



# Tsunami MP.11 Model 2411 and Model 5054

## Technical Specifications



### APPLICATIONS

- **Last Mile Access**  
Competitive broadband service alternative to DSL or cable modems for businesses and residences
- **Security and Surveillance** Low cost connectivity for IP surveillance cameras
- **Metropolitan Area Networks**  
Secure and reliable connectivity between city buildings
- **Enterprise Campus Connectivity**  
Extend main network to remote branch offices, warehouses or other out buildings without leased lines

RF MODULATION	Model 2411	PSK/ DSSS (Direct Sequence Spread Spectrum) DBPSK @ 1 Mbps DQPSK @ 2 Mbps CCK @ 5.5 and 11 Mbps
	Model 5054	OFDM (Orthogonal Frequency Division Multiplexing) BPSK 6 and 9 Mbps QPSK 12 and 18 Mbps 16-QAM 24 and 36 Mbps
WIRELESS PROTOCOL	WORP (Wireless Outdoor Router Protocol)	
OVER THE AIR DATA RATES	Model 2411 Model 5054	11 Mbps, 5.5 Mbps, 2 Mbps, 1 Mbps 36 Mbps, 24 Mbps, 18 Mbps, 12 Mbps, 9 Mbps, 6 Mbps
WIRED INTERFACE	Ethernet	Auto-sensing 10/100BASE-TX Ethernet
	Antenna Connector for BSU and SU with Type-N Connector	Standard Type-N Male
NETWORK ARCHITECTURE TYPE	Infrastructure	
FREQUENCY RANGE AND CHANNELS	Model 2411	Unlicensed 2.4 GHz Band Americas (FCC): 2.4 to 2.4835 GHz (11 channels) Europe (ETSI): 2.4 to 2.4835 (13 channels) France: 2.4465 to 2.4835 GHz (4 channels) Japan: 2.4 to 2.497 GHz (14 channels)
	Model 5054	Unlicensed 5 GHz Band Americas (FCC): 5.25 to 5.35 GHz (3 channels) Americas (FCC): 5.725 to 5.850 GHz (5 channels) Europe (ETSI): 5.47 to 5.725 GHz (11 channels) Licensed 5 GHz Band (for the UK) 50 GHz supports 4 channels
RECEIVE SENSITIVITY	Model 2411	-81dBm for 11Mbps -86dBm for 5.5Mbps -90dBm for 2Mbps -93dBm for 1Mbps
	Model 5054 (BER=10 <sup>-6</sup> )	76dBm for 36Mbps -80dBm for 24Mbps -83dBm for 18Mbps -85dBm for 12Mbps -86dBm for 9Mbps -87dBm for 6Mbps
AVAILABLE TRANSMIT POWER SETTINGS	Model 2411	14dBm
	Model 5054	5.25-5.35 GHz 16 dBm (max) 5.47-5.725 GHz 16 dBm (max) 5.725-5.850 GHz 16 dBm (max) Attenuation Step Value 3dB, from 16 dBm
RANGE INFORMATION <sup>2</sup>	Model 2411	8 miles at peak performance (11Mbps) for FCC 0.9 miles at peak performance (11Mbps) for ETSI up to 17.3 miles maximum (1Mbps) for FCC up to 3 miles maximum (1Mbps) for ETSI
	Model 5054	5.25-5.35 GHz 1.1 miles at peak performance (36Mbps mode) using SUs with external antennas 3 miles maximum (6Mbps mode) using SUs with external antennas 5.47-5.725 GHz 1.0 miles at peak performance (36Mbps mode) using SUs with external antennas 2.9 miles maximum (6Mbps mode) using SUs with external antennas 5.725-5.850 GHz 4.4 miles at peak performance (36Mbps mode) using SUs with external antennas 12.2 miles maximum (6Mbps mode) using SUs with external antennas

