



USER GUIDE

cnArcher

System Release 1.0



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Contents

- Contents 3
- About This User Guide 5**
 - Purpose 5
 - Cross-references 5
 - Feedback 5
- Chapter 1: Introduction 6**
 - Preparing to use cnArcher in your network 6
- Chapter 2: Installing cnArcher 7**
- Chapter 3: Initial Setup 8**
 - cnMaestro setup 8
 - cnMaestro configuration 8
 - Device selection 9
 - Radio configuration for PMP and ePMP 10
 - Download the software image 10
 - Configuring Wi-Fi 11
 - In Android phone 11
 - In iOS 12
- Chapter 4: Software Upgrade 14**
 - Home screen 14
 - Software download 14
 - SM connection and upgrade 16
- Chapter 5: cnArcher SM Installation Sequence 17**
 - PMP/ePMP SM installation sequence 17
 - Home screen 17
 - SM configuration 18
 - AP evaluation 19
 - Alignment 21
 - Link Test 22

cnMaestro onboarding	23
Finish Installation	24
cnRanger SM installation sequence	25
Home screen	25
SM configuration	25
AP evaluation	26
Alignment	27
Finish Installation	28
Chapter 6: Quick Align	29
Chapter 7: Apply Staging Configuration to SM	30
Chapter 8: Onboarding	31
Chapter 9: Spectrum Analysis	32
Chapter 10: Work Orders	33
Create work orders	33
Work order modes	34
Chapter 11: cnArcher Demo Mode	36
Chapter 12: Settings	38
cnMaestro settings	38
PMP/ePMP settings	39
App settings	39
Advanced settings	39
Chapter 13: Troubleshooting	40
Chapter 14: Report a Bug	41
Cambium Networks	42

About This User Guide

This document explains how to deploy the cnArcher along with important safety measures. It is intended for use by the system designer, system installer, and system administrator.

Purpose

Cambium Networks cnArcher documents are intended to instruct and assist personnel in the operation, installation, and maintenance of the equipment and ancillary devices. It is recommended that all personnel engaged in such activities be properly trained.

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Cross-references

References to external publications are shown in italics. Other cross-references, emphasized in blue text in electronic versions, are active links to the references.

This document is divided into numbered chapters that are divided into sections. Sections are not numbered but are individually named at the top of each page, and are listed in the table of contents.

Feedback

We appreciate feedback from the users of our documents. This includes feedback on the structure, content, accuracy, or completeness of our documents. To provide feedback, visit our support website: <https://support.cambiumnetworks.com>.

Chapter 1: Introduction

cnArcher communicates with the SM LAN port through a wireless connection from the a mobile device to a wireless router.



Figure 1: cnArcher to SM communication

For the best installation ergonomics in the field, Cambium Networks recommends to use portable Wi-Fi AP with PoE such as the **LinkTechs PowerLINK**. The LinkTechs PowerLINK PoE is a compatible patch cable required for the device to communicate with the SM. Use 48V power converter for 450i SM installations.

Installers can also use a separate Wi-Fi AP (in **Bridge** mode) and power supply to communicate SM with cnArcher.

By default, cnArcher is designed for IP communication with default factory SMs containing the 169.254.1.1 IP address. Operators can also specify a custom IP address.

Preparing to use cnArcher in your network

To use cnArcher in your network, perform the following steps:

1. Acquire radio, network, and security settings.

Work with your network administrator to determine which radio, network, and security settings are used across networks and how sectors/towers are configured. These configurations and security credentials are essential to ensure that SMs configured by cnArcher, and ready to connect with APs in your network. Non-default SNMP community strings (for cnArcher read/write access to the device) can be configured in cnArcher UI (**Settings > Community string**).

2. Assemble cnMaestro credentials and configurations.

cnArcher is designed to automatically onboard new SMs to cnMaestro. Onboarding SM devices require the network **CAMBIUM_ID** and **Onboarding Key** are configured in cnArcher. If an On-Premises cnMaestro is a resident in the network, cnArcher supports both Cloud and On-Premises cnMaestro deployments.

3. Prepare the wireless router.

To support communication between cnArcher and the SM LAN port, the wireless router must be configured in the **Bridge** mode. In this mode, packets are forwarded between cnArcher and SM with no additional routing.

Chapter 2: Installing cnArcher

To download and install cnArcher, click the following links:

- For iOS - <https://apps.apple.com/us/app/cnarcher/id1401836635>
- For Android - <https://play.google.com/store/apps/details?id=com.cambiumnetworks.cnMaestro.installer>

Chapter 3: Initial Setup

cnMaestro setup

If cnArcher is used for first time, then the user must configure cnMaestro (if applicable), radio scanning parameters, and downloaded SM software package. After initial setup is complete, the configuration can be updated at any time by navigating to the **Settings** menu.

cnMaestro configuration

To configure cnMaestro, perform the following steps:

1. Select your cnMaestro deployment type or select **No** as shown in "cnMaestro configuration" below.

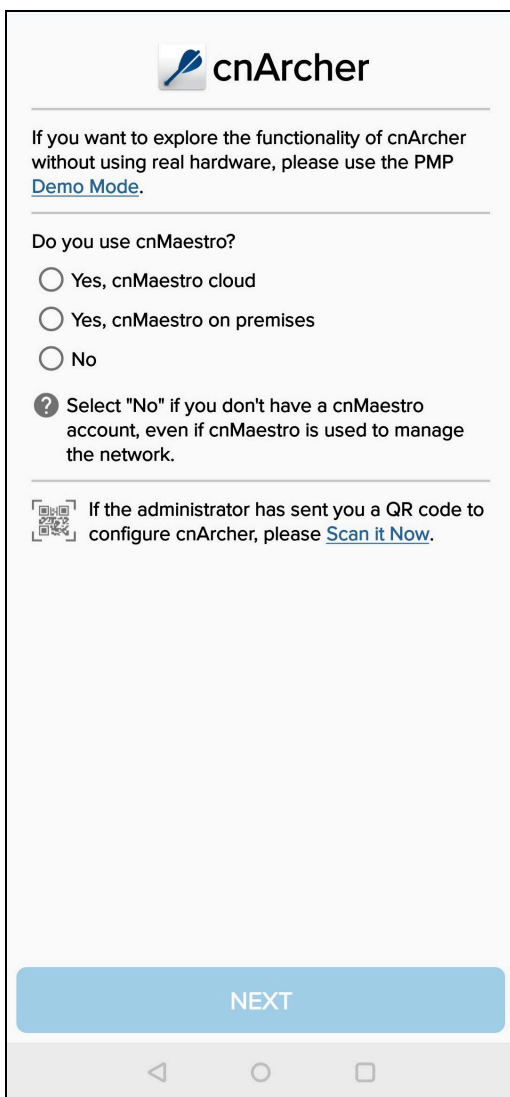


Figure 2: cnMaestro configuration

- **cnMaestro cloud configuration** - An internet connectivity for the mobile device is required.
 - i. Enter and validate **cnMaestro User credentials**.
 - ii. Configure **CAMBIUM_ID** and **Onboarding Key**.

