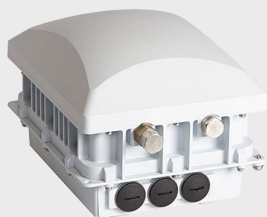


# 7781-CM

Outdoor 802.11n 3x3:3 Wi-Fi Access Point



## DATA SHEET



### BENEFITS

#### GOOD OUTDOOR WI-FI

Industrial-grade IP-67 hardened enclosures (-40°C to +65°C) with GPS and DOCSIS 3.0 cable modem.

#### GOOD WI-FI PERFORMANCE

Provide a great user experience no matter how challenging the environment with BeamFlex+™ adaptive antenna technology using over 2,000 directional antenna patterns.

#### AUTOMATE OPTIMAL THROUGHPUT

Improve performance automatically with ChannelFly™ and machine learning, which finds less congested Wi-Fi channels with dynamic RF channel selection.

#### MORE THAN WI-FI

Support services beyond Wi-Fi with [Ruckus IoT Suite](#), [Cloudpath](#) security and onboarding software, [SPoT](#) Wi-Fi locationing engine, and [SCI](#) network analytics.

In a fiercely competitive marketplace, multiple system cable operators (MSOs) are looking for new ways to differentiate their services and open new revenue streams. To do it, many are looking to expand branded broadband Wi-Fi throughout their coverage areas. But overlaying existing hybrid fiber coax (HFC) cable networks with new Wi-Fi services can be a complex—and expensive—proposition.

The Ruckus 7781-CM outdoor access point delivers the industry's highest performing 802.11n 3x3:3 Wi-Fi in a lightweight, strand-mounted form factor designed to easily integrate with existing HFC networks. It features patented Ruckus BeamFlex adaptive antenna technology for RF optimization and interference mitigation to extend wireless range and reliability, combined with an integrated DOCSIS 3.0-, EuroDOCSIS-, and Japan-certified cable modem. Available with an omnidirectional antenna, the 7781-CM can provide consistent, reliable data access in a wide range of high-density environments.

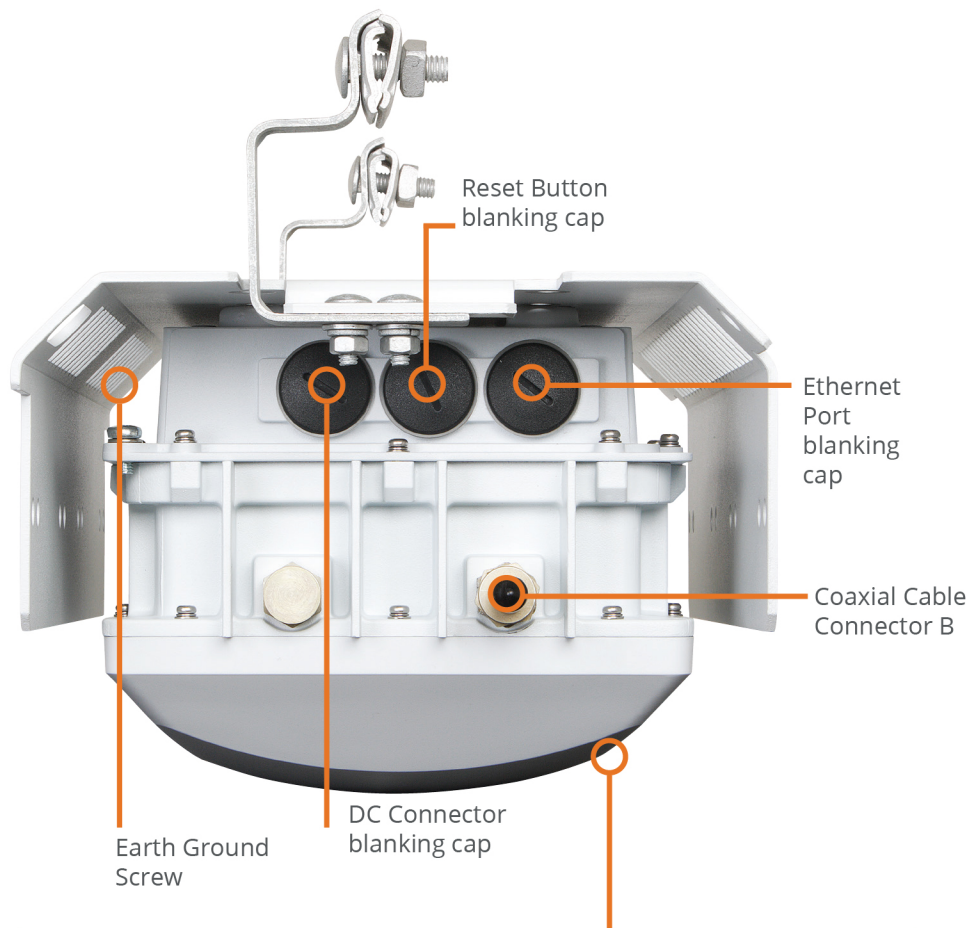
The 7781-CM is a perfect choice for MSOs looking to deliver branded Wi-Fi connectivity for hotspot services in neighborhoods, resorts, train stations, and other public locations across their coverage areas. Its low-profile form factor can be easily installed and integrated with HFC networks—using existing mounting, power, backhaul, customer service systems, and other existing cable assets. Network operators can easily create tiered wireless services at different quality levels, data offload solutions, and other new revenue-generating Wi-Fi services. And they can extend reliable managed wireless services outdoors to locations where Ethernet cabling is too expensive or impractical.

