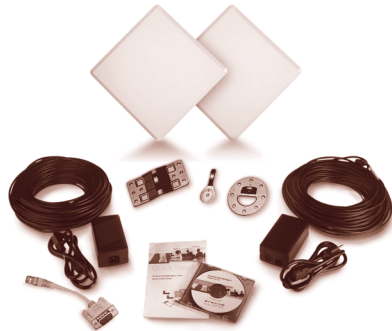




### APPLICATIONS

- **Backhaul to a Central POP**  
Avoid expensive installation and recurring charge of a second wireline backhaul to a remote virtual POP
- **Leased Line Redundancy**  
Eliminate recurring DS-3 leased line charges with one time installation charge of a QuickBridge.11 link
- **Repeater**  
Extend distance or overcome path blockage by adding point to point hops
- **High-bandwidth Last Mile Access**  
Use QuickBridge.11s to deliver TLS (Transparent LAN Services) to corporate parks
- **Inter-POP Redundancy**  
Avoid downtimes caused by a wireline backhaul failure by adding a QuickBridge.11 link as inter-POP redundancy

|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Part Numbers</b><br><br><b>(North America region)</b>               | <b><u>Model 2454-R</u></b><br><ul style="list-style-type: none"> <li>• 2454-QB-US-WORLD Tsunami QuickBridge.11 Model 2454-R US/CAN PSU-WORLD</li> </ul> <b><u>Model 5054-R</u></b><br><ul style="list-style-type: none"> <li>• 5054-QB-US Tsunami QuickBridge.11 Model 5054-R US/CAN PSU-WORLD</li> </ul> <b><u>Model 5054-R-LR*</u></b><br><ul style="list-style-type: none"> <li>• 5054-QB-LR-US Tsunami QuickBridge.11 Model 5054-R-LR, US/CAN PSU</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Part Numbers</b><br><br><b>(Europe and Middle East regions)</b>     | <b><u>Model 2454-R</u></b><br><ul style="list-style-type: none"> <li>• 2454-QB-EU Tsunami QuickBridge.11 Model 2454-R Europe PSU</li> <li>• 2454-QB-UK Tsunami QuickBridge.11 Model 2454-R UK PSU</li> </ul> <b><u>Model 5054-R</u></b><br><ul style="list-style-type: none"> <li>• 5054-QB-EU Tsunami QuickBridge.11 Model 5054-R Europe PSU</li> <li>• 5054-QB-UK Tsunami QuickBridge.11 Model 5054-R UK PSU</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Part Numbers</b><br><br><b>(Asia Pacific region)</b>                | <b><u>Model 2454-R</u></b><br><ul style="list-style-type: none"> <li>• 2454-QB-AU Tsunami QuickBridge.11 Model 2454-R Australia PSU</li> <li>• 2454-QB-CN Tsunami QuickBridge.11 Model 2454-R China PSU</li> <li>• 2454-QB-SK Tsunami QuickBridge.11 Model 2454-R South Korea PSU</li> <li>• 2454-QB-US-WORLD Tsunami QuickBridge.11 Model 2454-R US/CAN PSU -WORLD</li> <li>• 2454-QB-EU Tsunami QuickBridge.11 Model 2454-R Europe PSU</li> <li>• 2454-QB-UK Tsunami QuickBridge.11 Model 2454-R UK PSU</li> </ul> <b><u>Model 5054-R</u></b><br><ul style="list-style-type: none"> <li>• 5054-QB-AU Tsunami QuickBridge.11 Model 5054-R Australia PSU</li> <li>• 5054-QB-CN Tsunami QuickBridge.11 Model 5054-R China PSU</li> <li>• 5054-QB-SK Tsunami QuickBridge.11 Model 5054-R South Korea PSU</li> <li>• 5054-QB-US Tsunami QuickBridge.11 Model 5054-R US/CAN PSU</li> <li>• 5054-QB-EU Tsunami QuickBridge.11 Model 5054-R Europe PSU</li> <li>• 5054-QB-UK Tsunami QuickBridge.11 Model 5054-R UK PSU</li> </ul> |
| <b>Part Numbers</b><br><br><b>(Caribbean and Latin America region)</b> | <b><u>Model 2454-R</u></b><br><ul style="list-style-type: none"> <li>• 2454-QB-US-WORLD Tsunami QuickBridge.11 Model 2454-R US/CAN PSU -WORLD</li> </ul> <b><u>Model 5054-R</u></b><br><ul style="list-style-type: none"> <li>• 5054-QB-BR Tsunami QuickBridge.11 Model 5054-R Brazil PSU</li> <li>• 5054-QB-US Tsunami QuickBridge.11 Model 5054-R US/CAN PSU</li> </ul> <b><u>Model 5054-R-LR*</u></b><br><ul style="list-style-type: none"> <li>• 5054-QB-LR-US Tsunami QuickBridge.11 Model 5054-R-LR US/CAN PSU</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Part Numbers</b><br><br><b>(Universal)</b>                          | <b><u>Accessories</u></b><br><ul style="list-style-type: none"> <li>• 70251 PoE (Power over Ethernet) Surge Arrestor for Tsunami MP.11 and QuickBridge.11</li> </ul> <b><u>Outdoor Ethernet Cables</u></b><br><ul style="list-style-type: none"> <li>• 69819 25m outdoor, terminated CAT5 cable for Tsunami MP.11 or QB.11 with three RJ-45 and one weather-proof Ethernet port cap</li> <li>• 69820 50m outdoor, terminated CAT5 cable for Tsunami MP.11 or QB.11 with three RJ-45 and one weather-proof Ethernet port cap</li> <li>• 69821 75m outdoor, terminated CAT5 cable for Tsunami MP.11 or QB.11 with three RJ-45 and one weather-proof Ethernet port cap</li> </ul> <b><u>Power Injector</u></b><br><ul style="list-style-type: none"> <li>• 69823 Spare Power DC Injector for Tsunami MP.11 or QB.11</li> </ul>                                                                                                                                                                                                  |

