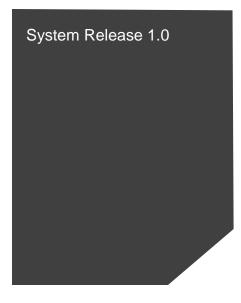




Troubleshooting Station Registration



Station fails to register with the AP

When an ePMP station is continuously failing to register with an ePMP AP, there are several items that should be verified. Troubleshooting these scenarios will require as a minimum, access to the failing ePMP station User Interface. If available, access to the desired ePMP AP may also be helpful.

The ePMP station needs to be able to "see" the desired AP during the scanning procedure for it to initiate registration. ePMP stations will display the system information for all APs that it can detect during the scanning procedure at the "Available AP List" table, at the bottom of the "Wireless Status" page under "MONITOR". If the desired AP is not listed in this table, the ePMP station is not detecting the AP during scanning and it will not be able to register with it. In this case, verify the following:

- The ePMP station is configured to scan <u>only</u> a specific set of frequencies that include the operational frequency of the desired AP.

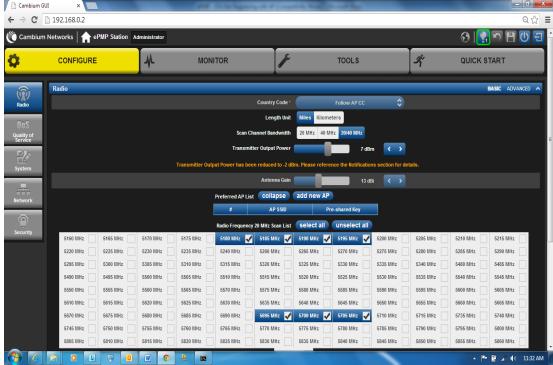


Figure 1: Frequency Scanning List

- If there are no frequencies with the checkbox selected at the "Radio" page under "CONFIGURE", the ePMP station will scan all frequencies listed.
- If one or more frequencies have the checkbox selected, the ePMP station will <u>only</u> scan those frequencies.
- Notice that the frequency scan lists for 20MHz and 40MHz channel bandwidths are separated. Make sure to look at the frequency scan list of interest based on the channel bandwidth.
- o Ensure that the operational frequency for the desired AP is selected.
- o If unsure of the operational frequency for the desired AP, unselect all frequencies.

- NOTE: This configuration may impact the duration of the network entry procedure as all supported frequencies will be scanned by the ePMP station. Once the operational frequency of the desired AP is known, the specific frequency can then be selected from the list of frequencies.
- Select the "Save Changes" button in the top right corner of the device GUI to apply your changes.
- The ePMP station is configured with the same channel bandwidth as the desired AP.
 - A mismatch of the channel bandwidth configuration between the ePMP station and the desired AP will prevent the station to detect the AP.
 - At the "Radio" page under "CONFIGURE", ensure that the selected channel bandwidth in the "Scan Channel Bandwidth" parameter matches the configuration of the desired AP.
 - If unsure about the channel bandwidth configuration for the desired AP, select the "20/40 MHz" option which will allow the ePMP station to scan both 20MHz and 40MHz channels.
 - NOTE: This configuration may impact the duration of the network entry procedure as all supported frequencies will be scanned by the ePMP station. Once channel bandwidth of the desired AP is known, the specific channel bandwidth can then be selected from the list of frequencies.
 - Once the ePMP station detects the desired AP, the AP system information (e.g. SSID, operational frequency, security mode and channel bandwidth) will be displayed in the "Available AP List" at the "Wireless Status" page under MONITOR.