The 7781-CM AP incorporates patented technologies found only in the Ruckus Wi-Fi portfolio.

- Extended coverage with patented BeamFlex+ utilizing multi-directional antenna patterns.
- Improve throughput with ChannelFly, which dynamically finds less congested Wi-Fi channels to use.

The 7781-CM also features a separate monitoring radio sensor to perform real-time spectrum analysis with no packet loss. Additionally, using the 7781-CM's integrated GPS capabilities, operators can automatically establish the exact location of each access point on a network map—greatly simplifying installation and maintenance.

Whether operators deploying ten or ten thousand APs, the 7781-CM is also easy to manage through Ruckus' appliance, virtual and cloud management options.



A patented adaptive antenna integrates high-gain vertically-polarized and horizontally-polarized antenna elements. With BeamFlex+ adaptive antenna technology, this enables over 2,000 potential antenna combinations and up to an additional 6dB BeamFlex+ gain on top of the physical antenna gain, thereby delivering unprecedented range extension and signal reliability.



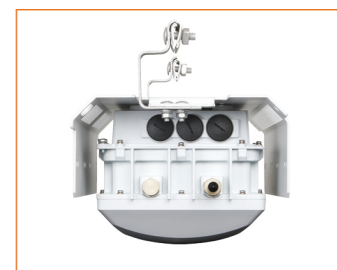
Lightweight for ease of installation. Environmentally hardened outdoor enclosure



Bare unit for mounting on pedestal, pole, or wall with accessory bracket



Internal 2.4/5GHz BeamFlex Adaptive Antenna



Integrated DOCSIS 3.0 cable modem leverages existing MSO cable plant

### ACCESS POINT ANTENNA PATTERN

Ruckus' BeamFlex+ adaptive antennas allow the 7781-CM AP to dynamically choose among a host of antenna patterns (over 2,000 possible combinations) in real-time to establish the best possible connection with every device. This leads to:

- Better Wi-Fi coverage
- Reduced RF interference

Traditional omni-directional antennas, found in generic access points, oversaturate the environment by needlessly radiating RF signals in all directions. In contrast, the Ruckus BeamFlex+ adaptive antenna directs the radio signals per-device on a packet-by-packet basis to optimize Wi-Fi coverage and capacity in real-time to support high device density environments. BeamFlex+ operates without the need for device feedback and hence can benefit even devices using legacy standards.