The user credentials must match with the user credentials created in cnMaestro, refer to Users section in *cnMaestro User Guide*.

The Onboarding Key should be pre-configured in cnMaestro, and this is based on the user credentials, refer to *Onboarding / Claim Device* section in *cnMaestro User Guide*.

- **cnMaestro On-Premises configuration** - Mobile device internet/network connectivity to On-Premises cnMaestro server is required.

Enter cnMaestro server URL, user credentials, and configure Onboarding Key and then validate.

2. Click **Next**.

Device selection

cnArcher supports the following devices:

- PMP
- ePMP
- cnRanger

Select the required device and click **Next**.

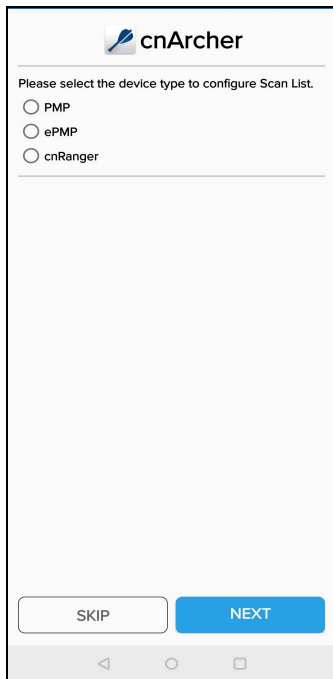


Figure 3: Device selection

Radio configuration for PMP and ePMP

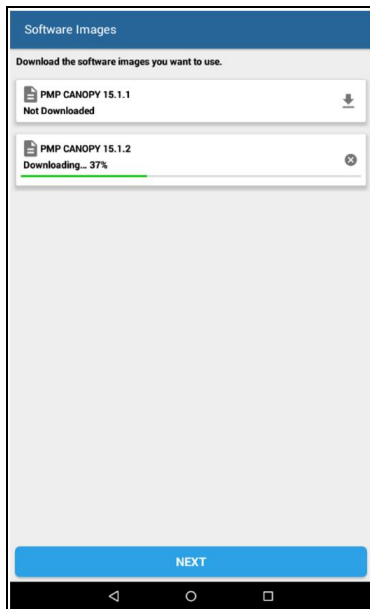
To configure the radio for PMP and ePMP devices, perform the following steps:

1. Select **Configure Scan List**.
2. Select channel frequencies and bandwidths applicable to overall network.



Download the software image

Download the software image to upgrade cnArcher SMs. Internet connectivity for the mobile device is required to download the software image.



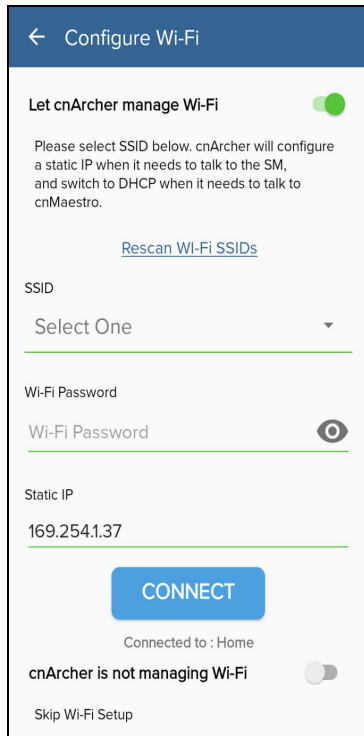
Configuring Wi-Fi

Configure cnArcher to manage the Wi-Fi connection or configure the connection manually.

In Android phone

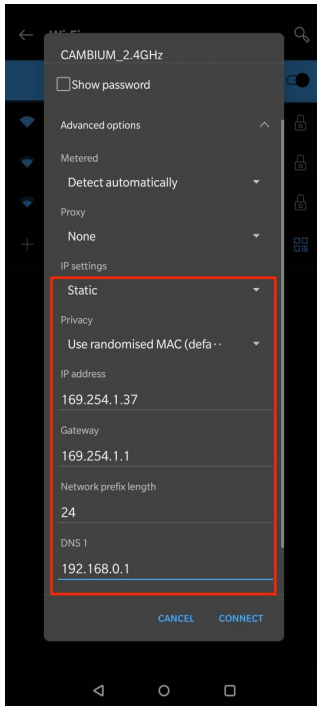
Configure Wi-Fi is supported only in Android 10 version and lower devices. cnArcher is not managing Wi-Fi for Android 10 and above. For users with the Android 10 version and above, configure Wi-Fi from the Android settings. Perform the below steps to configure Wi-Fi:

1. Go to Android Wi-Fi settings.



2. Select **SSID**.
3. Select **Static** for IP settings.
4. Set **IP address** to **169.254.1.x network** (other than 169.254.1.1 as SM is access through this IP).
5. Set Gateway to **169.254.1.1**.

6. Set DNS to **192.168.0.1**.



In iOS

With Android, the application is able to control the Wi-Fi settings for the user. But on iOS, it is not possible to control the Wi-Fi settings. To configure Wi-Fi, perform the below steps:

1. Go to **iPhone Wi-Fi** settings.
2. Select the dongle interface.
3. Change **Configure IP** from automatic to manual.
4. Set **IP address** to **169.254.1.x** network (other than 169.254.1.1 as SM is access through this IP).
5. Set **Subnet Mask** to **255.255.255.0**.

