

# InfiLINK 2x2 and InfiMAN 2x2

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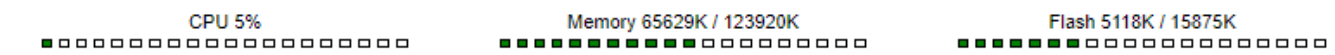
InfiLINK 2x2 and InfiMAN 2x2 product families have a wide range of monitoring capabilities. This section describes the web interface with all the utilities it offers, as well as the CLI command review for maintenance and monitoring of the devices and of the network status.

## Web interface

This article is only intended to briefly point out the main parameters that are relevant for device monitoring and troubleshooting. For more information about the Web interface please proceed to [Infinet Wireless R5000 - Web GUI - Technical User Manual](#).

### Device status section

There is a hardware monitoring information at the top of the section. Displays the CPU, memory and flash usage of the unit in real time.



### Interface statistics

Displays the status, MAC address and operational mode for each interface, along with the traffic load for Rx/Tx, the number of packets transferred on Rx/Tx and the Rx/Tx errors.

Interface Statistics

Uptime: 53 days 03:10:21   Sync Off   H08S11-TDMAv2.1.11

Interface	MAC Address	Status	Mode	Packets Rx/Tx	Errors Rx/Tx	Load (Kbps) Rx/Tx	Load (pps) Rx/Tx
eth0	00043503724f	Up	100 Mbps Full Duplex	552398 / 322207	0 / 0	29 / 29	15 / 11
rf5.0	00043513724f	Up	130 Mbps / 5430 MHz / 20 MHz / 27 dBm / GF / IDFS / DFSONLY	532286 / 1901817	132 / 0	31112 / 33325	1394 / 1484
svi1	L2 Management Interface 02043503724f	Up	Switch Group #1	320914 / 20390	0 / 0	9 / 11	6 / 2

Reset All Counters   Graphs

Extended interface statistics can be obtained by clicking on the the interface you are interested in. The following statistics are available:

#### General Statistics

Displays the operational mode of the interface and detailed information about the packet types sent and received (bytes, load, CRC errors, pause packets, runs, alignment errors, multiple collisions, single collisions, queue overflow etc).

#### QoS Statistics

In order to ensure the necessary quality of service for each application, user or data stream, different prioritization queues are used. QoS statistics displays the number of inbound and dropped packets for each priority queue, making it easy to identify and monitor the traffic types flowing through the unit.

#### Network address table

Displays the address table for a specific interface.

#### Modulation Statistics

Displays information about the modulation types, such as receive and transmit statistics for different coding schemes. This statistic is available in the firmware version with "TDMA" support.

#### Errors/Drops Statistics

Displays the number of errors, retries and dropped packets during transmission for each link. The number of retries must be close to zero and if this number is more than 10%, the radio cannot work properly.

## Title

TX Retries/Errors/Drops statistics										X
MAC	Name	TX Packets	TX Retries	TX Drops	TX Errors	SNR	Lost/Late ACK	Cap min Rx/Tx	Cap max Rx/Tx	
00043523FA93	Slave	52022	29 (0%)	0 (0%)	0 (0%)	30.28	4 / 1	24 / 25	47 / 49	
00043523FA94	Slave 2	855302	31128 (3%)	635 (0%)	0 (0%)	37.39	5 / 20	27 / 31	53 / 62	
FFFFFFFFFFFF		797793		0 (0%)	0 (0%)					
<div>Close</div> <div>Reset</div> <div>Auto Refresh: <input checked="" type="checkbox"/></div>										

### Radio Scanner

Allows to rapidly test the electromagnetic environment, visually estimates the efficiency of the air link utilization, reveals any pulses received (from unknown sources) and estimates their power. Every source of interference is displayed separately containing useful information like: signal level, bitrate, source type and frequency. It is therefore easy to identify the unknown radio sources. The pulses field shows the total number of noise impulses, the average impulse signal level and the number of pulses per second. If the number of pulses per second is more than 60, it means that you have an interference problem, which can affect the quality of the link.

