



## Coverage Hole Detection

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### Coverage Hole Detection and Correction

The RRM coverage hole detection algorithm can detect areas of radio coverage in a wireless LAN that are below the level needed for robust radio performance. This feature can alert you to the need for an additional (or relocated) lightweight access point.

If clients on a lightweight access point are detected at threshold levels (RSSI, failed client count, percentage of failed packets, and number of failed packets) lower than those specified in the RRM configuration, the access point sends a “coverage hole” alert to the device. The alert indicates the existence of an area where clients are continually experiencing poor signal coverage, without having a viable access point to which to roam. The device discriminates between coverage holes that can and cannot be corrected. For coverage holes that can be corrected, the device mitigates the coverage hole by increasing the transmit power level for that specific access point. The device does not mitigate coverage holes caused by clients that are unable to increase their transmit power or are statically set to a power level because increasing their downstream transmit power might increase interference in the network.

### Configuring Coverage Hole Detection (GUI)

Follow the procedure given below to configure client accounting.

#### Procedure

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- Step 1** Click **Configuration** > **Radio Configurations** > **RRM**.
- On this page, you can configure Radio Resource Management parameters for 802.11a/n/ac (5 GHz) and 802.11b/g/n (2.4 GHz) radios, and flexible radio assignment parameters.
- Step 2** Check the **Enable Coverage Hole Detection** check box.
- Enables coverage hole detection.
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## Configuring Coverage Hole Detection (CLI)

Coverage Hole Detection (CHD) is based on upstream RSSI metrics observed by the AP.



**Note** To revert back radios from 5-GHz to 24-GHz for CHD, ensure that the 5-GHz radio is UP and Client Network Preference value is other than the default.

Follow the procedure given below to configure CHD:

### Before you begin

Disable the 802.11 network before applying the configuration.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>ap dot11 {24ghz   5ghz} rrm coverage</b> <b>Example:</b> Device(config)# ap dot11 24ghz rrm coverage	Configures the 802.11 coverage level for data packets.  Use the <b>no</b> form of the command to disable CHD.
<b>Step 2</b>	<b>ap dot11 {24ghz   5ghz} rrm coverage data {fail-percentage   packet-count   rssi-threshold}</b> <b>Example:</b> Device(config)# ap dot11 24ghz rrm coverage data fail-percentage 60	Configures the 802.11 coverage level for data packets. <ul style="list-style-type: none"> <li>• <b>fail-percentage:</b> Configures the 802.11 coverage failure-rate threshold for uplink data packets as a percentage that ranges from 1 to 100%.</li> <li>• <b>packet-count:</b> Configures the 802.11 coverage minimum failure count threshold for uplink data packets that ranges from 1 to 255.</li> <li>• <b>rssi-threshold:</b> Configures the 802.11 minimum receive coverage level for data packets that range from -90 to -60 dBm.</li> </ul>
<b>Step 3</b>	<b>ap dot11 6ghz rrm coverage data {fail-percentage fail-percentage-value   packet-count packet-count-value}</b> <b>Example:</b> Device(config)# ap dot11 6ghz rrm coverage data fail-percentage 60	Configures the 802.11 6-GHz coverage hole detection for data packets. <ul style="list-style-type: none"> <li>• <b>fail-percentage:</b> Configures the 802.11 6-GHz coverage failure-rate threshold for uplink data packets as a percentage that ranges from 1 to 100%.</li> <li>• <b>packet-count:</b> Configures the 802.11 6-GHz coverage minimum failure count threshold for uplink data packets that ranges from 1 to 255.</li> </ul>

