
- Distance, Typically <2.5miles

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

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