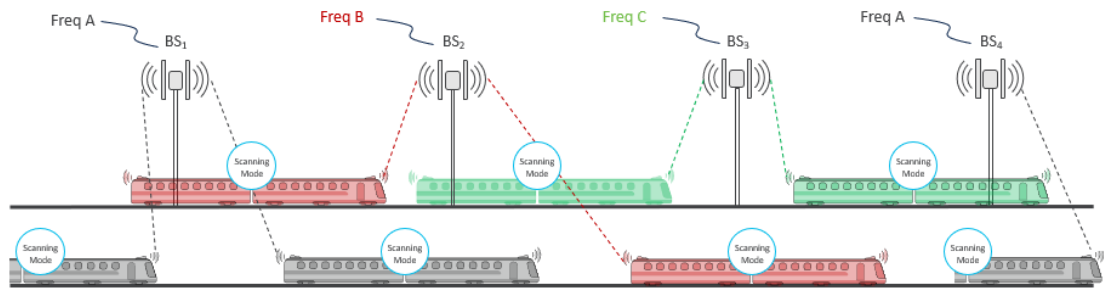# Frequency Scan

Frequency scan

URWB devices support two types of frequency scans:

1. Fluidity frequency scan

2. Fluidmax frequency scan

Overview of Fluidity frequency scan

Fluidity frequency scan is designed for scenarios involving high-density mobility environments using multiple frequencies on the infrastructure side to reduce self-interference and improve wireless channel capacity and performance. It helps to ensure continuous and seamless connectivity as these devices move across different network areas, facilitating smooth transitions between APs. When the current signal strength is weak, the device starts searching for a frequency with a better signal to maintain a stable connection. This feature is applicable in all high-density mobility environments, such as train-to-ground, mining, and port terminals.

For effective frequency scanning, a mobile device typically requires at least two radios:

- Radio 1: Maintains the current connection with the network.

- Radio 2: Performs scanning for better available frequencies without disrupting the existing connection on Radio 1.

Scanning can be performed in two modes:

- Periodic scan: Automatically conducted by the device at regular intervals to find the best available channel frequencies.

- Signal-triggered (threshold) scan: When the current device's signal strength drops below a specified minimum Signal-to-Noise Ratio (SNR) threshold value, the mobile device begins searching for another device with a stronger signal.

This dual-radio configuration allows continuous connectivity while optimizing connection quality.

Note
- Frequency scan is applicable only to fluidity vehicle devices, not to infrastructure devices.

- If the scan-periodic and scan-isolation parameters are set to zero, the frequency scan feature is disabled.

Configure Fluidity frequency scan using CLI

Use these commands to configure and manage Fluidity frequency scan on the device.

Clear the Fluidity frequency scan list using CLI

Use the **configure fluidity scan list clear** command to clear the Fluidity frequency scan list on the device.

```
Device#configure fluidity scan list clear
```

Configure channels for Fluidity frequency scan list using CLI

Use the **configure fluidity scan list** *pairs of channel numbers, bandwidths* command to configure list of channels and their bandwidths.

```
Device#configure fluidity scan list 100 20 108 20
```

Note For valid channel numbers and their bandwidths, refer topics Configure operating channel from CLI and Configure channel bandwidth from CLI.

Configure Fluidity frequency scan isolation time using CLI

Use the **configure fluidity scan isolation** *time* command to configure the isolation time of Fluidity frequency scan.

```
Device#configure fluidity scan isolation 3000
```

Note
- The isolation time valid range is from 0 to 65535.

- When the signal strength falls below a certain SNR threshold value for a continuous period of 3000 milliseconds, the device initiates scanning for better connectivity options.

- Use the **configure fluidity scan isolation disabled** command to disable the Fluidity frequency scan isolation mode on the device.

Configure SNR threshold for Fluidity frequency scan using CLI

Use the **configure fluidity scan rssi-threshold** *value* command to configure the SNR threshold for Fluidity frequency scan isolation mode.

```
Device#configure fluidity scan rssi-threshold 50
```

Note
- The device connects only to infrastructure devices that meet the specified minimum signal strength.