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COMPLIANCE AND STANDARDS	Safety	UL CSA IEC	60950, UL50 22.2 No. 60950-00 60950 3rd Ed (1999)
	Radio Approvals	USA  Canada Europe (ETSI)  ARIB	FCC 15.107, 15-109; 15-203-15.205, 15.207, 15.209; 15.247; 15.401-15.407  RSS-102; RSS-210; ICES-003 EN 301.893; EN 300.328; EN 301.489-1; EN 301.489-17; EN 300-440; EN50371  STD-T71, STD 33, STD
	EMI and Susceptibility (Class B)	USA Canada	FCC Part 15.107 ICES-00
SNMP COMPLIANCE	SNMPv1/v2 MIB-II Ethernet-like MIB Bridge MIB 802.3MAU 802.11 MIB Private MIB Orinoco MIB		RFC 1157 RFC 1213 RFC 1643 RFC 1493 RFC 2668
AE (IEEE 802.3AF) POWER INJECTORS	AE 3af 12 Port DC Injector AE 3af 6 Port DC Injector AE 3af 1 Port DC Injector		
SECURITY	<p>WORP provides critical feature support for secure long-range wireless deployments in unlicensed frequency spectrum.</p> <p>Filter based on packet information such as unicast/multicast/ broadcast MAC or IP</p> <p>Secure "over the air encryption" with:</p> <ul style="list-style-type: none"> <li>• For 2411: WEP and WEP+</li> <li>• For 5054: WEP and AES</li> </ul> <p>Authentication via Radius</p> <p>Intracell blocking allows the BSU to act as the central policy enforcer for SU to SU communication</p>		
STATUS LEDs	Three indicators on the top panel indicate power, wireless traffic, Ethernet traffic		
REMOTE CONFIGURATION SUPPORT	Telnet, HTTP, TFTP, and SNMPv1/ v2c		
LOCAL CONFIGURATION SUPPORT	RS-232 Serial port, DB9 Female		
DIMENSIONS	Packaged	12 in x 9.44 in x 4.5 in (305 mm x 240 mm x 115 mm)	
	Unpackaged	8.46 in x 6.89 in x 1.57 in (215 mm x 175 mm x 40 mm)	
WEIGHT	Packaged weight	3.5 lbs (1.6 kg)	
	Unpackaged weight	2.38 lbs (1.08 kg) Unit-only, .45 lbs (.20 kg) for power supply	
ENVIRONMENTAL	Operating	0° to 55°C, 5-95% humidity non-condensin @ 5° to 55°C	
	Storage	-20° to 75°C, 5-95% humidity non-condensing @ 5° to 75°C	
SYSTEM PROCESSOR AND MEMORY	166MHz Motorola 8241 processor 16 Mbytes RAM 8 Mbytes FLASH		
SOFTWARE SPECIFICATION	Base Station and Subscriber Units	<p>Miscellaneous</p> <p>WORP protocol</p> <p>Dynamic Data Rate Selection</p> <p>Transmit Power Control</p> <p>Antenna Alignment</p> <p>Integrity Check for Software Upload</p> <hr/> <p>Satellite Density</p> <hr/> <p>Dynamic Frequency Selection</p> <hr/> <p>Redundancy</p> <hr/> <p>Spanning Tree (802.1D)</p> <hr/> <p>Bridging and Routing</p> <hr/> <p>Bridge (802.1d)                      ICMP (RFC 792)</p> <p>IP/RIPv1 (RFC 1058)                IP (RFC 791)</p> <p>IP/RIPv2(RFC 1388)                ARP (RFC 826)</p> <p>CIDR (RFC 1519)</p>	