\*Available for FCC only

**Regulatory Approvals and Frequency Ranges for 2454-R<sup>1</sup>**

**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)<br>• 2.40 - 2.4835          | 5MHz<br>13                   | 10MHz<br>Up to 13            | 20MHz<br>Up to 13           | Yes           |
| Belgium                  |                                   |                              |                              |                             |               |
| 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)<br>2.40 - 2.4835            | 5MHz<br>13                   | 10MHz<br>Up to 13            | 20MHz<br>Up to 13           | Yes           |
| Other European Countries |                                   |                              |                              |                             |               |
| Iceland                  | (GHz)<br>2.40 - 2.4835            | 5MHz<br>13                   | 10MHz<br>Up to 13            | 20MHz<br>Up to 13           | Yes           |
| Liechtenstein            |                                   |                              |                              |                             |               |
| Norway                   |                                   |                              |                              |                             |               |
| Switzerland              |                                   |                              |                              |                             |               |
| Russia                   | (GHz)<br>5.15 - 5.85              | 5MHz<br>Up to 141            | 10MHz<br>Up to 71            | 20MHz<br>Up to 36           | In Process    |
| South America            |                                   |                              |                              |                             |               |
| Brazil                   | (GHz)<br>2.40 - 2.4835            | 5MHz<br>13                   | 10MHz<br>Up to 13            | 20MHz<br>Up to 13           | Yes           |
| APAC                     |                                   |                              |                              |                             |               |
| Australia                | (GHz)<br>2.40 - 2.4835            | 5MHz<br>13                   | 10MHz<br>Up to 13            | 20MHz<br>Up to 13           | Yes           |
| New Zealand              |                                   |                              |                              |                             |               |
| Japan                    |                                   |                              |                              |                             |               |
| Hong Kong                |                                   |                              |                              |                             |               |
| S. Korea                 |                                   |                              |                              |                             |               |
| China                    |                                   |                              |                              |                             |               |
| Taiwan                   |                                   |                              |                              |                             |               |
| Singapore                | (GHz)<br>5.15-5.25<br>5.725-5.825 | 5MHz<br>Up to 13<br>Up to 17 | 10MHz<br>Up to 7<br>Up to 9  | 20MHz<br>Up to 4<br>Up to 5 | In Process    |
| India                    | (GHz)<br>5.15-5.35<br>5.725-5.825 | 5MHz<br>Up to 32<br>Up to 17 | 10MHz<br>Up to 16<br>Up to 9 | 20MHz<br>Up to 7<br>Up to 5 | In Process    |