- The SNR threshold value valid range is from 0 to 100.

- Use the **configure fluidity scan rssi-threshold disabled** command to disable the SNR threshold.

Configure Fluidity frequency periodic scan time using CLI

Use the **configure fluidity scan periodic** *scan interval time* command to configure the periodic scan time on the device.

```
Device#configure fluidity scan periodic 5000
```

Note
- The specified time interval is in milliseconds.

- The periodic scan time valid range is from 0 to 65535. For best results, the minimum recommended value is 1500. This value should consider the number of channels configured.

- Use the **configure fluidity scan periodic disabled** command to disable the periodic frequency scan.

Onboard radios Fluidity frequency allocation using CLI

On the same channel

Use the **configure fluidity scan vehicle-frequency locked** command to lock the radio interfaces of onboard devices to operate on the same channel.

```
Device#configure frequency scan vehicle-frequency locked
```

On the separate channels

Use the **configure fluidity scan vehicle-frequency open** command to allow radio interfaces of onboard devices to operate on the separate channels.

```
Device#configure fluidity scan vehicle-frequency open
```

Verify Fluidity frequency scan configuration using CLI

Use the **show fluidity config command** to verify the Fluidity frequency scan on the device.

```
Device#show fluidity config
Fluidity enabled
Fluidity interface: 1
Vehicle ID: automatic, current ID: 89235672 current role: mobile primary unit
Handoff logic: standard
Handoff hysteresis high threshold: 6
Handoff hysteresis low threshold: 3
Rssi low/high zones threshold: 35
Color: enabled, current: 0
Color min RSSI threshold: 20
Network type: flat (layer 2)
Warmup time: 30000 ms
Wireless timeout: 800 ms
Wireless fastdrop: disabled
Frequency scan list: 5200@20 5240@20
Scan isolation time: 300 ms
Current Frequency: 5180 MHz
Current Channel Width: 20 MHz
Critical RSSI threshold for autoscan: disabled
Periodic autoscan interval: disabled
Vehicle frequency: open
Large network optimization: enabled
Routes: backhaul
Primary-pseudowire enforcement: disabled
Max number of clients: unlimited
DoP settings: limit 0, client 10, bias 0
Quadro telemetry: enabled
```

Overview of Fluidmax frequency scan

Fluidmax frequency scan is typically used for devices in static or semi-static network environments. These are often devices that require stable and reliable connections in fixed locations or areas where the network environment doesn't change frequently. Such environments could include industrial sites, remote monitoring stations, or any setting where maintaining a consistent and interference-free connection is crucial.

# Verify Fluidmax frequency scan status using GUI

Before you begin

Note In the wireless radio settings, you can select the radio role as Fluidmax secondary either for Radio 1 or Radio 2.

Procedure

Step 1 Launch the computer's web browser and enter the URL to open the configurator login page.

Step 2 Enter the username and password in the respective fields.

Step 3 Click **Login**.
Once you successfully log into the GUI, the URWB configurator displays.

Step 4 In the **ADVANCED SETTINGS**, click **advanced radio settings** to open the **ADVANCED RADIO SETTINGS** window.