6. Set **Router** value to **192.168.0.1**.

The screenshot shows a mobile application interface for configuring IPv4 settings. At the top, there is a navigation bar with a blue back arrow and the text '< Back', 'Configure IPv4', and a 'Save' button. Below the navigation bar, there are three radio button options: 'Automatic', 'Manual' (which is selected and has a blue checkmark), and 'BootP'. A light gray separator bar is below 'BootP'. Underneath, the text 'MANUAL IP' is displayed. The main content area contains three rows of settings: 'IP Address' with the value '169.254.1.33', 'Subnet Mask' with the value '255.255.255.0', and 'Router' with the value '192.168.0.1'. The bottom portion of the screen is a light gray area.

Option	Value
Automatic	
Manual	✓
BootP	
MANUAL IP	
IP Address	169.254.1.33
Subnet Mask	255.255.255.0
Router	192.168.0.1

Chapter 4: Software Upgrade

Software upgrade is supported only for PMP and ePMP devices. Click **Download** to upgrade the SM software.

Home screen

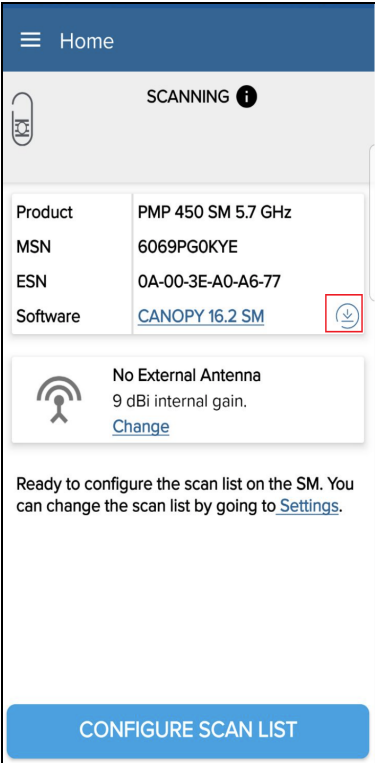



Figure 4: Home screen

The required software version for ePMP and PMP are **3.5.2** and **15.2** respectively.

Software download

Latest software packages are downloaded to the mobile device (if not download previously). The user can select the beta software from phone storage. The released software can be downloaded through cnArcher. Click download icon () to download the software package.

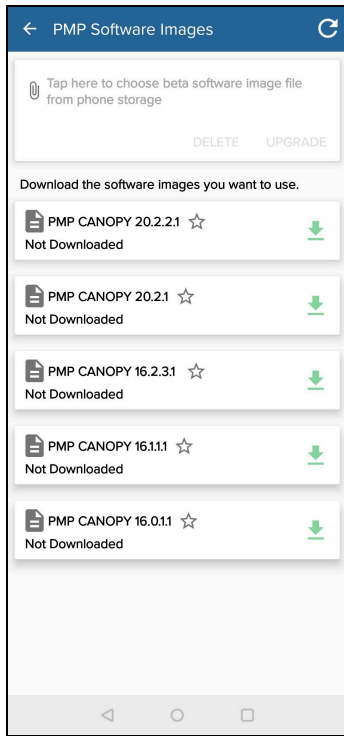


Figure 5: Software download

SM connection and upgrade

After the software download, connect mobile Wi-Fi with cnArcher dongle to upgrade the device.

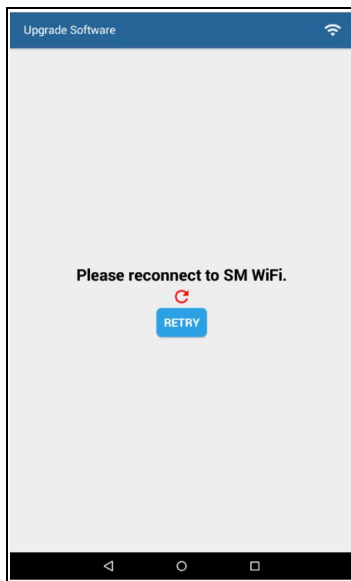


Figure 6: SM connection and upgrade

Chapter 5: cnArcher SM Installation Sequence



Note

The installation and upgrading of SM are supported in both Android and iOS operating systems.

PMP/ePMP SM installation sequence

To install PMP/ePMP SM, perform the following steps:

Home screen

Ready to configure the scan list on the SM. The user can change the scan list by navigating to **Settings** page.

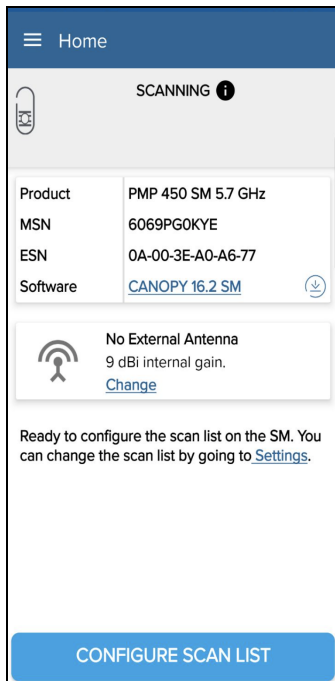


Figure 7: Home screen

SM configuration

All SM configuration is consolidated to a single screen, where the user can configure security, color code or SSID, and IP configuration.

Configure SM

SCANNING ⓘ

Security

None Pre-shared key AAA

Radio

Color code _____ ⋮

IP Configuration

SM Name _____

SM Height (Meters) from ground level _____

NAT

IP Settings

DHCP ▾

Management VLAN

User Data VLAN

NEXT

Figure 8: SM configuration

AP evaluation

Adjust the SM location and re-evaluate if necessary. DHCP option 66 configuration may prohibit SM LAN access upon registration. The user can manually enter the color code for PMP or preferred AP SSID for ePMP without performing **AP evaluation**. This picks up the list of APs already available on the SM and displays the results faster. The user can restart AP evaluation (if required) that performs AP scan in the SM.