|                                                                   |                          |              |          |          |          |     |
|-------------------------------------------------------------------|--------------------------|--------------|----------|----------|----------|-----|
| Regulatory Approvals and Frequency Ranges for 5054-R <sup>1</sup> | Model 5054-R             |              |          |          |          |     |
|                                                                   | 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                  |              |          |          |          | Yes |
|                                                                   | Belgium                  |              |          |          |          |     |
|                                                                   | Cyprus                   |              |          |          |          |     |
|                                                                   | Czech Republic           |              |          |          |          |     |
|                                                                   | Denmark                  |              |          |          |          |     |
|                                                                   | Estonia                  |              |          |          |          |     |
|                                                                   | Finland                  |              |          |          |          |     |
|                                                                   | France                   |              |          |          |          |     |
|                                                                   | Germany                  |              |          |          |          |     |
|                                                                   | Greece                   |              |          |          |          |     |
|                                                                   | Hungary                  |              |          |          |          |     |
|                                                                   | Italy                    |              |          |          |          |     |
|                                                                   | Latvia                   |              |          |          |          |     |
|                                                                   | Luxemburg                |              |          |          |          |     |
|                                                                   | Lithuania                |              |          |          |          |     |
|                                                                   | Malta                    |              |          |          |          |     |
|                                                                   | Netherlands              |              |          |          |          |     |
|                                                                   | Poland                   |              |          |          |          |     |
|                                                                   | Portugal                 |              |          |          |          |     |
|                                                                   | Spain                    |              |          |          |          |     |
|                                                                   | Sweden                   |              |          |          |          |     |
|                                                                   | Slovakia                 |              |          |          |          |     |
|                                                                   | Slovenia                 |              |          |          |          |     |
|                                                                   | United Kingdom           | (GHz)        | 5MHz     | 10MHz    | 20MHz    | Yes |
|                                                                   | Ireland                  | 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                  |              |          |          |          | Yes |
|                                                                   | Liechtenstein            |              |          |          |          |     |
|                                                                   | Norway                   |              |          |          |          |     |
|                                                                   | Switzerland              |              |          |          |          |     |
|                                                                   | 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                                                         |                          |              |          |          | Yes      |     |
| New Zealand                                                       |                          |              |          |          |          |     |
| Hong Kong                                                         | (GHz)                    | 5MHz         | 10MHz    | 20MHz    | Yes      |     |
| S. Korea                                                          | 5.725-5.85               | Up to 21     | Up to 11 | Up to 5  |          |     |
| China                                                             | (GHz)                    | 5MHz         | 10MHz    | 20MHz    | Yes      |     |
| Taiwan                                                            | 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  |          |     |

|                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                   |                 |                |        |              |                |                   |        |                |              |                |          |                |                |              |          |                |                |                |                       |            |  |  |
|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------|-----------------|----------------|--------|--------------|----------------|-------------------|--------|----------------|--------------|----------------|----------|----------------|----------------|--------------|----------|----------------|----------------|----------------|-----------------------|------------|--|--|
| Regulatory Approvals and Frequency Ranges for 5054-R-LR <sup>1</sup> | <div>Model 5054-R-LR</div> <table><tr><td>North America</td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="3">USA</td><td>(GHz)</td><td>5MHz</td><td>10MHz</td><td>20MHz</td></tr><tr><td>5.25 - 5.35</td><td>Up to 15</td><td>Up to 7</td><td>Up to 3</td></tr><tr><td>5.725 - 5.85</td><td>Up to 21</td><td>Up to 11</td><td>Up to 5</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                 | North America   |                   |                 |                |        | USA          | (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        |                |                |                       |            |  |  |
| North America                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                   |                 |                |        |              |                |                   |        |                |              |                |          |                |                |              |          |                |                |                |                       |            |  |  |
| USA                                                                  | (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         |                |        |              |                |                   |        |                |              |                |          |                |                |              |          |                |                |                |                       |            |  |  |
| Integrated Antenna Specification                                     | <div>Model 2454-R</div> <ul style="list-style-type: none"><li>Part Number2454-QB-xx</li><li>Frequency range2.4 to 2.5 GHz</li><li>Nominal Impedance50 Ohms</li><li>Gain18 dBi</li><li>Front-to-Back Ratio25 dB</li><li>HPBW/vertical22 degrees</li><li>HPBW/horizontal15 degrees</li><li>Cross Polarization20 dB</li><li>Power handling1 W</li><li>VSWR1.5 : 1 Max</li></ul> <div>Model 5054-R(-LR)</div> <ul style="list-style-type: none"><li>Part Number5054-QB-xx or 5054-QB-LR-US</li><li>Frequency range5250 - 5875 MHz</li><li>Nominal Impedance50 ohms</li><li>Gain23 dBi</li><li>Front-to-Back Ratio35 dB</li><li>HPBW/vertical9 degrees</li><li>HPBW/horizontal9 degrees</li><li>Cross Polarization24 dB</li><li>Power handling1 W (cw)</li><li>VSWR2.0 : 1 Max</li></ul> |                 |                   |                 |                |        |              |                |                   |        |                |              |                |          |                |                |              |          |                |                |                |                       |            |  |  |
| RF Modulation and over-the-air rates                                 | <div>Model 2454-R and 5054-R(-LR)</div> <div>OFDM (Orthogonal Frequency Division Multiplexing)</div> <table><tr><td></td><td>20 MHz Channels</td><td>10 MHz Channels</td><td>5 MHz Channels</td></tr><tr><td>• BPSK</td><td>6 and 9 Mbps</td><td>3 and 4.5 Mbps</td><td>2.25 and 1.5 Mbps</td></tr><tr><td>• QPSK</td><td>12 and 18 Mbps</td><td>6 and 9 Mbps</td><td>3 and 4.5 Mbps</td></tr><tr><td>• 16-QAM</td><td>24 and 36 Mbps</td><td>12 and 18 Mbps</td><td>6 and 9 Mbps</td></tr><tr><td>• 64 QAM</td><td>54 and 48 Mbps</td><td>36 and 24 Mbps</td><td>18 and 12 Mbps</td></tr><tr><td>• Maximum Packet Size</td><td colspan="3">1538 Bytes</td></tr></table>                                                                                                            |                 | 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 | 54 and 48 Mbps | 36 and 24 Mbps | 18 and 12 Mbps | • Maximum Packet Size | 1538 Bytes |  |  |
|                                                                      | 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                                                             | 54 and 48 Mbps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 36 and 24 Mbps  | 18 and 12 Mbps    |                 |                |        |              |                |                   |        |                |              |                |          |                |                |              |          |                |                |                |                       |            |  |  |
| • Maximum Packet Size                                                | 1538 Bytes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                   |                 |                |        |              |                |                   |        |                |              |                |          |                |                |              |          |                |                |                |                       |            |  |  |
| Wireless Protocol                                                    | <ul style="list-style-type: none"><li>Wireless Outdoor Routing Protocol (WORP)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |                   |                 |                |        |              |                |                   |        |                |              |                |          |                |                |              |          |                |                |                |                       |            |  |  |
| Device Interface                                                     | <div>Ethernet</div> <ul style="list-style-type: none"><li>Auto-sensing 10/100BASE-TX Ethernet</li></ul> <div>Antenna Connector for BSU and SU with Type-N Connector</div> <ul style="list-style-type: none"><li>Standard Type-N Female</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |                   |                 |                |        |              |                |                   |        |                |              |                |          |                |                |              |          |                |                |                |                       |            |  |  |
| Network Architecture Type                                            | <ul style="list-style-type: none"><li>Infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |                   |                 |                |        |              |                |                   |        |                |              |                |          |                |                |              |          |                |                |                |                       |            |  |  |

