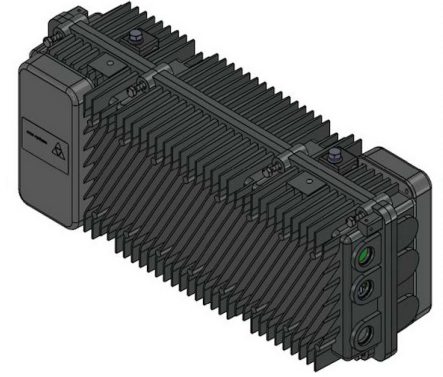


# Apex™ PicoStrand RAN Solution

## Coverage & Capacity

LTE-FDD, LTE-TDD, 3.5 GHz CBRS, DOCSIS



Casa Systems' end-to-end picocell solution is designed to address the need for mobile network coverage and capacity for today's subscribers and use cases. Casa's Apex Radio Access Network (RAN) solutions include: the PicoStrand, enterprise small cells, lifestyle small cells, indoor picocells, and outdoor picocells - to meet service providers' many different requirements.

The Apex PicoStrand is designed for areas where there are coverage issues or capacity is needed. The Apex PicoStrand takes advantage of existing cable strand to cost-effectively support two LTE carriers. CBRS along with several LTE-FDD and LTE-TDD licensed bands are supported.

Both Mobile Service Providers and MSOs can take advantage of the Apex PicoStrand. The solution helps solve the powering, backhaul and site issues that have plagued large scale, small cell deployments for many years. By using the cable strand, small cell backhaul can be supported with DOCSIS and power can be tapped from the HFC plant.

To develop the PicoStrand, Casa leveraged its experience developing, testing and deploying strand mounted Distributed Access Architecture (DAA) nodes for MSOs. Casa is a leader in the cable broadband market and as a result, Casa's DOCSIS knowledge and its experience with cable strand Outside Plant Equipment deployments provides a significant technology advantage

Casa's PicoStrand can be supported by the incumbent EPC, however Casa can also provide an overlay virtualized small cell core, including HeNB and security gateways which provide the scale, intelligence, and deployment flexibility needed for small cell growth.

### Highlights

- Strand mount picocell supporting licensed and CBRS band technologies in a rugged, carrier-grade solution
- 2W RF power per LTE Carrier
- 2 LTE Carriers
- Power over HFC
- Flexible transport options: DOCSIS 3.0 and 3.1
- Smart plug-and-play installation
- Seamless mobility with the macro network
- SON: hybrid SON support with dSON and cSON; SON macro integration
- Intelligent traffic management with E2E QoS support

## Technical Specifications

<b>GENERAL</b>	
Antennas	2 integrated directional panel antennas or 1 omni directional antenna per LTE carrier
Max TX Power	4 x 30 dBm (4 streams @ 1 W) - 2 independent sectors each with a MIMO 2x2 antenna
EIRP (per sector)	20W
RF Ports	4 (Tx & Rx), 1 RF Sniffer Port, 1 GPS Port and 2 external antenna ports
Synchronization	GPS, IEEE 1588v2 timing
Power Source	HFC Power 42-90 VAC Quasi Sine 50-60 Hz
Backhaul Options	DOCSIS 3.1
<b>PHYSICAL AND ENVIRONMENTAL</b>	
Operational Temperature	-50°C to 65°C, Humidity <95% non condensing
Protection	IP67
Dimensions	20 x 8 x 8 inches (LXHXD), 508 x 203 x 203 mm
Weight	10 Kg
Nominal Power Consumption (W)	45W @ 2x2W operation
<b>ANTENNA</b>	
Antenna Gain	10 dBi for integrated directional panel antennas, 6 dBi for omni antenna
Radiation Panel Azimuth	Directive panel antenna - different antenna specs may be supported upon request
Beamwidth Elevation	70 degrees (integrated directional panel antennas)
Beamwidth LTE	35 degrees (integrated directional panel antennas)
<b>FREQUENCY BANDS</b>	
	1, 3, 4, 7, 13, 38, 41, 42, 48, 66 and 71- additional bands and band combinations upon request
<b>CAPACITY</b>	
LTE Carriers	2 Carriers
MIMO Configuration	2x2 MIMO DL, UL Rx diversity (2Tx / 2Rx)
Throughput DL / UL Max. for TDD	240 / 30 Mbps with CA enabled
Throughput DL / UL Max for FDD	300 / 75 Mbps (64 QAM modulation), 400 / 75 Mbps (256 QAM modulation) FDD mode with CA enabled
Max Users	Max. scheduled users / TTI: 16; max RRC connected users: 64
Users Dual Cell Mode Carrier	Supported
Aggregation Mode Counters and Alarms	Supported Over 500 performance counters; over 50 alarms
<b>RADIO ACCESS TECHNOLOGY</b>	
	R13

## Technical Specifications

<p><b>Axyom Small Cell Manager</b></p>	<p><b>OAM&amp;P</b></p> <ul style="list-style-type: none"> <li>• H(e)MS small cell management system functions (3GPP TS 32.592 and TS 32.593)</li> <li>• TR-069 Auto-Configuration Server (with TR-196 and TR-181 Data Model Support)</li> <li>• KPI Management standard KPI definition (TS 32.453), custom KPI definition support</li> <li>• Fault Management 3GPP TS 32.111-2 Alarms (IRP/IS)</li> <li>• Syslog Server</li> <li>• X2 Gateway</li> </ul> <p><b>SON</b></p> <p>Self-optimization</p> <ul style="list-style-type: none"> <li>• Mobility load balancing (MLB)</li> <li>• Mobility robustness optimization (MRO)</li> <li>• Capacity and coverage optimization (CCO)</li> <li>• RACH organization</li> <li>• Energy saving</li> </ul> <p>Self-healing</p> <ul style="list-style-type: none"> <li>• Automatic cell outage detection</li> <li>• Software recovery</li> </ul> <p>Self-configuration</p> <ul style="list-style-type: none"> <li>• Automatic Neighbor Relation (ARO)</li> <li>• Physical Cell Identity (PCI) autoconfiguration</li> <li>• Radio Environment Management (REM)</li> <li>• S1/X2 autoconfiguration</li> <li>• RACH channel self-configuration</li> <li>• Channel Selection</li> <li>• Transmission Power Management</li> <li>• Optical Cluster Configuration</li> </ul>
<p><b>Supported Services</b></p>	<p>Supported services include:</p> <ul style="list-style-type: none"> <li>• LIPA: Local IP Access with a Local GW included in the eNB subsystem supported for providing edge &amp; local offloading</li> <li>• SON: Hybrid SON support with dSON and cSON; dSON agent can work with or without cSON and supports using a real-time interface through X2 or TR-069; SON macro integration supported through X2-GW, X2-Proxy or direct connection</li> <li>• TR-069: TR-069 agent supports TR-196v2 and TR-181 data models</li> </ul>