



nano3G AP Installation Manual

N3G_INST_300

8.1

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The information contained in this document is commercially confidential and must not be disclosed to third parties without prior consent.

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1 Introduction

The ip.access nano3G AP is an indoor Access Point for enterprise applications.

This manual provides all the necessary information required to install an ip.access nano3G AP. The manual provides step-by-step instructions for hardware installation and configuration steps required to bring a nano3G AP into service.

The AP can be configured with a static IP address or it can obtain an IP address dynamically via DHCP. The AP-AC connection can be configured to be secure (via IPSec and a security gateway) or unsecured.

1.1 Overview

This manual is organised as follows:

- AP installation requirements
- AP configuration preparation
- AP hardware installation
- Commissioning configuration, for initial connection to an AC
- Configuration from the OMC-R
- Installation troubleshooting
- Regulatory warnings and safety information
- Supplementary information on licensing

1.2 User Requirements

It is assumed that any readers that will use the OMC-R Client already know how to:

- Start the OMC-R Client
- Navigate the Explorer Pane to find an AP object

Refer to [OPM_410] for information on using the OMC-R Client.

1.3 Related Information

[INST_440]	nano3G AP Management System Installation Manual (N3G_INST_430)
[OPM_300]	nano3G AP Operations Manual (N3G_OPM_300)
[OPM_410]	3G OMC-R Client Operations Manual (N3G_OPM_410)
[OPM_440]	nano3G AP Management System Operations Manual (N3G_OPM_440)
[REF_105]	nano3G System Glossary (N3G_REF_105)
[REF_110]	nano3G System Configuration Management (CM) MIB Reference Manual (N3G_REF_110)
[REF_300]	nano3G AP License and Copyright Reference (N3G_REF_300)
[21.905]	Vocabulary for 3GPP Specifications (3GPP 3G TR 21.905)

1.4 Licenses and Copyright Notices

Portions of the AP are constructed from third-party software and open source code and ip.access ltd gratefully acknowledges the contributions that these libraries, technologies and components have made to the product. Each of these is supplied under the terms of a license agreement and these are either reproduced or referenced in [REF_300], in line with the stipulations of their authors.

1.5 Terminology

Common nano3G System terminology is defined in [REF_105].

For additional 3G terminology, see [21.905].

2 *Installation Overview and Requirements*

2.1 Installation Tasks

There are three basic tasks that must be completed to install a nano3G AP and make it ready to provide service:

- Pre-Provisioning
- Commissioning
- Site installation

These tasks can be completed in any order. In most cases, however, the most practical approach is to provision and commission an AP before final site installation.

2.1.1 Pre-Provisioning

Configure a nano3G AP with the information it needs to allow it to provide service, such as a serving AC address, neighbour lists, operating frequency and network identity details. As an AP's configuration is stored on its serving AP Management System, an AP can be pre-provisioned at any time. This offers maximum flexibility for pre-provisioning an AP as far or as little ahead of site installation as is needed.

It is recommended to perform at least some pre-provisioning for an AP before on site installation. As a minimum, use the Create Site Wizard in the OMC-R Client to create a site and AP object on the serving AP Management System that will contain the AP's configuration. If an AP attempts to connect to its serving AP Management System, but the AP Management System has not yet been provisioned with site details for the AP, the AP Management System will raise alarms about attempts to connect by an unknown AP.

For more information about AP pre-provisioning, see *3 Pre-Provisioning a nano3G AP*.

2.1.2 Commissioning

Use the nano3G AP's built-in configuration web page to configure the AP with the settings it needs to establish a connection with its serving AP Management System.

This is done using a commissioning terminal, either before sending the AP out for installation or on site using a suitably prepared laptop.

The benefits of commissioning an AP before sending on site are:

- The site installation engineer does not need a commissioning laptop.
- By corollary, the site installation engineer does not need to know the user name and password for the AP commissioning web page.
- If the AP has been properly pre-provisioned, the AP is effectively plug-and-play.
- By corollary, a nano3G S4 AP or nano3G S8 AP could be installed by an end customer, without help from a site installation engineer. The customer simply needs to provide suitable network and power connections.

Note: Due to the physical installation requirements of a nano3G E8 AP, which must be securely wall mounted, it is recommended that an E8 AP is installed by a suitably qualified site installation engineer.

The benefits of using a laptop for commissioning an AP on site are:

- If there is a commissioning error, this can be corrected immediately without needing to return the AP
- If an AP has been in storage for some time, the required software build and/or ATAS package can be installed on the AP in situ

2.1.3 On Site Installation

Physical installation of a nano3G AP at its operating site, including providing the AP with power and a suitable network connection that provides a backhaul path to the AP Management System and AC.

If a nano3G AP has been enabled for service prior to the site visit, the installation engineer can make test calls immediately.

2.2 Requirements for All nano3G APs

This applies to all nano3G APs.

2.2.1 General Requirements

All nano3G AP models have the following general requirements for installation:

- A commissioning terminal, which can be either a desktop computer or a laptop, with:
 - OS: Windows XP
 - Web browser: Microsoft Internet Explorer 7
 - JavaScript enabled in the web browser
- A short Ethernet cable for connecting the commissioning terminal to the AP
- A temporary means to provide power to the AP while it is connected to the commissioning terminal
- A permanent means to provide power to the AP once it is connected to the backhaul
- An Ethernet connection to the backhaul via CAT5 Ethernet cabling
- Access to a DNS service on the backhaul to resolve symbolic addresses
- Access to an NTP service on the backhaul to set the correct time and date - NTP servers must be chosen from a list of known NTP servers configured in the OMC-R
- If a firewall is in place on the network an AP will use for backhaul, this must be configured to allow traffic to and from the AP - see the port usage section below

Port Usage

All connections are outgoing. That is, they are initiated from the AP. Port usage has some dependency on whether or not the AP is using IPsec.

With IPsec, the standard two ports are used:

Protocol	Destination Port	Use
udp	500	IPsec initial connection
udp	4500	IPsec operations

Without IPsec, the following ports are used:

Protocol	Destination Port	Use
tcp	3052	SOIP connection to AC
udp	3000	CS RTP to AC
udp	3001	CS RTCP to AC
udp	3002	CS Mux to AC
udp	5000	PS RTP to AC
udp	5001	PS RTCP to AC
udp	5002	PS Mux to AC

The following ports are also used. When IPsec is used, they may be inside or outside the IPsec tunnel, depending on configuration:

Protocol	Destination Port	Use
tcp	80	PM upload, software download, CRL download
tcp	443	PM upload, software download, CRL download
udp	53	DNS
udp	67	DHCP - not needed for static IP configuration
udp	68	DHCP - not needed for static IP configuration
udp	123	NTP

2.2.2 Information Required for Pre-Provisioning

All nano3G AP models require the configuration details listed in this section. This information will be used to configure an AP from the OMC-R Client, typically by a NOC engineer.

- User name and password for the OMC-R Client. To be able to configure an AP from the OMC-R Client, the user name must have Full Access to the AP Management System serving the AP and Full Access granted to its APs. See [OPM_410] for full details about user permissions.
- The minimum set of configuration data for the AP is:
 - Cell ID (also used as the ID of this AP on the serving nano3G AC)
 - IP Address or FQDN of the serving AC
 - MCC
 - MNC
 - LAC
 - RAC
 - SAI SAC
 - SAI LAC
 - UARFCN
 - Scrambling code
 - RNC ID
 - RSSI scan bands
 - Latitude and longitude of the APs installation site, for RANAP location reporting
- Additional configuration that may be required includes:
 - Static neighbour list - see [OPM_300] for neighbour list configuration
 - URLs for the PM reporting and diagnostic services on the AP Management System

Note: It is possible to configure an AP before taking it on site.

2.2.3 Configuration Files - Optional

An initial configuration file can be used to rapidly configure the AP via the OMC-R Create Site Wizard. This is an alternative to using settings from an existing AP. Additional configuration files can be loaded against the AP object after it has been created by the Create Site Wizard. If they will be used, the location of any configuration files must be known.

When using configuration files, it is recommended, as a minimum, to create a generic configuration file that contains attribute settings that are common to all APs in the network. Optionally create a separate attributes file for each AP to be commissioned.

Configuration files are describe in section 4.

2.2.4 Optional Items for Commissioning

The optional items in this section can only be used if the commissioning terminal is running a web server that provides a path to any ip.access AP software download packages. That is, the required .sdp files must be present on the commissioning terminal.

Setting up a web server for this purpose on the commissioning terminal is outside the scope of this manual.

Software Image

If there is a requirement to update the AP's software during commissioning, the relevant .sdp file must be present on the commissioning terminal.

ATAS File

If there is a requirement to update the AP's security certificates during commissioning, the relevant .sdp file containing the ATAS package must be present on the commissioning terminal.

2.2.5 Information Required for Commissioning

All nano3G AP models require the configuration details listed in this section. This information will be to commission an AP from the commissioning terminal, so that the AP can subsequently connect to its serving AP Management System.

It is possible to commission an AP before taking it on site.

For connecting to the AP from the commissioning terminal:

- User name and password for the AP web server - if necessary, contact customer support at ip.access for the current user name and password

For commissioning the AP:

- IP Address or FQDN of the serving AP Management System
- IP Address or FQDN of an NTP server
- DHCP or static IP
- If static IP is required:
 - IP address for the AP

- Netmask
- IP Address or FQDN of the default gateway
- IP Address or FQDN of the Primary DNS
- IPsec is optional, but if IPsec is required:
 - IP Address or FQDN of the IPsec Security Gateway
 - IP Address or FQDN of a CRL server
 - Optionally, Traffic Selector information (IP address and subnet mask)
A traffic selector defines a range of IP addresses that are sent through the IPsec tunnel. This allows an extra degree of control over the traffic that is passed down the IPsec tunnel. Normally, the security gateway controls this range and no other configuration is needed.

2.3 nano3G S4 AP Site Requirements

The nano3G S4 APs are typically installed in retail or small office environments. In summary, each AP will require:

- Power supplied in one of the following ways:
 - From the mains adaptor unit supplied with the AP, which requires a suitable mains power supply point near the AP that is within reach of the adaptor's cabling
- or
- From the supplied POE splitter, which requires a Power over Ethernet connection to the splitter
- A site for the AP:
 - Wall mount location
- or
- Stable surface for free standing installation

2.3.1 nano3G S4 AP Power Requirements



Maximum expected power consumption:

- 13 Watts (Rated 9VDC 1450mA)

The nano3G S4 AP supports the following power and Ethernet cabling options:

- Direct power from the supplied power adaptor
- Power over Ethernet from the supplied POE injector, via the supplied POE splitter
- Power over Ethernet from a POE switch, via the supplied POE splitter

A POE cable must not be inserted directly into the AP.

The power adapter, as well as the POE inserter and splitter supplied by ip.access comply with LPS requirements in accordance with IEC/EN 60950-1.

Power Adapter

A suitable mains power supply point into which the power adapter for the AP can be plugged.

Only use the power adapter supplied by ip.access to power the AP:

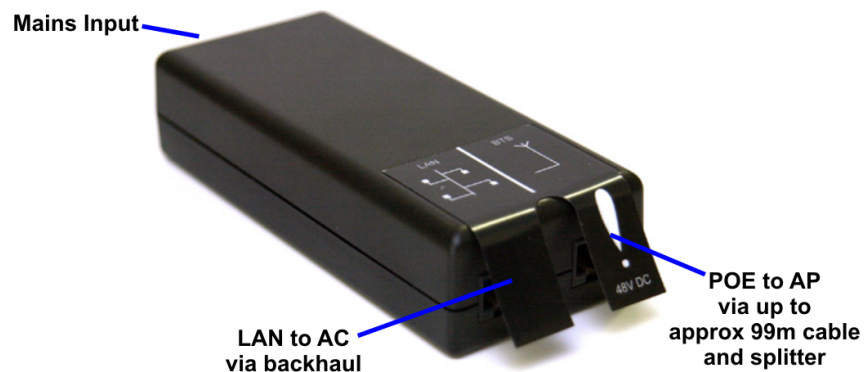
ip.access part number	EPS1173R
Input	100-240V ~ 50/60Hz 0.7A
Output	+9VDC 1.67A

Power over Ethernet

POE requires the use of a power inserter and a splitter. The power inserter is positioned close to the backhaul network connection and mains supply, while the splitter is positioned close to the AP.

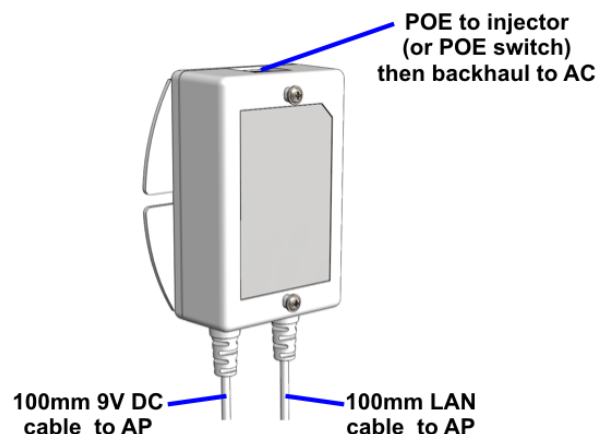
This is the POE inserter supplied by ip.access:

ip.access part number	109A
Input	100/230V ~ 60/50Hz 0.5/0.25A
Output	48VDC 0.38A



Only use the POE splitter supplied by ip.access:

ip.access part number	222A
Input	48VDC 0.35A
Output	9VDC 1.33A



2.3.2 nano3G S4 AP Physical Requirements

A nano3G S4 AP may be installed in one of the following ways (see section 6.2.4):

- Free-standing on a flat stable surface.
- Attached to a wall or partition using two screws that engage in keyhole slots in the rear surface of the AP.
- Attached to a POE splitter using the two screws that engage in keyhole slots in the rear surface of the AP. The POE splitter in turn attaches to a wall or partition using two screws.

The unit **must** be vertical to ensure that air can circulate freely around it.

It is recommended to install the AP with its front surface facing the area requiring cellular coverage, unobstructed by walls or partitions that may have significant RF attenuation.

Dimensions and weight	Height	176mm (without stand) 193mm (with stand)
	Width	170mm
	Depth	51mm
	Approximate Weight	0.42 kg (AP only)
Environmental	Cooling	Vents on the back at top and bottom
	Operating Temperature	0°C to 40°C
	Operating Humidity	10 to 70% non-condensing

2.3.3 nano3G S4 AP IP Bandwidth Requirements

At maximum capacity, a nano3G S4 AP will require:

- Downlink: at least 5Mbps
- Uplink: at least 512Kbps

This will deliver up to 4 voice calls and HSDPA services up to 3.6Mbps.

2.3.4 nano3G S4 AP Sundry Installation Equipment

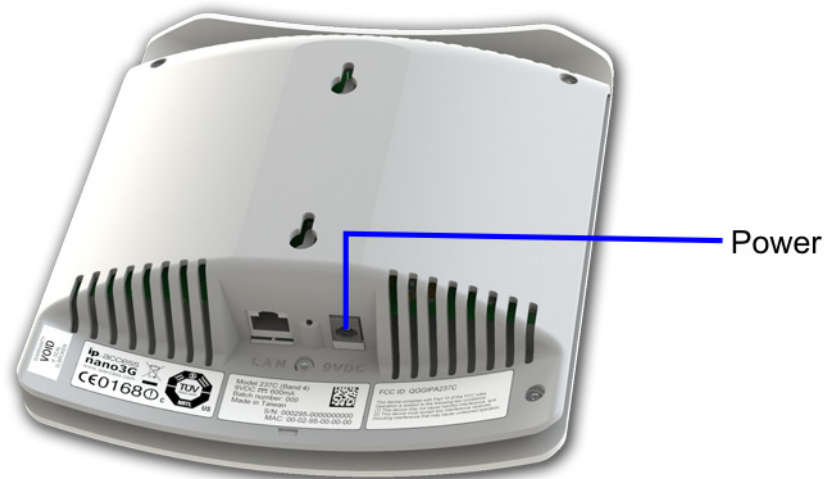
- To mount the POE splitter or the nano3G S4 AP onto the wall:
 - 2 self tapping pan head screws, size No. 6 (approx 3.5mm (0.14in) in diameter)
 - Wall plugs if required
 - Suitable drills and screwdriver

2.4 nano3G S8 AP Site Requirements

In addition to the site requirements for all APs, each S8 AP will require:

- Power supplied in one of the following ways, according to the accessory unit(s) supplied with the S8 AP:
 - From the mains adaptor unit, which requires a suitable mains power supply point near the AP that is within reach of the adaptor's cabling
 - or
 - From the supplied POE splitter, which requires a Power over Ethernet connection to the splitter
- or
- A site for the AP:
 - Wall mount location
 - or
 - Stable surface for free standing installation

2.4.1 nano3G S8 AP Power Requirements



Maximum expected power consumption:

- 13 Watts (Rated 9VDC 1450mA)

The nano3G S8 AP supports the following power and Ethernet cabling options:

- Direct power from the power adapter
- Power over Ethernet from the POE injector, via the POE splitter
- Power over Ethernet from a POE switch, via the POE splitter

A POE cable must not be inserted directly into the AP.

The power adapter, as well as the POE inserter and splitter supplied by ip.access comply with LPS requirements in accordance with IEC/EN 60950-1.

Power Adapter

A suitable mains power supply point into which the power adapter for the AP can be plugged.