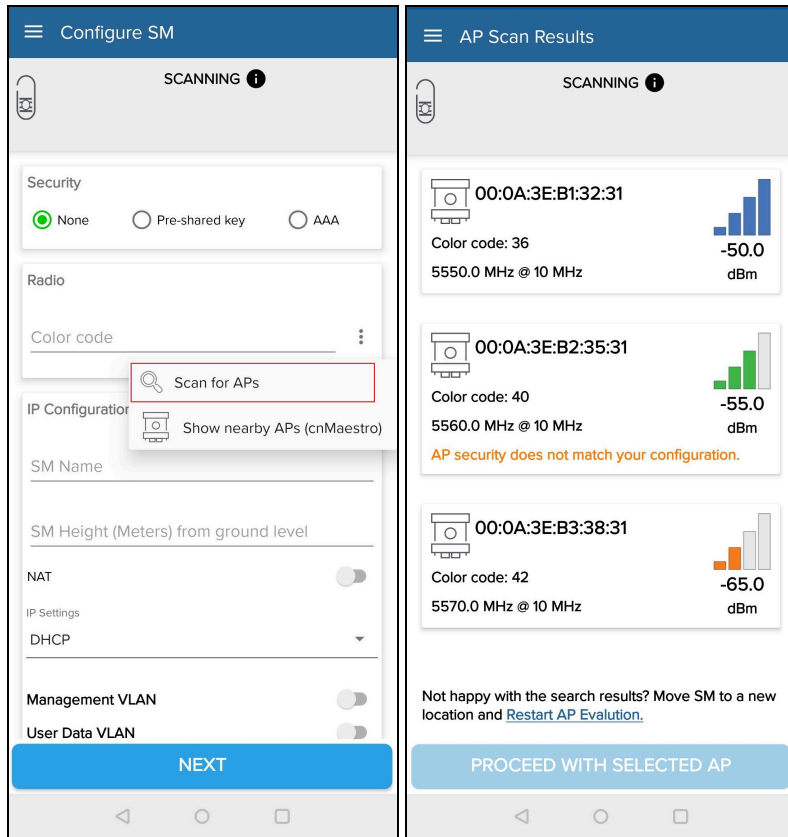


Figure 9: AP evaluation

Nearby APs

Nearby APs are displayed on maps where the user can view the relative location of the AP with respect to GPS location of the phone. The user can calibrate the mobile device to locate the relative position of the AP with respect to the location. Nearby towers are available if cnMaestro is configured and cnArcher displays the nearest visible APs as shown in "Nearby APs" below.

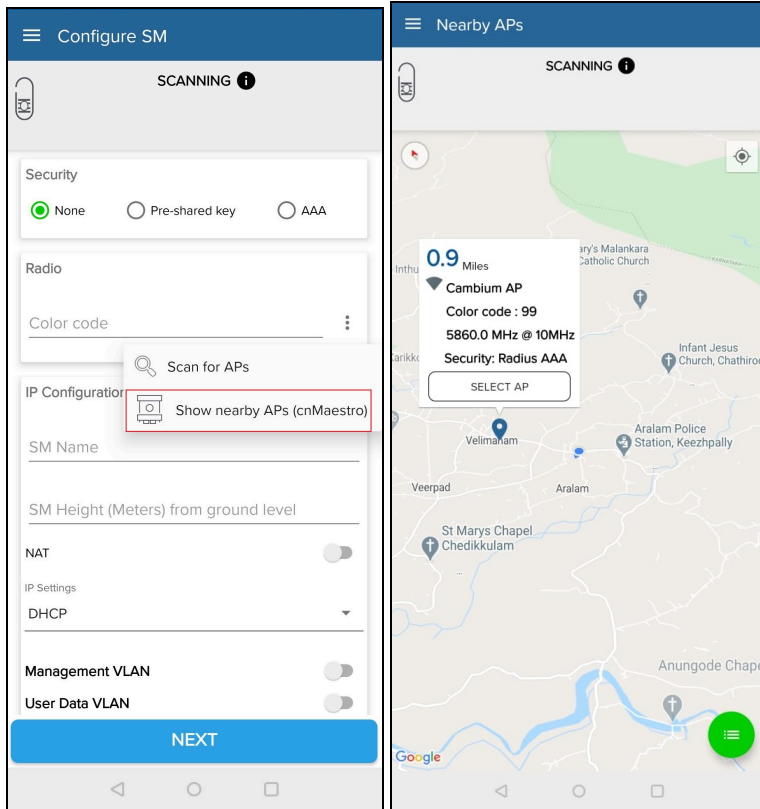


Figure 10: Nearby APs

Alignment

After connecting to an AP, cnArcher displays an **Alignment** page to finalize SM positioning adjustments. To get the best performance of link, the user must ensure that the **Receive Power Level** is maximum during alignment by pointing correctly.



Note

Proper alignment is important to prevent interference in other cells.

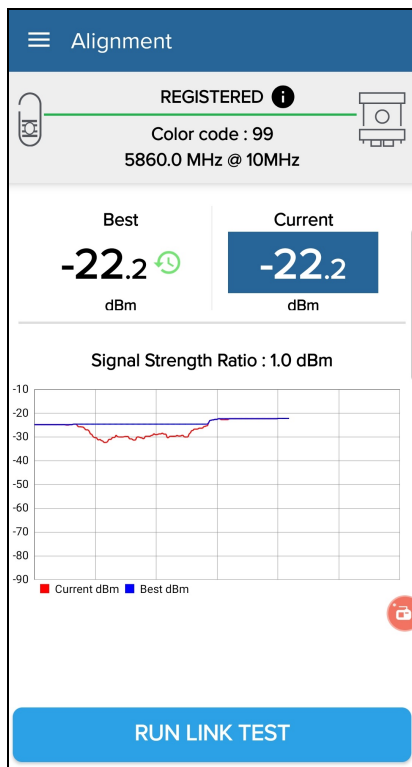


Figure 11: Alignment

Tips for alignment

- By adjusting the angle of the SM slowly, sweep through the appropriate adjustment angles at least two times to get the current receive power level equal to close to the best receive power level.
- The Signal Strength Ratio (SSR) displays the ratio of the vertical radio path received signal power to the horizontal radio path received signal power. This ratio can be useful for determining multipathing conditions (high vertical to horizontal ratio) for the uplink. Multipath may increase or decrease the signal level, resulting in overall attenuation that may be higher or lower than that caused by the link distance. This is problematic at the margin of the link budget, where the standard operating margin (fade margin) may be compromised.



Attention

Use **Quick Align** mode to re-align and test a previously installed link. Access **Quick Align** mode through the tri-bar (☰) menu.

Link Test

The **Link Test** page allows the user to measure the throughput of the radio link between two modules.

