



## CHAPTER 25

# Configuring Link Noise Monitor

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Noise on T1 and E1 links that span between the BTS and central office can affect voice quality for mobile users to the point where it becomes unacceptable. To monitor the quality of individual links in a multilink bundle, you can configure the Link Noise Monitor (LNM) on your Cisco MWR 2941 router.

The LNM detects, alerts, and removes noisy links from a bundle based on user-defined thresholds and durations. In addition, the LNM notifies the operator once the quality of the line has improved, and restores the link service if the link has been removed.

To detect noise on a link, the LNM monitors the following two types of errors which make up the Bit Error Rate (BER) and compares the number of errors with the user-defined thresholds:

- Line Code Violation (LCV)—A Bi-Polar Violation (BPV) or Excessive Zeroes (EXZ) error has occurred.
- Path Code Violation (PCV)—A Cyclic Redundancy Check (CRC) error, which is generally caused by one or more LCV or logic errors, has occurred in a time slot.

The LNM provides the following types of noise monitors:

- Link Warning—Issues a warning when the noise level of a link exceeds a user-defined threshold and notifies the operator when the noise level improves to the point that it drops below a second user-defined threshold.
- Link Removal—Issues an error and removes a link from service when the noise level of the link exceeds a user-defined threshold and restores the link and provides notification when the noise level improves to the point that it drops below a second user-defined threshold.



**Note**

If the noise level on the last active link in a multilink bundle exceeds the Link Removal threshold, an alert is issued but the link will not be removed from service. If this situation occurs, the standard T1 error rate is used to determine if the last active link must be removed from service.

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To configure the LNM feature, issue the **span** command from controller configuration mode of each T1 or E1 link in the bundle that you want to monitor. To disable LNM on a link, issue the **no** version of the command from controller configuration mode of the link.

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span { warn | remove } [ { [ lcv value [ pcv value ] ] [ duration seconds ] } set | clear ]
```

where:

- **warn**—Enables Link Warning monitoring on the link.
- **remove**—Enables Link Removal monitoring on the link.

- **lcv value**—Threshold (in bit errors per second) that when exceeded for the configured duration when the **set** keyword has been specified, creates a condition (warning or link removal), or when fallen below for the configured duration when the **clear** keyword has been specified, clears the condition.

For T1 links:

- Valid range is 5 to 1544.
- For Link Warning monitoring, the default is 15.
- For Link Removal monitoring, the default is 154.

For E1 links,

- Valid range is 7 to 2048.
- For Link Warning monitoring, the default is 20.
- For Link Removal monitoring, the default is 205.

- **pcv value**—Number of time slots in errors per second. If not specified by the user, this value is calculated from the LCV threshold based on a Gaussian distribution that matches typical noise-induced errors.

For T1 links:

- Valid range is 3 to 320.
- For Link Warning monitoring, the default is 15.
- For Link Removal monitoring, the default is 145.

For E1 links,

- Valid range is 8 to 832.
- For Link Warning monitoring, the default is 20.
- For Link Removal monitoring, the default is 205.

- **duration seconds**—Number of seconds that a threshold must be exceeded to create a condition or fallen below to clear a condition. Valid range is 1 to 600. The default is 10.

When specified with the **lcv** keyword, the duration must be configured after the LCV threshold. For example, **span warn lcv 55 duration 20** is a correct way to issue the command; **span warn duration 20 lcv 55** is not.

- **set**—Specifies that the values configured for the **span** command are to be used to set a condition.
- **clear**—Specifies that the values configured for the **span** command are to be used to clear a condition.

## Usage Notes

When configuring the LNM, please note the following:

- If the **warn** and **remove** keywords are specified without any other options, the LCV and PCV thresholds and duration defaults will be used to determine (**set**) and clear (**clear**) the condition.
- If the **span** command is issued with the **set** keyword specified (defining the LNM type and parameters to use to determine a condition exists) and the command is not issued again with the **clear** keyword specified (defining the parameters used to clear a condition), or vice versa, the values configured for the threshold and duration will be used for both.
- If the **span** command is issued without either the **set** or **clear** keywords specified, **set** is the default.

- The **set** and **clear** keywords can only be specified if the threshold and/or duration has been specified.
  - If the PCV threshold is not configured (using the **pcv** keyword and value), the threshold is calculated using Gaussian probability distribution that is representative of most noise environments.
  - The following SYSLOG messages have been added for fault notification:
    - %LNM-4- WARNEXCEED:Controller <Controller IF>, exceeded noise warning threshold <int>, duration <int>
    - %LNM-4- WARNIMPROVE:Controller <Controller IF>, noise improved below threshold <int>, duration <int>
    - %LNM-2-REMOVE:Interface <Serial IF> removed, noise exceeded threshold <int>, duration <int>
    - %LNM-2- RESTORE:Interface <Serial IF> restored, noise improved below threshold <int>, duration <int>
    - %LNM-2- REMEXCEED:Interface <Serial IF>, noise exceeded threshold <int>, duration <int>
    - %LNM-2- REMIMPROVE:Interface <Serial IF>, noise improved below threshold <int>, duration <int>
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