**Receive Sensitivity (BER=10<sup>-6</sup>):**

**Model 2454-R**

| Modulation | 40 MHz Channels Turbo Mode (US Only) | 20 MHz Channels Standard Mode | 10 MHz Channels Standard Mode | 5 MHz Channels Standard Mode |
|------------|--------------------------------------|-------------------------------|-------------------------------|------------------------------|
| 64QAM 3/4  | N/A                                  | -71 dBm @54Mbps               | -74 dBm @36Mbps               | -77 dBm @18Mbps              |
| 64QAM 1/2  |                                      | -74 dBm @48Mbps               | -77 dBm @24Mbps               | -80 dBm @12Mbps              |
| 16QAM 3/4  |                                      | -79 dBm @36Mbps               | -82 dBm @18Mbps               | -85 dBm @9Mbps               |
| 16QAM 1/2  |                                      | -84 dBm @24Mbps               | -87 dBm @12Mbps               | -90 dBm @6Mbps               |
| QPSK 3/4   |                                      | -87 dBm @18Mbps               | -90 dBm @9Mbps                | -93 dBm @4.5Mbps             |
| QPSK 1/2   |                                      | -89 dBm @12Mbps               | -92 dBm @6Mbps                | -95 dBm @3Mbps               |
| BPSK 3/4   |                                      | -91 dBm @9Mbps                | -94 dBm @4.5Mbps              | -97 dBm @2.25Mbps            |
| BPSK 1/2   |                                      | -91 dBm @6Mbps                | -94 dBm @3Mbps                | -97 dBm @1.5Mbps             |

**Model 5054-R**

| Modulation | 40 MHz Channels Turbo Mode (US only) | 20 MHz Channels Standard Mode | 10 MHz Channels Standard Mode | 5 MHz Channels Standard Mode |
|------------|--------------------------------------|-------------------------------|-------------------------------|------------------------------|
| 64QAM 3/4  | -66 dBm @108Mbps                     | -69 dBm @54Mbps               | -72 dBm @36Mbps               | -75 dBm @18Mbps              |
| 64QAM 1/2  | -68 dBm @96Mbps                      | -72 dBm @48Mbps               | -75 dBm @24Mbps               | -78 dBm @12Mbps              |
| 16QAM 3/4  | -68 dBm @96Mbps                      | -77 dBm @36Mbps               | -80 dBm @18Mbps               | -83 dBm @9Mbps               |
| 16QAM 1/2  | -75dBm @72Mbps                       | -80 dBm @24Mbps               | -83 dBm @12Mbps               | -86 dBm @6Mbps               |
| QPSK 3/4   | -78dBm @48Mbps                       | -83 dBm @18Mbps               | -86 dBm @9Mbps                | -89 dBm @4.5Mbps             |
| QPSK 1/2   | -81dBm @36Mbps                       | -86 dBm @12Mbps               | -89 dBm @6Mbps                | -92 dBm @3Mbps               |
| BPSK 3/4   | -83 dBm @24Mbps                      | -87 dBm @9Mbps                | -90 dBm @4.5Mbps              | -93 dBm @2.25Mbps            |
| BPSK 1/2   | -84 dBm @18Mbps                      | -88 dBm @6Mbps                | -91 dBm @3Mbps                | -94 dBm @1.5Mbps             |
|            | -85 dBm @12Mbps                      |                               |                               |                              |