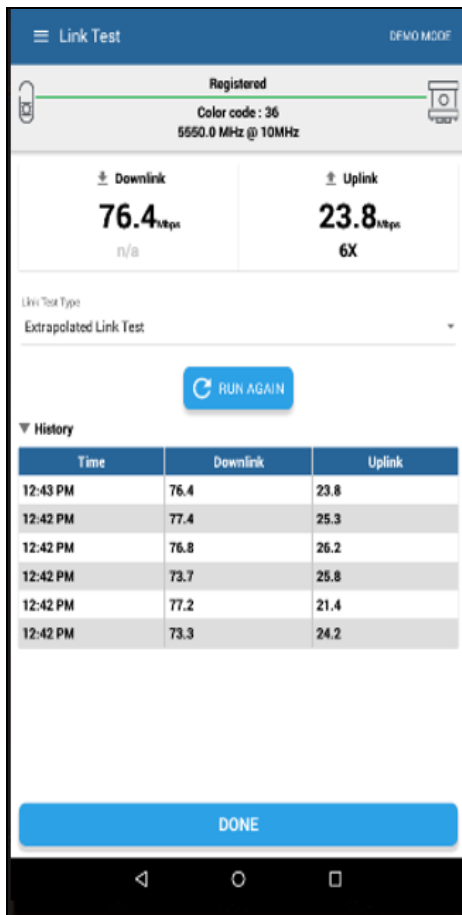


Figure 12: Link test



Notes

cnMaestro conducts the **Link Test** with a packet length configuration of 1522 bytes.

The **Link Test** tool has two modes:

- **Extrapolated Link test**

This test estimates the link capacity by sending a small number of packets then measuring link quality. Once the test is initiated, the radio starts the session at the lowest modulation level and modulates up as data is successfully passed over the link (until the highest possible modulation level supported by the link is reached). Cambium Networks recommends running an Extrapolated Link Test on an active link with traffic present to get accurate measurements.



Note

Running the Extrapolated Link Test immediately after establishing a session does not provide an accurate results.

- **Link Test with Bridging**

This test bridges the traffic to simulated Ethernet ports to provide a status of link as a whole.

cnMaestro onboarding

The user can perform the software upgrade and apply the template configuration while onboarding.

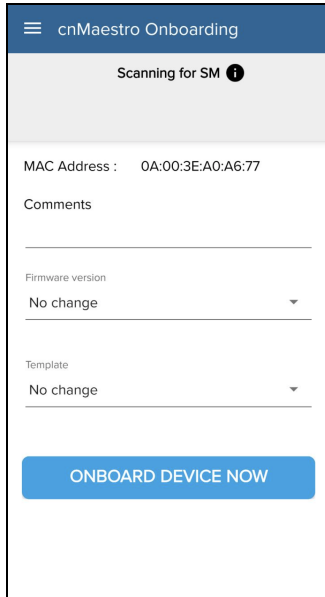


Figure 13: Device which is not onboarded in cnMaestro

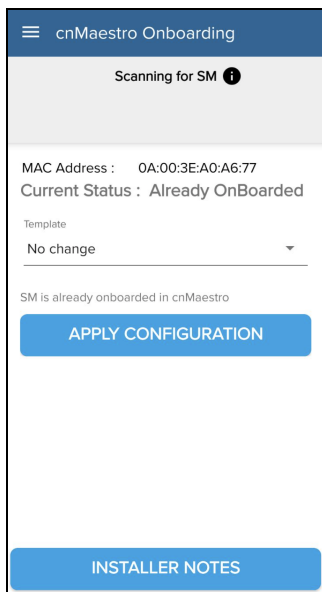


Figure 14: Device which is already onboarded in cnMaestro



Note

For cnMaestro onboarding, an internet connection is required.

Finish Installation

The **Installation Summary** displays the detailed summary of installation. Click **Detailed Summary** option from bottom of the screen to view the detailed summary.

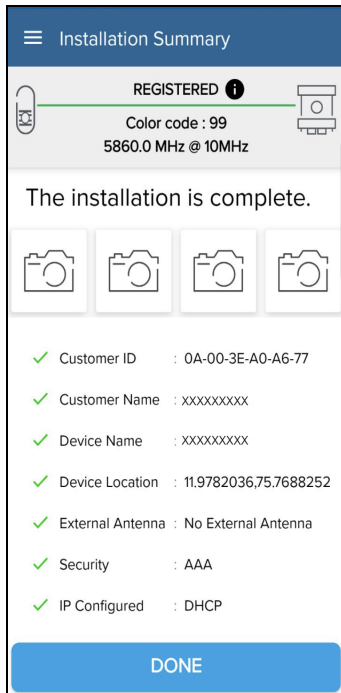


Figure 15: Installation Summary screen

cnRanger SM installation sequence

To install cnRanger SM, perform the following steps:

Home screen

To scan the SM, click **START** in **Home** page.

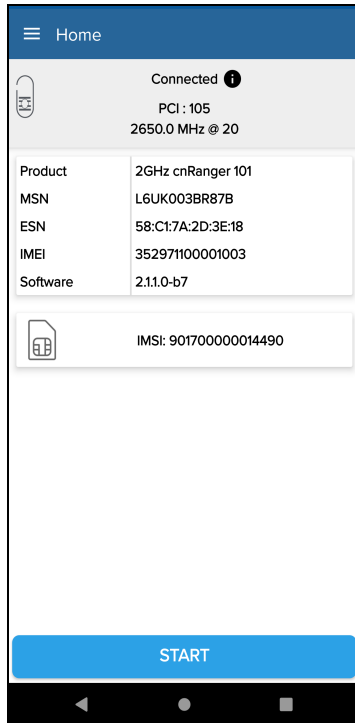


Figure 16: Home screen

SM configuration

All SM configuration is consolidated to a single screen, where the user can configure security, color code or SSID, and IP configuration.

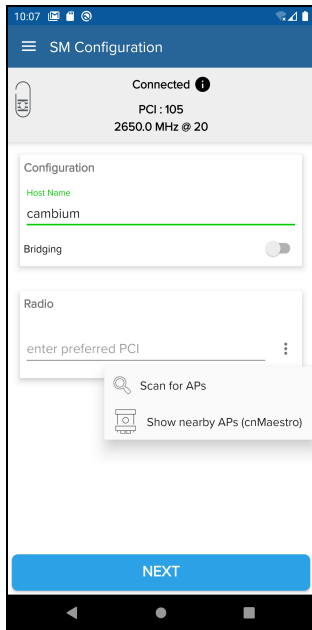


Figure 17: SM configuration

AP evaluation

The user can manually enter the Physical Cell Identity (PCI) without performing **AP evaluation**. Adjust SM location and re-evaluate if necessary.