Figure 1. Example of BeamFlex+ pattern

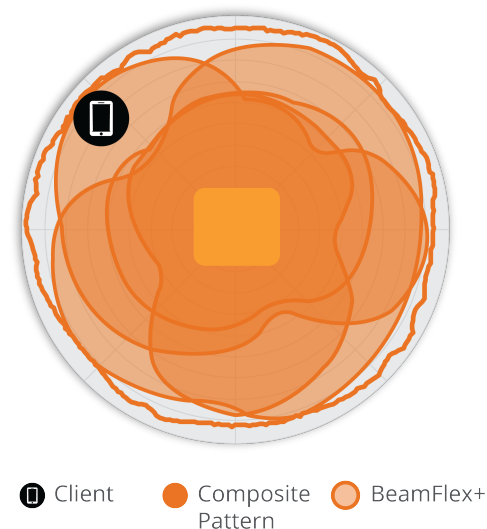


Figure 2. 7781-CM 2.4GHz Azimuth Antenna Patterns



Figure 3. 7781-CM 5GHz Azimuth Antenna Patterns



Figure 4. 7781-CM 2.4GHz Elevation Antenna Patterns

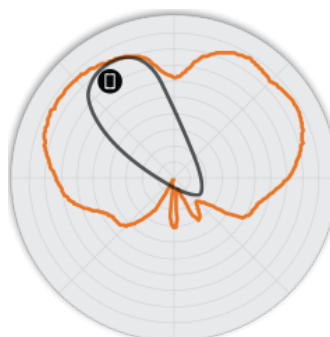
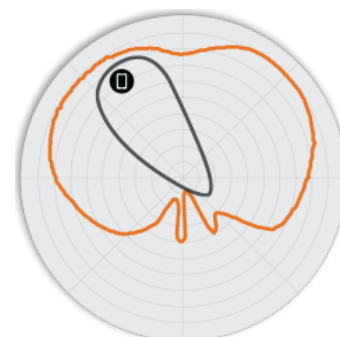


Figure 5. 7781-CM 5GHz Elevation Antenna Patterns



Note: The outer trace represents the composite RF footprint of all possible BeamFlex+ antenna patterns, while the inner trace represents one BeamFlex+ antenna pattern within the composite outer trace.

WI-FI	
Wi-Fi Standards	<ul style="list-style-type: none"> <li>IEEE 802.11a/b/g/n</li> </ul>
Supported Rates	<ul style="list-style-type: none"> <li>802.11n: 6.5 Mbps to 600Mbps (MCS0 to MCS23)</li> <li>802.11a/g: 54, 48, 36, 24, 18, 12, 9, 6Mbps</li> <li>802.11b: 11, 5.5, 2 and 1 Mbps</li> </ul>
Supported Channels	<ul style="list-style-type: none"> <li>2.4GHz: 1-13</li> <li>5GHz: 36-64, 100-144, 149-165</li> </ul>
MIMO	<ul style="list-style-type: none"> <li>3x3 SU-MIMO</li> </ul>
Spatial Streams	<ul style="list-style-type: none"> <li>3 SU MIMO</li> </ul>
Radio Chains and Streams	<ul style="list-style-type: none"> <li>3x3:3</li> </ul>
Channelization	<ul style="list-style-type: none"> <li>20, 40MHz</li> </ul>
Security	<ul style="list-style-type: none"> <li>WPA-PSK, WPA-TKIP, WPA2 AES, 802.11i, Dynamic PSK</li> <li>WIPS/WIDS</li> </ul>
Other Wi-Fi Features	<ul style="list-style-type: none"> <li>WMM, Power Save, LDPC, STBC, 802.11r/k/vv</li> <li>Hotspot</li> <li>Hotspot 2.0</li> <li>Captive Portal</li> <li>WISPr</li> </ul>

RF	
Antenna Type	<ul style="list-style-type: none"> <li>BeamFlex+ adaptive antennas with polarization diversity</li> <li>Adaptive antenna that provides over 2,000 unique antenna patterns per band</li> </ul>
Antenna Gain (max)	<ul style="list-style-type: none"> <li>4dBi for both 2.4 and 5GHz</li> </ul>
Peak Transmit Power (aggregate across MIMO chains)	<ul style="list-style-type: none"> <li>2.4GHz: 23dBm</li> <li>5GHz: 21dBm</li> </ul>
Minimum Receive Sensitivity <sup>1</sup>	<ul style="list-style-type: none"> <li>-100dBm (2.4GHz)</li> <li>-98dBm (5GHz)</li> </ul>
Frequency Bands	<ul style="list-style-type: none"> <li>ISM (2.4-2.484GHz)</li> <li>U-NII-1 (5.15-5.25GHz)</li> <li>U-NII-2A (5.25-5.35GHz)</li> <li>U-NII-2C (5.47-5.725GHz)</li> <li>U-NII-3 (5.725-5.85GHz)</li> </ul>