Only use the power adapter available from ip.access to power the AP:

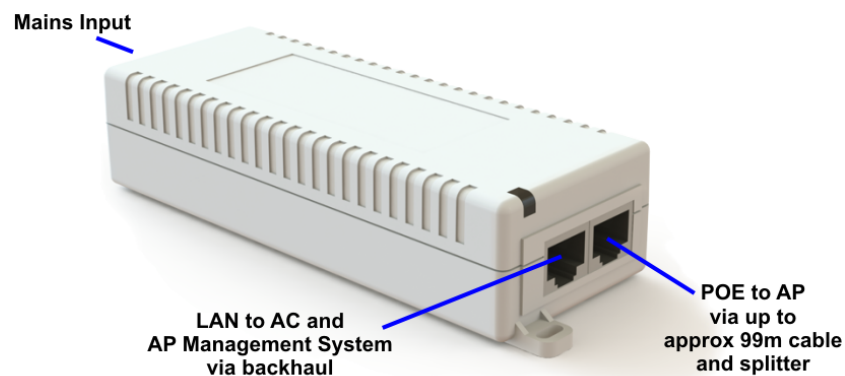
ip.access part number	PSA15R-090PV-R
Input	100-240V ~ 50/60Hz 0.5A
Output	+9VDC 1.67A

Power over Ethernet

POE requires the use of a power inserter and a splitter. The power inserter is positioned close to the backhaul network connection and mains supply, while the splitter is positioned close to the AP.

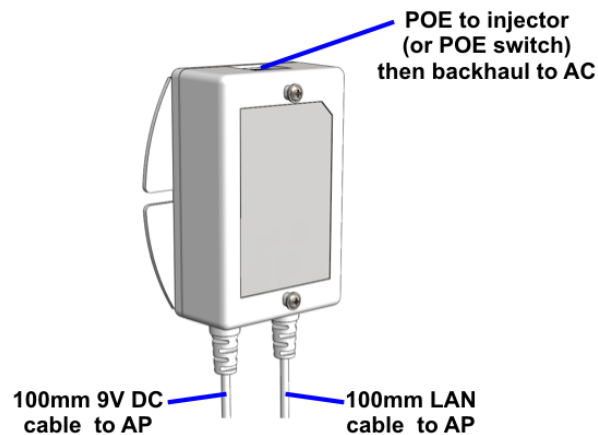
This is the POE inserter supplied by ip.access:

ip.access part number	236
Input	100/240V ~ 60/50Hz 0.5A
Output	48VDC 0.35A



Only use the POE splitter available from ip.access:

ip.access part number	222A
Input	48VDC 0.35A
Output	9VDC 1.33A



2.4.2 nano3G S8 AP Physical Requirements

A nano3G S8 AP may be installed in one of the following ways (see section 6.3.4):

- Free-standing on a flat stable surface.
- Attached to a wall or partition using two screws that engage in keyhole slots in the rear surface of the AP.
- Attached to a POE splitter using the two screws that engage in keyhole slots in the rear surface of the AP. The POE splitter in turn attaches to a wall or partition using two screws.

The unit **must** be vertical to ensure that air can circulate freely around it.

It is recommended to install the AP with its front surface facing the area requiring cellular coverage, unobstructed by walls or partitions that may have significant RF attenuation.

Dimensions and weight	Height	176mm (without stand) 193mm (with stand)
	Width	170mm
	Depth	51mm
	Approximate Weight	0.42 kg (AP only)
Environmental	Cooling	Vents on the back at top and bottom
	Operating Temperature	0°C to 40°C
	Operating Humidity	10 to 70% non-condensing

2.4.3 nano3G S8 AP IP Bandwidth Requirements

At maximum capacity, a nano3G S8 AP will require:

- Downlink: at least 7Mbps
- Uplink: at least 1Mbps

This will deliver up to 8 voice calls and HSDPA services up to 7.2 Mbps.

2.4.4 nano3G S8 AP Sundry Installation Equipment

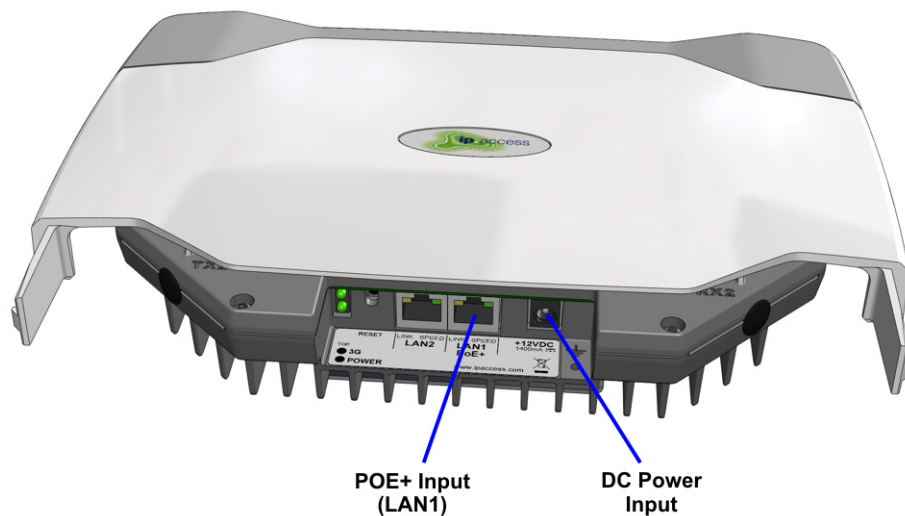
- To mount the POE splitter or the nano3G S8 AP onto the wall:
 - 2 self tapping pan head screws, size No. 6 (approx 3.5mm (0.14in) in diameter)
 - Wall plugs if required
 - Suitable drills and screwdriver

2.5 nano3G E8 AP Site Requirements

In addition to the site requirements for all APs, each E8 AP will require:

- A site for wall mounting
 - Power supplied in one of the following ways:
 - From the supplied POE injector, which requires a suitable mains power supply point near the injector - the AP must be within reach of a 100m Ethernet cable
- or
- From a mains adaptor unit, supplied separately, which requires a suitable mains power supply point near the AP that is within reach of the adaptor's cabling

2.5.1 nano3G E8 AP Power Requirements



Maximum expected power consumption:

- 20 Watts (Rated +12V or -48V DC)

The nano3G E8 AP supports the following power options:

- Power over Ethernet from a IEEE 802.3at compliant POE+ power source equipment - a suitable POE+ inserter is supplied with the AP
- Direct power from a suitable DC source (+12V, 2.5A rated centre positive 2.1mm jack) - a suitable mains adaptor is available separately

These power options are mutually exclusive. When POE+ is used, a DC power adapter must not be plugged in to the AP and vice versa.

The nano3G E8 AP can be used with any IEEE 802.3at compliant POE+ power source.

Note: The Ethernet cable carrying POE+ must be plugged into the LAN 1 port. The LAN 2 port, next to LAN 1, is not used and does not support POE.

POE+ Injector



The POE+ injector unit is supplied as standard with each nano3G E8 AP. The POE+ injector has two Ethernet connections, one for connection to the main LAN, the other for connection to the AP. The POE+ injector can be located anywhere on the cable run between the network switch and the AP, including locally at the AP or remotely at the network switch.

The POE+ injector is a pass-through connector for the LAN. Its function is to add POE+ to provide power to the AP. Therefore, the maximum cable run from the network switch to the AP is 100m, regardless of the placement of the POE+ injector.

The POE+ injector supplied by ip.access complies with LPS requirements in accordance with IEC/EN 60950-1.

2.5.2 nano3G E8 AP Physical Requirements

A nano3G E8 AP is installed by attaching it to a wall or partition using the two screws which engage in keyhole slots in the rear surface of the AP (see section 6.4.6).

Pay attention to ensure that air can circulate freely around the unit. The unit must be vertical.

It is recommended to install the AP with its front surface facing the area requiring cellular coverage, unobstructed by walls or partitions that may have significant RF attenuation.

Dimensions and weight	Height	211mm
	Width	274mm
	Depth	58.6mm
	Approximate Weight	1.75 kg
Environmental	Cooling	Vents on the back at top and bottom
	Operating Temperature	0°C to +45°C
	Operating Humidity	10 to 70% non-condensing

2.5.3 nano3G E8 AP IP Bandwidth Requirements

At maximum capacity, a nano3G E8 AP will require:

- Downlink: at least 7Mbps
- Uplink: at least 1Mbps

This will deliver up to 8 voice calls and HSDPA services up to 7.2 Mbps.

Note: The HSDPA rate of 7.2Mbps is the air-interface rate on Uu. The downlink rate needed to support this is lower. The uplink assumes a maximum load of 8 UEs each with 64Kbps PS bearers. Voice traffic has negligible impact.

2.5.4 nano3G E8 AP Installation Tool Requirements

- To mount the bracket onto the wall:
 - 6 pan head screws, size No. 6 (approx 3.5mm (0.14in) in diameter) – 4 for the nano3G E8 AP, 2 for the POE+ adapter

Note: No screws are supplied to mount the AP or the POE+ unit.

- Wall plugs if required.
- Suitable drills and screwdriver.

3 Pre-Provisioning a nano3G AP

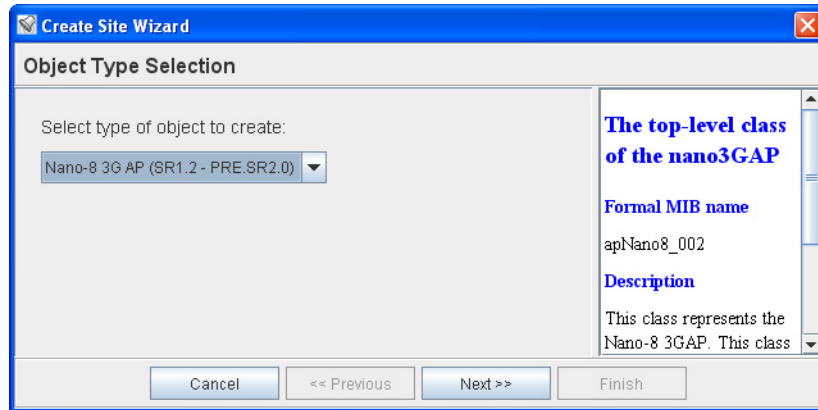
The nano3G AP must be provisioned on the AP Management System before it can be brought into service. It is recommended to do this in advance of physical site installation.

3.1 Create a Site for a New AP

Use the Create Site Wizard in the OMC-R Client to create a site object and child AP object for an AP. The real AP will be matched to the AP object according to its serial number. The configuration data for the AP object is stored on the AP's serving AP Management System. When a commissioned AP starts up, it connects to the serving AP Management System and downloads the configuration. This approach means that the AP's configuration can be entered and changed on the AP Management System in advance of physically installing an AP on site.

3.1.1 Start the Create Site Wizard

- 1) In the OMC-R Client, select the **AP Management Service (AMS)** that will be used to manage the AP.
- 2) Within the AMS, drill down to **AC Details** then the **AC Detail** object for the AC that the AP will connect to.
- 3) Right-click the AC Detail object and, from the menu, select **Create > Create Site**. The first page of the Create Site Wizard will appear:

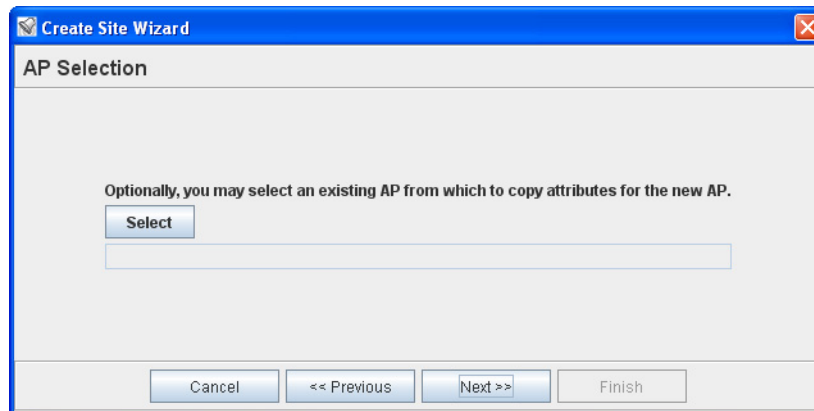


- 4) From the drop-down list on the left, choose the type of AP object to create. Choose either:
 - Nano-8 3G AP (SR2.0 -) - use this for both E8 APs and S8 APs
 - Nano-4 3G AP (SR2.0 -) - use this for S4 APs

Note: Do not choose either of the choices for (SR1.2 - PRE-SR2.0). These are only used for APs running software from a release prior to N3G_2.0.5. These choices must be present for backwards compatibility and thereby enable AP upgrades from previous releases.

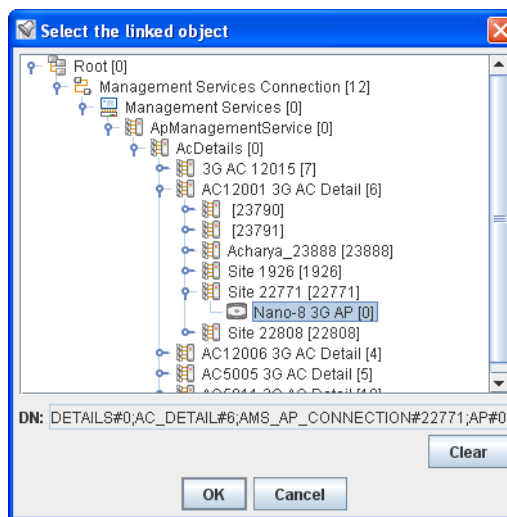
3.1.2 Optional - Use an Existing AP Configuration

- 5) Click **Next** and the AP Selection page of the wizard will appear:



Optionally use this page to copy the configuration of an existing AP.

- 6) To copy the configuration from an existing AP, click the **Select** button. The Select linked object browser will appear, initially showing the Root object in the OMC-R object hierarchy. When this is expanded, only Management Services that have APs configured will be shown. Drill down to find the required AP. For example:

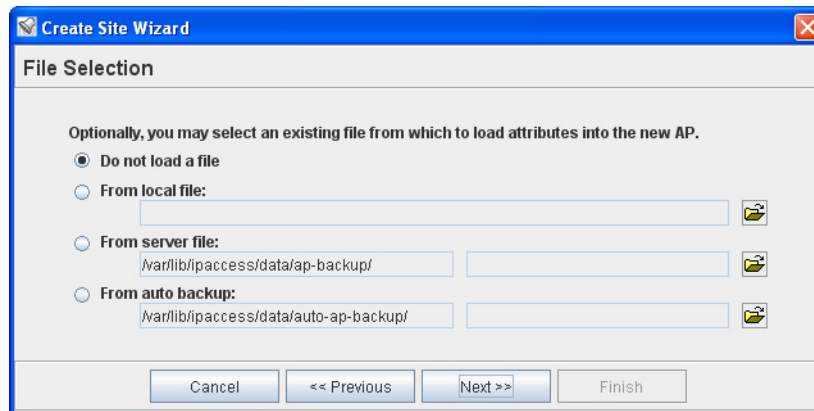


The DN box will show the Distinguished Name for the selected AP. This uniquely identifies the AP object within the object hierarchy on this OMC-R. The AP object must be the same type of AP object as has been selected for the new site.

Click **OK** and the DN will be shown on the AP Selection page of the wizard.

3.1.3 Optional - Load an AP Configuration File

7) Click **Next** and the File Selection page of the wizard will appear:



Optionally use this page to load a configuration file for the AP. The four options for file sources are:

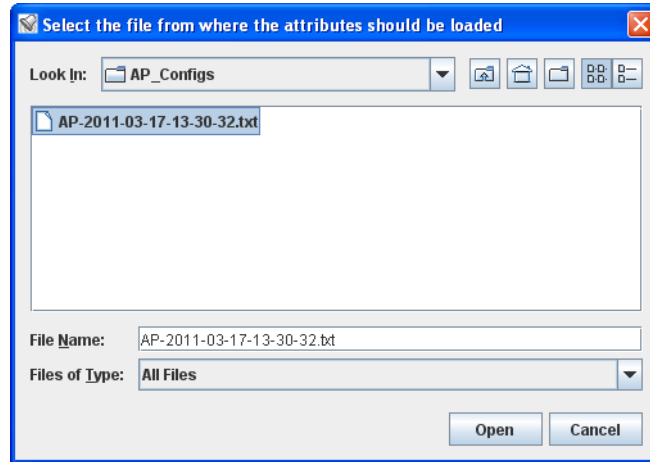
- Do not load a file - no configuration file will be loaded - if preferred, it is possible to load a configuration file later using the Load Attributes Wizard
- Local file - a configuration file stored on the local computer running the OMC-R Client
- Server file - a configuration file saved on the OMC-R server by saving the attributes from an AP
- Auto backup - a configuration file saved on the OMC-R server automatically for an AP when its attributes were last changed

Although files can be selected for all three sources, only the item for the selected radio button will be used on moving to the next page of the wizard. The AP type in the chosen configuration file must be the same type of AP object as has been selected for the new site.

For information on preparing an AP configuration file, see section 4.

Select a Local File

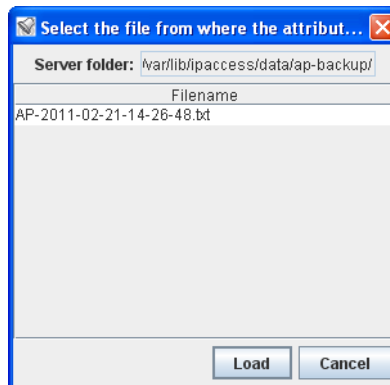
- 8) Click the radio button for **From local file**, then click the browse button on the right. The file browser will appear. Browse to the location of the required file and select it. For example:



- 9) Click **Open** and the file name will be shown in the box for Local file.