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Network Status			Uplin	k MCS Mode	MCS 12				
			Downlin	k MCS Mode	MCS 12				
System Log			Power Control M	ode from AP	N/A				
			Ethernet Int	erface (LAN)	Up				
			Wireless Inte	erface (WAN)	Up				
	Available AP List	llapse							
	SSID	MAC Frequency Carrier	Bandwidth CINR	RSSI	Network Entry State	Last Network Entry Age	Last Scan Age	Security Mode	
	St.John-N	00:04:56:c0:0d:bf 5790 MHz	20 MHz 30 dB	-65 dBm	STA has not allocation on AP	0000:00:00:15	0000:00:00:04	secure	
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Figure 2: Available AP List

- The ePMP station is running a software version compatible with the desired AP software version.
 - In some cases, incompatible software versions will prevent ePMP stations to successfully connect to an AP.
 - Software version running in the ePMP device can be found in the "Software Upgrade" page under "TOOLS" or in the "System Status" page under "MONITOR".
 - If syslog is configured to display all messaging (configurable from the "System" page under "CONFIGURE") on the ePMP station, an entry indicating that the station has disassociated from the AP with the reason "SW VERSION INCOMPATIBILITY" will be logged.

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<u>h</u> .				Hardware Version	STA 5Ghz 9344 8M 64M SMPX Integrated	ePMP_nonGPS_AP or e	PMP_STA for the 9344
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Figure 3: Software Version Info

- The ePMP station hardware is not defective.
 - To rule out potential issues with the ePMP station itself, use a known good ePMP station to scan all frequencies and channel bandwidths in that location.
 - If the known good ePMP station detects the desired AP, the AP system information (e.g. SSID, operational frequency, security mode and channel bandwidth) and signal strength (DL CINR/DL RSSI) will be displayed in the "Available AP List" at the "Wireless Status" page under MONITOR.

The ePMP station is designed to initiate scanning for APs right after powering up and attempt to connect the most suitable AP of the ones detected during the scanning process, based of RF conditions. Features like the Preferred AP List and STA Registration Limits, are provided to allow operators to have additional control over their system. But in some cases, these features may interfere with the operation of the system if not properly configured or if the operator is not fully aware of them. The next section attempts to cover some of those scenarios.

In the case that the ePMP station performs its scanning and it does display the desired AP system information in the "Available AP List", but it is still failing to connect to the desired AP, verify the following:

- The desired AP's SSID has been correctly entered in the "Preferred AP List" table at the "Radio" page under "CONFIGURE".
 - An incorrectly provisioned SSID for the desired AP will prevent the station from successfully connecting to the AP.
 - Verify and, if needed, re-enter the SSID in the "Preferred AP List" table for the desired AP. Select the "Save Changes" button in the top right corner of the device GUI to apply your changes.

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vork					^ 🗸 🗙 St.	lohn-N	2					
					Radio Frequency	20 MHz Scan List	select all	unselect all				
urity	5160 MHz	5165 MHz	5170 MHz	5175 MHz	5180 MHz	5185 MHz	5190 MHz	5195 MHz	5200 MHz	5205 MHz	5210 MHz	5215 MHz
	5220 MHz	5225 MHz	5230 MHz	5235 MHz	5240 MHz	5260 MHz	5265 MHz	5270 MHz	5275 MHz	5280 MHz	5285 MHz	5290 MHz
	5295 MHz	5300 MHz	5305 MHz	5310 MHz	5315 MHz	5320 MHz	5325 MHz	5330 MHz	5335 MHz	5340 MHz	5480 MHz	5485 MHz
	5490 MHz	5495 MHz	5500 MHz	5505 MHz	5510 MHz	5515 MHz	5520 MHz	5525 MHz	5530 MHz	5535 MHz	5540 MHz	5545 MHz
	5550 MHz	5555 MHz	5560 MHz	5565 MHz	5570 MHz	5575 MHz	5580 MHz	5585 MHz	5590 MHz	5595 MHz	5600 MHz	5605 MHz
	5610 MHz	5615 MHz	5620 MHz	5625 MHz	5630 MHz	5635 MHz	5640 MHz	5645 MHz	5650 MHz	5655 MHz	5660 MHz	5665 MHz
	5670 MHz	5675 MHz	5680 MHz	5685 MHz	5690 MHz	5695 MHz	5700 MHz	5705 MHz	5710 MHz	5715 MHz	5735 MHz	5740 MHz
	5745 MHz	5750 MHz	5755 MHz	5760 MHz	5765 MHz	5770 MHz	5775 MHz	5780 MHz	5785 MHz	5790 MHz	5795 MHz	5800 MHz