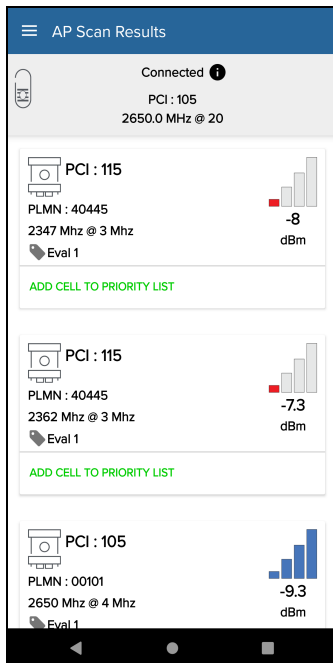


Figure 18: AP evaluation

Alignment

After connecting to an AP, cnArcher displays an **Alignment** page to finalize SM positioning adjustments. To get the best performance of link, the user must ensure that the **Receive Power Level** is maximum during alignment by pointing correctly.



Note

Proper alignment is important to prevent interference in other cells.

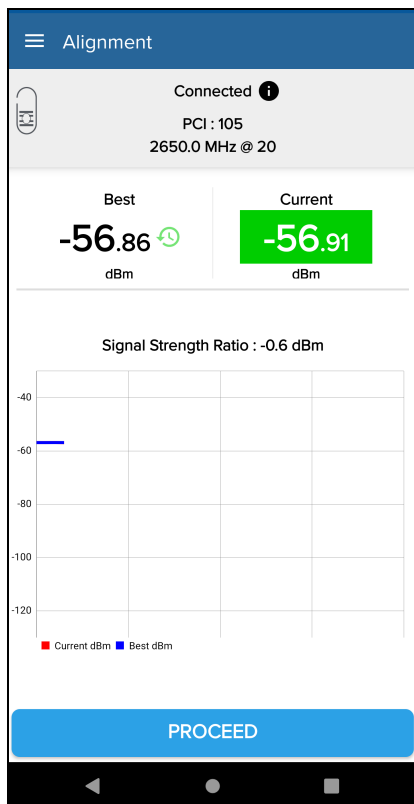


Figure 19: Alignment

Tips for alignment

- By slowly adjusting the angle of the SM, sweep through the appropriate adjustment angles at least two times to get the current receive power level equal to close to the best receive power level.
- The Signal Strength Ratio (SSR) displays the ratio of the vertical radio path received signal power to the horizontal radio path received signal power. This ratio can be useful for determining multipathing conditions (high vertical to horizontal ratio) for the uplink. Multipath may increase or decrease the signal level, resulting in overall attenuation that may be higher or lower than that caused by the link distance. This is problematic at the margin of the link budget, where the standard operating margin (fade margin) may be compromised.



Attention

Use **Quick Align** mode to re-align and test a previously installed link. Access **Quick Align** mode through the tri-bar (☰) menu.

Finish Installation

The **Installation Summary** displays the detailed summary of installation. Click **Detailed Summary** option from bottom of the screen to view the detailed summary.

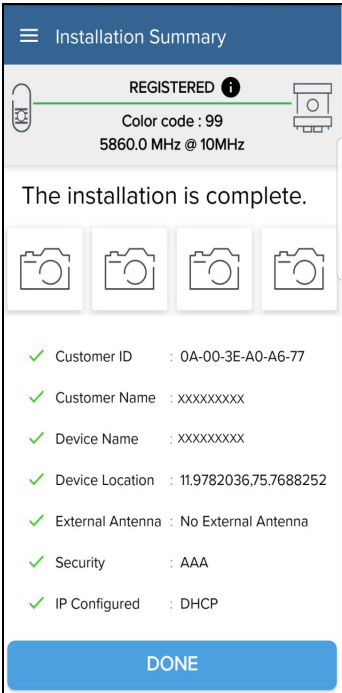


Figure 20: Installation Summary screen

Chapter 6: Quick Align

Quick Align helps user to set SM better aligned with AP. This process takes user with alignment and SM link test steps. An option to perform AP evaluation again is also given. This is supported for **PMP, PTP, ePMP**, and **cnRanger** devices. Android operating system supports **PTP, PMP**, and **ePMP** devices. iOS supports only **PMP** and **ePMP** devices. This is performed on SM that are installed previously. Use **Quick Align** mode to re-align and test a previously installed link. Access **Quick Align** mode via the tri-bar (☰) menu in cnArcher.



Note

The **Quick Align** is supported for both Android and iOS operating systems.

Chapter 7: Apply Staging Configuration to SM

Create a configuration template for PMP SM or ePMP SM and set the description to **cnArcher_Initial_Configuration**. cnArcher downloads and cache this configuration template. Installer can now apply **Initial Configuration** to the SM before starting the installation. This feature is supported for PMP and ePMP devices.



Note
Apply Staging Configuration to SM is supported only in Android operating system.

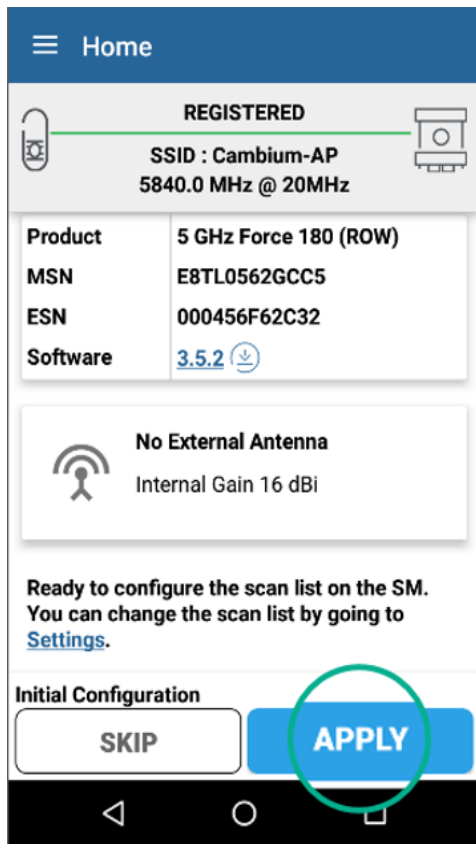


Figure 21: Apply Staging Configuration to SM

Chapter 8: Onboarding

cnPilot and cnRanger SIM pack onboarding is now supported by cnArcher.