Select a File Saved on the OMC-R Server

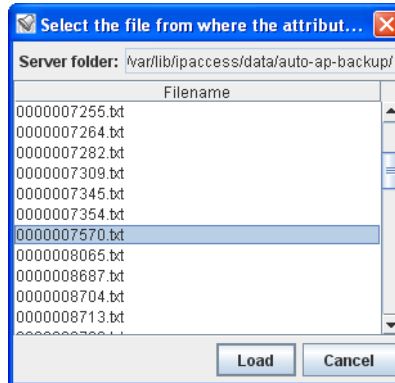
- 10) Click the radio button for **From server file**, then click the browse button on the right. A list of files saved on the OMC-R server will appear. For example:



- 11) Click the required file in the list, then click **Load**. The list will close and the file name will be shown in the box for Server file.

Select a File Automatically Backed Up on the OMC-R Server

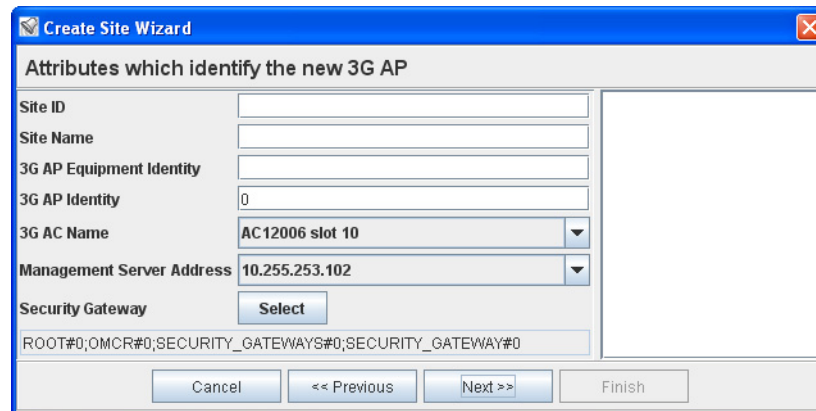
- Click the radio button for **From auto backup**, then click the browse button on the right. A list of files automatically saved on the OMC-R server will appear. For example:



- Click the required file in the list, then click **Load**. The list will close and the file name will be shown in the box for Auto backup file.

3.1.4 Enter AP Identification Details

- Click **Next**. The page for specifying AP identification details will appear:

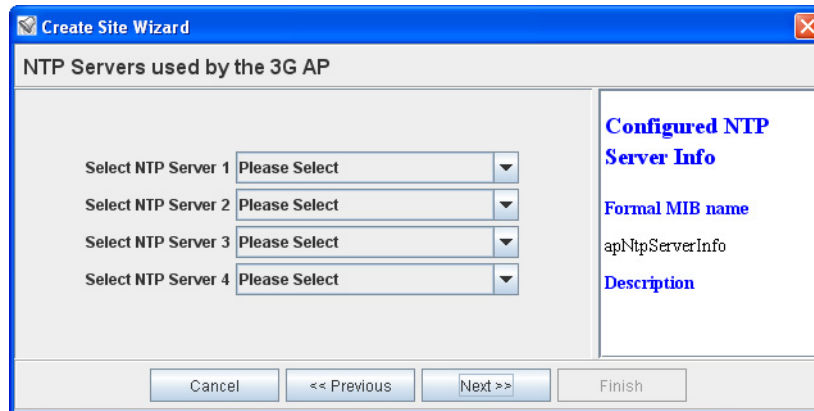


- Click in the Site ID box and type a numeric ID. This must be unique within the parent AC Detail object. As the ID number is entered, the Site Name is set automatically.
- If required, click in the Site Name box and type any text to replace the default Site Name. Enter text that will help identify this site.
- Click in the 3G AP Equipment Identity box and enter the serial number for the AP. This must be an exact match for the AP's serial number. If this does not match, the AP Management System will not allow the AP to connect.

- 18) Click in the 3G AP Identity box and type a numeric ID.

3.1.5 Select NTP Servers

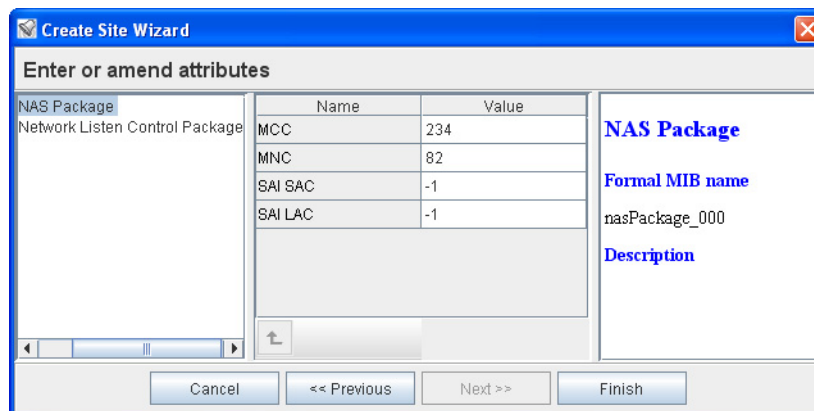
- 19) Click **Next**. The page for selecting NTP servers will appear:



- 20) Click the drop-down lists to choose up to four NTP servers for the AP. The available NTP servers are defined under Root > OMCR > NTP Servers. At least one NTP server must be selected.

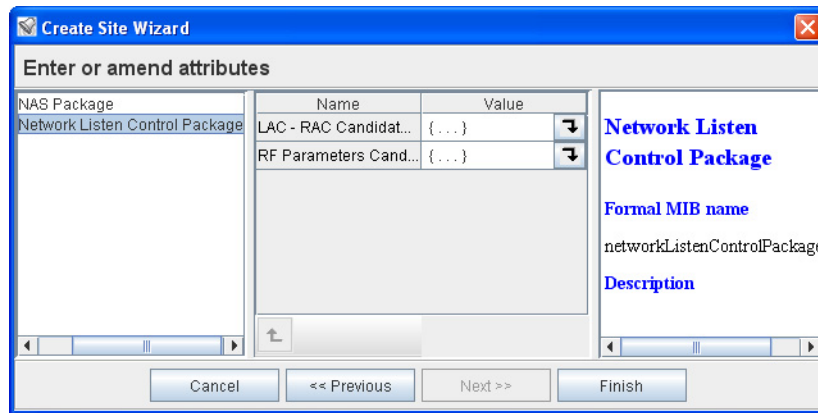
3.1.6 Modify NAS and Network Listen Settings

- 21) Click **Next**. The identification details are checked to ensure there are no duplication conflicts with existing APs. If there are any conflicts, a message will indicate the conflict and the wizard will stay on the AP identity details page. If the details pass these checks, the page for NAS and Network Listen details will appear:



- 22) If required, change the NAS entries. In most cases, the correct values should have already been selected automatically.

23) If required, click the Network Listen Control Package:



24) Make changes in the LAC - RAC Candidate List and RF Parameters Candidate List as needed.

25) Click **Finish**. The site and the AP object will be created within the AC Detail object.

3.2 Apply an Attribute Configuration to the AP

This is optional. This could be done if, for example:

- No AP or configuration file was used as the basis for the AP's initial configuration
- There is a requirement to load multiple configuration files

For information on preparing an AP configuration file, see section 4.

- 1) Ensure the attribute configuration file is available on the OMC-R Server or the computer running the OMC-R Client.
- 2) Log in to the OMC-R Client with a user name that has Full Access to the AP.
- 3) To start the OMC-R Load Attributes Wizard, right-click on the AP object in the OMC-R Client and then select **Load Attributes From File**.
- 4) Browse to the edited configuration file and click **Apply** to load and apply the configuration settings.

If any of the loaded values are inconsistent with the current state of the AP or if any of the values are illegal, the wizard displays a warning.

- 5) Repeat as needed, if there are multiple configuration files.

4 Configuration File Preparation

The attribute values for configuring a nano3G AP can be stored in a text file, and then loaded via the OMC-R Client to provision the AP. A text file of attributes can be loaded when creating the site for the AP or at any time after that once the AP object exists.

This section describes how to prepare one or more text files of attributes for provisioning nano3G APs. This can be done in combination with configuration adjustments from the OMC-R Client, according to whichever method is best suited for given configuration tasks.

4.1 Overview of Attribute Configuration Files

An attribute configuration file is a text file containing an object class followed by a list of attribute names and the value applied to each attribute. The file can also contain comment lines anywhere that start with the # character. Hence, the file content is of the form:

```
# some comment about the object type
Object=class_nnn
# some other comment
attribute1=value
attribute2=value
...
attributeN=value
```

The file must contain the Object type. The OMC-R Client will not load a file that does not have an Object type defined. For N3G_2.0.5, the Object for a nano3G AP must be apNano8_020 or apNano_020. So in each case the file must start like this:

- For a nano3G S8 AP or nano3G E8 AP:

```
Object=apNano8_020
```

- For a nano3G S4 AP:

```
Object=apNano_020
```

An attribute configuration file can be created from scratch. More conveniently, a file can be saved from within the OMC-R Client from an object of the same type and then customized for a different object of the same class. The resulting configuration file can then be imported against the target object, which in this case will be an AP. An example file is provided in section 4.3.

Configuration files must be imported one at a time, but there is no restriction on the number of configuration files that can be imported to configure any given object. This means it is possible to create a generic template file, which contains attribute values common to all APs of the same type. Typically, this can be started by exporting the configuration from an AP that has already been fully configured, and then edited to remove non-generic attributes. Once the generic template has been created, optionally create a file for each individual AP with additional settings particular to each AP. However, if the majority of required settings are in the generic template, it may be easier to simply load the template then use the OMC-R Client for fine tuning the configuration of an individual AP.

The ObjectInstance must be removed from a generic template if the original file was created by export from the OMC-R Client. If required, a configuration file for a specific AP can include the ObjectInstance value for that AP. This will ensure the file can only be loaded against the target AP.

When using the ObjectInstance value, it must be reproduced exactly or the configuration file will not load against the target AP. A way around this is to save a configuration file for that AP, regardless of its configuration state, then copy and paste the ObjectInstance into the file that has the correct configuration.

Note: All of the attributes can be configured from the OMC-R Client. After initial provisioning from a configuration file the OMC-R Client can be used to set attributes or the configuration file can be edited to set more parameters, for example when using configuration information from a radio planning system. To obtain a sample file with all the attributes that can be configured, export a configuration file as described in section 4.2 and inspect its content.

4.1.1 Attribute Types and Values

The attribute types and values conform to the attribute definitions in the MIB. See [REF_110] for a full description of each object type, the attributes it may contain and the valid values that may be assigned to each attribute.

The following attribute types are available, which are also formally described in [REF_110]:

- Base types:
 - Integer - a whole number numeric value, often must be within a range of valid values

```
tos=0
```

- Enumeration, or enum - a value name from a pre-defined set of names with specific values

```
t300=T300_4000_MSEC
```

- Boolean - a true or false value

```
soipHeartbeatEnabled=true
```

- String - a value enclosed in double-quotes (the double-quote character itself cannot be part of the value)

```
mnc="12"
```

- Compound types that are made of multiple instances of any types:

- Array - a comma delimited set of values of the same type within square brackets []

```
ascPersistenceScalingFactors=[6,6,6,6,6,6]
```

- Structure - a comma delimited set of values within curly brackets { }, and each value can be of any type

```
cellBroadcastMessage={50,GSM_DEFAULT,"nano3G"}
```

- Set - similar to an array, this a comma delimited set of values of the same type within round brackets (), however, each value must be different

```
rfParamsCandidateList=({1062,437,1})
```

Note: In the OMC-R Client, the compound types are the complex attributes that have multiple levels within the Navigation and Properties panes.

Note: In [REF_110], there is a distinction between expert and non-expert attributes. As a general rule, it is recommended to leave expert attributes at their default values.

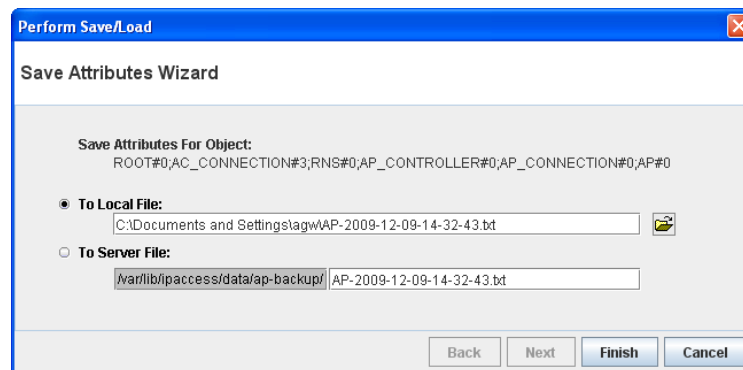
4.2 Create a nano3G AP Attribute Configuration File

A file can be created from scratch in a text editor, or can be started from the configuration of an existing AP. To create a configuration file from scratch, simply open a text editor and enter the required configuration details.

For information on the syntax of the configuration file, see section 4.1. For example configuration files, see section 4.3.

To start a configuration file by saving the configuration of an existing AP:

- 1) Start an OMC-R Client session.
Note: For full information on using the OMC-R Client, see [OPM_410].
- 2) In the Explorer pane of the OMC-R Client, find and select a suitable 3G AP object to use as a template. That is, select an AP of the same type as the target AP.
- 3) Right-click on the AP object and select **Save Attributes to File**. The Save Attributes Wizard will appear.



- 4) Select the radio button for the required location. For the purposes of creating a template for another AP, saving **To Local File** is recommended.

When saving **To Local File**, the target directory and file name may be changed.

When saving **To Server File** (on the OMC-R Server), the directory and file name are set automatically and cannot be changed. The file is named as follows:

```
AP-<Serial_number>-<Object_name>-<Date_Time>.txt
```

Where the <Serial_number> for the AP ensures the file name is unique, the <Object_name> can make individual APs easier to identify and the <Date_Time> is the date and time the file was created.

- 5) Click **Finish** to save the configuration file.
The file will contain all writable attributes. That is, all attributes that can be changed from within the OMC-R Client. Most of these will be at default values.
- 6) Edit the file in a suitable text editor, and adjust the configuration as needed for the new AP, or any number of new APs. If the file will be used as a general template that will be loaded on multiple APs, remove the ObjectInstance= line from the file.

Note: Use a text editor that can edit Unix text files. Windows® WordPad can be used, but Notepad is not suitable.

4.3 Example AP Configuration Files

4.3.1 Example Generic Template File for nano3G S4 AP

The following example file shows the attributes that are typically the same for all AP on the same AC. This is a manually created example, rather than being based on a file exported from an existing AP.

```
Object=apNano8_020
#
# Cell Package
rncIdentity=139
#
# NAS Package
mcc="159"
mnc="12"
sac=1
saiLac=1
#
# Network Listen Control Package
rfParamsCandidateList=({1062,437,1})
rssiScanBands=({BAND_NAME_UMTS_BAND_04_NO_SPOT,()})
neighbourListPopulation=STATIC_ONLY
# to scan all bands, use the empty value: rssiScanBands=()
#
# 3G AP Diagnostics Package
diagnosticReporting=({REPORT_ON_CRASH,"http://oam.server/upload/diagnostic"})
#
# 3G AP Measurement Control Package
reportingUrl=http://oam.server/upload/pm/ap
#
# 3G AP Time Package
localTimeZone=PST8PDT
#
# end of file
```

Parameter	Description
Object	Object type for APs, must be apNano_020 or apNano8_020
rncIdentity	RNC ID of the AC
mcc	Mobile Country Code
mnc	Mobile Network Code
sac	This is the SAI SAC (Service Access Code) which can be used by the billing system. If this is not used by the billing system, it is recommended to set this to 1.
saiLac	SAI Location Area Code which can be used by the billing system. This is a different value than the LAC set in the lacRacCandidateList for an individual AP. If this is not used by the billing system, it is recommended to set this to 1.
rssiScanBands	Specify which bands to scan with Network Listen, when performing RSSI detect and BCCH decode tests. Leave this empty to scan all bands supported by the AP hardware.

Parameter	Description
neighbourListPopulation	This determines how the live neighbour list is populated. The recommended setting is STATIC_ONLY, which only uses neighbours entered in the static neighbour lists, as determined by network planning.
diagnosticReporting for S4 APs or diagnosticReporting_001 for E8 APs	Set the URL of the AP Management System diagnostics service. Replace oam.server with the IP address or FQDN of the server.
reportingUrl	Set the URL of the AP Management System measurement reporting service. Replace oam.server with the IP address or FQDN of the server.
localTimeZone	Set the timezone, in POSIX format, where the APs are located. This assumes that all APs on the same AC are in the same timezone, which is the most probable scenario. If APs are spread across several timezones, this can be an AP-specific setting.

4.3.2 Example AP-Specific Configuration File

The following example file shows the attributes that are unique for each AP. This is a manually created example, rather than being based on a file exported from an existing AP.

```
Object=apNano8_020
#
# Network Listen Control Package
lacRacCandidateList=({15912,(99)})
rfParamsCandidateList=({1062,437,1})
rfScanControl={"0200",1440,240,true}
#
# Location Package
lcsLongitude=-2540
lcsLatitude=695
lcsUncertainty=15
#
# end of file
```

Parameter	Description
Object	Object type for APs, must be apNano_002 or apNano8_001
lacRacCandidateList	LAC and RAC for the AP.
rfParamsCandidateList	Set the UARFCN, Scrambling Code and Cell ID to be used by the AP.

