

# AT&T MetroCell **Technical Requirements**



For the following MetroCell model:  
Alcatel-Lucent 9363 Metro Cell - Indoor (v2 1900/850 MHz)



## Contents

Purpose of this Document	2
LAN and Router Configuration	2
Internet Access	3
Bandwidth	
Placement of the MetroCell	3
Multiple MetroCells	4
Environmental Requirements	4

## Purpose of this document

In order to ensure successful operation of an AT&T MetroCell, there are a number of technical requirements which must be met. It is the customer's responsibility to understand these requirements and ensure that they can be met.

The requirements fall into the following categories:

- LAN and Router Configuration
- Internet Access
- Placement of the MetroCell
- Multiple MetroCells
- Environmental Requirements

## Local Transport Requirements

Confirm the following router/switch settings prior to activating your AT&T MetroCell:

- **DHCP is ON**
- **MTU size is set to 1492**
- **MAC address filtering** is either **turned off** or allows the MAC address of the MetroCell
- **IPSec Pass-Through is Enabled**
- **Block Fragmented Packets is Disabled**

If using multiple routers, the MetroCell must be connected to the first router connected to the broadband modem.

If the MetroCell is connected to a router that is connected to a modem and both the router and the modem have NAT (Network Address Translation) enabled, disable NAT either in the router or the modem.

### • TCP/UDP Ports

All ports listed need to be Open for inbound and outbound connections:

- **UDP Ports 123, 500, 4500, 33434, 33435, 33436**
- **TCP Ports 443, 7004, 7014**

### • IP Address Pass-Through

If the local network has a firewall with specific IP addresses allowed to pass through, the following addresses must be allowed to pass:

Port	IP Addresses
TCP 443, 7004, 7014:	166.147.105.25
UDP 123:	12.230.208.133 12.230.209.5 12.230.208.48 12.230.209.133
UDP 500, 4500, 33434, 33435, 33436:	12.230.209.81 12.230.209.161 12.230.209.225 12.230.209.17 12.230.208.25 12.230.208.81 12.230.208.209 12.230.208.145

In addition, no traffic to or from the following URLs should be blocked:

fileserver.metro.wireless.att.com  
hnm.metro.wireless.att.com  
initial-ipsecrouter.metro.wireless.att.com

## Internet Access

The customer is responsible for providing connectivity to the Internet and must have an available Ethernet port on a router or switch for each MetroCell to be installed.

### Bandwidth

The required bandwidth will depend on the number of simultaneous users you want to be able to support and whether data-intensive applications are being used.

The maximum total traffic that can be carried by a MetroCell across all simultaneous users, based on its radio interface, is:

- 5.6 Mbit/sec. from handsets to the MetroCell (uplink)
- 21 Mbits/sec. from the MetroCell to handsets (downlink)

Each simultaneous voice call requires 37 Kbit/sec. of bandwidth on the Internet access connection.

A full complement of 32 simultaneous voice calls would require 1.2 Mbit/sec.

If some of these user sessions are high-volume data sessions instead of voice calls, the required bandwidth can be much higher. For example, watching a streaming video can peak above 1.5 Mbit/sec. for a single user. Data sessions tend to be "bursty," with fluctuating demands for bandwidth.

When voice and data sessions are competing for limited bandwidth, priority is given to the voice calls, but inadequate bandwidth will adversely affect voice quality.

Customer is responsible for taking all of these factors into consideration in determining how much bandwidth is needed on the Internet access connection.

Various tools are available to measure bandwidth and quality of service metrics, including one at [att.com/speedtest](http://att.com/speedtest)

In the absence of any specific information on expected usage, the following are offered as guidelines:

Number of users	Small cells deployed	Minimum recommended	
		Downstream bandwidth	Upstream bandwidth
1 - 60	1	10 Mbps	2 Mbps
61 - 120	2	10 Mbps	2 Mbps
121 - 180	3	11 Mbps	3 Mbps

## Placement of the MetroCell

At its heart, the MetroCell is a cellular radio transmitter and receiver. Its performance is affected by physical obstructions, by other devices which emit radio signals, and by potential interference between the MetroCell signals and those of the public or “macro” cellular network.

The following guidelines will help ensure strong and clear performance in your environment.