**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 3/4  | -70dBm @108Mbps            | -73 dBm @54Mbps               | -73 dBm @36Mbps               | -76 dBm @18Mbps              |
| 64QAM 1/2  | -72dBm @96Mbps             | -75 dBm @48Mbps               | -76 dBm @24Mbps               | -79 dBm @12Mbps              |
| 16QAM 3/4  | -74dBm @72Mbps             | -84 dBm @36Mbps               | -81 dBm @18Mbps               | -83 dBm @9Mbps               |
| 16QAM 1/2  | -78dBm @48Mbps             | -85 dBm @24Mbps               | -84 dBm @12Mbps               | -86 dBm @6Mbps               |
| QPSK 3/4   | -81dBm @36Mbps             | -89 dBm @18Mbps               | -87 dBm @9Mbps                | -89 dBm @4.5Mbps             |
| QPSK 1/2   | -83 dBm @24Mbps            | -90 dBm @12Mbps               | -90 dBm @6Mbps                | -92 dBm @3Mbps               |
| BPSK 3/4   | -84 dBm @18Mbps            | -93 dBm @9Mbps                | -81 dBm @4.5Mbps              | -93 dBm @2.25Mbps            |
| BPSK 1/2   | -85 dBm @12Mbps            | -94 dBm @6Mbps                | -91 dBm @3Mbps                | -95 dBm @1.5Mbps             |

**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                     |

|                                                                                                                                                                                                                                                                                           |                                                                                             |                                                       |                               |                               |                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------|-------------------------------|------------------------------|
| 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*<br>*under throughput test conditions indicated above. |                                                       |                               |                               |                              |
| Transmit Power Settings                                                                                                                                                                                                                                                                   | Model 2454-R                                                                                |                                                       |                               |                               |                              |
|                                                                                                                                                                                                                                                                                           |                                                                                             | 6-24 Mbps @ 20 MHz<br>16QAM ½, QPSK ¾, BPSK ¾, BPSK ½ | 36 Mbps @ 20 MHz<br>16QAM ¾   | 48 Mbps @ 20 MHz<br>64QAM ½   | 54 Mbps @ 20 MHz<br>64QAM ¾  |
|                                                                                                                                                                                                                                                                                           | 2.400-2.483 GHz                                                                             | 16 dBm                                                | 16 dBm                        | 14 dBm                        | 13 dBm                       |
| Output Power Attenuation: 0 - 18dB, in 3dB steps<br>Output Power Values will have a tolerance of +- 1.5 dB                                                                                                                                                                                |                                                                                             |                                                       |                               |                               |                              |
| Model 5054-R                                                                                                                                                                                                                                                                              |                                                                                             |                                                       |                               |                               |                              |
|                                                                                                                                                                                                                                                                                           |                                                                                             | 6-24 Mbps @ 20 MHz<br>16QAM ½, QPSK ¾, BPSK ¾, BPSK ½ | 36 Mbps @ 20 MHz<br>16QAM ¾   | 48 Mbps @ 20 MHz<br>64QAM ½   | 54 Mbps @ 20 MHz<br>64QAM ¾  |
|                                                                                                                                                                                                                                                                                           | 5.15-5.35 GHz                                                                               | • 15 dBm                                              | • 13 dBm                      | • 12 dBm                      | • 11 dBm                     |
|                                                                                                                                                                                                                                                                                           | 5.47-5.725 GHz                                                                              | • 16 dBm                                              | • 13 dBm                      |                               |                              |
|                                                                                                                                                                                                                                                                                           | 5.725-5.850 GHz                                                                             | • 16 dBm                                              | • 13 dBm                      |                               |                              |
| Output Power Attenuation: 0 - 18dB, in 3dB steps<br>Output Power Values will have tolerance of +- 1.5 dB                                                                                                                                                                                  |                                                                                             |                                                       |                               |                               |                              |
| Model 5054-R-LR                                                                                                                                                                                                                                                                           |                                                                                             |                                                       |                               |                               |                              |
|                                                                                                                                                                                                                                                                                           |                                                                                             | 6-24 Mbps @ 20 MHz<br>16QAM ½, QPSK ¾, BPSK ¾, BPSK ½ | 36 Mbps @ 20 MHz<br>16QAM ¾   | 48 Mbps @ 20 MHz<br>60QAM ¾   | 54 Mbps @ 20 MHz<br>64QAM ¾  |
|                                                                                                                                                                                                                                                                                           | •5.25-5.35 GHz                                                                              | •20 dBm                                               | •20 dBm                       | •20 dBm                       | •20 dBm                      |
|                                                                                                                                                                                                                                                                                           | •5.725-5.850 GHz                                                                            | •25 dBm                                               | •23 dBm                       | •22 dBm                       | •20 dBm                      |
| Output Power Attenuation: 0 - 18dB, in 3dB steps<br>Output Power Values will have a tolerance of +- 1.5 dB                                                                                                                                                                                |                                                                                             |                                                       |                               |                               |                              |