Parameter	Description
rfScanControl	<p>This is composed of:</p> <ul style="list-style-type: none"> • The scan time, as HHMM, for the first scan, after which the scans take place every time the interval passes - if this is daily, set the time when usage is expected to be low so that the NWL scan does not disrupt the service • The interval in minutes, the default value of 1440 is one day, or set to 0 to disable periodic scans • The randomization period in minutes, which ensures multiple APs in close proximity do their scans at different times • Use reduced scan, true or false: a reduced scan is faster but may not detect all changes to the RF environment <p>Note: Depending on deployment requirements, this could be in the general template instead.</p>
lcsLongitude	This is entered as a number for east (positive) or west (negative) of the Greenwich meridian. It may be easier to enter this directly in the OMC-R Client, as this allows entry in degrees, minutes and seconds.
lcsLatitude	This is entered as a number for north (positive) or south (negative) of the equator. It may be easier to enter this directly in the OMC-R Client, as this allows entry in degrees, minutes and seconds.
lcsUncertainty	Radius of uncertainty in metres.

4.3.3 Other Attributes

The following table shows some other attributes to consider for inclusion in AP configuration files. Apart from the static neighbour lists, which are usually configured individually, any of these can be in a general template for all APs or can be set individually.

Parameter	Description
Admission Control Package	
psHandoverEnabled	Whether or not PS RABs will handover between an AP and the macro network. This is disabled (false) by default.
Network Listen Control Package	
neighbourPlmns	If specified, this restricts the networks that neighbouring cells can belong to for populating the neighbour lists by specifying the MCC/MNC values.
plmnsToSyncWith	If specified, this restricts the networks that neighbouring cells can belong to for frequency synchronisation by specifying the MCC/MNC values.

Parameter	Description
staticGsmNeighbourList	<p>This is a complex attribute that specifies GSM (2G) neighbour candidates. It is recommended to enter these directly in the OMC-R Client. However, if a similar list has already been configured for a nearby AP, it may be advantageous to copy this attribute from a configuration file saved from the nearby AP, load this into the target AP and then make suitable adjustments from the OMC-R Client.</p> <p>See [OPM_300] for information on neighbour list configuration.</p>
staticUmtsNeighbourList	<p>This is a complex attribute that specifies UMTS (3G) neighbour candidates. It is recommended to enter these directly in the OMC-R Client. However, if a similar list has already been configured for a nearby AP, it may be advantageous to copy this attribute from a configuration file saved from the nearby AP, load this into the target AP and then make suitable adjustments from the OMC-R Client.</p> <p>See [OPM_300] for information on neighbour list configuration.</p>
Oscillator Synchronisation Package	
oscillatorSynchronisationTimeout	<p>The number of days an AP can go without resynchronisation before it raises the relevant alarm.</p>

5 Commission a nano3G AP

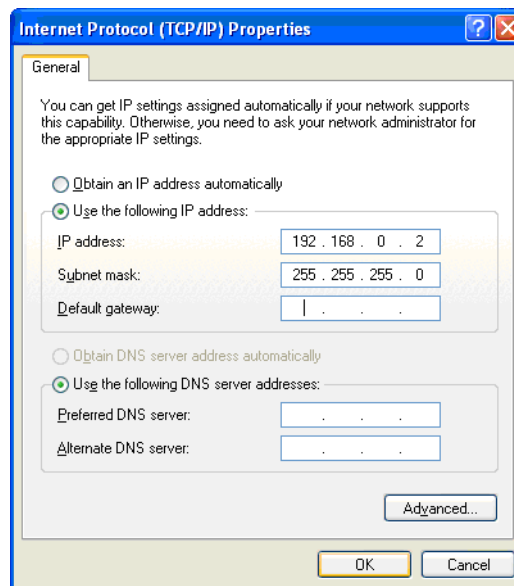
This procedure configures the nano3G AP with the settings it needs to establish a connection with its serving AP Management System. Once commissioning is complete, use the OMC-R Client for any remaining configuration and to bring the AP into service.

An AP can be commissioned either in advance of the site visit via a commissioning computer or on site via a commissioning laptop. This procedure is identical in both cases. The term *commissioning terminal* is used to refer to allow for both of these scenarios.

The nano3G AP must be in the factory reset state for this procedure. If a factory reset is required, see section 8.2 for instructions.

5.1 Configure a Commissioning Terminal to Connect to the AP

- 1) Open the Windows Control Panel on the terminal.
- 2) Go to **Network Connections**.
- 3) Right-click the relevant **Local Area Connection** and select Properties.
- 4) In the list of items on the General tab, select **Internet Protocol (TCP/IP)** and then click **Properties**. The following dialogue appears:



- 5) If it is not possible to leave this network connection permanently configured for AP commissioning, make a note of the current settings.
- 6) Click the **Use the following IP address** radio button.
- 7) Set the IP Address to **192.168.0.2**.
- 8) Set the Subnet Mask to **255.255.255.0**.
- 9) There is no default gateway, so ensure the default gateway address is cleared.

- 10) Click **OK** to close and save the changes in each of the two dialogues. Also close the Control Panel.

5.2 Start Up the AP

5.2.1 Start up a nano3G S4 or S8 AP

- 1) To power up an S4 or S8, either.
 - Use the power supply provided with the APor
 - Connect a POE source to the splitter unit, then connect the short power cable from the POE Splitter unit to the DC input on the AP

Note: The AP may have been provided with only one of these options.
- 2) Connect the commissioning terminal directly to the AP with an Ethernet cable.

5.2.2 Start up a nano3G E8 AP

- 1) To power up a nano3G E8 AP, typically do one of the following:
 - Connect a cable to carry POE+ from the injector to the LAN1 port on the AP, then plug the POE+ injector into the mainsor
 - Connect the optional power supply for the AP to the AP's 12V DC input
- 2) To establish an Ethernet connection between an E8 AP and the commissioning terminal, do one of the following according to how the AP has been powered up:
 - If using POE+ to power the AP, connect the Ethernet cable from the commissioning terminal to the LAN input on the POE+ injector unitor
 - If not using POE+, connect the Ethernet cable from the commissioning terminal directly to the LAN1 port on the AP

5.3 Access the Commissioning Web Page for the AP

- 1) Start a web browser on the commissioning terminal.
- 2) In the address bar, enter the pre-defined static IP address and port number for the web server: http://192.168.0.1:8089. A login screen appears.
- 3) Enter the commissioning user name and the password (supplied separately for security reasons). The Connection Config page appears:



The screenshot shows the 'ip.access' logo at the top left. Below it is a dark grey header with the text '3G AP'. The main content area is light grey and contains a navigation menu on the left with the following items: 'Connection Config' (underlined), 'SW Download', 'ATAS Download', and 'IP Config'. To the right of the menu, the 'Serial Number' is displayed as '000000-0000000000'. Below this, the 'Connection Configuration' section is shown. It includes two radio buttons: 'IPSec Disabled' (unselected) and 'IPSec Enabled' (selected). There are two rows of input fields for 'Traffic Selector - IP Address' and 'Traffic Selector - Subnet Mask', each with four boxes containing the digit '0'. Below these are four single-line text input fields for 'IPSec Gateway', 'Management Server URL', 'CRL Server Base URL', and 'NTP Server Address'. At the bottom of the form are two buttons: 'Apply Changes' and 'Complete Commissioning'.

5.4 Optional Download Activities

If it is necessary to download a software or ATAS package to the AP, this **must** be done before configuring the connection to the AP Management System. This is because the web pages that provide the download options will not be available once the connection commissioning activities are complete.

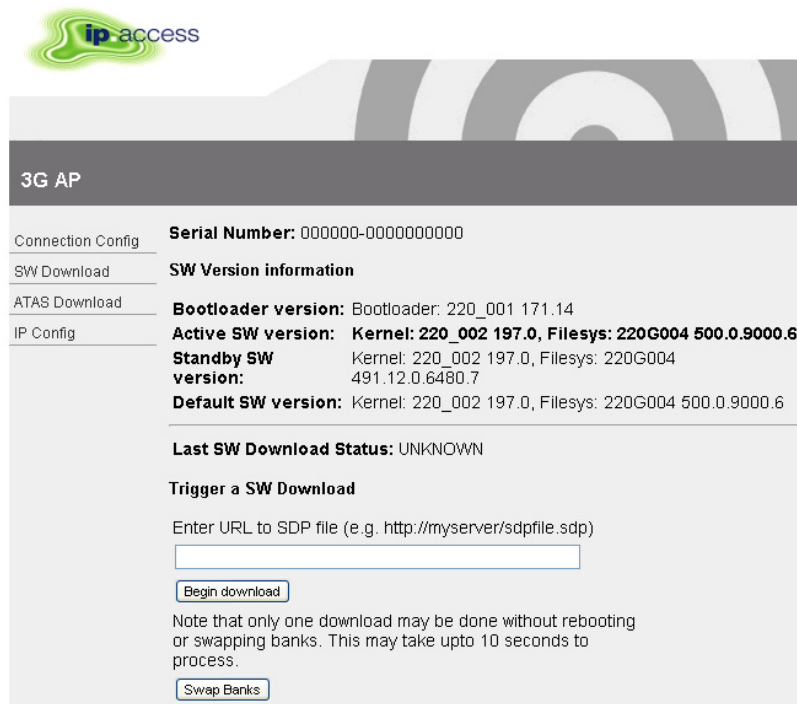
This can only be done if the commissioning terminal is running a web server that provides a path to any ip.access AP software download packages. That is, the required .sdp files must be present on the commissioning terminal.

Setting up a web server for this purpose on the commissioning terminal is outside the scope of this manual.

5.4.1 Optional - Software Download

Use the SW Download page to download a different version of AP software to the AP from the commissioning terminal. Then switch banks to the new software version, which restarts the AP.

- 4) Click the **SW Download** link on the left. The web page for downloading software will be shown. This also provides details about the current software installed on the AP.



ip.access

3G AP

Connection Config **Serial Number:** 000000-000000000000

SW Download **SW Version information**

ATAS Download **Bootloader version:** Bootloader: 220_001 171.14

IP Config **Active SW version:** Kernel: 220_002 197.0, Filesys: 220G004 500.0.9000.6

Standby SW version: Kernel: 220_002 197.0, Filesys: 220G004 491.12.0.6480.7

Default SW version: Kernel: 220_002 197.0, Filesys: 220G004 500.0.9000.6

Last SW Download Status: UNKNOWN

Trigger a SW Download

Enter URL to SDP file (e.g. http://myserver/sdpfile.sdp)

Note that only one download may be done without rebooting or swapping banks. This may take upto 10 seconds to process.

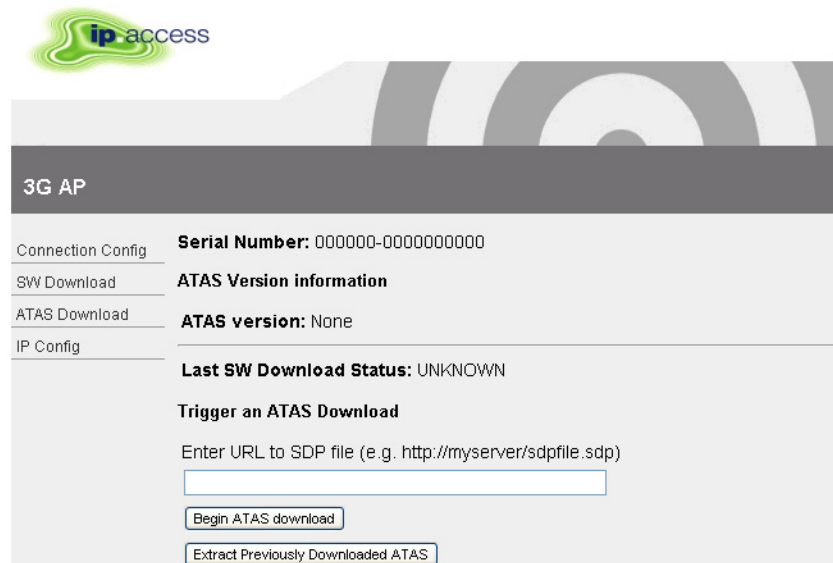
- 5) In the text box, enter the URL for the SPD file stored on the commissioning terminal. For example, the URL of a software file for a nano3G E8 AP might be:
`http://192.168.0.2/webservername/220H007_<ver>.spd`
Where <ver> is the actual build version of the required software package.
- 6) Click **Begin Download**.
- 7) Wait about a minute for the download to take place.

- 8) Click **Swap Banks**. This will restart the AP from the new software just downloaded.
- 9) When the AP has restarted, login again with the commissioning user name and password.
- 10) Click the **SW Download** link on the left.
- 11) Inspect the software version information to verify that the AP has booted from the downloaded software.

5.4.2 Optional - ATAS Download

Use the ATAS Download page to download a package of security certificates that are appropriate for the AP's target network. This is not necessary if the AP is factory installed with the correct certificates.

- 12) Click the **ATAS Download** link on the left. The web page for downloading an ATAS bundle will be shown. This will also show any current ATAS version information, if applicable.



ip.access

3G AP

Connection Config **Serial Number:** 000000-0000000000

SW Download **ATAS Version information**

ATAS Download **ATAS version:** None

IP Config

Last SW Download Status: UNKNOWN

Trigger an ATAS Download

Enter URL to SDP file (e.g. http://myserver/sdpfile.sdp)

- 13) In the text box, enter the URL for the SPD file stored on the commissioning terminal, which contains the required ATAS bundle. For example:

```
http://192.168.0.2/webservername/atas_file.spd
```

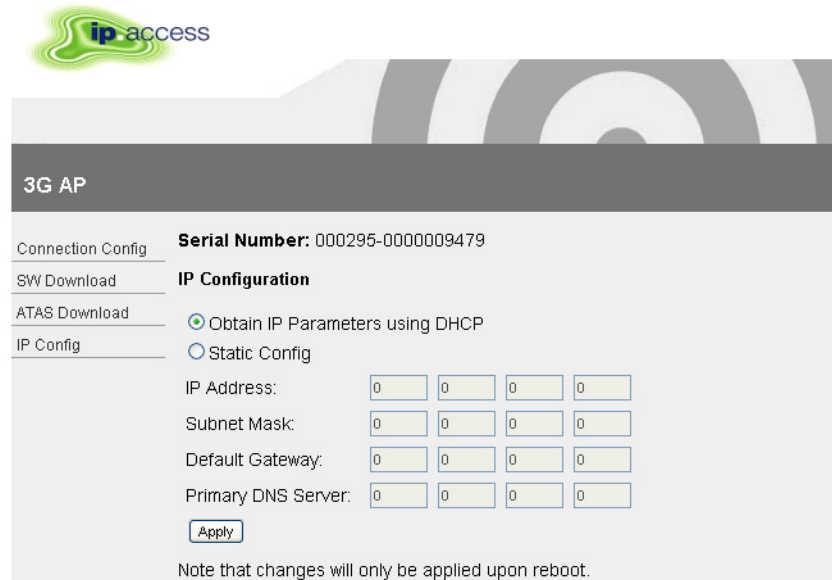
- 14) Click **Begin Download**.
- 15) Wait about a minute.
- 16) Click **Extract Previously Downloaded ATAS**.
- 17) Wait about a minute. If the ATAS version information is not refreshed, use the appropriate browser command to refresh the web page.
- 18) Inspect the ATAS version information to verify it is correct.

5.5 Configure the Connection to the AP Management System

5.5.1 Static IP Configuration

Obtaining an IP address with DHCP is recommended for the nano3G AP, and this is selected by default. Only execute this section if static IP configuration is needed. This must be done before completing the Connection Config page.

- 19) If static IP is required, click the **IP Config** link on the left. The IP Configuration page appears.



ip.access

3G AP

Connection Config **Serial Number:** 000295-0000009479

SW Download **IP Configuration**

ATAS Download

IP Config Obtain IP Parameters using DHCP

Static Config

IP Address:

Subnet Mask:

Default Gateway:

Primary DNS Server:

Note that changes will only be applied upon reboot.

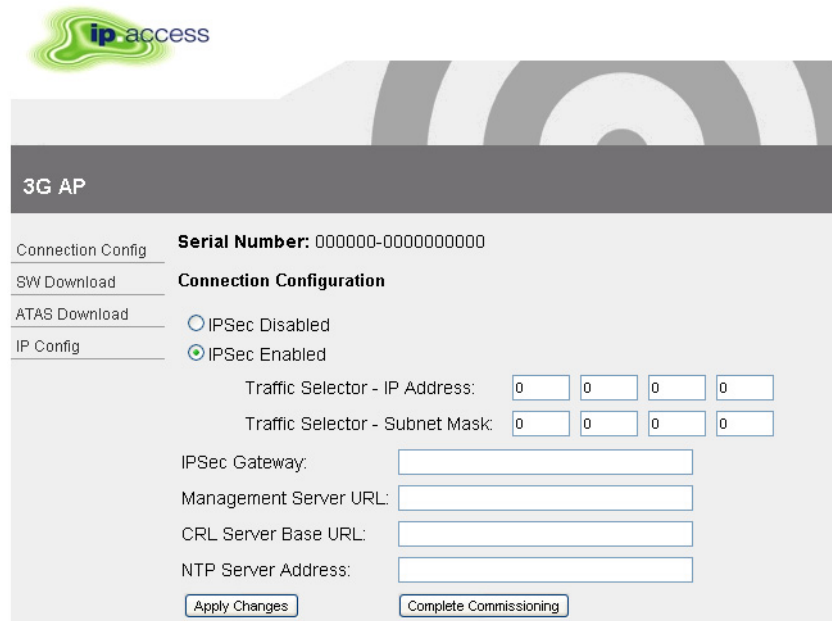
- 20) Edit the parameters as needed and then click **Apply**.