2.4GHZ RECEIVE SENSITIVITY			
HT20		HT40	
MCS0		MCS0	
-100		-94	

5GHZ RECEIVE SENSITIVITY			
VHT20		VHT40	
MCS0		MCS0	
-100		-94	

2.4GHZ TX POWER TARGET	
Rate	Pout (dBm)
MCS0 HT20	24

5GHZ TX POWER TARGET	
Rate	Pout (dBm)
MCS0 VHT20	24

PERFORMANCE AND CAPACITY	
Peak PHY Rates	<ul style="list-style-type: none"> <li>2.4GHz: 450 Mbps</li> <li>5GHz: 450 Mbps</li> </ul>
Client Capacity	<ul style="list-style-type: none"> <li>Up to 500 clients per AP</li> </ul>
SSID	<ul style="list-style-type: none"> <li>Up to 64 per AP</li> </ul>

RUCKUS RADIO MANAGEMENT	
Antenna Optimization	<ul style="list-style-type: none"> <li>BeamFlex+</li> <li>Polarization Diversity with Maximal Ratio Combining (PD-MRC)</li> </ul>
Wi-Fi Channel Management	<ul style="list-style-type: none"> <li>ChannelFly</li> </ul>
Client Density Management	<ul style="list-style-type: none"> <li>Band Balancing</li> <li>Client Load Balancing</li> <li>Airtime Fairness</li> <li>Airtime-based WLAN Prioritization</li> </ul>
SmartCast Quality of Service	<ul style="list-style-type: none"> <li>QoS-based scheduling</li> <li>Directed Multicast</li> <li>L2/L3/L4 ACLs</li> </ul>
Mobility	<ul style="list-style-type: none"> <li>SmartRoam</li> </ul>
Diagnostic Tools	<ul style="list-style-type: none"> <li>Spectrum Analysis</li> <li>SpeedFlex</li> </ul>

NETWORKING	
Controller Platform Support	<ul style="list-style-type: none"> <li>SmartZone</li> <li>ZoneDirector</li> <li>Standalone</li> </ul>
IP	<ul style="list-style-type: none"> <li>IPv4, IPv6</li> </ul>
VLAN	<ul style="list-style-type: none"> <li>802.1Q - BSSID-based (16 BSSIDs / radio)</li> <li>Port-based</li> <li>Dynamic, per user based on RADIUS</li> </ul>
802.1x	<ul style="list-style-type: none"> <li>Wired &amp; wireless</li> <li>Authenticator and Supplicant</li> </ul>
Tunnel	<ul style="list-style-type: none"> <li>L2TP, RuckusGRE, softGRE</li> </ul>
Gateway and Routing	<ul style="list-style-type: none"> <li>NAT/DHCP<sup>2</sup></li> </ul>
Policy Management Tools	<ul style="list-style-type: none"> <li>Application Visibility and Control</li> <li>Access Control Lists</li> <li>Device Fingerprinting</li> </ul>

<sup>1</sup> Rx sensitivity varies by band, channel width and MCS rate.

<sup>2</sup> DHCP is only supported on SmartZone.

OTHER RADIO TECHNOLOGIES	
<b>Cable Modem</b>	<ul style="list-style-type: none"> <li>• DOCSIS 3.0 with 8 x 4 bonding</li> <li>• EuroDOCSIS</li> <li>• JCTEA STD-005 (Japan)</li> </ul>
<b>GPS</b>	<ul style="list-style-type: none"> <li>• Types GLONAS...etc</li> </ul>