Figure 4: Preferred AP List

- A Pre-shared key has been provisioned for the desired AP in the "Preferred AP List" table at the "Radio" page under "CONFIGURE" if the "Security Mode" displayed for the desired AP is "Secure".
 - If no pre-shared key is provisioned for an AP which "Security Mode" is Secure, the station will not be allowed to connect.
 - "Network Entry State" in the "Available AP List" in the ePMP station shows as "Unknown".
 - Provision the pre-shared key in the "Preferred AP List" table and select the "Save Changes" button in the top right corner of the device GUI to apply your changes.
- The provisioned Pre-shared key is correct for the desired AP.
 - If the provisioned Pre-shared key for the desired AP is incorrect, the station will not be allowed to connect.

• "Network Entry State" in the "Available AP List" in the ePMP station shows "STA has no allocation on AP" error.

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2				Operating	Channel	Bandwidth	20 MHz					
Wireless Status						DL RSSI	-95 dBm					
						DL CINR	0 dB					
Network Status				Transm	nitter Ou	tput Power	Off					-
E					Uplink	MCS Mode	MCS 11					
System Log				D	ownlink	MCS Mode	MCS 11					
-,,				Power Cor	ntrol Mo	de from AP	N/A					
				Ether	rnet Inte	rface (LAN)	Up					
				Wirele	ess Inter	rface (WAN)	Up					
	Available AP List	ollapse										
	SSID	MAC F	Frequency E Carrier	Bandwidth	CINR	RSSI	Network Entry State	Last Network Entry Age	Last Scan Age	Security Mode		
	St.John-N	00:04:56:c0:0d:bf	5790 MHz	20 MHz	34 dB	-61 dBm	STA has not allocation on AP	0000:00:00:16	0000:00:00:05	secure		
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Figure 5: Network Entry State - No Allocation

- If syslog is configured to display all messaging (configurable from the "System" page under "CONFIGURE") on the desired AP, an entry will be logged for the ePMP station containing its MAC address, association identifier (aid) and the reason "INVALID KEY" for its disassociation.
- If syslog is configured to display all messaging (configurable from the "System" page under "CONFIGURE") on the ePMP station, an entry indicating that the station has disassociated from the AP with the reason "NO ALLOCATION ON AP" will be logged.
- Ensure the Pre-share key matches the desired AP's and, if needed, re-provision the preshared key in the "Preferred AP List" table. Select the "Save Changes" button in the top right corner of the device GUI to apply your changes.
- The ePMP station is not out of range of the desired AP.
 - If the station is out of the configured cell range for the desired AP, the station will not be allowed to connect.
 - If syslog is configured to display all messaging (configurable from the "System" page under "CONFIGURE") on the ePMP station, an entry will be logged indicating that the station cannot complete registration with the reason "STA IS OUT OF CONFIGURED CELL SIZE".
 - The AP default cell range is 3 miles.
 - o Cell max range is configurable from the "Radio" page under "CONFIGURE".

- The desired ePMP AP has not reached its registration limit.
 - If the desired AP has reached its maximum number of registered stations it is configured for, all additional registration attempts will be rejected.
 - The default number of allowed registering STAs is 60.
 - If syslog is configured to display all messaging (configurable from the "System" page under "CONFIGURE") on the ePMP station, an entry indicating that the station has been rejected by the AP with the reason "MAX CAPACITY" will be logged.
 - "Network Entry State" in the "Available AP List" in the ePMP station shows "Rejected by Capacity" error.