# Tsunami MP.11 Technical Specifications

SOFTWARE SPECIFICATION (CONT'D)	Base Station and Subscriber Unit	<p>Filtering</p> <p>Ethernet protocol (Ethertype) Static MAC Storm threshold IP address Broadcast protocol</p> <p>Services</p> <p>DHCP Server (RFC 2131) DHCP Client (RFC 2131) Bi-Directional Bandwidth Control</p> <p>Management</p> <p>SNMPv1v2c (RFC 1157)      TFTP Client (RFC 783) SNMPv2c RFC 1907      SU/BSU statistics HTTP Server (RFC 2616)      Link test Telnet Server (RFC 855)      Remote reboot or reset to factory default via Power Injector Temperature Logging</p> <p>Security Features</p> <p>MAC Authentication Radius MAC Access Control WEP/AES-OCB encryption RADIUS (RFC 2138)</p> <p>Mobility</p> <p>Subscriber Unit Roaming</p>
	Base Station Unit	<p>Filtering</p> <p>Intra Cell Blocking</p>
	Subscriber Unit	<p>Services</p> <p>NAT (RFC 3022) DHCP Relay (RFC 2131)</p>
	INPUT POWER REQUIREMENTS	<p>Wall Mount Unit (included)</p> <p>Power over Ethernet</p> <p>Power Consumption</p>
ANTENNA ALIGNMENT TOOLS	Audible Tone CLI output	
PACKAGING CONTENTS	One Tsunami MP.11 Model 2411 or Model 5054 Base Station or (Residential) Subscriber Unit One metal base for ceiling/ desk mounting One wall-mount power supply One country specific power cord One Documentation and Software CD-ROM	
MTBF	150,000 hrs	
WARRANTY	One year	
PART NUMBERS	<b>NORTH AMERICA REGION</b>	
	Model 2411	<p>Base Station Unit</p> <p>2411BSU-US      Tsunami MP.11 Model 2411 (MP.11) Base Station Unit - USA/CAN PSU</p> <p>Residential Subscriber Unit</p> <p>2411RSU-US-WA      Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - USA/CAN PSU - w/12 dBi Window Antenna</p> <p>2411RSU-US-MP      Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - USA/CAN PSU - 5-pack</p> <p>5-packs contain: RSU (5), Power Supply (5); No software, No documentation, No Antennas</p> <p>Subscriber Unit</p> <p>2411SU-US      Tsunami MP.11 Model 2411 (MP.11) Subscriber Unit - USA/CAN PSU</p>
		Model 5054