Note: At this point it may be useful to make a separate note of the parameter values entered in this screen. Alternatively, save a screenshot of the web page (information about how to take a screenshot is outside the scope of this manual).

- 21) Click the **Connection Config** link on the left.

5.5.2 Configure the AP Management System Connection

- 22) If a secure connection is required, select **IPSec Enabled**. Also enter the address for the **IPSec Gateway** and the **Traffic Selector** address and subnet mask.



ip access

3G AP

Connection Config **Serial Number:** 000000-0000000000

SW Download **Connection Configuration**

ATAS Download IPSec Disabled

IP Config IPSec Enabled

Traffic Selector - IP Address:

Traffic Selector - Subnet Mask:

IPSec Gateway:

Management Server URL:

CRL Server Base URL:

NTP Server Address:

- 23) Enter addresses for the AP Management System, a suitable CRL server and the NTP server.
- 24) To save the configuration, click **Apply Changes**.

Note: At this point it may be useful to make a separate note of the parameter values entered in this screen. Alternatively, save a screenshot of the web page (information about how to take a screenshot is outside the scope of this manual).

5.5.3 Complete the AP Commissioning

- 25) Click the **Connection Config** link on the left, to ensure the correct page is showing.
- 26) To start the AP in normal operation mode, click **Complete Commissioning**.
- 27) Acknowledge the warning about changes in the IP configuration and click **OK**.
- 28) When the initial configuration is complete, power off the AP and disconnect it from the commissioning terminal.

At this point, the commissioning web page is no longer accessible. If there are configuration errors that prevent the AP connecting to its serving AP Management System, the commissioning procedure must be started again after resetting the AP with a factory reset. See section 8.2 for factory reset instructions.

5.6 Commissioning Finished

Commissioning the AP is now finished.

From this point on, the AP must be managed from the OMC-R Client, via the AP Management System. If the AP has not been pre-provisioned in the AP Management System, it must be configured before it can enter service. See section 3 for information about AP provisioning.

5.6.1 Finished On Site Commissioning

If commissioning has been done on site, return to the site installation procedure in section 6.2.3, 6.3.3 or 6.4.5, as appropriate.

5.6.2 Finished Advance Commissioning

If commissioning has been done in advance of sending the AP on site, it is advisable to ensure that the AP will connect to its serving AP Management System prior to sending the AP on site. To do this:

- 1) Verify that the AP has been pre-provisioned with a Site in the serving AP Management System.
- 2) Provide the AP with an appropriate network connection. If the AP has been commissioned to use IPsec, this means a network connection that will go via the Security Gateway, which is likely to require connection of the AP to an external network.
- 3) Power up the AP.
- 4) Use the OMC-R Client to verify that the AP has connected to its serving AP Management System. The Site for the AP should have a green tick symbol against its icon.
- 5) After verifying this, re-pack the AP so that it is ready for delivery to its intended site.

6 *nano3G AP Hardware Installation*

This section documents the procedures for installing the nano3G AP hardware and physical connections.

The following hardware variants are described:

- *6.2 nano3G S4 AP Hardware Installation*
- *6.3 nano3G S8 AP Hardware Installation*
- *6.4 nano3G E8 AP Hardware Installation*

Note: If possible, the engineer should stay on site until the AP is brought into service, ready to make test calls to verify the AP has been configured correctly from the OMC-R.

6.1 **Warnings and Regulatory Information**



For all warnings and regulatory information, see section 9.

6.2 nano3G S4 AP Hardware Installation

6.2.1 Unpack the nano3G S4 AP

- 1) Unpack the nano3G S4 AP and its accessories.

Box contents may vary, but typically the box should contain the following, as pictured:

<p>Upper layer:</p> <ul style="list-style-type: none">• nano3G S4 AP unit• nano3G S4 AP stand	 A photograph showing the upper layer of the nano3G S4 AP box. The nano3G S4 AP unit is wrapped in clear plastic and sits on a white nano3G S4 AP stand. The items are centered within a cardboard box.
<p>Lower layer:</p> <ul style="list-style-type: none">• POE injector unit• POE splitter unit• Mains adaptor unit• Mains cable for POE injector	 A photograph showing the lower layer of the nano3G S4 AP box. It contains a POE injector unit, a POE splitter unit, a mains adaptor unit, and a mains cable for the POE injector. The items are laid out on a cardboard base.

Note: No screws are supplied to mount the AP or the splitter unit.

- 2) Check that the serial number on the nano3G S4 AP unit matches the label on the box.
 - 3) Check that the items have not been damaged in transit.
- For any damaged units, contact the supplier immediately for returns advice.

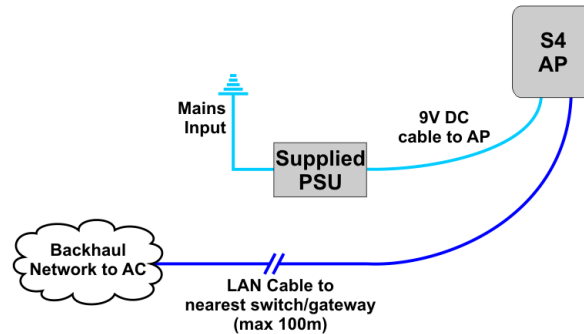
6.2.2 Commission the nano3G S4 AP

Configure the AP so that it will connect to its serving AP Management System. If this has not been done already, do this now, before installing the AP in its final location. For instructions, see section 5.

6.2.3 Cable Connections

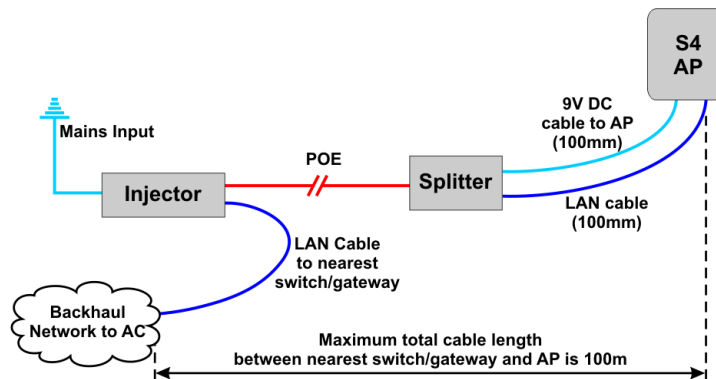
Use one of the cable connection schemes described below, to provide power and the LAN connection.

Supplied PSU and LAN



When the supplied PSU is used to power the AP, the POE injector and splitter units are not needed. However, this means that the mains socket providing power to the AP must be within reach of the cabling included with the supplied PSU (less than 2m).

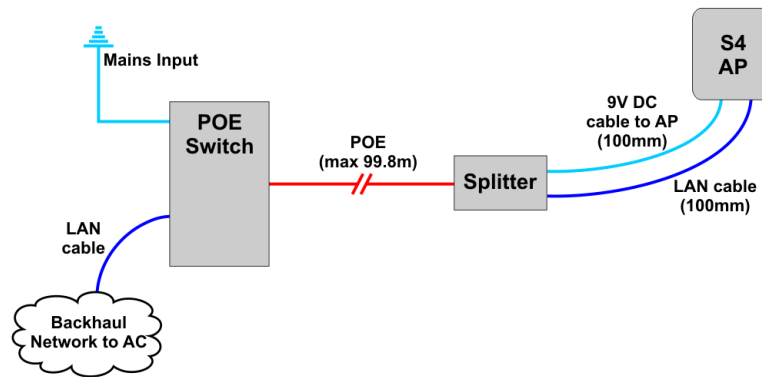
POE Injector and Splitter



This improves flexibility for locating the AP, as the AP can be up to approximately 100m from a mains power supply, depending on the placement of the POE Injector.

In this case, the PSU for the AP is not used. The injector takes a direct mains input using the supplied mains cable.

POE Switch and Splitter



In this case, the POE switch is a third-party item. This has similar benefits to using the POE injector, but a POE switch will typically only be used if there are multiple APs on site and/or there is other equipment that can take advantage of POE. The supplied POE splitter must be used with the AP.

Notice that the POE cable to the splitter should not exceed 99.8m in length. This will ensure that the total cable run from the POE switch to the AP is within the Ethernet limit of 100m.

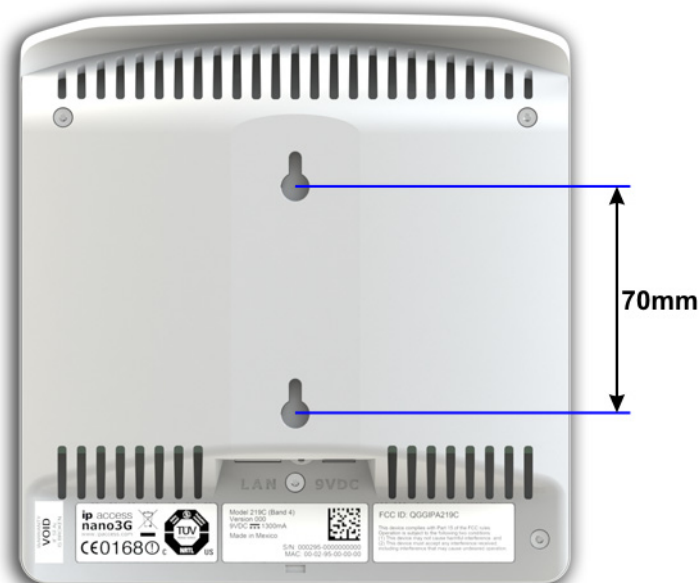
6.2.4 Mount the nano3G S4 AP

Note: The nano3G S4 AP should be installed in a position so that it is at least 2m away from the area where handsets are normally used.

The nano3G S4 AP **must** be mounted vertically in a location that allows air circulation around the unit. The AP can be mounted in the following ways:

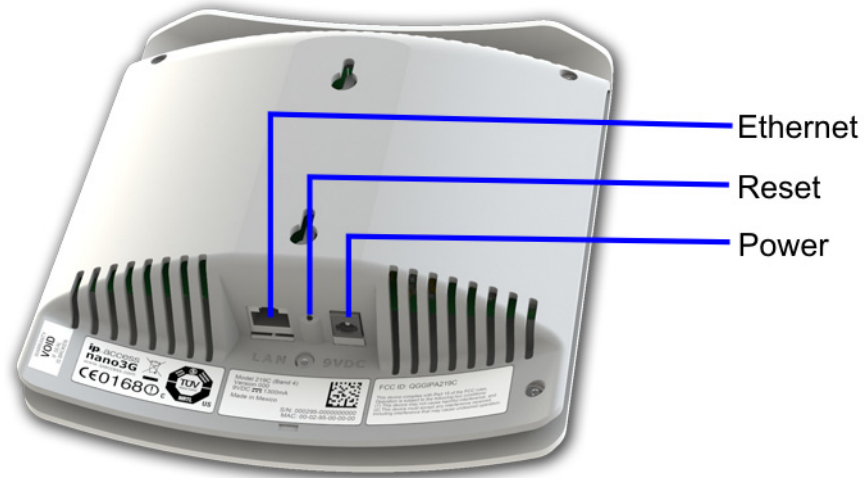
- On a stand
- Directly onto the wall at or above head height
- Onto the splitter unit on the wall at or above head height

The nano3G S4 AP has two holes at the back for direct wall mounting or mounting on the POE splitter:



Mount the nano3G S4 AP on a Stand

- 1) Plug the Ethernet cable and the power cable into the AP or plug the cables from the POE splitter into the AP.



- 2) Slide the AP onto the stand.



- 3) Place the AP on its stand on a stable flat surface.

Mount the nano3G S4 AP directly onto the wall

- 1) Drill two holes 70mm (2.76in) apart vertically for the two screws.
- 2) Insert wall plugs (if required) and secure the screws leaving approximately 3mm (0.12in) clearance between the screw heads and the wall.
- 3) Plug the Ethernet cable and the power cable into the AP.

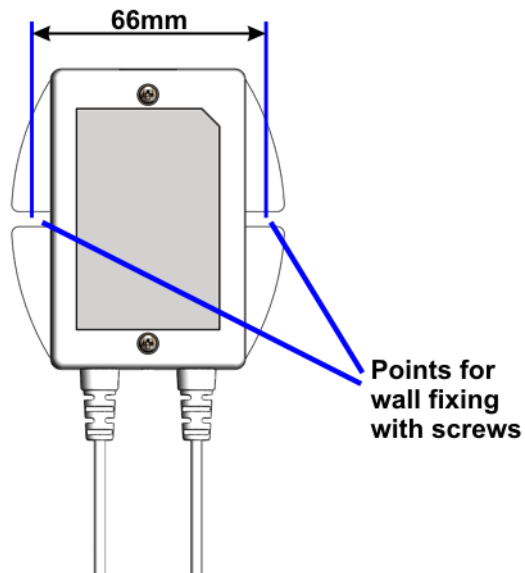
Note: If using the POE splitter when wall mounting the AP, it is recommended to mount the AP directly on the POE splitter, as in the following section. In some cases, it may be necessary to mount the AP and the POE splitter on the wall separately to minimise how far the AP projects from the wall. In this case, position the POE splitter below the AP where the 100mm cables will reach the AP.

- 4) Slide the AP onto the 2 screws.



Mount the nano3G S4 AP onto the splitter unit on the wall

- 1) Drill two holes 66mm (2.6in) apart horizontally for the two screws.



- 2) Secure the splitter unit to the wall using two screws.
Ensure that the Ethernet socket is at the top.
- 3) Plug the Ethernet cable into the top of the splitter unit.
- 4) Plug the captive Ethernet cable and the power cable from the splitter unit into the AP.
- 5) Mount the AP onto the 2 screws that are already fixed onto the splitter unit.



6.3 nano3G S8 AP Hardware Installation

6.3.1 Unpack the nano3G S8 AP

- 1) Unpack the nano3G S8 AP and its accessories.



Box contents may vary, but typically the box should contain the following:

- nano3G S8 AP unit
- nano3G S8 AP stand

Plus any combination of the following items, according to the options ordered:

- Mains adaptor unit
- POE injector unit and suitable mains cable
- POE splitter unit

Note: No screws are supplied to mount the AP or the splitter unit.

- 2) Check that the serial number on the nano3G S8 AP unit matches the label on the box.
- 3) Check that the items have not been damaged in transit.

For any damaged units, contact the supplier immediately for returns advice.

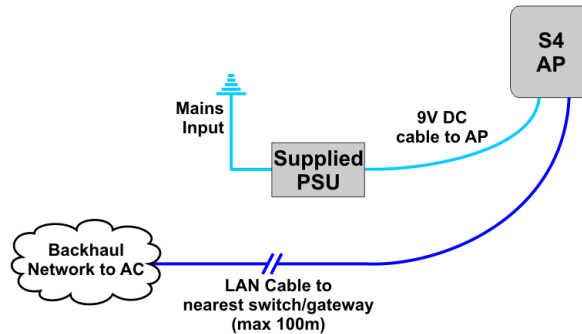
6.3.2 Commission the nano3G S8 AP

Configure the AP so that it will connect to its serving AP Management System. If this has not been done already, do this now, before installing the AP in its final location. For instructions, see section 5.

6.3.3 Cable Connections

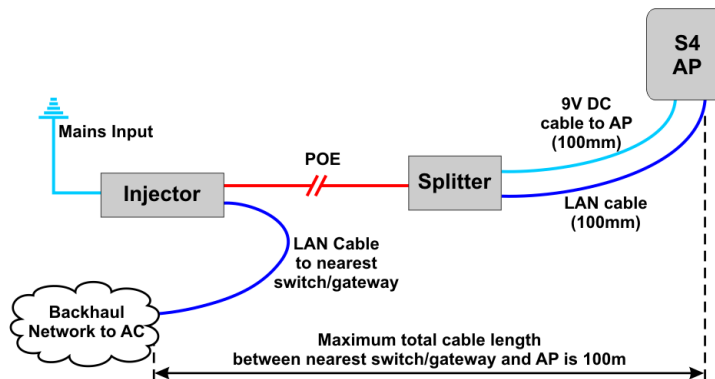
Use one of the cable connection schemes described below, to provide power and the LAN connection.

Supplied PSU and LAN



When the supplied PSU is used to power the AP, the POE injector and splitter units are not needed. However, this means that the mains socket providing power to the AP must be within reach of the cabling included with the supplied PSU (less than 2m).

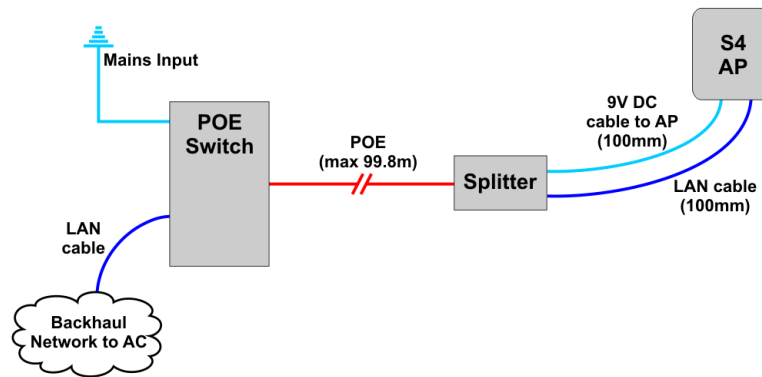
POE Injector and Splitter



This improves flexibility for locating the AP, as the AP can be up to approximately 100m from a mains power supply, depending on the placement of the POE Injector.