Note
If the **FluidMAX Autoscan** checkbox is checked, the status is enabled; if unchecked, the status is disabled.
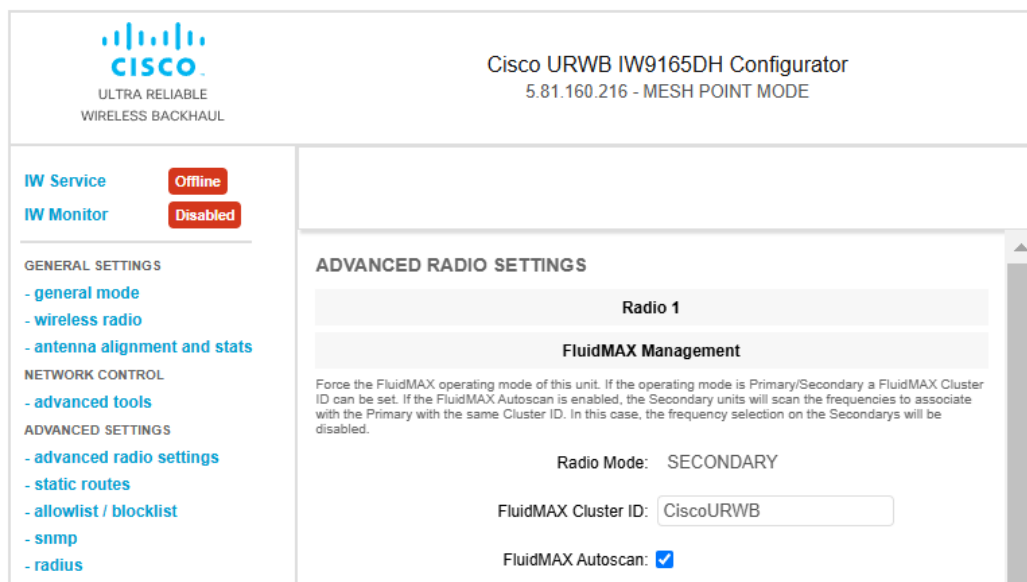
Configure Fluidmax frequency scan using CLI

Use these commands to configure Fluidmax frequency scan on the device.

Enable or disable Fluidmax frequency scan using CLI

Use the **configure dot11Radio** *slot number* **mode fluidmax automatic-scan enable** command to enable the Fluidmax frequency on the radio.

```
Device#configure dot11Radio 1 mode fluidmax automatic-scan enable
```

Note Use the **configure dot11Radio** *slot number* **mode fluidmax automatic-scan disable** command to disable the Fluidmax frequency on the radio.

Configure threshold value for Fluidmax frequency scan using CLI

Use the **configure dot11Radio** *slot number* **mode fluidmax** *threshold value* command to configure the Fluidmax threshold value on the radio.

```
Device#configure dot11Radio 1 mode fluidmax threshold 90
```

Note • The Fluidmax threshold value valid range is from 0 to 100.

• If auto-scan is enabled, it triggers when the signal from the master falls below the specified threshold value.

Verify Fluidmax frequency scan configuration using CLI

Use the **show dot11Radio 1 config** command to verify the Fluidmax scan on the device.

```
Device #show dot11Radio 1 config

Interface: enabled

Mode: fluidmax secondary

Frequency: 5200 MHz
Channel: 40
Channel width: 20 MHz
Antenna number: 2
TX power level: 2
TX power: 14 dBm
Antenna gain: 15 dBi
Maximum tx mcs: 9
High-efficiency: disabled
Maximum tx nss: 2
RTS protection: 512
guard-interval: 800 ns
ampdu max length: 255
distance: 3000 m

The ampdu Tx
priority 0: enabled
priority 1: enabled
priority 2: enabled
priority 3: enabled
priority 4: enabled
```

```
priority 5: enabled
priority 6: disabled
priority 7: disabled

Fluidmax configuration
Tower ID: disabled
Cluster ID: CiscoURWB
Automatic scan: enabled
Automatic scan threshold: disabled

Enhanced Distributed Channel Access (EDCA) configuration
vo: aifs=1 cw_min=2 cw_max=3 txop=15
vi: aifs=1 cw_min=3 cw_max=4 txop=31
be: aifs=3 cw_min=4 cw_max=6 txop=31
bk: aifs=7 cw_min=3 cw_max=4 txop=0

Passphrase: 58ac1e597fda4e37bc0c2472d8c8c69f
AES encryption: disabled
AES key-control: disabled
Key rotation: disabled
Key rotation timeout: 0(second)

DFS region: B
DFS radar role: auto
Radar detected: 0
Indoor deployment: disable
Rx-SOP Threshold: 0 dBm(AUTO)
Max packet retries: 32
High throughput 4.9Ghz: disabled
```

Verify Fluidmax frequency scan configuration using CLI