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	CONFIGURE	4	IOM	NITOR		F		TOOLS	-ŕ	QUIC	K START
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⊳ Status						DL RSSI	-95 dBm				
5						DL CINR	0 dB				
Status				Trans	mitter Ou	utput Power	Off				
						« MCS Mode					
- Log						« MCS Mode					
						ode from AP					
						erface (LAN)					
				Wire	less inte	rface (WAN)	Up				
	Available AP List SSID	MAC	Frequency Carrier	Bandwidth	CINR	RSSI	N	etwork Entry State	Last Network Entry Age	Last Scan Age	Security Mode
	StJohn-N	00:04:56:c0:0d:bf	5790 MHz	20 MHz	29 dB	-66 dBm	Re	jected by "Capacity"	0000:00:01:16	0000:00:00:06	secure

Figure 6: Network Entry State - Capacity

- The number of stations allowed to register with an AP is controlled by the "STA Registration Limit" parameter which is accessible from the "Radio" page under "CONFIGURE". Select the "Save Changes" button in the top right corner of the device GUI to apply your changes.
- The ePMP AP is not configured in "PTP Access" mode.
 - o PTP or "Point-to-Point" mode only allows one station to be connected at any given time.
 - "PTP Access" mode is configurable from the "Radio" page under "CONFIGURE".
 - If "PTP Access" mode is set to "Connect 1st STA", only the first ePMP station to successfully connect to the AP will be allowed. All other ePMP stations will be rejected by the AP. If syslog is configured to display all messaging (configurable from the "System" page under "CONFIGURE") on the ePMP station, an entry indicating that the station has been rejected by the AP with the reason "MAX

CAPACITY" will be logged. Also, "Network Entry State" in the "Available AP List" in the ePMP station shows "Rejected by Capacity" error.

If "PTP Access" mode is set to "MAC Limited", only the ePMP station which MAC address is provisioned at the "PTP MAC Address" field will be allowed to successfully connect to the AP. All other ePMP stations will be rejected by the AP. If syslog is configured to display all messaging (configurable from the "System" page under "CONFIGURE") on the ePMP station, an entry indicating that the station has been rejected by the AP with the reason "PTP MODE (ACL POLICY)" will be logged. The "Network Entry State" in the "Available AP List" in the ePMP station will also show "Rejected by PTP only: ACL Policy" error.

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	Available AP Lis	collapse			in a inte		6			
	SSID	MAC	Frequency Carrier	Bandwidth	CINR	RSSI	Network Entry State	Last Network Entry Age	Last Scan Age	Security Mode
	St.John-N	00:04:56:c0:0d:bf	5790 MHz	20 MHz	30 dB	-66 dBm	Rejected by "PTP only : ACL Policy"	0000:00:00:22	0000:00:00:00	secure

Figure 7: Network Entry State - PTP Only ACL Policy

- The ePMP station is not blacklisted.
 - An ePMP station may get blacklisted at the AP if it exceeds the maximum number of network entry attempts without a successful connection.
 - If syslog is configured to display all messaging (configurable from the "System" page under "CONFIGURE") on the ePMP station, an entry will be logged indicating the AP has rejected the registration with the reason "STA IN BLACKLIST".
 - The "Network Entry State" in the "Available AP List" in the ePMP station will also show "Rejected by STA in the Black List" error.

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¢	CONFIGURE	₼	MONITOR	F		TOOLS	-Å	QUICK START
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9			Transmitte	r Output Power	Off			
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E-			Down	nlink MCS Mode	MCS 9			
System Log			Power Contro	I Mode from AP	N/A			
			Ethernet	Interface (LAN)	Up			
			Wireless I	interface (WAN)	Up			
	Available AP List collap	se						
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Figure 8: Network Entry State - STA in the Black List

• The default blacklisting timeout is 30 minutes. After this timeout, the ePMP station is removed from the AP's blacklist.