|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |             |         |        |                                 |            |            |            |                                    |            |             |             |                  |           |           |           |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|---------|--------|---------------------------------|------------|------------|------------|------------------------------------|------------|-------------|-------------|------------------|-----------|-----------|-----------|
| <div>Range information for 2454-QB<sup>2</sup></div> | <table><tr><td></td><td>54 Mbps</td><td>36 Mbps</td><td>6 Mbps</td></tr><tr><td>2.4-2.4835GHz (US)</td><td>3mi/4.8km</td><td>5mi/8.05km</td><td>3mi/4.8km</td></tr><tr><td>2.4-2.8 GHz (ETSI)</td><td>1mi/1.6km</td><td>2.6mi/4.2km</td><td>2.6mi/4.2km</td></tr></table> <div>Minimum fade margin; 99.995% or better availability; average terrain/climate; no unusual multipath; proper path clearance (0.6F1).</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             | 54 Mbps     | 36 Mbps | 6 Mbps | 2.4-2.4835GHz (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 |                  |           |           |           |
|                                                      | 54 Mbps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 36 Mbps     | 6 Mbps      |         |        |                                 |            |            |            |                                    |            |             |             |                  |           |           |           |
| 2.4-2.4835GHz (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 |         |        |                                 |            |            |            |                                    |            |             |             |                  |           |           |           |
| <div>Range Information for 5054-QB<sup>2</sup></div> | <table><tr><td></td><td>54 Mbps</td><td>36 Mbps</td><td>6 Mbps</td></tr><tr><td>5.25-5.35 GHz (US)</td><td>3mi/4.8km</td><td>6mi/9.6km</td><td>3mi/4.8km</td></tr><tr><td>5.47-5.7GHz (ETSI)</td><td>3mi/4.8km</td><td>6mi/9.6km</td><td>2.1mi/3.8km</td></tr><tr><td>5.725-5.850 (US)</td><td>3mi/4.8km</td><td>6mi/9.6km</td><td>3mi/4.8km</td></tr></table> <div>Minimum fade margin; 99.995% or better availability; average terrain/climate; no unusual multipath; proper path clearance (0.6F1).</div> <div>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 inthe US with proper engineering.</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             | 54 Mbps     | 36 Mbps | 6 Mbps | 5.25-5.35 GHz (US)              | 3mi/4.8km  | 6mi/9.6km  | 3mi/4.8km  | 5.47-5.7GHz (ETSI)                 | 3mi/4.8km  | 6mi/9.6km   | 2.1mi/3.8km | 5.725-5.850 (US) | 3mi/4.8km | 6mi/9.6km | 3mi/4.8km |
|                                                      | 54 Mbps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 36 Mbps     | 6 Mbps      |         |        |                                 |            |            |            |                                    |            |             |             |                  |           |           |           |
| 5.25-5.35 GHz (US)                                   | 3mi/4.8km                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 6mi/9.6km   | 3mi/4.8km   |         |        |                                 |            |            |            |                                    |            |             |             |                  |           |           |           |
| 5.47-5.7GHz (ETSI)                                   | 3mi/4.8km                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 6mi/9.6km   | 2.1mi/3.8km |         |        |                                 |            |            |            |                                    |            |             |             |                  |           |           |           |
| 5.725-5.850 (US)                                     | 3mi/4.8km                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 6mi/9.6km   | 3mi/4.8km   |         |        |                                 |            |            |            |                                    |            |             |             |                  |           |           |           |
| <div>Range Information for 5054-QB-LR</div>          | <table><tr><td></td><td>54 Mbps</td><td>36 Mbps</td><td>6 Mbps</td></tr><tr><td>5.25-5.35 GHz (US)<sup>1</sup></td><td>5mi/8.05km</td><td>6mi/9.6km</td><td>5mi/8.05km</td></tr><tr><td>5.725-5.850GHz (ETSI)<sup>2</sup></td><td>5mi/8.05km</td><td>20mi/32km</td><td>20mi/32km</td></tr></table> <div>Ranges calculated with minimum 15 dB theoretical System Operating Margin with a 20 MHz bandwidth. Assumes the integrated 23 dBi panel is used at each end, the link has clear line of site, proper path clearance (0.6F1), average terrain/climate and no unusual multipath.</div> <div><sup>1</sup> Presumes transmit power is reduced to -3dBm to comply with FCC EIRP limitations.</div> <div><sup>2</sup> Presumes transmit power is set to maximum, which complies with FCC EIRP limitations.</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             | 54 Mbps     | 36 Mbps | 6 Mbps | 5.25-5.35 GHz (US) <sup>1</sup> | 5mi/8.05km | 6mi/9.6km  | 5mi/8.05km | 5.725-5.850GHz (ETSI) <sup>2</sup> | 5mi/8.05km | 20mi/32km   | 20mi/32km   |                  |           |           |           |
|                                                      | 54 Mbps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 36 Mbps     | 6 Mbps      |         |        |                                 |            |            |            |                                    |            |             |             |                  |           |           |           |
| 5.25-5.35 GHz (US) <sup>1</sup>                      | 5mi/8.05km                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 6mi/9.6km   | 5mi/8.05km  |         |        |                                 |            |            |            |                                    |            |             |             |                  |           |           |           |
| 5.725-5.850GHz (ETSI) <sup>2</sup>                   | 5mi/8.05km                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 20mi/32km   | 20mi/32km   |         |        |                                 |            |            |            |                                    |            |             |             |                  |           |           |           |
| <div>System Processor and Memory</div>               | <div><ul style="list-style-type: none"><li>• 166MHz Motorola 8241 processor</li><li>• 16 Mbytes RAM</li><li>• 8 Mbytes FLASH</li></ul></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |             |         |        |                                 |            |            |            |                                    |            |             |             |                  |           |           |           |
| <div>Software Specification</div>                    | <div><ul style="list-style-type: none"><li>• Key Features<ul style="list-style-type: none"><li>• Dynamic Data Rate Selection</li><li>• Transmit Power Control</li><li>• Antenna Alignment</li><li>• Integrity Check for Software Upload</li><li>• 5, 10, and 20MHz channels</li><li>• QoS Support; up to 8 class of service, up to 8 Service Flows per class*</li></ul></li><li>• Bridging and Routing<ul style="list-style-type: none"><li>• Bridge (802.1d)</li><li>• IP/ RIPv1 (RFC 1058)</li><li>• IP/ RIPv2 (RFC 1388)</li><li>• CIDR (RFC 1519)</li><li>• ICMP (RFC 792)</li><li>• IP (RFC 791)</li><li>• ARP (RFC 826)</li></ul></li><li>• Filtering<ul style="list-style-type: none"><li>• Ethernet protocol (Ethertype)</li><li>• Static MAC</li><li>• Storm threshold</li><li>• IP address</li><li>• Broadcast protocol</li></ul></li><li>• Services<ul style="list-style-type: none"><li>• DHCP Server (RFC 2131)</li><li>• DHCP Client (RFC 2131)</li><li>• Bi-Directional Bandwidth Control</li></ul></li><li>• VLAN<ul style="list-style-type: none"><li>• 802.1Q</li></ul></li><li>• Security Features<ul style="list-style-type: none"><li>• MAC Authentication</li><li>• Radius MAC Access Control</li><li>• WEP/AES-OCB encryption</li><li>• RADIUS (RFC 2138)</li></ul></li></ul></div> |             |             |         |        |                                 |            |            |            |                                    |            |             |             |                  |           |           |           |