	Command or Action	Purpose
Step 4	<p><b>ap dot11 {24ghz   5ghz} rrm coverage exception global <i>exception level</i></b></p> <p><b>Example:</b></p> <pre>Device(config)# ap dot11 24ghz rrm coverage exception global 50</pre>	Configures the 802.11 Cisco AP coverage exception level as a percentage that ranges from 0 to 100%.
Step 5	<p><b>ap dot11{24ghz   5ghz}rrm coverage level global <i>cli_min exception level</i></b></p> <p><b>Example:</b></p> <pre>Device(config)# ap dot11 24ghz rrm coverage level global 10</pre>	Configures the 802.11 Cisco AP client minimum exception level that ranges from 1 to 75 clients.
Step 6	<p><b>ap dot11 {24ghz   5ghz} rrm coverage voice {fail-percentage   packet-count   rssi-threshold}</b></p> <p><b>Example:</b></p> <pre>Device(config)# ap dot11 24ghz rrm coverage voice packet-count 10</pre>	<p>Configures the 802.11 coverage hole detection for voice packets.</p> <ul style="list-style-type: none"> <li>• <b>fail-percentage:</b> Configures the 802.11 coverage failure-rate threshold for uplink voice packets as a percentage that ranges from 1 to 100%.</li> <li>• <b>packet-count:</b> Configures the 802.11 coverage minimum failure count threshold for uplink voice packets that ranges from 1 to 255.</li> <li>• <b>rssi-threshold:</b> Configures the 802.11 minimum receive coverage level for voice packets that range from -90 to -60 dBm.</li> </ul>
Step 7	<p><b>ap dot11 6ghz rrm coverage voice {fail-percentage <i>fail-percentage-value</i>   packet-count <i>packet-count-value</i>}</b></p> <p><b>Example:</b></p> <pre>Device(config)# ap dot11 6ghz rrm coverage voice packet-count 10</pre>	<p>Configures the 802.11 6-GHz coverage hole detection for voice packets.</p> <ul style="list-style-type: none"> <li>• <b>fail-percentage:</b> Configures the 802.11 6-GHz coverage failure-rate threshold for uplink voice packets as a percentage that ranges from 1 to 100%.</li> <li>• <b>packet-count:</b> Configures the 802.11 6-GHz coverage minimum failure count threshold for uplink voice packets that ranges from 1 to 255.</li> </ul>
Step 8	<p><b>end</b></p> <p><b>Example:</b></p> <pre>Device(config)# end</pre>	Returns to privileged EXEC mode. Alternatively, you can also press <b>Ctrl-Z</b> to exit global configuration mode.

	Command or Action	Purpose
<b>Step 9</b>	<b>show ap dot11 {24ghz   5ghz   6ghz} coverage</b>  <b>Example:</b>  Device# show ap dot11 5ghz coverage	Displays the CHD details.



**Note** If both the number and percentage of failed packets exceed the values entered in the **packet-count** and **fail-rate** commands for a 5-second period, the client is considered to be in a pre-alarm condition. The controller uses this information to distinguish between real and false coverage holes. False positives are generally due to the poor roaming logic implemented on most clients. A coverage hole is detected if both the number and percentage of failed clients meet or exceed the values entered in the **coverage level global** and **coverage exception global** commands over a 90-second period. The controller determines if the coverage hole can be corrected and, if appropriate, mitigates the coverage hole by increasing the transmit power level for that specific access point.

## Configuring CHD for RF Tag Profile (GUI)

### Procedure

- Step 1** Choose **Configuration > Radio Configurations > RRM**.
- Step 2** On the **Coverage** tab, select the **Enable Coverage Hole Detection** check box.
- Step 3** In the **Data Packet Count** field, enter the number of data packets.
- Step 4** In the **Data Packet Percentage** field, enter the percentage of data packets.
- Step 5** In the **Data RSSI Threshold** field, enter the actual value in dBm. Value ranges from -60 dBm to -90 dBm; the default value is -80 dBm.
- Step 6** In the **Voice Packet Count** field, enter the number of voice data packets.
- Step 7** In the **Voice Packet Percentage** field, enter the percentage of voice data packets.
- Step 8** In the **Voice RSSI Threshold** field, enter the actual value in dBm. Value ranges from -60 dBm to -90 dBm; the default value is -80 dBm.
- Step 9** In the **Minimum Failed Client per AP** field, enter the minimum number of clients on an AP with a signal-to-noise ratio (SNR) below the coverage threshold. Value ranges from 1 to 75 and the default value is 3.
- Step 10** In the **Percent Coverage Exception Level per AP** field, enter the maximum desired percentage of clients on an access point's radio operating below the desired coverage threshold and click **Apply**. Value ranges from 0 to 100% and the default value is 25%.
- Step 11** Click **Apply**.

## Configuring CHD for RF Profile (CLI)

Follow the procedure given below to configure Coverage Hole Detection (CHD) for RF profile.

**Before you begin**

Ensure that the RF profile is already created.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> Device# <code>configure terminal</code>	Enters global configuration mode.
<b>Step 2</b>	<b>ap dot11 {24ghz   5ghz   6ghz} rf-profile</b> <i>rf-profile-tag</i> <b>Example:</b> Device(config)# <code>ap dot11 24ghz rf-profile</code> <code>alpha-rfprofile-24ghz</code>	Configures the 802.11 coverage hole detection for data packets.
<b>Step 3</b>	<b>coverage data rssi threshold</b> <i>threshold-value</i> <b>Example:</b> Device(config-rf-profile)# <code>coverage data</code> <code>rssi</code> <code>threshold -80</code>	Configures the minimum RSSI value for data packets received by the access point. Valid values range from -90 to -60 in dBm.
<b>Step 4</b>	<b>end</b> <b>Example:</b> Device(config-rf-profile)# <code>end</code>	Returns to privileged EXEC mode.
<b>Step 5</b>	<b>show ap dot11 24ghz rf-profile summary</b> <b>Example:</b> Device# <code>show ap dot11 24ghz</code> <code>rf-profile summary</code>	Displays summary of the available RF profiles.

