Ubiquiti LiteBeam AC (LBE-5AC-Gen2)

The LiteBeamAC is a very good, cheap directional wireless antenna. We use it for rooftop installs to connect to a sector antenna at another hub or supernode. **Scroll down for configuration instructions**.

> The AC in the name is not 802.11ac, it is Ubiquiti's own protocol. These devices can only connect to other Ubiquiti "AC" devices like Sectors or Prism Stations.

Ubiquity LiteBeam 5AC Gen2

Device specs are available at store.ubnt.com.

As LiteBeams are a directional antenna, alignment is very important to get a good signal. The web interface or UISP app has an alignment tool to help you align the antenna.
Above -65db is usable, though above -60db is preferred for 50mbps+ speeds. The highest signal strength possible is in the -40s, when you are right next to a sector antenna.

The Gen2's management radio is very useful when troubleshooting in the field as it allows you to connect to the litebeam even without knowing its IP address on the network. The management radio turns off after not being used for a while, power cycle the LiteBeam to turn it back on.

The default IP when connecting over ethernet is https://192.168.1.20/, though by default the Litebeam will take a DHCP address from any router that it's connected to.
If you connect to the management radio the IP is https://192.168.172.1 and doesn't change. Your device must have an IP in the x.x.172.x range, turn DHCP on and it should get one automatically.

Default login:

- Name:ubnt
- Pwd:ubnt

> After applying our configuration file, the password will be changed from the default one. Please reach out in #DIY-install-support on slack if you need them.

LiteBeam Gen1 vs LiteBeam Gen2:

There are two versions of the LiteBeam - gen1 and gen2. Gen 1 is the older version and not sold anymore.

The Gen 1 model by default uses a different set of channels which causes much confusion. The gen1 cannot use DFS channels unless you unlock it with a code on the System tab. Once you unlock a gen1 it has the same channels as the gen2. We have the unlock code for "NYCMesh". Ask us if you need to connect a gen1 to one of our hubs or supernodes.

Gen2 comes with a more sturdy mount (though with less adjustment range) and also a management 2.4Ghz radio. The new mount has separate up/down and side/side adjustments vs the ball mount of the gen1.

The management radio is very useful when troubleshooting in the field as it allows you to connect to the litebeam even without knowing it's IP address on the network. The management radio turns off after not being used for a while, power cycle the LiteBeam to turn it back on.
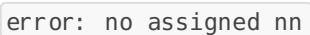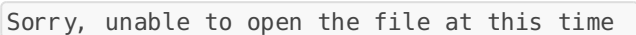
Configuration Instructions:

Client for supernodes and hubs with sectors:

First, download the `WA` firmware in case your LiteBeam is running an outdated version. Please see the Ubiquiti Firmware page for the currently recommended version.

Second, download the config file for either a standard LiteBeam or LiteBeam LR from

configgen.nycmesh.net

You will need your network number which you can get from the tool at nycmesh.net/nn by entering your install number. (you should have received this your email after completing the join form).

If `error: no assigned nn` is displayed, please reach out to us on Slack in the #diy-install-support or via email to be assigned one.

If your get the error `Sorry, unable to open the file at this time`, open the page in Incognito Mode or Private Browsing or try a different browser. (This error occurs if you are logged into multiple google accounts at the same time.)

Once you have the firmware and configuration file, follow these steps:

1. Plug in the LiteBeam to PoE power and connect via the management WiFi network. The SSID should be something like "LBE-5AC-Gen2:...." or "NBE..." (The WiFi will remain active for 15 minutes after startup, power cycle the antenna to re-enable it)
2. Go to https://192.168.172.1 in your browser. You may be met with a "insecure connection" warning due to a self-signed security certificate, which you can bypass.

3. At the "Please Set Up Your Device" prompt, select `United States` under Country and `English` under language. Check the Terms of Use checkbox and click `Upload Backup Configuration`. Select the `.cfg` file you downloaded from Configgen.
4. You will see a prompt on the top-right corner of the screen saying `Configuration backup file uploaded.` Select `Apply` and wait a minute for the page to reload. Sometimes you will have to refresh the page to get back into the interface.
   - **The username/password will be changed and you will need ones to log back in**. Please mention your network number and that you're looking for the credentials on Slack in `#diy-install-support`, and they will be sent to you. **Please do not share them publicly!**

To connect to a supernode or hub:

1. Go to Settings > Wireless and click the SSID "SELECT..." button. This will do a scan of the available networks.
2. Find the NYC Mesh signal from the hub you want to connect to:
   1. Type "nycmesh" in the search box. This should narrow the results to only NYC Mesh signals.
   2. NYC Mesh hubs broadcast a signal formatted as "nycmesh-<NodeNumber>-<CompassDirection>"
      - For example, "nycmesh-713-northeast" is the signal from the northeast sector antenna at SuperNode 3 (Node Number 713)
      - Some nodes have multiple sectors for each direction, so you may see "nycmesh-5916-east1" "nycmesh-5916-east2" etc. Choose the one with the best signal unless told otherwise.
3. Click the "connect" button next to the strongest AirMac AC signal.
   - Signal strength is measured in -dbm.
   - Better signal means a -dbm that's closer to zero. (So -55dbm is better than -60dbm)

Point to Point (PtP) Link Configuration:

Coming Soon!