\* Available with version 2.5 software release

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Security</b>                    | <ul style="list-style-type: none"> <li>• Filter based on packet information such as unicast/multicast/ broadcast MAC or IP</li> <li>• Secure “over the air encryption” with WEP, WEP+, and AES, and AES-CCB)</li> <li>• Authentication via Radius</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Management</b>                  | <ul style="list-style-type: none"> <li>• SU/BSU statistics</li> <li>• Link Test</li> <li>• Temperature logging</li> <li>• SNMPv1/v2 RFC 1157</li> <li>• SNMP v2c RFC 1907</li> <li>• HTTP Server RFC 2616</li> <li>• Telnet RFC 855</li> <li>• TFTP client RFC 783</li> <li>• CLI</li> <li>• MIB-II RFC 1213</li> <li>• Ethernet-like MIB RFC 1643</li> <li>• Bridge MIB RFC 1493</li> <li>• 802.3MAU RFC 2668</li> <li>• 802.11 MIB</li> <li>• Remote reboot (reload) or reset to factory default via power injector</li> <li>• Private MIB</li> <li>• Orinoco MIB</li> </ul>                                                                                                                                                                                                                                                              |
| <b>Antenna Alignment Tools</b>     | <ul style="list-style-type: none"> <li>• Audible Tone</li> <li>• CLI output</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Status LEDs</b>                 | <ul style="list-style-type: none"> <li>• Two indicators on the RJ-45 connector to indicate power, wireless traffic, and Ethernet traffic</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Local Configuration Support</b> | <p><b><u>RS-232 Serial port</u></b></p> <ul style="list-style-type: none"> <li>• RJ11 port built-into the unit</li> <li>• DB9 Female via a converter (included)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Compliance and Standards</b>    | <p><b><u>Safety</u></b></p> <ul style="list-style-type: none"> <li>• UL 60950, UL50 (radio units, except CAT-5 cable)</li> <li>• CSA 22.2 No. 60950-00</li> <li>• IEC 60950 3rd Ed (1999)</li> </ul> <p><b><u>Radio Approvals</u></b></p> <ul style="list-style-type: none"> <li>• USA FCC 15.107, 15-109; 15-203-15.205, 15.207, 15.209; 15.247; 15.401-15.407*</li> <li>• Canada RSS-102; RSS-210; ICES-003</li> <li>• Europe (ETSI) EN 301.893 v1.3.1; EN 300.328; EN 301.489-1; EN 301.489-17; EN 300-440; EN50371</li> <li>• ARIB STD-T71, STD 33, STD 66</li> </ul> <p><b><u>EMI and Susceptibility (Class B)</u></b></p> <ul style="list-style-type: none"> <li>• USA FCC Part 15.107</li> <li>• Canada ICES-003</li> </ul> <p><b><u>Water and Dust Proof</u></b></p> <ul style="list-style-type: none"> <li>• NEMA4/IP56</li> </ul> |

