

# Apex™ Indoor Picocell

## Coverage and Capacity

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

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 RAN solutions include a range of Apex small cells – indoor picocells, enterprise small cells, lifestyle small cells, the PicoStrand (a strand mount picocell) and outdoor picocells - to meet service providers' many different deployment requirements.

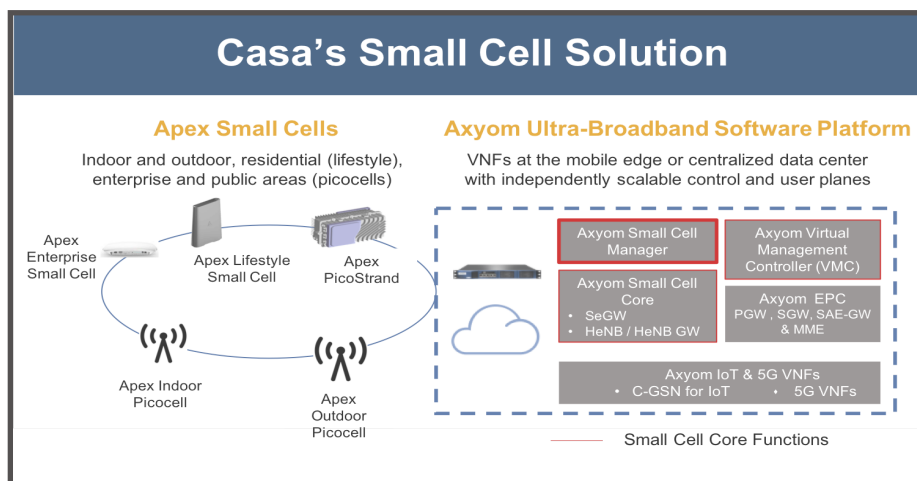
The Apex Indoor Picocell is designed for environments where there is a high density of UEs, such as SMBs, large enterprises and public venues. The Apex Indoor Picocell cost-effectively supports two FDD or TDD LTE carriers.

Both Mobile Service Providers and MSOs can take advantage of the Apex Indoor Picocell to provide targeted coverage and capacity. As the figure below shows, Apex Indoor Picocells are part of Casa's overall Small Cell Solution. Other components of the solution include:

- The Axyom Small Cell Manager - 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.

## Highlights

- Indoor picocell supporting LTE licensed and CBRS 3.5 GHz bands
- Rugged carrier-grade solution
- 2 LTE Carriers
- Ceiling, wall or pole mount
- Flexible transport options
- Sleek form factor and smart plug-and-play installation
- Seamless mobility with macro network
- SON: hybrid SON support with dSON and cSON; SON macro integration
- Intelligent traffic management with E2E QoS support



Delivering high performance with minimum power consumption and smooth integration with other RAN solutions, the Compact 4G is ideally suited for network densification while also supporting CSFB, VoLTE, 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 Compact 4G 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 new services like Private LTE or location insight, service providers will find a comprehensive and innovative answer with Casa.

## Technical Specifications

<b>INSTALLATION MOUNTING OPTIONS</b>	Ceiling, Wall, Pole
<b>GENERAL</b>	
Antennas	6 internal interfaces
Max TX Power RF	24 dBm (2 streams @ 21 dBm), 250 mW per LTE carrier
GPS I/F	0
Synchronization	Network Listen, IEEE 1588v2 PTP
PoE	IEEE802.3at
Backhaul Options	10/100/1000 Gigabit Ethernet, RJ-45, SFP
<b>PHYSICAL AND ENVIRONMENTAL</b>	
Power	PoE (48V) AC/DC Adapter 12V@2.5A
Operational Temperature	-20°C to 60°C, Humidity 5% to 95% RH non-condensing
Storage Temperature	-45°C to 70°C
Protection	IP40
Dimensions	270 x 230 x 80mm (exemplary)
Weight	500g
Nominal Power Consumption (W)	24W Max
<b>ANTENNA, SUPPORTED BANDS</b>	
Radiation Pattern	Antenna dependent
Polarization	Antenna dependent
<b>FREQUENCY BANDS</b>	3, 4, 7, 38, 40, 41, 48 - 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: 32; max RRC connected users: 128
eNB ID Support	20 bit and 28 bit Macro eNB ID supported
Cross Carrier Scheduling	Supported
Dual Cell Mode	Supported
Carrier Aggregation Mode	Supported
Performance Counters and Alarms	Over 500 performance counters; over 50 alarms
<b>RADIO ACCESS TECHNOLOGY</b>	R13

## Technical Specifications

### Axyom Small Cell Manager

#### OAM&P

- H(e)MS small cell management system functions (3GPP TS 32.592 and TS 32.593)
- TR-069 Auto-Configuration Server (with TR-196v2 and TR-181 Data Model Support)
- KPI Management standard KPI definition (TS 32.453), custom KPI definition support
- Fault Management 3GPP TS 32.111-2 Alarms (IRP/IS)
- Syslog Server
- X2 Gateway

#### SON

##### Self-optimization

- Mobility load balancing (MLB)
- Mobility robustness optimization (MRO)
- Capacity and coverage optimization (CCO)
- RACH organization
- Energy saving

##### Self-healing

- Automatic cell outage detection
- Software recovery

##### Self-configuration

- Automatic Neighbor Relation (ARO)
- Physical Cell Identity (PCI) autoconfiguration
- Radio Environment Management (REM)
- S1/X2 autoconfiguration
- RACH channel self-configuration
- Channel Selection
- Transmission Power Management
- Optical Cluster Configuration

### 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