Troubleshooting:

If you are unable to log into the LiteBeam, reset it to factory defaults. Press and hold the Reset button for more than 10 seconds while the LiteBeam is already powered on. You will need to follow the configuration steps to re-apply the configuration.

What the config file does: The config file sets DHCP for the IP address, WPA password: nycmeshnet, adds the building number to the device name, adds the UNMS key for monitoring and sets the SNMP location and contact to "nycmesh".

How to save a LiteBeam via SSH:

These instructions were adapted from a [Ubiquiti Community post](#).

Sometimes due to a bad configuration change or issue with the connected sector, the LiteBeam signal will be too low to log into the web interface. This can be a big issue especially if the users at the node are unable to locally revert the change. Luckily, SSH can be used to reconfigure the LiteBeam to change any settings to restore proper connectivity to the node, even over a poor connection.

1. Connect and log into the LiteBeam

Using your favorite SSH software, log into the LiteBeam using the configured credentials, which will be the same as those used for the web interface. You will then be presented with a standard Linux shell.

2. Prepare for the change

Since this shell does not have any nice text editors like `nano`, we will use the `sed` command to replace text in the config file. In this example, we will be changing the SSID `nycmesh-sn1-ev` to `nycmesh-sn1-northeast` and saving the changes. Make sure that the LiteBeam will be able to connect to the new radio! (We will cover this part in the following section.)

This command confirms that the current SSID is what we expect (current SSID goes after the `grep`):

```
# cat /tmp/system.cfg | grep nycmesh-sn1-ev
wireless.1.ssid=nycmesh-sn1-ev
```

If the command does not return anything, that means that the current SSID does not match what you provided after `grep`. Run this line removing everything after the pipe `|` to review the config file before proceeding.

3. Edit and save the file

Now we will edit the file by finding and replacing the old SSID with this command (old and new SSIDs go before and after the middle slash `/` respectively):

```
sed -i 's/nycmesh-sn1-ev/nycmesh-sn1-northeast/' /tmp/system.cfg
```

Confirm that you made the change by running this command (new SSID goes after the `grep`):

```
# cat /tmp/system.cfg | grep nycmesh-sn1-northeast
wireless.1.ssid=nycmesh-sn1-northeast
```

Finally, run these two commands to commit the change and reboot the device:

```
save
reboot
```

Wait 2-3 minutes for the device to reboot and re-scan for the new radio and you should be good to go.

How to scan for radios:

If you are positive that the LiteBeam can connect to another radio's SSID, you do not need to perform a scan (known in the web interface as a Site Survey). However, it is a good idea to confirm that the signal of the other radio is strong enough to connect to before potentially losing the device.

To perform the scan, follow Step 1 from the previous section to connect to the LiteBeam. Then, run the following command to start the scan:

```
# iwlist ath0 scan
ath0      Scan in progress :
          Cell 01 - Address:  04:18:D6:4C:BB:07
                    ESSID:"ubnt-3P7-N"
                    Mode:Master
                    Frequency:5.165 GHz (Channel 33)
                    Quality=26/94  Signal level=-70 dBm  Noise level=-90 dBm
                    Encryption key:off
                    Bit Rates:6 Mb/s; 9 Mb/s; 12 Mb/s; 18 Mb/s; 24 Mb/s
                              36 Mb/s; 48 Mb/s; 54 Mb/s
                    Extra:bcn_int=100
                    Extra: wme_ie=dd180050f2020101810003a4000027a4000042435e0062322f00
                    Extra: ath_ie=dd0900037f01010000ff7f
                    Extra: ieee_mode=802.11n
                    Extra: center1=5165 Mhz
                    Extra: chanbw=20 Mhz
          Cell 02 - Address:  E0:63:DA:D4:41:6B
                    ESSID:"nycmesh-sn1-northeast"
                    Mode:Master
                    Frequency:5.205 GHz (Channel 41)
```

```
                        Quality=41/94  Signal level=-55 dBm  Noise level=-90 dBm

                        Encryption key: on

                        Bit Rates: 6 Mb/s;  9 Mb/s;  12 Mb/s;  18 Mb/s;  24 Mb/s

                                    36 Mb/s;  48 Mb/s;  54 Mb/s

                        Extra: bcn_int=100

                        Extra: hostname="nycmesh-sn1-northeast"

                        IE: IEEE 802.11i/WPA2 Version 1

                            Group Cipher : CCMP

                            Pairwise Ciphers (1) : CCMP

                            Authentication Suites (1) : PSK

                        Extra: wme_ie=dd180050f2020101000003a4000027a4000042435e0062322f00

                        Extra: ath_ie=dd0900037f01010000ff7f

                        Extra: airmax_ie=enabled

                        Extra: airmax_mode=ptmp

                        Extra: ieee_mode=802.11ac

                        Extra: center1=5215 Mhz

                        Extra: chanbw=40 Mhz


 ...
```

This scan takes about a minute to complete. You may notice the terminal freeze during this time; the LiteBeam switches to another wireless mode while scanning which can sometimes disrupt the connection. As you can see in this example, our target radio with SSID `nycmesh-sn1-northeast` has a signal level of -55dB which should be more than adequate for us to connect.