Radio Scanner

X

Bandwidth (MHz)	20	Frequency (MHz)	5430
-----------------	----	-----------------	------

Total sources	2
Total packets	12488
Skipped packets	0
CRC errors	0
Pulses	0, avg level 0 (0), avg pps 0.0

Count	MAC	Type	Level	Bitrate	Length	Name	SID	Freq
6253	<00043523FA93	N	31 / -63	13000 (0x81)	75	Slave		5430 (20 MHz)
6235	<00043523FA94	N	41 / -53	13000 (0x81)	74	Slave 2		5430 (20 MHz)

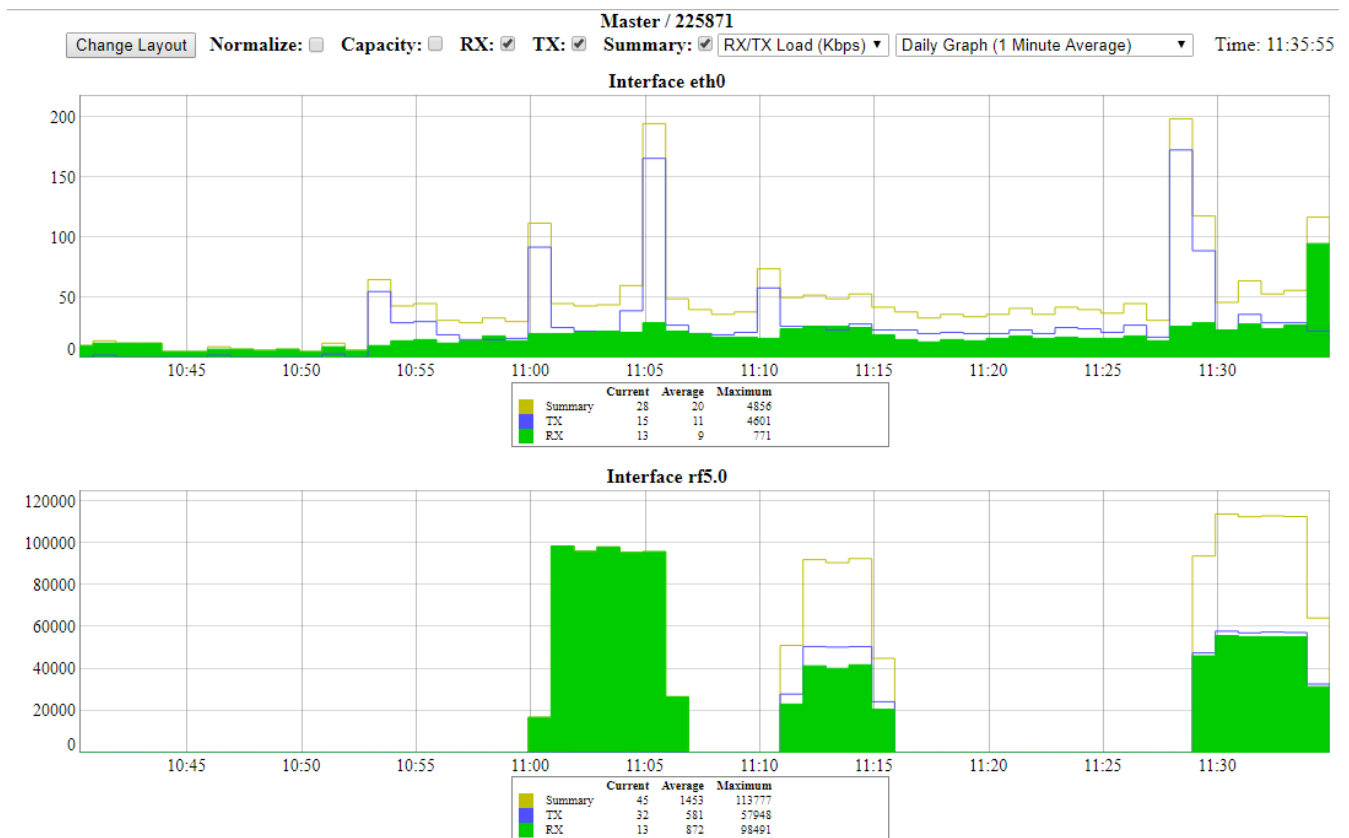
Type	Description	Type	Description
N	Neighbor (connected)	LA	Locally defined node (not authenticated)
C	Candidate (not connected yet)	LD	Locally defined node (disabled)
n	Known node in the MINT network	A	Not authenticated MINT node
T	TDMA Master	-	Unknown source