- The MetroCell should usually be installed in a central location, relative to the desired coverage area.
- The MetroCell should be installed on an interior wall or column, near the ceiling.
- Placement must be within range of an exterior window, glass wall or door (to receive GPS signals), and preferably at least 15 feet from such a window to reduce interference from external cellular signals. If multiple MetroCells are to be installed (maximum of three in the same location) and are provisioned in a single “Group”, only one of them needs to have its GPS antenna reach a window. The GPS antenna cable included in the kit is 25 feet long. A 70-foot extension is available - ask your AT&T representative.
- Planned placement should be at least 2 feet away from metal obstructions, microwave ovens, cordless phones, fans, motors, heating and air-conditioning ducts, large roof or ceiling trusses, and major power cables and fluorescent lighting in order to avoid interference with the radio signal.
- The MetroCell must be installed at least 1 foot away from any work station or where people may gather in order to avoid excessive exposure to radio frequency emissions. The MetroCell should not be mounted where any person will spend more than a minute within a 12-inch radius of the device when it is active.
- Walls between the MetroCell and users will reduce signal strength. Solid metal or metal mesh can block a radio signal entirely. Signals can typically penetrate one or two solid concrete walls, three or four cinder block walls, five or six drywall or wood walls.

- Installation of more than one small cell (MetroCell, MicroCell, or repeater) in a single location can result in interference between the radios. In such a case, the devices must be placed sufficiently far apart to minimize interference, possibly 50 to 100 feet. The distance varies based on the existence of intervening walls, building construction, etc. See the section on Multiple MetroCells in this document.
- The MetroCell kit includes 150 ft. of shielded Cat5e Ethernet cable. Select a location for the MetroCell that is within 150 ft. of the router or switch port to which it will be connected. If necessary, the MetroCell can be as far away from the router or switch as 300 ft. If a cable longer than 150 ft. is required, customer must provide this cable, which must be shielded Cat 5e with metallic “boots”.
- The area to be served by the MetroCell should have no more than 2 “bars” of signal strength from the macro network. If it has more than 2 bars, there is a strong possibility that performance will be worse with the MetroCell installed due to signal interference.

## Multiple MetroCells

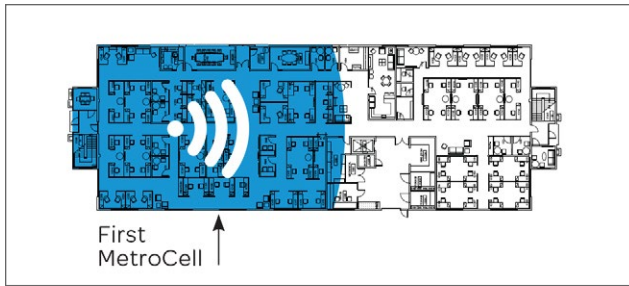
The floor area that can be covered by a single MetroCell is estimated to be up to 15,000 square feet, varying substantially according to the building layout and construction material. If the area to be served is larger than this, a 2nd or 3rd MetroCell may be a possibility. However, be aware of the following considerations:

- If the MetroCells are too close to each other (or to a MicroCell or Distributed Antenna System (DAS)), their signals may interfere with each other’s, resulting in poor performance.
- If the MetroCells are too far away, then if one is walking from the area served by one to the area served by another, a call in progress may drop before it is handed off to the other MetroCell.

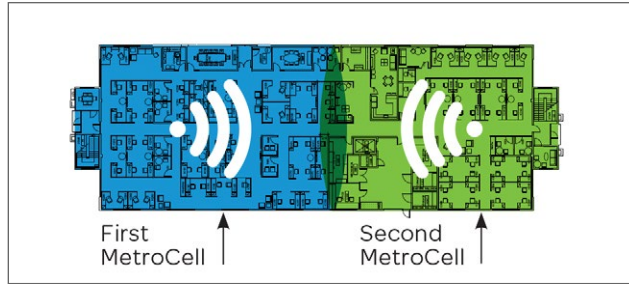
If optimal performance is desired, a custom Radio Frequency (RF) design, performed by a qualified RF engineer using sophisticated equipment, is recommended, followed by optimization of the antennas, power, and other settings.

In the absence of such a custom design, the following guidelines are provided.

1. Install the first MetroCell and activate it. If possible, allow some flexibility to be able to move it to adjust the coverage area in step 5.
2. Map out the effective coverage area of the first MetroCell by walking around while looking at the number of “bars” of signal strength on a handset. Identify the edge of the area covered by the 1st MetroCell where signal strength is between 1 and 2 bars. This is as far away from the first MetroCell as a user could be and still be properly served by that MetroCell.



- Find a site for the 2nd MetroCell that is as far away from the edge of the coverage area identified in step 2 as that edge is away from the first MetroCell. Map the coverage area as in step 2.



- Install and activate the 2nd MetroCell. If possible, allow some flexibility to move it to adjust the coverage area in the next step.
- Place test calls from points throughout the combined coverage area, especially in the overlap area, where interference between the two may adversely affect call quality. Test for the ability to place calls, the ability to maintain calls without dropping, and voice quality. Adjust the locations of the MetroCells if necessary to achieve the best performance.

## Environmental Requirements

The following are the environmental requirements for the MetroCell device:

Parameter	Value
Operating temperature range	-5°C to +45°C [23°F to 113°F]
Storage temperature range	-40°C to +70°C [-40°F to 158°F]
Relative humidity	Up to 93%