

# Apex™ Enterprise Small Cell RAN Solution - Coverage & Capacity



Casa Systems' end-to-end small cell 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 a range of small cells – enterprise small cells, lifestyle small cells, the PicoStrand (a strand mount picocell), indoor picocells, and outdoor small cells - to meet service providers' many different deployment requirements.

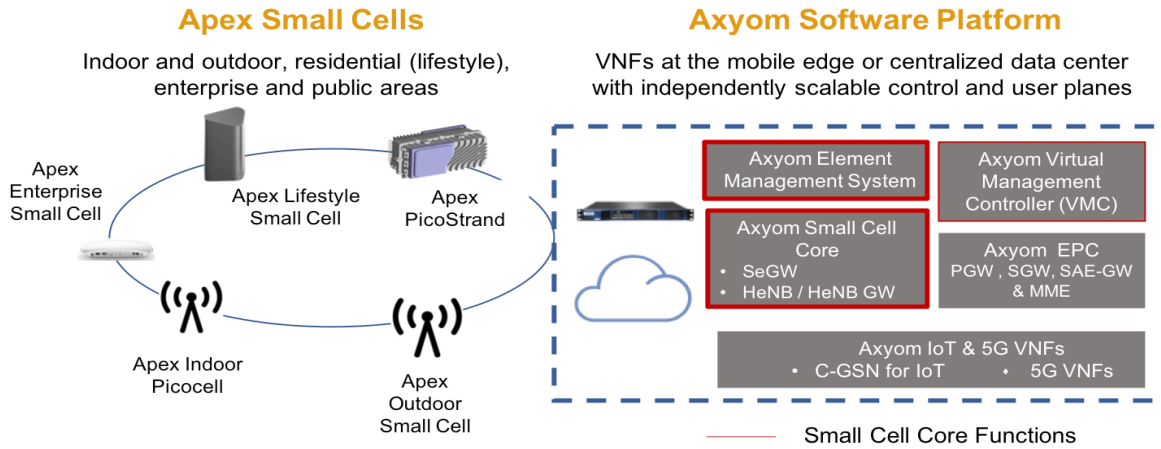
Casa's Apex Enterprise Small Cell is designed for business environments. The Enterprise small cell leverages Casa Systems' in-house designed L2/L3 Protocol Stack software, designed for the challenges of dense heterogeneous environments. As the figure below shows, Apex Enterprise Small Cells are part of Casa's overall Small Cell Solution. Other components of the solution are:

- The Axyom Element Management System (AeMS) - The AeMS provides H(e)MS, and real-time SON functions that reduce operational costs, speed time to market, and optimize the customer experience. An advanced GUI gives control over all small cell parameters.
- The Axyom Small Cell Gateways - aggregation of control and user plane traffic and capabilities necessary to manage large clusters of small cells.
- The Axyom Virtual Management Controller - VNF management and integration.
- The Axyom Location Function - real-time small cell location information which is critical in some countries to support emergency services.

## Key Features

- High performance 3GPP LTE Protocol Stack
- Up to 32 active users per LTE carrier, 8 scheduled users / TTI
- 2 LTE carriers
- MIMO 2x2 and Network Listen RF interfaces
- Self-configuration based on TR-069
- ARNF algorithms for self-managing and optimal neighbor list
- High efficiency multi-agent platform for SON and O&M
- Advanced LTE scheduler including QoS aware scheduling and frequency selective scheduling
- Support of frequency dynamic ICIC and MRO
- Power over Ethernet (PoE) option

# Casa's Small Cell Solution



Delivering high performance with minimum power consumption and smooth integration with existing Radio Access Network (RAN), the Apex Enterprise small cell is ideally suited for network densification while also supporting VoLTE, IoT and QoS based services. Casa's Open API Framework includes, e.g., geo-location APIs that leverage zonal presence and traffic flow information available from the Apex Enterprise Small Cell to enable new services.

Casa Systems' mobile broadband solutions are engineered for high performance, strong security, ease of integration, and most of all, flexibility. Whether seeking small cells to densify an existing network and add capacity, or to profit from services, such as IoT, Private LTE, and location insight, service providers will find a comprehensive and innovative answer with Casa.

## Technical Specifications

<b>GENERAL</b>	
Max TX Power	24 dBm (2 streams @21 dBm), 250 mW
Antenna Configuration	2 x 2 MIMO DL, UL Rx diversity (2 Tx /2 Rx) per LTE carrier
Antennas	3 Internal Antennas
RF Ports	4 TX & RX ports, 1 sniffer port
Network Listen	1700-2100 MHz, 2500 -2700 MHz
BW Channelization	3.5, 5, 10, 15, 20 MHz
Interfaces	LTE: S1-U, S1-MME, X2
Backhaul Options	10/100/1000 Gigabit Ethernet, RJ-45
<b>PHYSICAL AND ENVIRONMENTAL</b>	
Dimensions	220 mm x 220 mm x 42 mm
Weight	450 Grams
Nominal Power Consumption Power	< 15W at full capacity
Operational Temperature	12 VDC@1.5A, power supply @ 220 VAC / Power over Ethernet (PoE) option
Humidity	-20°C to 60°C
Protection	<80% non condensing
	IP30

## Technical Specifications

<b>FREQUENCY BANDS</b>	3, 4, 7, 38, 40, 41 or 48 - additional bands and band combinations upon request
<b>CAPACITY</b> <b>LTE Carriers</b> <b>Max. Data Throughput</b> <b>Max. Simultaneous Active Users</b>	2 150 Mbps DL / 50 Mbps UL Cat 4 per LTE Carrier RCC Connected Users / LTE Carrier: 32 Scheduled Users / TTI: 8
<b>RADIO ACCESS TECHNOLOGY</b>	R13
<b>Advanced Feature Support</b>	Access control: open, hybrid or closed access Advanced LTE scheduler with QoS aware scheduling and frequency selective scheduling Standard IOI, RNTP and HII messages over X2 adapted to the HeNB needs for Interference Management Support of frequency dynamic ICIC and MRO Support of CSFB, VoLTE, ViLTE and QoS based services LTE and IRAT mobility support
<b>Security Features</b>	IPSEC: AES, 3DES PKI: IKEv2 key management, certificate-based authentication (x.509) Secure boot
<b>Axyom Small Cell Manager</b>	<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-196v2 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>

## Technical Specifications

---

### Supported Services

Supported services include:

- LIPA: Local IP Access with a Local GW included in the eNB subsystem supported for providing edge & local offloading
  - 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
  - TR-069: TR-069 agent supports TR-196v2 and TR-181 data models
-