Close

Auto Refresh: ☒

### Graphs

The same information that is displayed in real time in the statistics tables can be monitored continuously using graphs in order to visualize the evolution in real time, daily or monthly. The Rx/Tx Load and CPU load can be monitored for each interface and the reference level, retries, Rx/Tx load and bitrate graphs are available for the radio link monitor.



## Links Statistics on rf5.0

The top of this section displays the following information for the radio interface of the unit:

- Node name and ID
- Noise level
- Number of established links
- ATPC status (activated or deactivated)
- Autobitrate status (activated or deactivated)
- Polling mode (if the software with Polling technology support is used)
- TDMA parameters (if the software with TDMA technology support is used):
  - Operational mode of the unit (Master/Slave)
  - Time slot duration (in microseconds)
  - Downlink percentage of the time slot
  - Maximum RSSI level (in dBm)
  - Maximum operational distance (in kilometers)
  - RX/TX Capacity

### Links Statistics on rf5.0 (Master ID: 25871) Links: 2

Noise: -96 dBm ATPC: On Autobitrate: On TDMA: Master (Frame:5 ms DL/UL: Auto RSSI: -43 Distance: 1 km) RX/TX Capacity: 41/55 Mbps

Status	MAC Address	Name	Node ID ▼	Distance (Km)	Tx Power (dBm) Rx/Tx	RSSI (dBm) Rx/Tx	SNR (dB) Rx/Tx	Level (dB) Rx/Tx	Bitrate Rx/Tx	Retries (%) Rx/Tx	Load (Kbps) Rx/Tx	Load (pps) Rx/Tx
1 day	00043523fa93	Slave	60755	0.21	25 / 27	-62 / -54	31 / 37	20 / 16	78 / 104	12 / 0	28 / 21	12 / 11
1 day	00043523fa94	Slave 2	60756	0.21	12.5 / 27	-51 / -29	40 / 60	18 / 29	117 / 130	0 / 0	6 / 4	1 / 0

Hint: Click on link data to invoke Extended Link Diagnostics menu

Route Map Graphs

## Status

Gives a color indication for the wireless connection quality with the neighbor unit, link uptime and some other options:

- Red: poor connection;
- Yellow: good connection;
- Green: excellent connection;
- F – relevance of remote unit firmware (optional). Indicates that the remote unit has an older firmware than the local one;

## Title

- ? – system password of the remote unit (optional). Indicates that the remote unit has no system password;
- E – Ethernet port status on the remote device (optional). Indicates that the remote device Ethernet port is flapping.

**RSSI** (only for software with TDMA technology support)

Displays the power of the received radio signal:

- "Rx" – the power of the received radio signal, measured at the local unit;
- "Tx" – the power of the received radio signal, measured at the remote unit;
- "\*" – indicates the difference in the signals power for the vertical and horizontal polarizations.

Desirable values are between -40 and -60 dBm.

### **SNR**

Displays the ratio of the useful signal power to the noise power for the input and output signals at the neighbor unit (in dB), should be equal to or greater than 28 dB.

### **Level**

It is an abstract value that shows the fading margin for the current modulation. If it is lower than 10 dB or if there are a big difference between RX and TX (more than 5 dB), then this may indicate problems.