Note
Onboarding is supported only in Android operating system.



Figure 22: Onboarding

Chapter 9: Spectrum Analysis

The integrated spectrum analyzer is a useful tool for troubleshooting and RF planning. This feature is supported only for PMP devices.



Note
Spectrum Analysis is supported only in Android operating system.

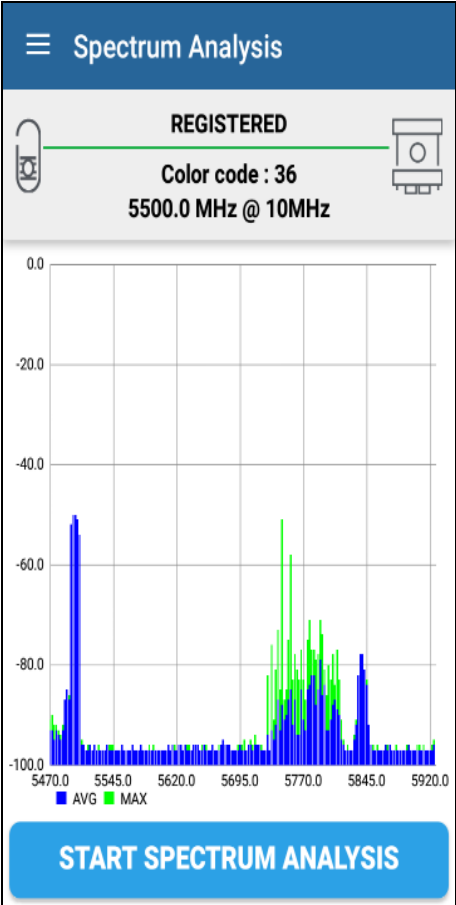


Figure 23: Spectrum Analysis screen

Chapter 10: Work Orders

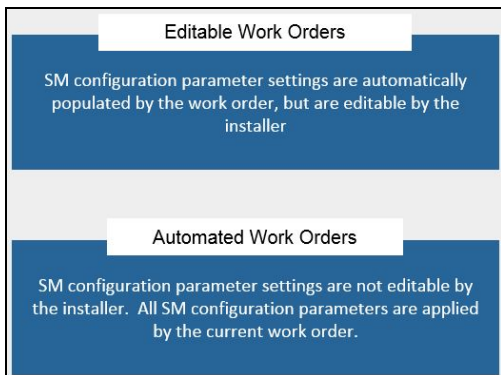
Work orders aggregates all information about customers, devices, and deployment records for the installer.

This information can be used for:

- Displaying open work orders sorted by distance
- Viewing completed installations, including configured parameters and installation time
- Navigation to the installation site.


Create work orders

1. Scan the work order QR code using the device camera. Generate cnArcher work order QR codes from <https://www.cambiumnetworks.com/cnarcher-workorder/>
2. Manually enter the work order details.



3. Navigate to the site and start the installation.
4. Click **Start Install** in work order to start the installation for each work order or by select the checkbox next to the customer name in the **Home** screen.



The SM installations associated with a work order displays the work order icon () at the top-right.

5. Verify and share the installation results .

The installation summary contains information about all of the SM configuration parameters and

installation.

Installation Summary	
Customer Info	
Customer ID	Customer 1
Customer Name	John Smith
Address	3800 Golf Road, Rolling Meadows, IL
Phone	11234567890
SM Info	
Product	PMP 450 SM 900 MHz
MSN	6069RU14EA
MAC	0A-00-3E-45-FC-63
Software Version	CANOPY 15.1.2 SM-DES
External Antenna	No External Antenna
Device Name	SM1
Time & Location	
Latitude	40.8275164
Longitude	-87.764701
Install Complete Time	May 28, 2018 7:08:57 PM
Install Duration	00:09:29
Security	
Security Config	None
Encryption	DES
Link Test	
Mode	Extrapolated
Downlink	
Throughput	24.5 Mbps
Modulation	n/a
Received Power	-60.0dBm
Signal Strength Imbalance (V+)	0.0



Note

Create work order feature is supported for both Android and iOS operating systems.

Work order modes

There are two work order modes in cnArcher:

- Editable work order
- Automated work order

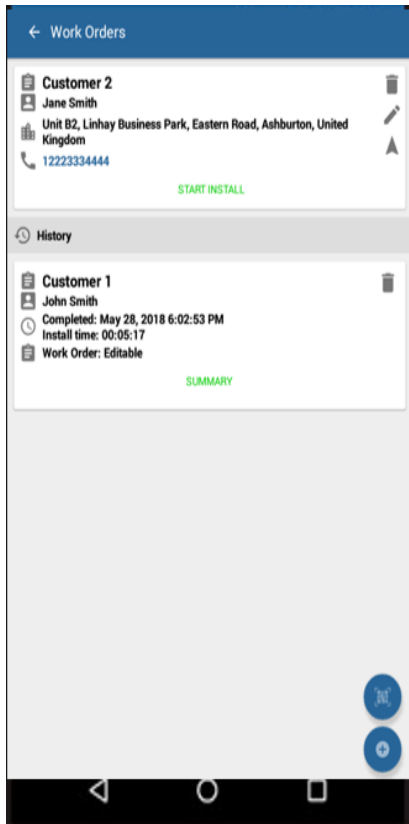


Figure 24: Work order modes

Editable work order

SM configuration parameter settings are automatically populated by the work order, and editable by the installer.

Automated work order

SM configuration parameter settings are not editable by the installer. All the SM configuration parameters are applied by the current work order.

Chapter 11: cnArcher Demo Mode

cnArcher Demo Mode feature is used to step through the cnArcher installation sequence without physically installing the SM equipment. To access Demo Mode, click tri-bar (☰) menu in cnArcher.