\*QB.11 5054-LR FCC only

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Electrical</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p><b><u>5054-R(-LR) / 2454-R PoE Power Injector</u></b></p> <ul style="list-style-type: none"> <li>• Custom Power over Ethernet (802.3af compatible)</li> <li>• Input: Voltage 110 to 250 VAC (47-63Hz)</li> <li>• Output: 48V @ 420mA MAX (injected into the Cat-5 Cable)</li> <li>• Pin for Remote reboot (reload) or reset to factory default</li> </ul> <p><b><u>5054-QB(-LR) / 2454-QB Outdoor Radio Unit</u></b></p> <ul style="list-style-type: none"> <li>• Power Consumption: 7.5W typical. Up to 20Watts across full operating temperature range.</li> <li>• Input: Voltage 42 to 60 VDC</li> </ul>            |
| <b>Dimensions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>Packaged: 22.5 x 15.5 x 14.75 in (571 x 394 x 375 mm)<br/> Unpackaged (per unit): 12.6 x 12.6 x 3.5 in (320 x 320 x 89 mm)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Weight</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>Packaged: 35 lbs (15.9 kg)<br/> Unpackaged (per unit): 6 lbs (2.72 kg)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Environmental</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p><b><u>Operating</u></b></p> <ul style="list-style-type: none"> <li>• -33° to 60°C (-27.5° to 140° Fahrenheit)</li> <li>• 100% humidity</li> <li>• Wind loading: 125mph</li> </ul> <p><b><u>Storage</u></b></p> <ul style="list-style-type: none"> <li>• -55° to 80°C (-41° to 176° Fahrenheit)</li> <li>• 100% humidity</li> </ul>                                                                                                                                                                                                                                                                                     |
| <b>Package Contents</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• Tsunami QuickBridge.11 2454-R, Tsunami QuickBridge.11 5054-R or Tsunami QuickBridge.11 5054-R-LR radios with 23 dBi integrated antennas (Qty 2)</li> <li>• 50 Meter Outdoor Rated CAT 5 Cables with connectors (Qty 2)</li> <li>• Ethernet cable weatherproof plugs (Qty 2)</li> <li>• Wall/Pole Mounting Brackets (Qty 2)</li> <li>• CD-ROM with user documentation and software (Qty 1)</li> <li>• Power-Over-Ethernet injector for Models 2454-R, 5054-R, 5054-R-LR (Qty 2)</li> <li>• Country specific power cords (Qty 2)</li> <li>• Quick Install Guide (Qty 1)</li> </ul> |
| <b>MTBF</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• 100,000 hrs</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Warranty</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>• One year</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>1 Check with the local regulatory agency for certain restrictions</p> <p>2</p> <ul style="list-style-type: none"> <li>- PTP - (1BS to 1 SU) using USA regulations for L and U bands, ETSI regulations for M bands</li> <li>- Base Station external Antenna (Parabolic Grid 29dB)</li> <li>- Subscriber Antenna, external 5Ghz (29dB Parabolic Grid antenna) with short 1dB jumper cable</li> <li>- Subscriber Antenna, external 2.4Ghz (24dB Parabolic Grid antenna) with short 1dB jumper cable</li> <li>- Clear LOS (Line of Sight)</li> <li>- 99.995% availability</li> <li>- Fade margin minimum of 10dB to 2 miles, 0.2dB additional fade margin for every 0.1 mile to 15dB</li> <li>- Predicted availability &gt;99.990% (one-way) for all configurations</li> <li>- 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.</li> </ul> <p>Near LOS (Line of Sight)</p> <ul style="list-style-type: none"> <li>- 40-50% visibility</li> <li>- Distance, Typically &lt;2.5miles.</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