### **Bitrate**

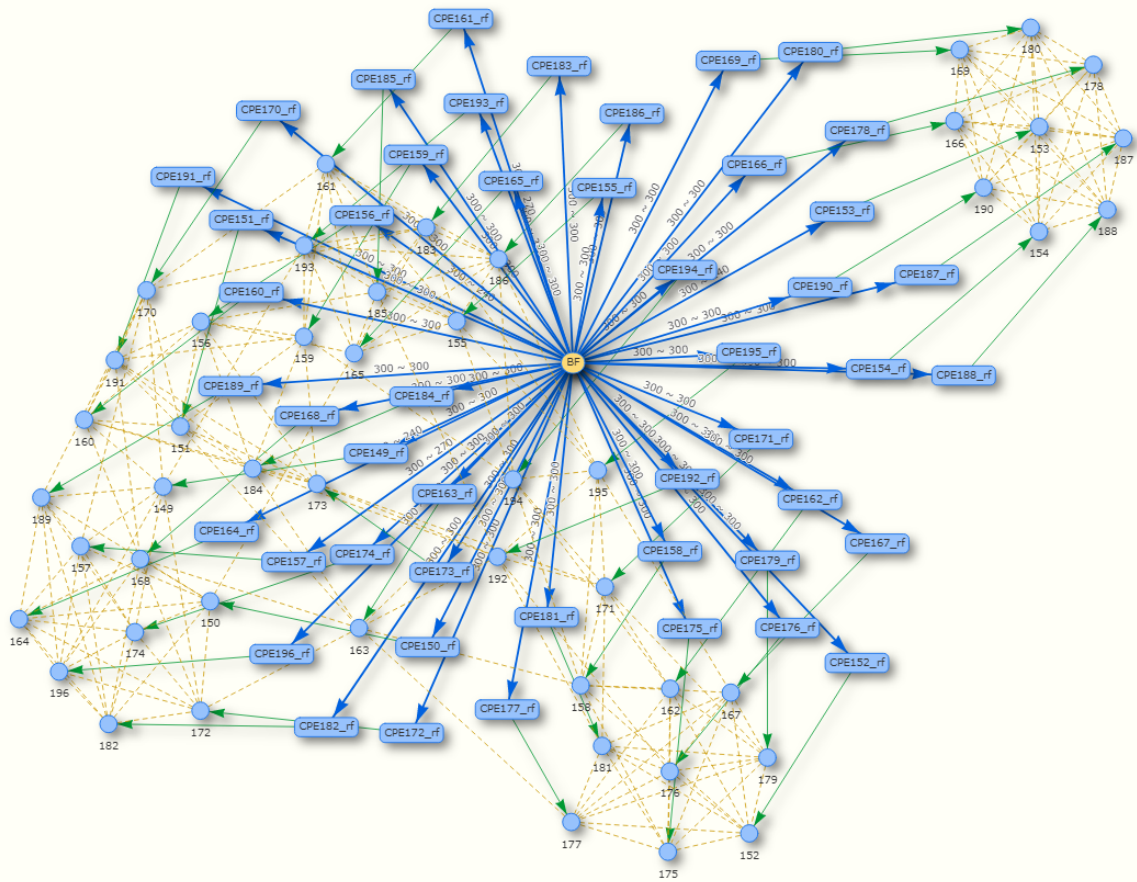
Displays the current bitrate value for the Tx and Rx signals of the neighbor unit.

### **Retries**

Displays the percentage of Tx and Rx retries of the neighbor unit, might tend to zero, if this number is more than 10% the link cannot work properly.