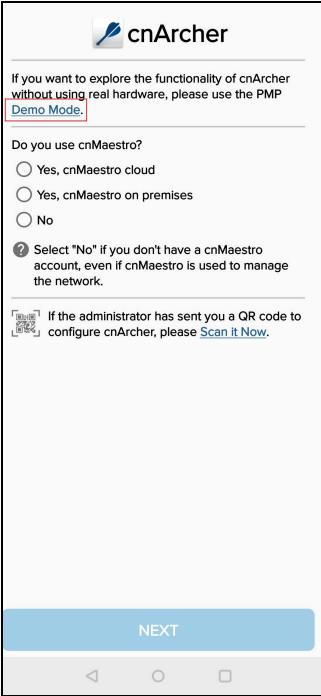


Figure 25: Demo mode access from initial set up

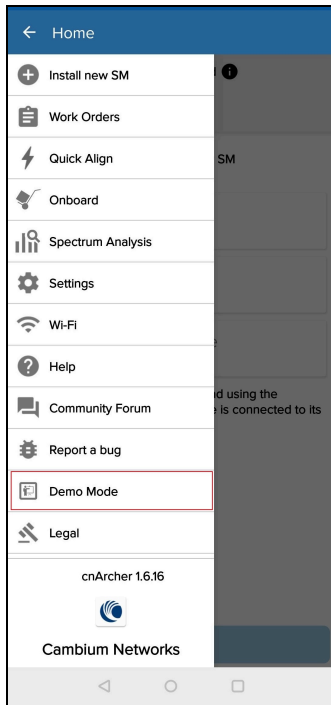


Figure 26: Demo Mode access from side navigation bar

Chapter 12: Settings

Settings page helps user to configure cnMaestro, ePMP/PMP radio settings, and import/export cnArcher configuration. This is supported for both Android and iOS operating systems. The user can modify the following settings:

- [cnMaestro settings](#)
- [PMP/ePMP settings](#)
- [App settings](#)
- [Advanced settings](#)

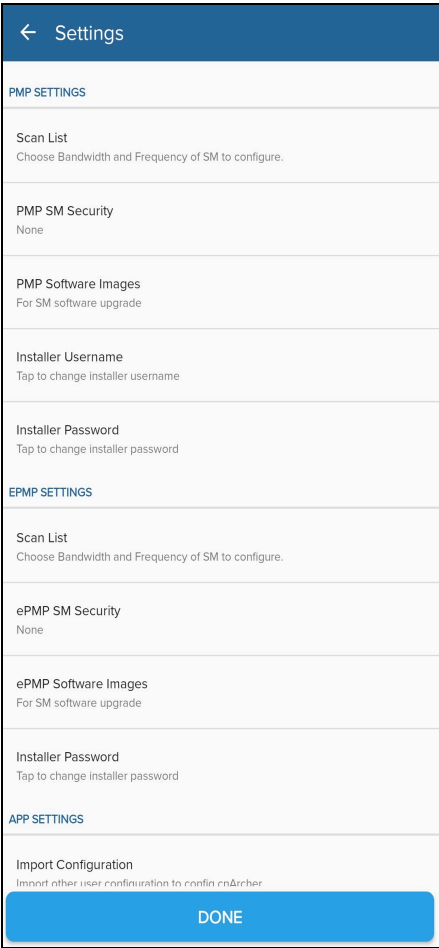


Figure 27: Settings

cnMaestro settings

cnMaestro settings are allowed with Cloud/On-Premises settings. The user must configure **Cambium ID** and **onboarding key** for Cloud onboarding.

PMP/ePMP settings

These **PMP/ePMP settings** allows the users to perform the following settings:

- Modify or verify the scan list configuration from **Settings**.
- Supports PMP/EPMP software download for SM upgrade.
- Set or modify the security setting. PMP supports **None, Pre-Sharedkey** and **AAA**. ePMP supports **None, WPA2** and **AAA**.
- Set custom username and password of ePMP and PMP SM. The default username and password is **admin**.

App settings

Use cnArcher **Export Configuration** and **Import Configuration** to share the configuration with other installers.

The **Export Configuration** function creates a **JSON text file** that can be converted to a QR code later. This QR code can be scanned by using the **Import Configuration** function.

Consider using a website such as <http://goqr.me/> to create the QR code. Copy the text exported from cnArcher to create the QR code.



Note

The large non-contiguous SM scan lists may create large export files. If these files are converted to QR codes, then it may cause some difficulties in scanning the QR code.

Upon import, cnArcher overwrites current settings with the configuration imported through QR code

Advanced settings

The user can modify the SM LAN IP(default 169.254.1.1), http port (default 80) and SNMP community string using the **Advanced** option.

Chapter 13: Troubleshooting

If a problem occurs, attempt to answer the following questions:

- **If SM is not accessible through cnArcher**
 - Open Wi-Fi settings and check Wi-Fi is connected to your desired Wi-Fi dongle
 - If mobile data is ON, turn it OFF and try again
 - Open any browser and check if you are able to access the SM web page using 169.254.1.1 (SM IP address).
- **If SM is not getting registered**
 - Verify your security settings
 - Verify scan list configured in cnArcher settings.

Chapter 14: Report a Bug

Report a Bug is used to send a bug report. To send the report, click **Report a Bug** option from the tri-bar (☰) menu.



Note
Report a Bug is supported for both Android and iOS operating systems.

← Send Bug Report

Feature/Screen (Optional)
What cnArcher screen or function is problematic?

Comments (Optional)
Help us understand what is not working as expected?

Cambium Support Ticket # (Optional)
Working with customer support? Enter existing ticket # (i.e. 191xxx)

cnArcher_logs.txt

SEND

Figure 28: Send Bug Report

Cambium Networks

Cambium Networks provides professional grade fixed wireless broadband and microwave solutions for customers around the world. Our solutions are deployed in thousands of networks in over 153 countries, with our innovative technologies providing reliable, secure, cost-effective connectivity that's easy to deploy and proven to deliver outstanding performance.

Our award-winning Point to Point (PTP) radio solutions operate in licensed, unlicensed and defined use frequency bands including specific FIPS 140-2 solutions for the U.S. Federal market. Ruggedized for 99.999% availability, our PTP solutions have an impeccable track record for delivering reliable high-speed backhaul connectivity even in the most challenging non-line-of-sight RF environments.

Our flexible Point-to-Multipoint (PMP) solutions operate in the licensed, unlicensed and federal frequency bands, providing reliable, secure, cost-effective access networks. With more than three million modules deployed in networks around the world, our PMP access network solutions prove themselves day-in and day-out in residential access, leased line replacement, video surveillance and smart grid infrastructure applications.

Cambium Networks solutions are proven, respected leaders in the wireless broadband industry. We design, deploy and deliver innovative data, voice and video connectivity solutions that enable and ensure the communications of life, empowering personal, commercial and community growth virtually everywhere in the world.

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