



## RRM Data Collection Activities

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### RRM Data Collection Activities

The RRM processes collect data to use in the organization of RRM as well as for processing channel and power selections for the connected APs. A base understanding of where RRM gets its information and how is essential to understand the algorithms. For now, how and where to configure monitoring tasks, and what that translates to in an operational environment will be covered. For each RRM algorithm discussed, what data is used and how it is used will be covered in the discussion.

The channel list monitored is configured under **Wireless=>802.11a/b=>RRM=>General - Noise/Interference/Rogue/CleanAir Monitoring Channels**

Figure 1: RRM General Configuration Dialogue

The screenshot displays the Cisco RRM General Configuration Dialogue for 802.11a. The interface is divided into a left-hand navigation pane and a main configuration area. The navigation pane includes sections for Access Points, Radios (802.11a/n, 802.11b/g/n, Dual-Band Radios, Global Configuration), Advanced, Mesh, RF Profiles, FlexConnect Groups, and 802.11a/n (Network, RRM, RF Grouping, TPC, DCA, Coverage, General, Client Roaming, Media, EDCA Parameters, DFS (802.11h), High Throughput (802.11n), CleanAir). The main configuration area is titled '802.11a > RRM > General' and contains several sections:

- Profile Threshold For Traps:** Interference (0 to 100%) is set to 10; Clients (1 to 75) is set to 12; Noise (-127 to 0 dBm) is set to -70; Utilization (0 to 100%) is set to 80.
- Noise/Interference/Rogue/CleanAir Monitoring Channels:** The Channel List is set to 'All Channels'.
- Monitor Intervals (60 to 3600 secs):** Channel Scan Interval is set to 180; Neighbor Packet Frequency is set to 60.
- Factory Default:** A button labeled 'Set to Factory Default' is present.
- Foot Notes:** A note states: '1. CleanAir monitoring is done on these channels only when the AP is in monitor mode.'

The choices for monitoring are:

- 1 **All Channels**—RRM channel scanning occurs on all channels supported by the selected radio, which includes channels not allowed in the country of operation. (passive only).
- 2 **Country Channels**—RRM channel scanning occurs only on the data channels in the country of operation. This is the default value.
- 3 **DCA Channels**—RRM channel scanning occurs only on the channel set defined by the DCA algorithm, which by default includes all of the non-overlapping channels allowed in the country of operation. However, you can modify the channel set to be used by DCA if desired.

Two types of off-Channel events are defined:

- 1 **Passive Dwell**—used to detect Rogues, and collect noise and interference metrics. The dwell time is 50 ms
- 2 **Neighbor Discovery Protocol Tx**—used to send the NDP message from all channels defined under the monitor set.

The Channel Scan Frequency (Wireless=>802.11a/b=>RRM=>General) is 180 seconds (default value). This means all channel dwells must be completed within 180 seconds. So depending on the number of channels defined by the selection in the Monitor list, the interval between dwells will increase or decrease. For instance:

- Channel List = DCA, slot=0 (2.4 GHz) – DCA defines channels 1,6,11 for a total of 3 channels. So  $180 \text{ (seconds)} / 3 \text{ (channels)} = 60$ , the AP will go off channel every 60 seconds to listen.
- Channel List = Country, slot=1 (5 GHz) in the –A regulatory domain (US) with UNii 2e enabled - gives us 22 channels defined – so  $180 \text{ (seconds)} / 22 \text{ (channels)} = 8.18$ , the AP will go off channel every 8 seconds or so to listen for 50 ms.

Neighbor Packet Frequency is also defined on the same page, the default value is 60 seconds. This means that the radio must go off channel and send a single NDP packet for every channel defined by the channel monitoring list within 60 seconds. Using the same example from above where Channel List = Country and slot=1 (5 GHz) this translates to  $60 \text{ (seconds)} / 21 \text{ (channels)} = 3$  seconds, so for every three second the radio is sending an NDP packet on a channel other than the one it is currently serving.

Both the Channel Scan Interval, and the Neighbor Packet Frequency should be left at the default values. The Monitoring Channels list is set by default to use country channels; this is best for wIPS configurations. However if wIPS is not a primary concern, you can select DCA channels and reduce off channel activity to just the channels which you are using.