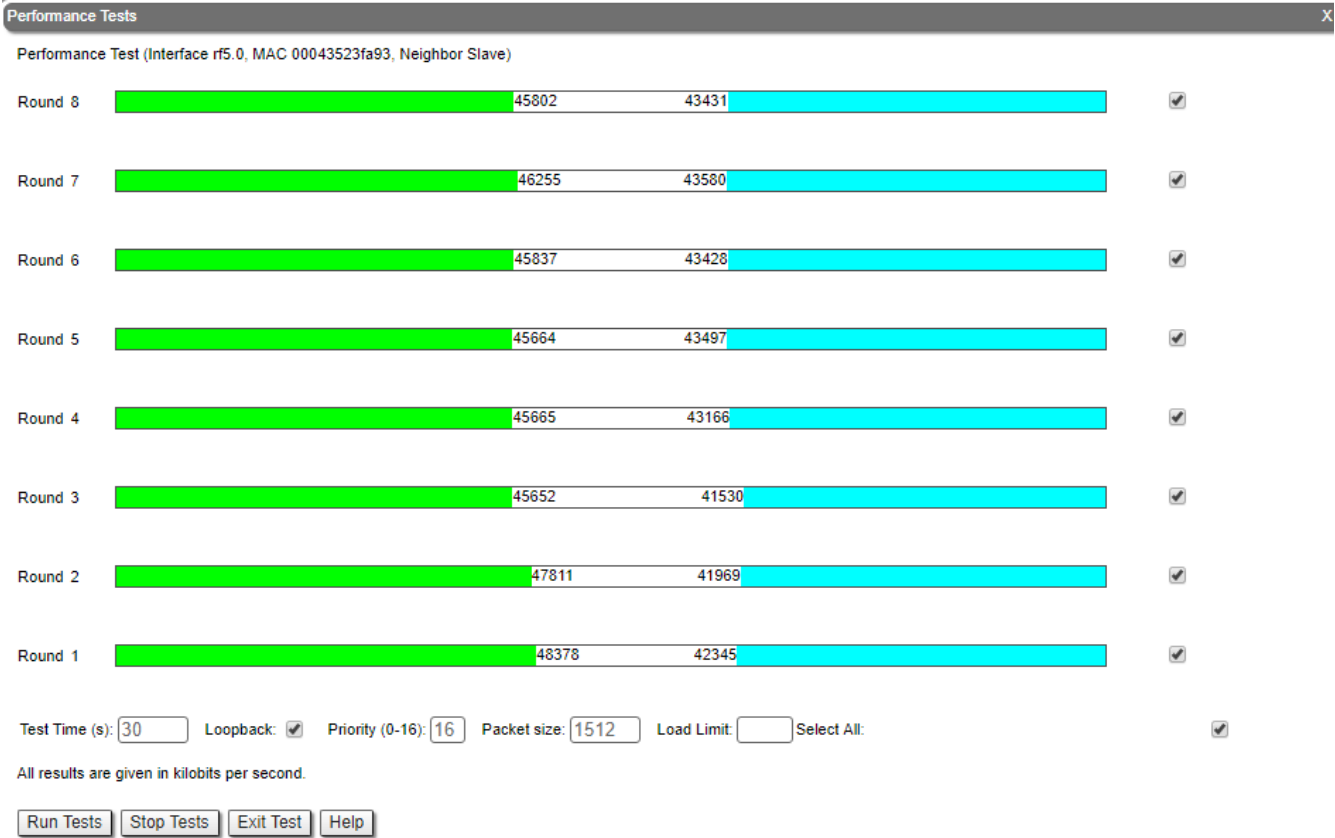
### **Route map**

Displays the MINT topology schematic map with visualization of the active and alternative routes to each node. Allows to visually determine the network connectivity and complexity and to track the route switching, including mobile objects, showing also the bitrate value, Ethernet interface state and wired connections.



## Performance test

Traffic is generated one way or bidirectional in order to test the link throughput. For the software with Polling technology support, traffic is generated with different bitrates and it will display the maximum throughput obtained for each bitrate, together with the number of retries (the number of retries reflects the quality of the link – an increased number of retries or retransmissions indicates a bad quality). For the software with TDMA technology support, traffic is generated with the maximum possible bitrate. In case of testing a link that operates in poor radio conditions, it shows that higher bitrates have a lot of retries and low throughput.