# Tsunami MP.11 Technical Specifications

PART NUMBERS (CONT'D)	Model 5054	Residential Subscriber Unit
		5054RSU-US-WA
	5054RSU-US-MP	Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - USA/CAN PSU - 5-pack
	5-packs contain: RSU (5), Power Supply (5); No software, No documentation, No Antennas	
	Subscriber Units	
	5054SU-US	Tsunami MP.11 Model 5054 (MP.11a) Subscriber Unit - USA/CAN PSU
	<b>EUROPE AND MIDDLE EAST REGIONS</b>	
	Model 2411	Base Station Unit
	2411BSU-EU-LP	Tsunami MP.11 Model 2411 (MP.11) Base Station Unit - Europe PSU - 8 dBm
	2411BSU-UK-LP	Tsunami MP.11 Model 2411 (MP.11) Base Station Unit - UK PSU - 8 dBm
	2411BSU-EU	Tsunami MP.11 Model 2411 (MP.11) Base Station Unit - Europe PSU
	2411BSU-UK	Tsunami MP.11 Model 2411 (MP.11) Base Station Unit - UK PSU
	Residential Subscriber Unit	
	2411RSU-EU-LP-WA	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - Europe PSU - 8 dBm - w/12 dBi Window Antenna
	2411RSU-UK-LP-WA	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - UK PSU - 8 dBm - w/12 dBi Window Antenna
	Residential Subscriber Unit 5-packs	
	2411RSU-EU-LP-MP	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - Europe PSU - 8 dBm - 5-pack
	2411RSU-UK-LP-MP	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - UK PSU - 8 dBm - 5-pack
	2411RSU-EU-MP	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - Europe PSU - 5-pack
	2411RSU-UK-MP	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - UK PSU - 5-pack
	5-packs contain: RSU (5), Power Supply (5); No software, No documentation, No Antennas	
	Subscriber Units	
	2411SU-EU-LP	Tsunami MP.11 Model 2411 (MP.11) Subscriber Unit - Europe PSU - 8 dBm
	2411SU-UK-LP	Tsunami MP.11 Model 2411 (MP.11) Subscriber Unit - UK PSU - 8 dBm
	2411SU-EU	Tsunami MP.11 Model 2411 (MP.11) Subscriber Unit - Europe PSU
	2411SU-UK	Tsunami MP.11 Model 2411 (MP.11) Subscriber Unit - UK PSU
	Model 5054	Base Station Unit
	5054BSU-EU	Tsunami MP.11 Model 5054 (MP.11a) Base Station Unit - Europe PSU
	5054BSU-UK	Tsunami MP.11 Model 5054 (MP.11a) Base Station Unit - UK PSU
	Residential Subscriber Unit	
	5054RSU-EU-WA	Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - Europe PSU - w/13 dBi Window Antenna
	5054RSU-UK-WA	Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - UK PSU - w/13 dBi Window Antenna
	Residential Subscriber Unit 5-packs	
	5054RSU-EU-MP	Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - Europe PSU - 5-pack
	5054RSU-UK-MP	Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - UK PSU - 5-pack
	5-packs contain: RSU (5), Power Supply (5); No software, No documentation; No antennas	
	Subscriber Units	
	5054SU-EU	Tsunami MP.11 Model 5054 (MP.11a) Subscriber Unit - Europe PSU
	5054SU-UK	Tsunami MP.11 Model 5054 (MP.11a) Subscriber Unit - UK PSU

# Tsunami MP.11 Technical Specifications

## PART NUMBERS (CONT'D)

## ASIA PACIFIC REGION

### Model 2411

#### Base Station Unit

2411BSU-EU-LP	Tsunami MP.11 Model 2411 (MP.11) Base Station Unit - Europe PSU – 8 dBm
2411BSU-UK-LP	Tsunami MP.11 Model 2411(MP.11) Base Station Unit - UK PSU - 8 dBm
2411BSU-EU	Tsunami MP.11 Model 2411 (MP.11) Base Station Unit - Europe PSU
2411BSU-UK	Tsunami MP.11 Model 2411(MP.11) Base Station Unit - UK PSU
2411BSU-AU	Tsunami MP.11 Model 2411 (MP.11) Base Station Unit - Australia PSU
2411BSU-US	Tsunami MP.11 Model 2411 (MP.11) Base Station Unit - US/CAN PSU
2411BSU-JP	Tsunami MP.11 Model 2411 (MP.11) Base Station Unit - Japan PSU

#### Residential Subscriber Unit

2411RSU-EU-LP-WA	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - Europe PSU - 8 dBm - w/12 dBi Window Antenna
2411RSU-UK-LP-WA	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - UK PSU - 8 dBm - w/12 dBi Window Antenna
2411RSU-AU-WA	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - Australia PSU - w/12 dBi Window Antenna
2411RSU-US-WA	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - US/CAN PSU - w/12 dBi Window Antenna
2411RSU-JP-WA	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - Japan PSU - w/12 dBi Window Antenna

#### Residential Subscriber Unit 5-packs

2411RSU-EU-LP-MP	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - Europe PSU - 8 dBm - 5-pack
2411RSU-UK-LP-MP	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - UK PSU - 8 dBm - 5-pack
2411RSU-AU-MP	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - Australia PSU - 5-pack
2411RSU-US-MP	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - US/CAN PSU - 5-pack
2411RSU-JP-MP	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - Japan PSU - 5-pack
2411RSU-EU-MP	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - Europe PSU - 5-pack
2411RSU-UK-MP	Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - UK PSU - 5-pack