PHYSICAL CHARACTERISTICS	
<b>Physical Size</b>	<ul style="list-style-type: none"> <li>• 41.4cm (L) x 23.9cm (W) x 23.1cm (H)</li> <li>• 16.3in (L) x 9.4in (W) x 9.1 in (H)</li> </ul>
<b>Weight</b>	<ul style="list-style-type: none"> <li>• 5.65kg (12.5lbs) with strand-mount</li> <li>• 4.00kg (8.8lbs) bare unit</li> </ul>
<b>Ingress Protection</b>	<ul style="list-style-type: none"> <li>• IP-67</li> </ul>
<b>Mounting</b>	<ul style="list-style-type: none"> <li>• Strand-mount</li> </ul>
<b>Operating Temperature</b>	<ul style="list-style-type: none"> <li>• (-US01/WW01/JP21)</li> <li>• -40°C (-40°F) to +65°C (149 °F)</li> <li>• (WW11)</li> <li>• -10°C (14°F) to +65°C (149 °F)</li> </ul>
<b>Operating Humidity</b>	<ul style="list-style-type: none"> <li>• Up to 95%, non-condensing</li> </ul>

POWER <sup>3</sup>	
Power Supply	Max Power Consumption
<b>No PoE_Out/No Heater</b>	• 4W
<b>No PoE_Out/Heater On</b>	• 44W
<b>PoE_Out 15.4W/Heater On</b>	• 69W

CERTIFICATIONS AND COMPLIANCE	
<b>Wi-Fi Alliance<sup>4</sup></b>	<ul style="list-style-type: none"> <li>• Wi-Fi CERTIFIED™ a, b, g, n, ac, ax</li> <li>• Passpoint®, Vantage</li> </ul>
<b>Standards Compliance<sup>5</sup></b>	<ul style="list-style-type: none"> <li>• EN 60950-1 Safety</li> <li>• EN 60601-1-2 Medical</li> <li>• EN 61000-4-2/3/5 Immunity</li> <li>• EN 50121-1 Railway EMC</li> <li>• EN 50121-4 Railway Immunity</li> <li>• IEC 61373 Railway Shock &amp; Vibration</li> <li>• UL 2043 Plenum</li> <li>• EN 62311 Human Safety/RF Exposure</li> <li>• WEEE &amp; RoHS</li> <li>• ISTA 2A Transportation</li> </ul>

SOFTWARE AND SERVICES	
<b>Location Based Services</b>	• SPoT
<b>Network Analytics</b>	• SmartCell Insight (SCI)
<b>Security and Policy</b>	• Cloudpath

ORDERING INFORMATION	
<b>901-7781-US01</b>	<ul style="list-style-type: none"> <li>• 7781-CM concurrent dual-band 3x3:3 802.11n outdoor wireless access point with 360 degree BeamFlex+ 2.4GHz/5GHz antennas and integrated cable modem (DOCSIS 3.0). Includes strand-mount bracket. US country code.</li> </ul>
<b>901-7781-WW01</b>	<ul style="list-style-type: none"> <li>• 7781-CM concurrent dual-band 3x3:3 802.11n outdoor wireless access point with 360 degree BeamFlex+ 2.4GHz/5GHz antennas and integrated cable modem (DOCSIS 3.0). Includes strand-mount bracket.</li> </ul>
<b>901-7781-WW11</b>	<ul style="list-style-type: none"> <li>• 7781-CM concurrent dual-band 3x3:3 802.11n outdoor wireless access point with 360 degree Beamflex+ 2.4GHz/5GHz antennas and integrated cable modem (EuroDOCSIS). Mounting bracket not included.</li> </ul>
<b>901-7781-JP21</b>	<ul style="list-style-type: none"> <li>• 7781-CM concurrent dual-band 3x3:3 802.11n outdoor wireless access point with 360 degree BeamFlex+ 2.4GHz/5GHz antennas and integrated cable modem (JCTEA STD-005). Includes strand-mount bracket.</li> </ul>

Warranty: Sold with a limited lifetime warranty.  
For details see: <http://support.ruckuswireless.com/warranty>.

OPTIONAL ACCESSORIES	
<b>902-0182-0003</b>	<ul style="list-style-type: none"> <li>• Outdoor Mounting Bracket, Bare Metal, Any-Angle. For pole or wall mounting.</li> </ul>
<b>903-0183-0000</b>	<ul style="list-style-type: none"> <li>• Spare data connector; weatherizing data cable gland.</li> </ul>

<sup>3</sup> Max power varies by country setting, band, and MCS rate.

<sup>4</sup> For complete list of WFA certifications, please see Wi-Fi Alliance website.

<sup>5</sup> For current certification status, please see price list.