In this case, the PSU for the AP is not used. The injector takes a direct mains input using the supplied mains cable.

POE Switch and Splitter



In this case, the POE switch is a third-party item. This has similar benefits to using the POE injector, but a POE switch will typically only be used if there are multiple APs on site and/or there is other equipment that can take advantage of POE. The supplied POE splitter must be used with the AP.

Notice that the POE cable to the splitter should not exceed 99.8m in length. This will ensure that the total cable run from the POE switch to the AP is within the Ethernet limit of 100m.

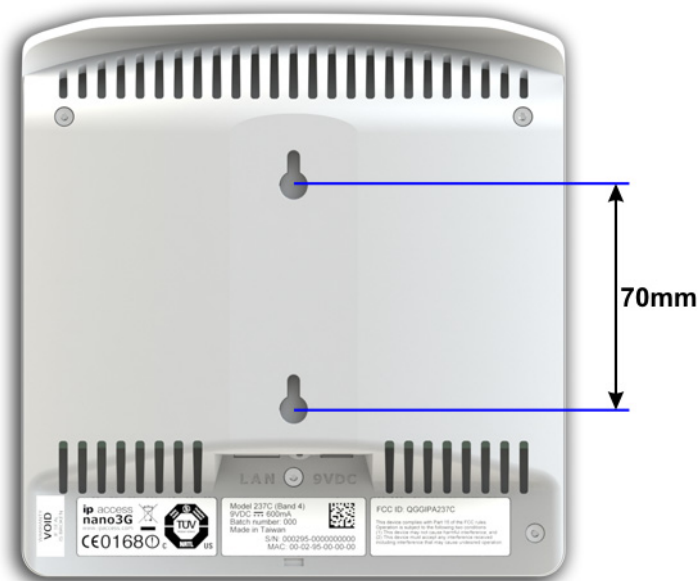
6.3.4 Mount the nano3G S8 AP

Note: The nano3G S8 AP should be installed in a position so that it is at least 2m away from the area where handsets are normally used.

The nano3G S8 AP **must** be mounted vertically in a location that allows air circulation around the unit. The AP can be mounted in the following ways:

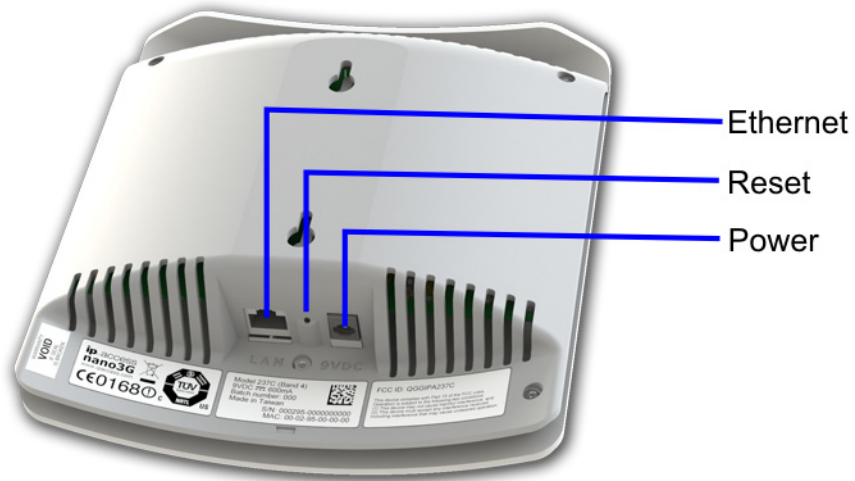
- On a stand
- Directly onto the wall at or above head height
- Onto the splitter unit on the wall at or above head height

The nano3G S8 AP has two holes at the back for direct wall mounting or mounting on the POE splitter:



Mount the nano3G S8 AP on a Stand

- 1) Plug the Ethernet cable and the power cable into the AP or plug the cables from the POE splitter into the AP.



- 2) Slide the AP onto the stand.



- 3) Place the AP on its stand on a stable flat surface.

Mount the nano3G S8 AP directly onto the wall

- 1) Drill two holes 70mm (2.76in) apart vertically for the two screws.
- 2) Insert wall plugs (if required) and secure the screws leaving approximately 3mm (0.12in) clearance between the screw heads and the wall.
- 3) Plug the Ethernet cable and the power cable into the AP.

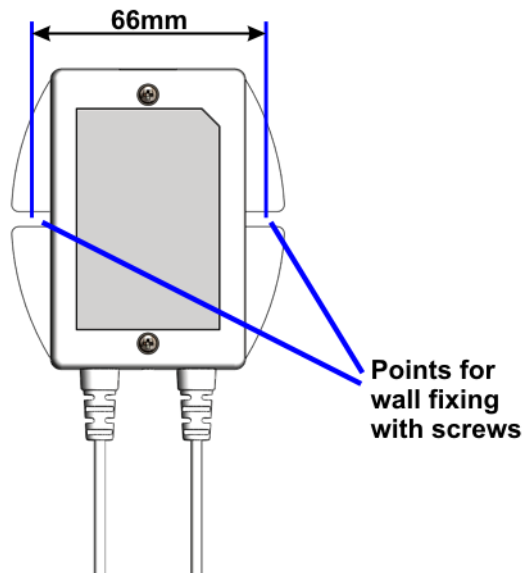
Note: If using the POE splitter when wall mounting the AP, it is recommended to mount the AP directly on the POE splitter, as in the following section. In some cases, it may be necessary to mount the AP and the POE splitter on the wall separately to minimise how far the AP projects from the wall. In this case, position the POE splitter below the AP where the 100mm cables will reach the AP.

- 4) Slide the AP onto the 2 screws.



Mount the nano3G S8 AP onto the splitter unit on the wall

- 1) Drill two holes 66mm (2.6in) apart horizontally for the two screws.



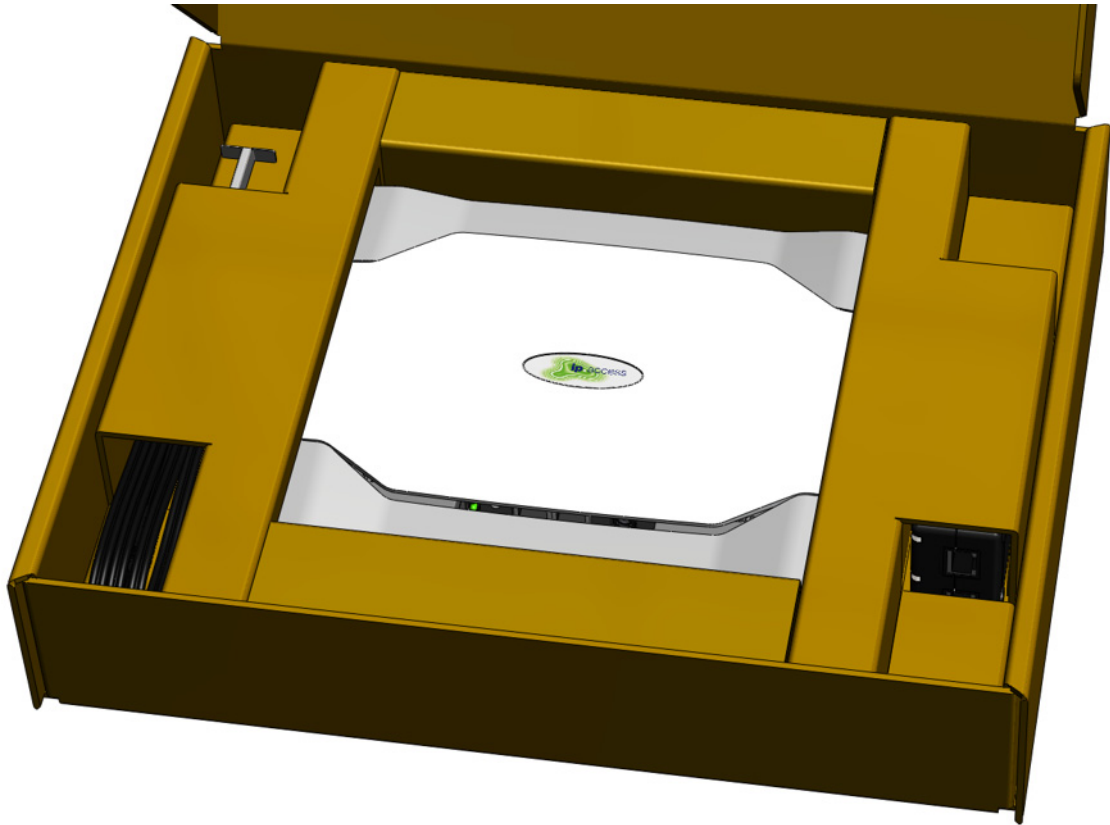
- 2) Secure the splitter unit to the wall using two screws.
Ensure that the Ethernet socket is at the top.
- 3) Plug the Ethernet cable into the top of the splitter unit.
- 4) Plug the captive Ethernet cable and the power cable from the splitter unit into the AP.
- 5) Mount the AP onto the 2 screws that are already fixed onto the splitter unit.



6.4 nano3G E8 AP Hardware Installation

6.4.1 Unpack the nano3G E8 AP

- 1) Unpack the nano3G E8 AP and its accessories.



Box contents may vary, but typically the box should contain the following:

- nano3G E8 AP unit with wall bracket attached
 - Extraction tool for removing the AP from its wall bracket
 - Injector unit for POE+
 - Mains cable for the POE+ injector
- 2) Check that the serial number on the nano3G E8 AP unit matches the label on the box.
 - 3) Check that the items have not been damaged in transit.

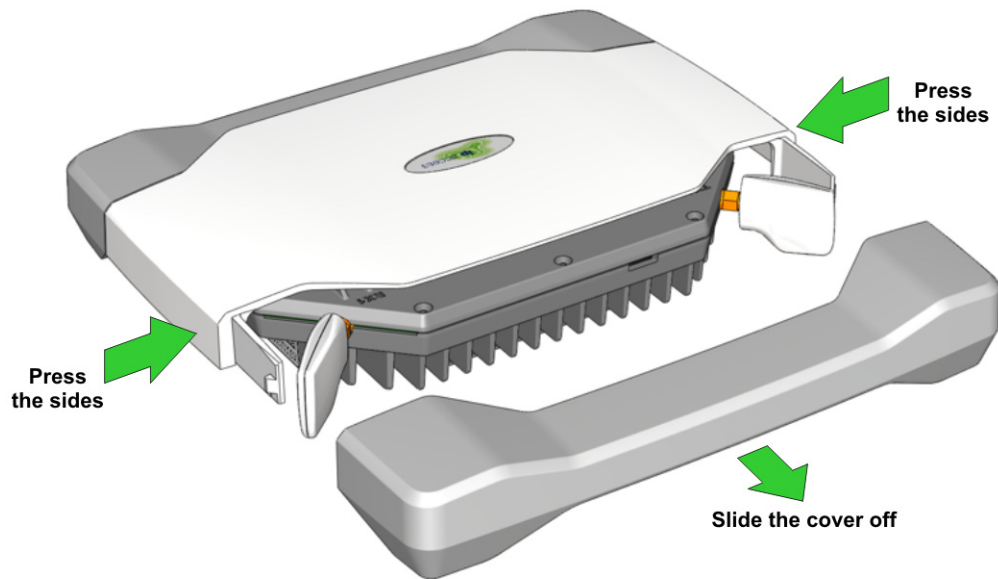
For any damaged units, contact the supplier immediately for returns advice.

6.4.2 Removable Cable and Antenna Covers

The nano3G E8 AP has two removable covers. The top cover goes over the antennae, and the bottom cover goes over the cable sockets.

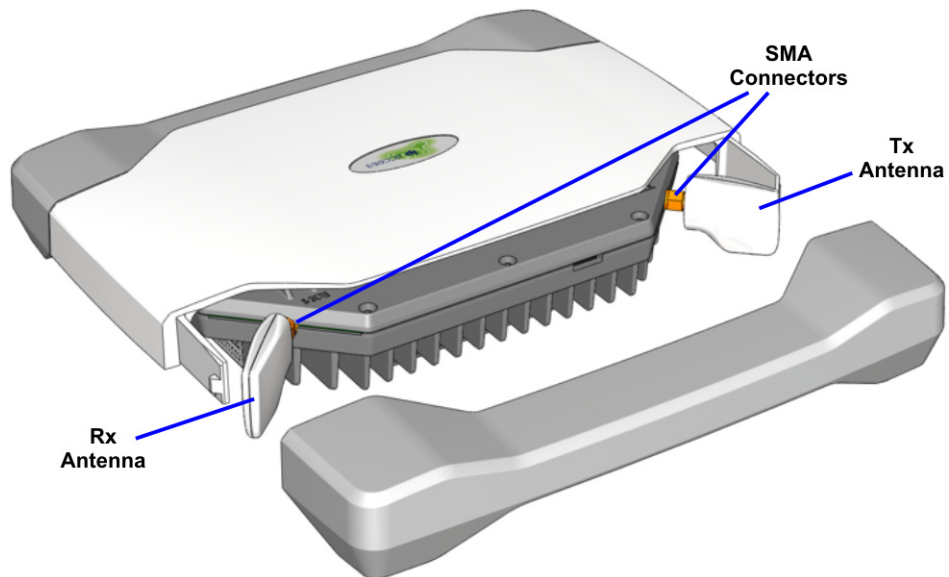
- 1) Place the unit on a flat surface.

- 2) Press the sides of the unit next to the cover to be removed. Do not apply excessive force.



- 3) Slide the cover off.
- 4) To refit the cover, simply slide it back onto the tabs on the main cover until it snaps into place.

6.4.3 Antennas



The antennas must be oriented perpendicular to the unit, as shown, so that the cover fits correctly without stressing the connectors.

To fit external antennas, first remove the plastic cover from the antenna side of the unit. Unscrew the antennas to expose the SMA connectors. Connect external antennas directly to the SMA connectors. Route the cables out of the way of the antenna cover, then refit the cover.

6.4.4 Commission the nano3G E8 AP

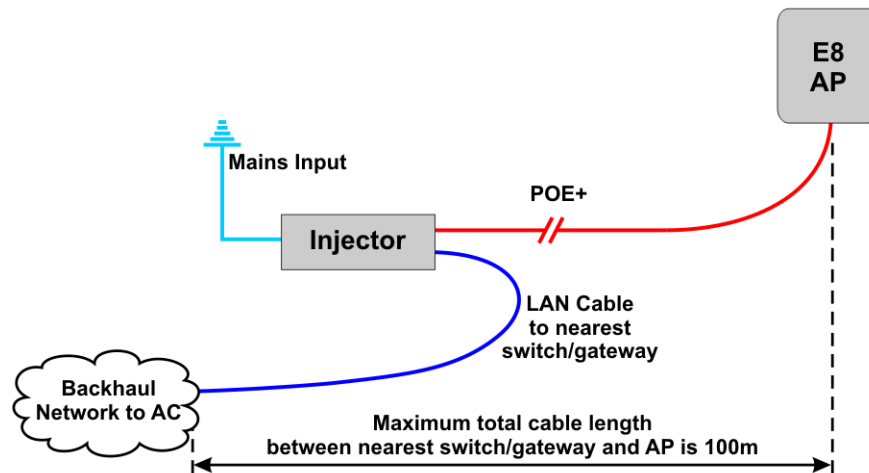
Configure the AP so that it will connect to its serving AP Management System. If this has not been done already, do this now, before installing the AP in its final location. For instructions, see section 5.

6.4.5 Cable Connections

Two power supply modules are available from ip.access, designed for use with the ip.access nano3G E8 AP and are compliant with the IEEE 802.3at standard:

- The POE+ injector, as supplied, is commonly used for single site installations
- Direct power from the mains via an optional power adapter

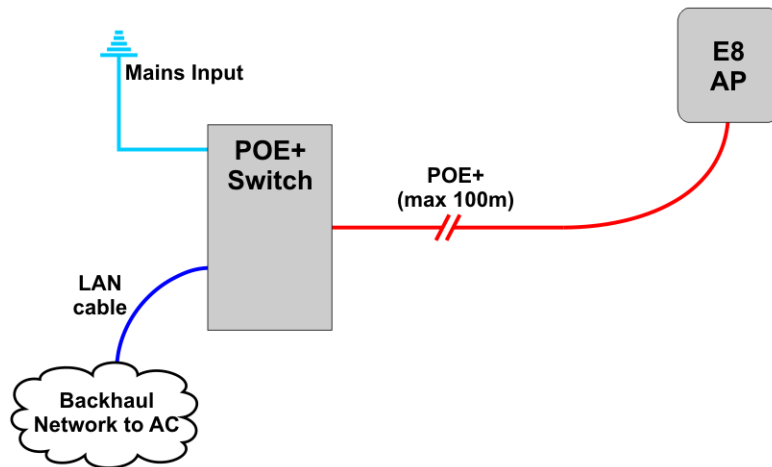
POE+ Injector



The AP can be up to 100m from the switch/gateway to the backhaul, but allow approximately 0.1m for routing through the injector. The injector can be positioned anywhere on this cable run. Hence the injector can be at the most convenient point for providing power, without restricting the location of the AP.

The injector takes a direct mains input using the supplied mains cable. Use a CAT5 Ethernet cable that is capable of carrying POE from the injector to the AP.