5-packs contain: RSU (5), Power Supply (5); No software, No documentation, No Antennas

#### Subscriber Units

2411SU-EU-LP	Tsunami MP.11 Model 2411 (MP.11) Subscriber Unit - Europe PSU - 8 dBm
2411SU-UK-LP	Tsunami MP.11 Model 2411 (MP.11) Subscriber Unit - UK PSU - 8 dBm
2411SU-EU	Tsunami MP.11 Model 2411 (MP.11) Subscriber Unit - Europe PSU
2411SU-UK	Tsunami MP.11 Model 2411 (MP.11) Subscriber Unit - UK PSU
2411SU-AU	Tsunami MP.11 Model 2411 (MP.11) Subscriber Unit - Australia PSU
2411SU-US	Tsunami MP.11 Model 2411 (MP.11) Subscriber Unit - US/CAN PSU
2411SU-JP	Tsunami MP.11 Model 2411 (MP.11) Subscriber Unit - Japan PSU

### Model 5054

#### Base Station Unit

5054-BSU-EU	Tsunami MP.11 Model 5054 (MP.11a) Base Station Unit - Europe PSU
5054-BSU-UK	Tsunami MP.11 Model 5054 (MP.11a) Base Station Unit - UK PSU
5054-BSU-AU	Tsunami MP.11 Model 5054 (MP.11a) Base Station Unit - Australia PSU
5054-BSU-SK	Tsunami MP.11 Model 5054 (MP.11a) Base Station Unit - South Korea PSU
5054-BSU-CN	Tsunami MP.11 Model 5054 (MP.11a) Base Station Unit - China PSU
5054-BSU-US-WORLD	Tsunami MP.11 Model 5054 (MP.11a) Base Station Unit - US/CAN PSU - WORLD

# Tsunami MP.11 Technical Specifications

PART NUMBERS (CONT'D)	Model 5054	Residential Subscriber Unit
		5054-RSU-EU-WA Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - Europe PSU - w/13 dBi Window Antenna
		5054-RSU-UK-WA Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - UK PSU - w/13 dBi Window Antenna
		5054-RSU-AU-WA Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - Australia PSU - w/13 dBi Window Antenna
		5054-RSU-SK-WA Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - South Korea PSU - w/13 dBi Window Antenna
		5054-RSU-CN-WA Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - China PSU - w/13 dBi Window Antenna
		5054-RSU-US-WORLD Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - US/CAN PSU - w/13 dBi Window Antenna - WORLD
		<b>Residential Subscriber Unit 5-packs</b>
		5054-RSU-AU-MP Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - Australia PSU - 5-pack
		5054-RSU-US-MP-WORLD Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - US/CAN PSU - 5-pack WORLD
		5054-RSU-SK-MP Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - South Korea PSU - 5-pack
		5054-RSU-CN-MP Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - China PSU - 5-pack
		5054-RSU-EU-MP Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - Europe PSU - 5-pack
		5054-RSU-UK-MP Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - UK PSU - 5-pack
		5-packs contain: RSU (5), Power Supply (5); No software, No documentation; No antennas
		<b>Subscriber Units</b>
		5054-SU-EU Tsunami MP.11 Model 5054 (MP.11a) Subscriber Unit - Europe PSU
		5054-SU-UK Tsunami MP.11 Model 5054 (MP.11a) Subscriber Unit - UK PSU
		5054-SU-AU Tsunami MP.11 Model 5054 (MP.11a) Subscriber Unit - Australia PSU
		5054-SU-SK Tsunami MP.11 Model 5054 (MP.11a) Subscriber Unit - South Korea PSU
		5054-SU-CN Tsunami MP.11 Model 5054 (MP.11a) Subscriber Unit - China PSU
		5054-SU-US-WORLD Tsunami MP.11 Model 5054 (MP.11a) Subscriber Unit - US/CAN PSU - WORLD
		<b>CARIBBEAN AND LATIN AMERICA REGION</b>
	Model 2411	Base Station Unit
		2411BSU-US Tsunami MP.11 Model 2411 (MP.11) Base Station Unit – USA/CAN PSU
		Residential Subscriber Unit
		2411RSU-US-WA Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - USA/CAN PSU - w/12 dBi Window Antenna
		2411RSU-US-MP Tsunami MP.11 Model 2411 (MP.11) Residential Subscriber Unit - USA/CAN PSU - 5-pack
		5-packs contain: RSU (5), Power Supply (5); No software, No documentation, No Antennas
		Subscriber Unit
		2411SU-US Tsunami MP.11 Model 2411 (MP.11) Subscriber Unit - USA/CAN PSU
	Model 5054	Base Station Unit
		5054BSU-US Tsunami MP.11 Model 5054 (MP.11a) Base Station Unit – USA/CAN PSU
		Residential Subscriber Unit
		5054RSU-US-WA Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - USA/CAN PSU - w/12 dBi Window Antenna
		5054RSU-US-MP Tsunami MP.11 Model 5054 (MP.11a) Residential Subscriber Unit - USA/CAN PSU - 5-pack
		5-packs contain: RSU (5), Power Supply (5); No software, No documentation, No Antennas
		Subscriber Units
		5054SU-US Tsunami MP.11 Model 5054 (MP.11a) Subscriber Unit - USA/CAN PSU