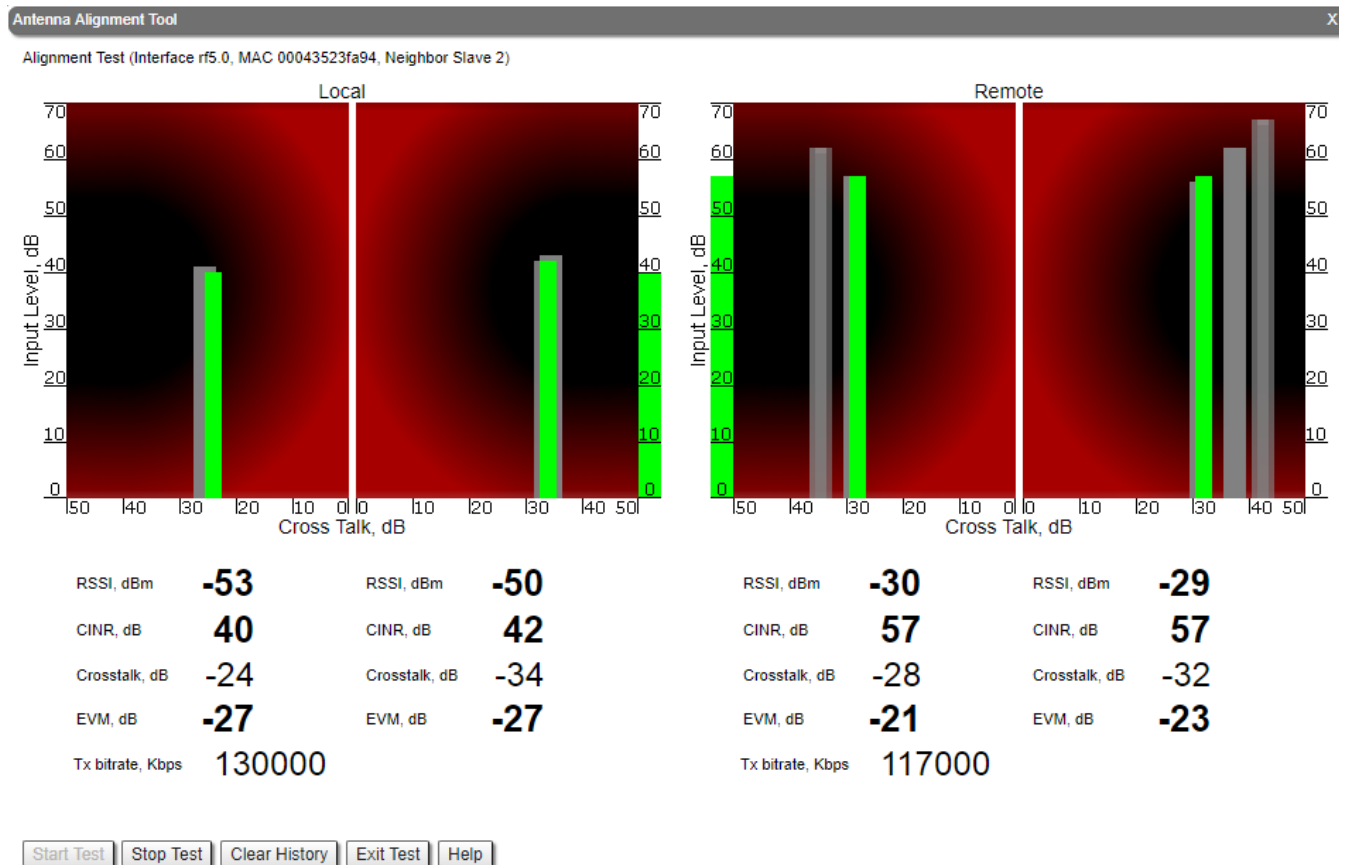


Antenna Alignment

An intuitive graphical tool that helps to check the antenna alignment and to troubleshoot problems related to the link quality (errors, retries, poor signal level). It provides information about the RSSI level, the signal level, retries in percentage, Error Vector Magnitude (EVM) and bitrate. Some basic guidelines:

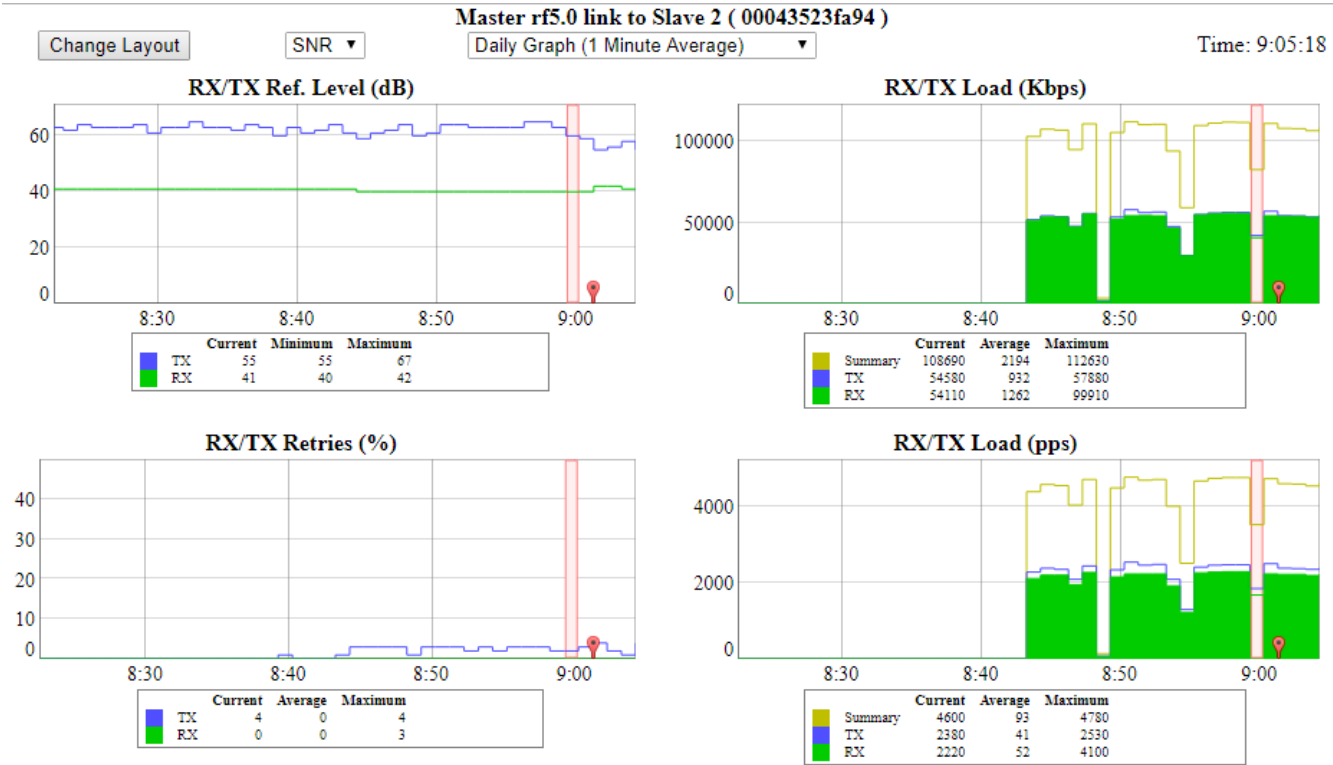
- For correct alignment the green graphical indication for the signal level should be seen as close as possible to the center of the black area.
- Parameter display section: the optimal level for the RSSI is between -60 to -40 dBm, the CINR (carrier-to-interference-and-noise ratio), should be equal to or greater than 28 dB. The Crosstalk indicates the influence of the vertical and horizontal polarizations on each other, and it should not exceed -20 dB. Error or Vector Magnitude shows how far are the real constellation points from the ideal ones in the modulation scheme. The optimal value is below -21 dB. If the CINR level is more than 50 dB the Tx power should be reduced. Sometimes levels below 12 dB can be enough to have an operational link, but for this to happen, the EVM should be more than 21 and the retries should be very small.

## Title



### Statistics graphs

Allows to monitor the device parameters represented in the graphical charts. It helps to find out the exact time when the problem occur and critical events like link outages or frequency swaps are marked by small red markers on the bottom of each graph.

