muffer command (Environment analyzer)

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Description

The "*muffer*" command is used to analyze the electromagnetic environment. Allows to test the electromagnetic environment rapidly, visually estimate the efficiency of the radio links utilization, reveal interference sources, and estimate their power. Several "*muffer*" module operating modes allow to display different levels of details in test results.

The analyzer can be stopped by pressing the "*Esc"* or "*Ctrl/C"* keys.

Syntax:

```
muffer IFNAME [-tXX] [-lXX] [-p] [-bg] {mac[2|3] | mynet | scan} [MAC]
muffer IFNAME sensor [record=SEC] [F1 [F2] [BW STEP]]
muffer IFNAME sensor [replay]
muffer stat [clear]
```

Parameters

Parameter	Description
IFNAME	The interface identifier for which the radio environment is monitored.
MAC	CPE MAC address to analyze. If not specified, information is displayed for all CPEs.

mac[2|3] |mynet	Allows to select MAC addresses analysis mode to estimate the number of clients with different MAC addresses and the efficiency of their radio link utilization.
	
	• "*mac*" – analyze data packets only.
	• "*mac2*" – analyze data packets and link-level ACK messages (if possible).
	• "*mac3*" – in addition to mac2 mode, includes pulses noise counter:
	
	    • The first value is the number of electromagnetic energy peaks during the scanner operation. The Pulses counter includes frames for which the modulation and source MAC address could not be recognized.
	    • The "*SNR*" value shows an average noise level, the first value is a noise level relative to the receiver sensitivity at a given modulation (dB), the second is an absolute input signal level (dBm).
	    • The "*PPS*" value indicates an average pulses per second number. The value over 50 pps indicates a high noise level.
	
	• "*mynet*" – analyze only packets from the given network.

scan	Provides deep analysis of radio emission sources within the given network. In this mode, the device scans the radio spectrum on all frequencies and for all modulation types. Information is displayed on any source of irregular (non-repetitive) radio signals. To obtain information as complete as possible, the scanning process may take significant time.
-p	Allows to show the result as plain text (without the cursor control commands). It can be useful in case of including scan results in a diagnostic map or running scan process via web-interface (Remote Commands).
-tXX	Specifies the time duration, in seconds, for which the test mode is enabled (2 minutes by default). The "0" value cancels the time limit completely.

Title

-lXX	Specifies the number of lines on the screen for displaying test results (24 lines by default).
-bg	If specified, the analysis is carried out in the background, the results will be recorded in the system log.
sensor [record=SEC] [F1 [F2] [BW STEP]]	Enables the spectrum analyzer mode, provides deep analysis of radio emission sources. Information is displayed in a alphanumeric format. 🛇 **CAUTION** Running "Spectrum Analyzer" mode disturbs normal operation of the radio module and makes it impossible to access the unit via radio. • "*F1*" – sets the initial frequency for scanning in MHz. Minimal available frequency for the given equipment model is used by default. • "*F2*" – sets the ending frequency for scanning in MHz. Maximal available frequency for the given equipment model is used by default. The actual shown ending frequency is limited by the size of the program window. • "*BW*" – sets bandwidth in MHz. Allowed values are 1/5/10/20 MHz depending on the concrete equipment type. • "*STEP*" – sets frequency changing step in MHz. Allowed values are 1/5/10/20 MHz but no more than defined bandwidth value. • "*record*" – starts spectrum analyzer in the background mode with the specified duration time in seconds. ⚠ **NOTE** The spectrum analyzer mode works on all platforms except H02. • "*replay*" – shows the last spectrum analyzer scan result.
stat [clear]	Enables statistic mode which is used to estimate link load intensity for each client. The amount of packets sent and received, and the retransmissions number is shown for each MAC address participating in the data exchange. A large retransmissions number caused by a low signal level or a lot of interference leads to useless channel loading and decreasing the overall network bandwidth. • "*clear*" – resets all counters.

Examples

Display the "*mac2*" mode output.

Scanned frequency

Freq: 4900 Band: 40 (CRC errors: 0)

Number of packets received from each unit

56	(14/14)	12
42	(13/13)	18
14	(12/12)	18

Current signal level

Average signal level

The "mac2" mode output

Possible node types values are:

- "*N*" – neighbor (connected).
- "*C*" – candidate (not connected yet).
- "*n*" – MINT network known mode.
- "*-*" – unknown source.
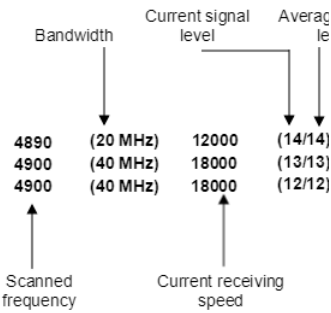- "*LA*" – locally defined node (not authenticated)
- "*LD*" – locally defined node (disabled).
- "*A*" – not authenticated MINT node.
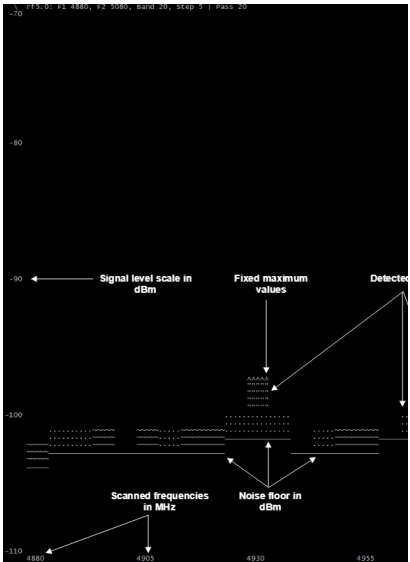- "***" – own MAC address.

Title

Enable the "*scan*" mode.

The "scan" mode output

Enable spectrum analyzer for frequency range 4880...5080 MHz with bandwidth 20 MHz end step 5 MHz.

```
muffer rf5.0 sensor 4880 5080 20 5
```


Spectrum analyzer output

Title

Display links to CPEs load statistic.

Average numb
per pa

Number of unique   Number of
packets transmitted   pack

	MAC	Out/
rf5.0	00043522A514	167277/
rf5.0	00043523F7DD	280971/
TOTAL:		448248/

Burst: → Send 42933+52710   (max 10,
PHS: │ Packets 33734, bytes 473680 (
        Sent packets   Re
        statistic
                                    Aggr

Statistic mode output