# Tsunami MP.11 Technical Specifications

PART NUMBERS (CONT'D)	UNIVERSAL
	Accessories
848 274 163	Surge Arrestor - Standard-N Female to Female
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
848 274 197	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 60
	Model 2411 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 - Standard N
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
2411WA12-STN	12 dBi Wide Angle Antenna with Integrated 2 m cable (st-N) Mountable on Window or Flat Surface
848 274 221	14 dBi Directional Antenna (Yagi) - St-N -Female
848 515 714	24 dBi Directional Antenna (Parabolic Grid) - St-N Female
	Model 5054 5 GHz Antennas
5054-WA-15-STN	15 dBi Window Antenna - St-N Female - 5.25 - 5.875 GHz
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
	AE (IEEE 802.3af) Power Injectors
4312-XX	AE 3af 12 Port DC Injector
4306-XX	AE 3af 6 Port DC Injector
4301-XX	AE 3af 1 Port DC Injector
	Outdoor Ethernet Cables
69819	25m outdoor, terminated CAT5 cable for MP.11 with three RJ-45 and one weather-proof Ethernet port cap
69820	50m outdoor, terminated CAT5 cable for MP.11 with three RJ-45 and one weather-proof Ethernet port cap
69821	75m outdoor, terminated CAT5 cable for MP.11 with three RJ-45 and one weather-proof Ethernet port cap

1 IEEE 802.3ad is not included for RSU. Power Injector is sold separately

2 Assumptions for Model 5054 Range Calculation

- PMP configuration using USA regulations for L and U bands, ETSI regulations for M bands
- Clear LOS
- Sector antenna (17dBi, 60-degrees) at BSU with short 1dB jumper cable
- 3' parabolic dish (31.4dBi) with short 1dB jumper cable for SUs with external antennas
- Fade margin minimum of 10dB to 2 miles, 0.2dB additional fade margin for every 0.1 mile to 15dB

Assumptions for Model 2411 Range Calculation

- PMP configuration using USA regulations and ETSI regulations
- Clear LOS, no unusual multipath
- Sector antenna (60-degrees) at BSU with 20' LMR-600 cable
- 3' parabolic dish (31.4dBi) at SU with 20' LMR-600 cable for USA
- 14dBi panel antenna at SU with 20' LMR-600 cable for ETSI
- Fade margin minimum of 10dB to 2 miles, 0.2dB additional fade margin for every 0.1 mile) to 15dB, then availability >99.990%

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