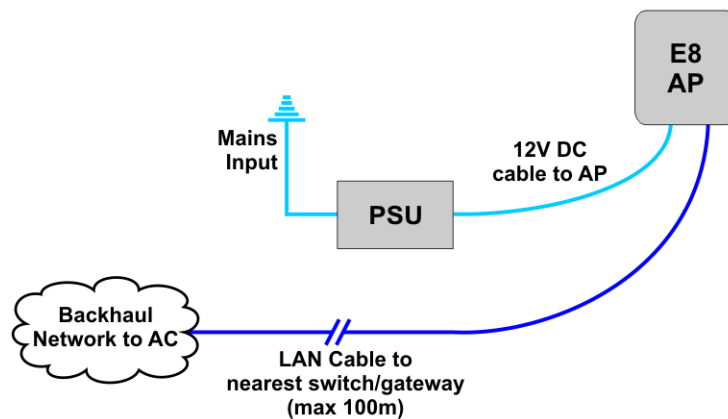
POE+ Switch



In this case, the POE+ switch is a third-party item. The cable run from the switch to the AP can be a full 100m.

A POE+ switch will typically only be used if there are multiple APs on site and/or there is other equipment that can take advantage of POE+.

PSU and LAN



When a suitable PSU is used to power the AP (see section 2.5.1) the POE+ injector unit is not needed. However, this means that a mains socket providing power to the AP must be within reach of the cabling included with the PSU. This is typically less than 2m. The PSU for the E8 AP is an optional extra.

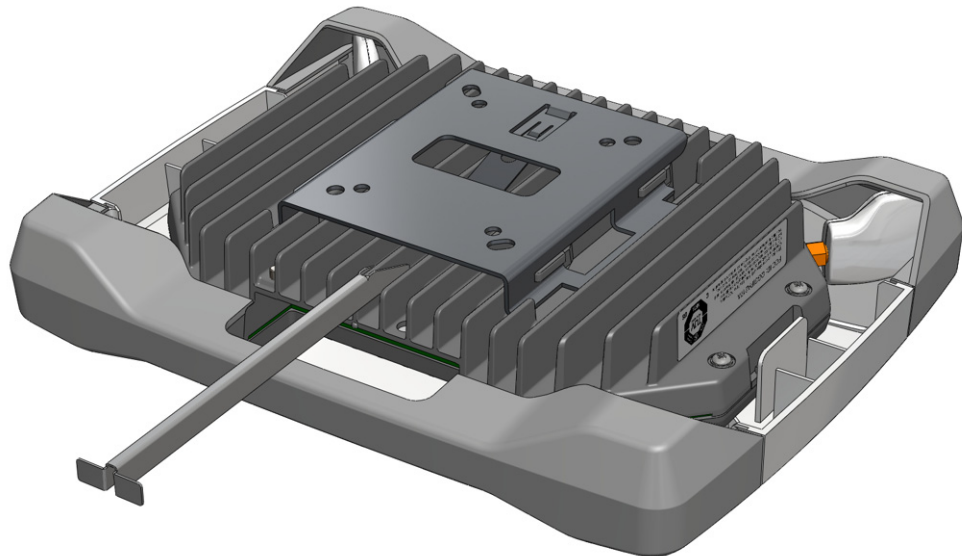
6.4.6 Mount the nano3G E8 AP on a Wall

Note: The nano3G E8 AP should be installed in a position so that it is at least 2m away from the area where handsets are normally used.

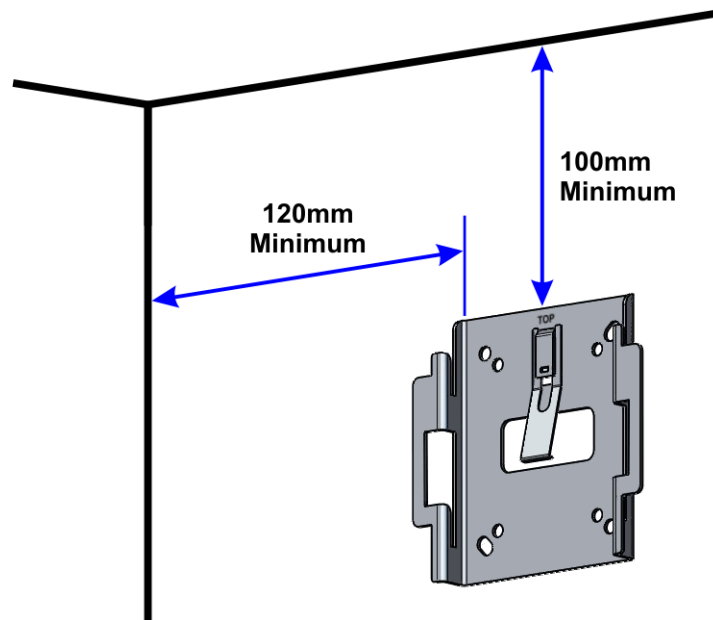
The nano3G E8 AP must be mounted vertically to ensure air circulation around the unit.

The location of each nano3G E8 AP is shown on the installation floor plan produced at the network planning stage. For example, it must take into account that all APs must be at least 2m from any mobile equipment. The network wiring must be complete before the nano3G E8 AP can be installed and commissioned. The nano3G E8 AP should be placed on a wall at or above head height.

- 1) Remove the nano3G E8 AP from the wall bracket. Lay the AP on a flat surface with the wall bracket upwards. Slide the removal tool over the central fin between the bracket and the body of the unit to disengage the locking spring, then slide the bracket to separate it from the AP. The removal tool may be inserted from the top or bottom of the nano3G E8 AP.

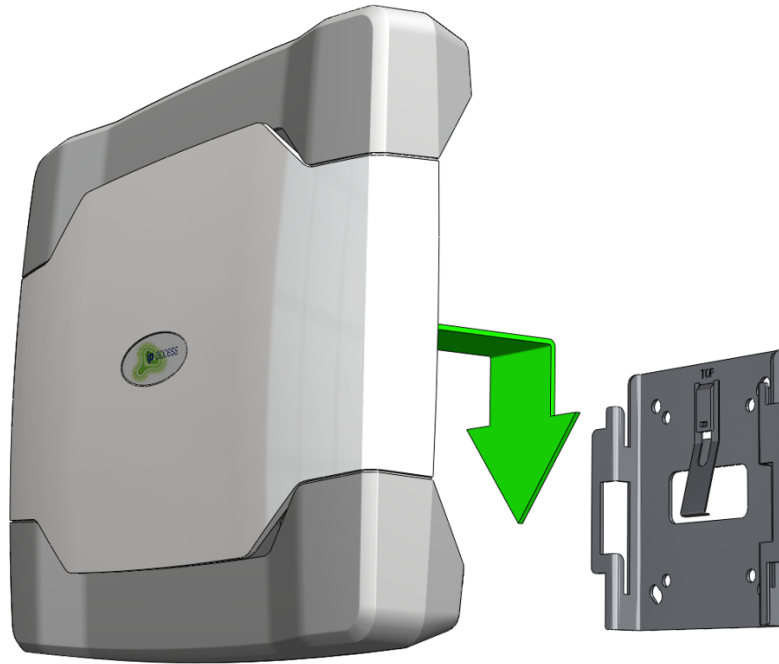


- 2) Position the bracket on the wall with its flat surface against the wall and the clip part towards the top. Ensure the bracket is level and sufficient clearance is maintained to allow the AP to be fitted to the bracket. Allow at least 100mm from the bracket to the top of wall, and 120mm from the side of the bracket to a side wall.

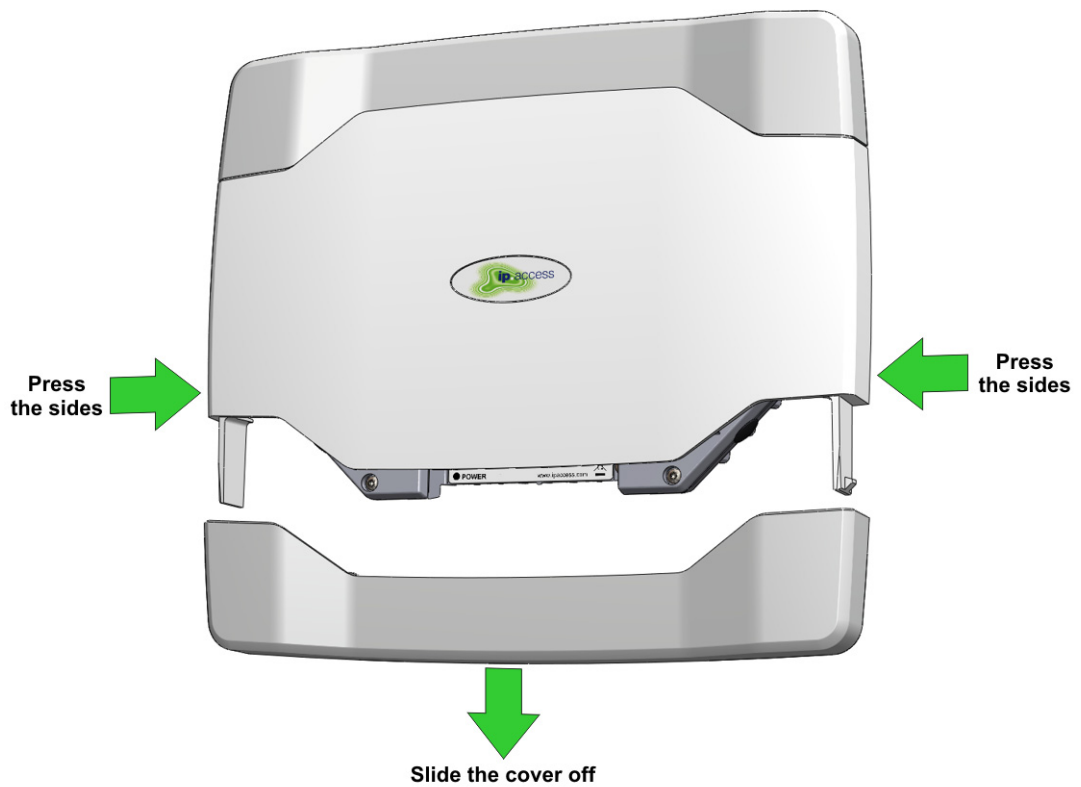


- 3) Mark the position of the four screw holes.
- 4) Drill the four holes in the positions marked previously and insert wall plugs (if required) and fix the mounting bracket securely to the wall. The bracket is designed to allow the nano3G E8 AP unit to be mounted with the connections either at the top or at the bottom of the unit.

- 5) Slide the nano3G E8 AP onto the bracket and ensure that the retaining spring engages into the indent at the rear of the unit.



- 6) Remove the lower cover to reveal the cable ports and LEDs.

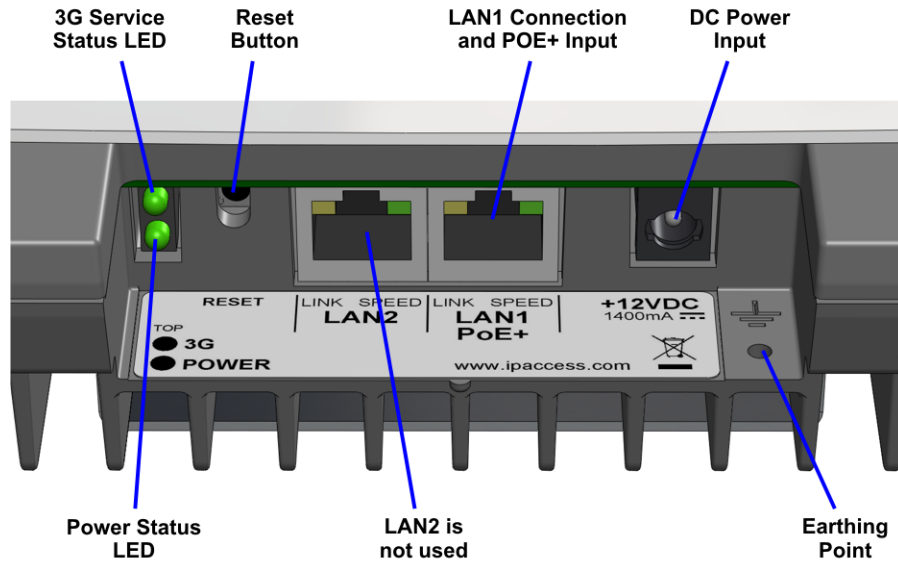


7) Plug in the required cables. Either:

- Plug an Ethernet cable from the POE+ injector or POE+ switch into LAN1

or

- Plug an Ethernet cable from a switch/gateway (no POE+) into LAN1 and an optional power supply into the +12V DC input



Note: Do not connect an Ethernet cable to LAN2. This will have no effect.

8) To refit the lower cover, slide it onto the tabs on the main cover until it snaps into place.

7 Finalize Installation

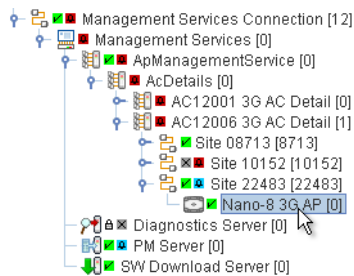
All the activities in this section are managed from the OMC-R Client.

7.1 Check and Upgrade the nano3G AP Software Image

This is a useful check to ensure that the AP has the required software version, even if the AP software was recently updated during commissioning.

7.1.1 Check the Current Software Image Version

- 1) Login to the OMC-R Client with a user name (and password) that has Full Access rights for changing the AP's configuration.
- 2) Find the AP according to its Site and select the AP object.



Note: For full information on using the OMC-R Client, see [OPM_410].

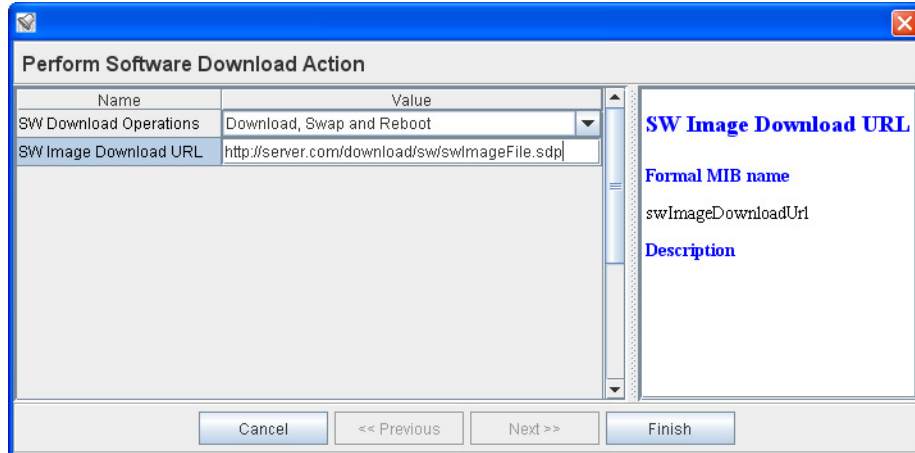
- 3) Verify that the **Site** has a green tick, to show that the AP is connected to the AP Management System. The AP object, below the Site, may be currently locked. The AP will remain locked if it is not ready to provide service.
- 4) In the Navigation pane, browse to the **AP Admin Package**.
- 5) Check the values of the **Active SW Version** and **Standby SW Version** attributes.
- 6) If the AP does not have the latest software image, download it to the AP from the AP Management System according to the instructions below.

7.1.2 Download the Latest Software Image from the AP Management System to the AP

For instructions about how the software images (SDP files) are uploaded to the AP Management System, see [OPM_440].

- 1) Select the AP in the OMC-R Client.

- 2) Right-click the AP, select **Actions** and then **Perform Software Download**. The Perform Software Download Actions dialog box will appear.



- 3) Change the **SW Download Operations** to Download, Swap and Reboot.
- 4) Click in the **SW Image Download URL** box and enter the URL of the required SDP file using the following URL pattern:

```
http://<server>/download/sw/<filename>.sdp
```

Where <server> is the IP address or host name of the required AP Management System, and <filename>.sdp is the required software download package file.
- 5) Press **<TAB>** or **<Enter>** to set the URL.
- 6) Click **Finish** and the download will take place. On the AP, download progress is indicated by the flashing network LED. When the download is complete, the AP will reboot under the new software, which should take less than 1 minute.
- 7) Wait for the AP to be shown as connected to the OMC-R.
- 8) Select the **3G AP Admin Package** for the AP object and verify that the Filesys version reported by the **Active Software Version** matches the SDP file that was downloaded.

7.2 Finalize Configuration

- 1) Login to the OMC-R Client with a user name that has Full Access to the required AP.

7.2.1 Final Attribute Changes and Checks

- 2) Make any AP-specific configuration changes that have not already been applied by the Create Site Wizard or loading configuration files. In particular, ensure the static neighbour lists are correctly configured. See [OPM_300] for information on neighbour list configuration.
- 3) Spot check any or all of the following packages to verify the attributes are set to the correct values:
 - Cell Package
 - NAS Package
 - Location Package

7.2.2 Network Listen and Frequency Correction

- 4) To execute a Network Listen scan, right-click the AP object, select **Actions** and then select **Start Sequential NWL Scan**.
- 5) When the scan is complete, view the results and verify there is some radio activity detected, and ideally some neighbour cells. This will confirm the radio is working.
- 6) Only if a suitable macro neighbour has been detected, a correction can be applied to ensure that the oscillator frequency is correct. Select **Actions** and then select **Apply Frequency Correction**.

Note: Assuming there is a suitable macro neighbour, this should be repeated approximately 24 hours after the AP is brought into service. This will allow time for the oscillator crystal to stabilize, at which time the frequency correction should be re-applied.

7.2.3 Automatic Configuration Backup

The configuration of an AP is automatically backed up on the OMC-R server each time configuration changes are applied from the OMC-R Client. The configuration files are named according to the AP serial numbers. A file is overwritten automatically by subsequent configuration changes. The files are saved in:

```
/var/lib/ipaccess/data/auto-ap-backup
```

7.3 Bring the AP into Service

Once the AP has the latest software image and configuration is complete, it is ready for service.




- 1) To bring the AP into service, right-click the 3G AP object in the OMC-R Client and select **Unlock**. The padlock symbol next to the 3G AP icon will be removed.
- 2) If the installation engineer is still on site, the engineer should make CS and PS test calls to verify the AP is providing service.

8 Troubleshooting

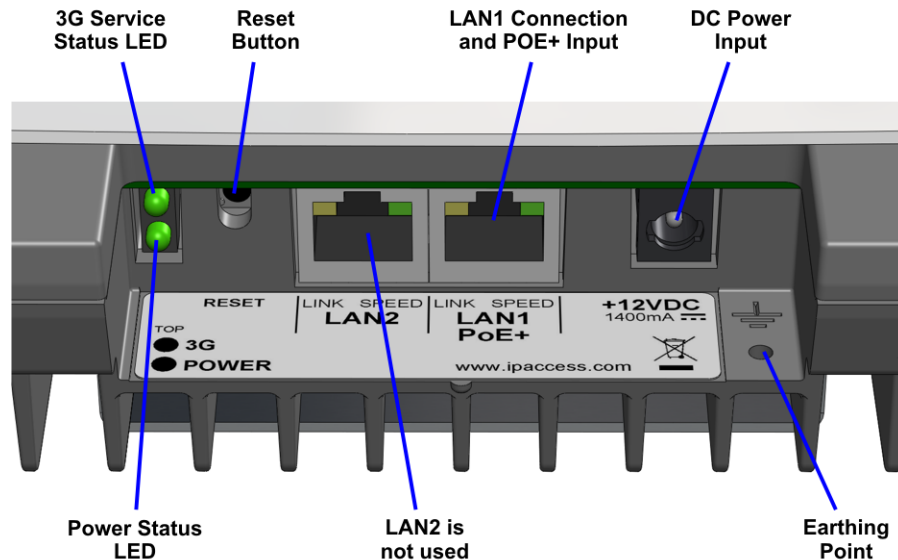
8.1 LED Status Indicators

8.1.1 nano3G S4 AP and nano3G S8 AP LEDs

The following table shows the meaning of the status LEDs under normal and fault conditions.

 Power	Off	The nano3G AP is not switched on.
	Green	The nano3G AP is powered up normally.
	Flashing green	Self-test is running.
	Red	There is a fault with the nano3G AP.
 Network	Off	Unable to detect a network. This is usually because there is no network cable connected, or there is no network connection at the other end of the cable (for example, the router or broadband modem may have failed).
	Green	The 100Mbps connection is OK.
	Flashing green	Indicates activity on the network at 100Mbps speed (that is, the nano3G AP is sending and/or receiving data across the LAN).
	Amber	The 10Mbps connection is OK.
	Flashing amber	Indicates activity on the network at 10Mbps speed (that is, the nano3G AP is sending and/or receiving data across the LAN).
 Service	Off	The nano3G AP is not provisioned, it has no IP address. This may be a temporary condition when the AP is switched on for the first time, or after factory reset.
	Green	The nano3G AP is provisioned and unlocked, it is connected to the AP and is providing service.
	Flashing green (evenly, slowly)	The nano3G AP is provisioned but has lost connection to the AC, for example because the AC is not available or there is a DNS problem.
	Flashing green (evenly, fast)	The nano3G AP has been reinitialized (the reset button was pressed but for less than 5 seconds).
	Off, with a short green blink every 3 seconds	The nano3G AP is administratively Locked.
	Off, with short green blinks on	Factory reset is in progress in the nano3G AP (the reset button was pressed for more than 5 seconds).
	On, with short green blinks off	Software download is in progress to the nano3G AP.

8.1.2 nano3G E8 AP LEDs



The following table shows the meaning of the status indicators under normal and fault conditions.

3G	Off	The nano3G E8 AP is not provisioned, it has no IP address. This may be a temporary condition when the AP is switched on for the first time, or after factory reset.
	Green	The nano3G E8 AP is provisioned and unlocked, it is connected to the AC and is providing service.
	Flashing green (evenly, slowly)	The nano3G E8 AP is provisioned but has lost connection to the AC, for example because the AC is not available or there is a DNS problem. The nano3G E8 AP is locked.
	Flashing green (evenly, fast)	The nano3G E8 AP has been reinitialized (the reset button was pressed but for less than 5 seconds).
	Off, with short green blinks on	Factory reset is in progress in the nano3G E8 AP (the reset button was pressed for more than 5 seconds).
	On, with short green blinks off	Software download is in progress to the nano3G E8 AP.
Power	Off	The nano3G E8 AP is not switched on.
	Green	The nano3G E8 AP is powered up normally.
	Flashing green	Self-test is running.
	Red	There is a fault with the nano3G E8 AP.
Ethernet Link	Amber	This is on to show the link is active, or flashes when there is network activity.
Ethernet Speed	Green	Shows the network speed. On for 100Mbps or off for 10Mbps.

8.2 Backhaul Network Connection Problems

If static IP addressing is disabled and DHCP is in use, the nano3G AP expects to be automatically provided with an IP address by the broadband router every time it starts. Ensure that the DHCP service is enabled on the broadband router.

8.3 nano3G E8 AP Does Not Start Up

Check the following:

- Check the power-over-Ethernet inserter: it must be a POE+ unit.
- Verify the Ethernet cable from the POE+ inserter is plugged into the correct socket (LAN1).
- If using a DC power supply instead of POE+, verify the power supply is a 12V supply with the correct polarity.

8.4 Factory Reset

A factory reset will delete all configuration settings that have been applied to an AP. This includes the initial configuration applied to commission the AP so that it will connect to its serving AP Management System, and all configuration changes downloaded from the AP Management System. Therefore, executing a factory reset will mean that the AP will not be able to provide service until it is recommissioned from a commissioning terminal and subsequently re-obtains its configuration from the AP Management System.



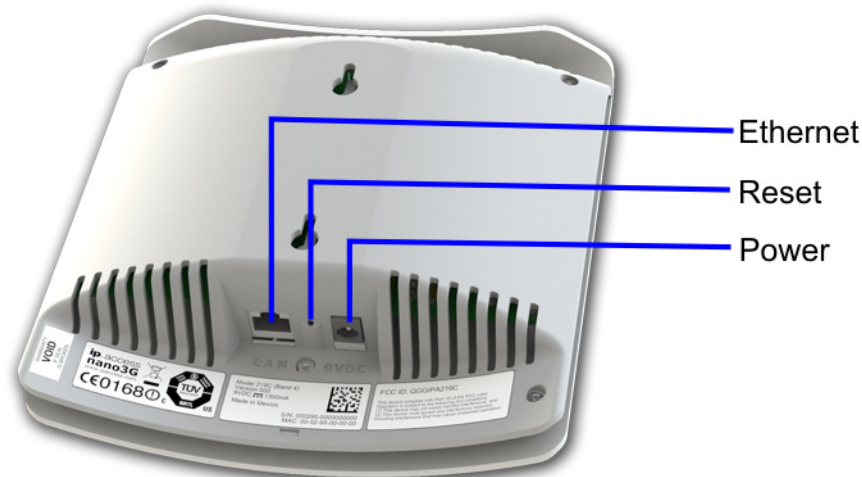
WARNING

Only use the reset button to return the AP to factory reset state as a last resort, such as when the AP does not connect to the AP Management System. After a factory reset, the AP will need to be commissioned again, as in section 5.3.

Note: If the reset button is pressed for less than 5 seconds, the AP will reboot. It will not return to the factory reset state.

8.4.1 nano3G S4 AP and nano3G S8 AP Factory Reset

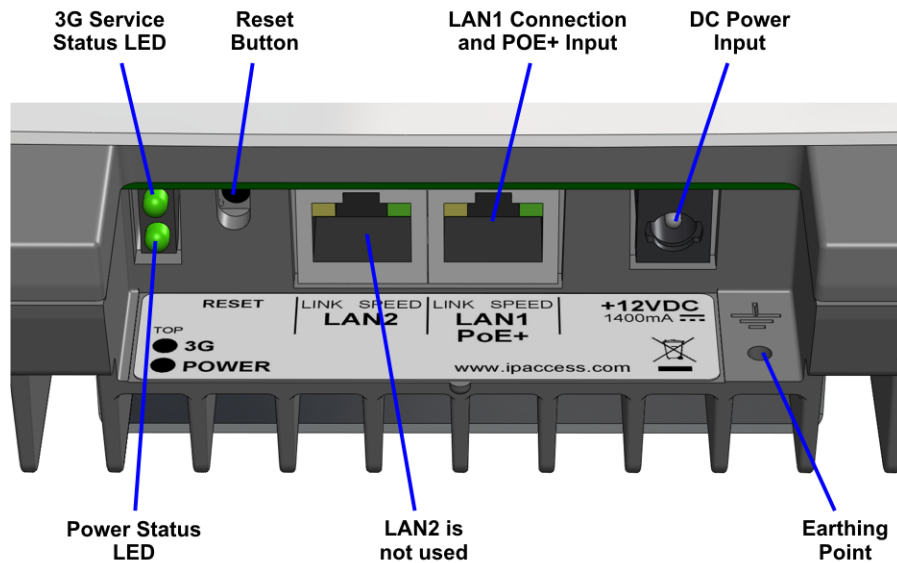
To perform a factory reset, use a thin rod to press and hold the reset button for more than 5 seconds.



The Service LED will blink fast (50ms on, 50ms off) until the factory reset commences, then it will start to blink slowly (200ms on, 200ms off). When the factory restore process has completed, the LED will extinguish and the AP will automatically reboot, take the fixed IP address and enable the web interface for commissioning. See section 5 for the commissioning procedure.

8.4.2 nano3G E8 AP Factory Reset

To perform a factory reset, press and hold the reset button for more than 5 seconds.














The 3G LED will blink fast (50ms on, 50ms off) for 5 seconds, then it will start to blink slowly (200ms on, 200ms off). When the factory restore process has completed, the LED will extinguish and the AP will automatically reboot, take the fixed IP address and enable the web interface for commissioning. See section 5 for the commissioning procedure.




This chapter provides the customer with safety and regulatory warnings, cautions and information for the ip.access Ltd range of products.

9.1 Warnings and Cautions






Electrical Safety

	<p>CAUTION</p> <p>The nano3G AP is intended for dry indoor applications only. If evidence of condensation is present do not apply power to the nano3G AP.</p>
	<p>CAUTION</p> <p>The nano3G AP is designed to be operated as a fixed system device and must be located away from the user. It must be mounted in a manner to ensure that all users and bystanders are kept a minimum of 20cm away from the integral antennas at all times.</p>
	<p>WARNING</p> <p>Do not immerse any part of the nano3G AP or its power supply in water or any other liquid. Do not install or use the nano3G AP or its power supply near open water. Do not spill liquids of any type on the nano3G AP or its power supply.</p>
	<p>WARNING</p> <p>Do not use liquid, solvent or aerosol cleaning agents on or near the nano3G AP or its power supply.</p>
	<p>CAUTION</p> <p>To avoid the risk of fire and/or electrical shock, do not push objects through openings into the nano3G AP or its power supply (except when operating the Reset switch on the nano3G AP).</p>
	<p>CAUTION</p> <p>Do not disassemble the nano3G AP or its power supply.</p>
	<p>CAUTION</p> <p>The nano3G AP must only be powered using the ip.access power supply provided for use with the nano3G AP.</p>
	<p>CAUTION</p> <p>Before using the power supply, verify that the mains voltage is within the range specified by the voltage printed on the power supply.</p>
	<p>CAUTION</p> <p>The PSU supplied with the nano3G AP must not be used for powering any other equipment.</p>
	<p>CAUTION</p> <p>To avoid the risk of fire and/or electrical shock, do not overload power outlets or extension cables.</p>
	<p>CAUTION</p> <p>When disconnecting the power supply from the mains, pull the plug. Pulling the cable may result in damage to the cable.</p>

Interference with Electronic Devices

	CAUTION If using a pacemaker, ensure you are using the device in accordance with its safety requirements with respect to RF devices. Consult your doctor if you have questions about RF signals and your pacemaker.
	CAUTION If using a hearing aid, RF devices may cause interference.
	CAUTION Unshielded electronic devices should not be used near the nano3G AP. Conversely, the nano3G AP should not be installed adjacent to unshielded electrical or electronic devices (such as unshielded speakers).

Other Warnings and Cautions

	WARNING Do not install the nano3G AP in a position where the power supply cable or network cable may cause a tripping or choking hazard.
	WARNING Do not install the nano3G AP or the power supply on an unstable surface. All caution must be observed to prevent the device from falling and causing injury to a person and/or damage to the device.
	WARNING The nano3G AP should not be disposed of in household waste bins. Please follow local regulations for disposal of electronic devices.
	CAUTION Do not install the nano3G AP in a position where the power supply cable or network cable may be damaged by walking on the cables.
	CAUTION Do not attempt to fit an external antenna or antenna cabling to the nano3G S4 AP.

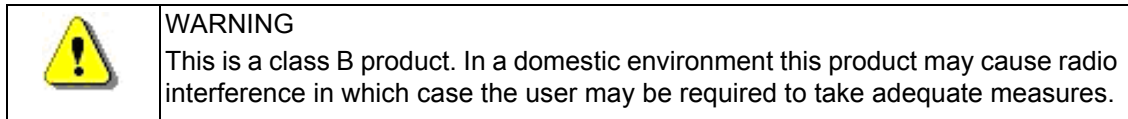
9.2 Regulatory Statements for nano3G S4 AP

9.2.1 US FCC Compliance

- FCC CFR47 Parts 15B, 27

Note: Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate this equipment.

Model nano3G 219C has FCC ID QGGIPA219C



Note: This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

9.2.2 Safety Standards

- IEC 60950-1:2005 (2nd Edition) and EN 60950-1:2006

The power adapter, as well as the POE inserter and splitter supplied by ip.access comply with LPS requirements in accordance with IEC/EN 60950-1.

9.3 Regulatory Statements for nano3G S8 AP

9.3.1 US FCC Compliance

- FCC CFR47 Part 15B: Variants 237B, BA, C, CA
- FCC CFR47 Parts 22, 24: Variants 237B, BA
- FCC CFR47 Part 27: Variants 237C, CA

Note: Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate this equipment.

The FCC IDs for nano3G S8 AP model variants are:

Model	FCC ID
nano3G 237B	QGGIPA237B
nano3G 237BA	QGGIPA237BA
nano3G 237C	QGGIPA237C
nano3G 237CA	QGGIPA237CA



WARNING

This is a class B product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Note: This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

9.3.2 EU Regulatory Compliance

Models nano3G 237A and 237AA conform to the following regulatory standards:

Health (Art 3.1(a)):	EN50385: 2002
Safety (Art 3.1(a)):	EN60950-1: 2006
EMC (Art 3.1(b)):	EN 301 489-23 V1.3.1, EN 302 489-1 V1.8.1
Spectrum (Art 3.2):	EN 301 908-1 V4.2.1, EN 301 908-3 V3.2.1

This product is intended for use in all Member States of the European Union.

"Hereby, ip.access Ltd, declares that this nano3G S4 AP is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC."

A copy of regulatory compliance documentation may be obtained in writing from "IP Access Ltd, Building 2020, Cambourne Business Park, Cambourne, Cambridge, CB23 6DW, UK".

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9.3.3 Safety Standards

- IEC 60950-1:2005 (2nd Edition), EN 60950-1:2006 and UL60950-1:2007

The power adapter, as well as the POE inserter and splitter supplied by ip.access comply with LPS requirements in accordance with IEC/EN 60950-1.

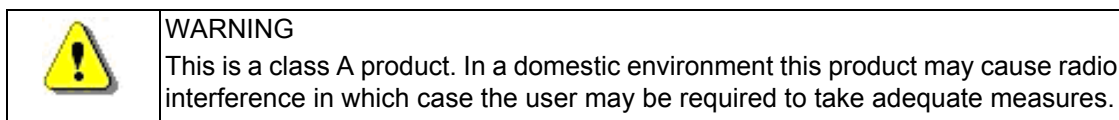
9.4 Regulatory Statements for nano3G E8 AP

9.4.1 US FCC Compliance

- FCC CFR47 Parts 15B, 27

Note: Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate this equipment.

Model nano3G 217C has FCC ID QGGIPA217C



Note: This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

9.4.2 EU Regulatory Compliance

Model nano3G 217A conforms to the following regulatory standards:

Health (Art 3.1(a)):	EN50385: 2002
Safety (Art 3.1(a)):	EN60950-1: 2006
EMC (Art 3.1(b)):	EN 301 489-23 V1.3.1, EN 302 489-1 V1.8.1
Spectrum (Art 3.2):	EN 301 908-1 V4.2.1, EN 301 908-3 V3.2.1

This product is intended for use in all Member States of the European Union.
--

"Hereby, ip.access Ltd, declares that this nano3G S4 AP is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC."

A copy of regulatory compliance documentation may be obtained in writing from "IP Access Ltd, Building 2020, Cambourne Business Park, Cambourne, Cambridge, CB23 6DW, UK".

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9.4.3 Safety Standards

- IEC 60950-1:2005 (2nd Edition) and EN 60950-1:2006

The POE+ inserter supplied by ip.access complies with LPS requirements in accordance with IEC/EN 60950-1.

9.4.4 Environmental Standards

- ETSI 300 019-2-3
- ETSI 300 019-2-2