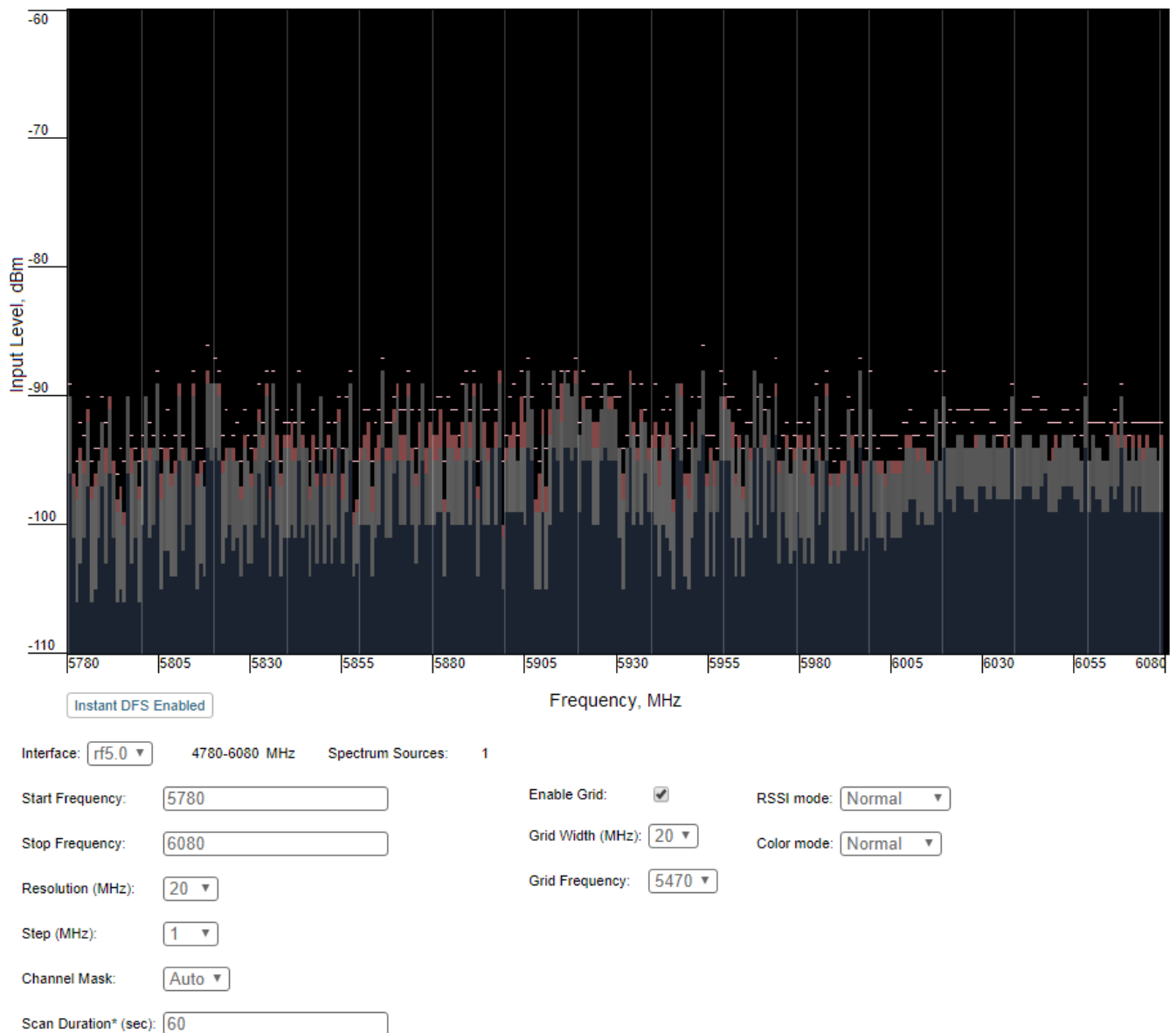


Spectrum analyzer

Performs a scan of the electromagnetic spectrum in the desired frequency range and provides detailed information about the emitting sources present in the area. While the test is being performed, the link is disconnected and the unit will function in listening mode only. Interference can be easily spotted this way.

Interference pulses are displayed for the frequencies that are polluted. By pointing over the desired pulse, detailed information will be displayed about the strength of the interference: input level, max, average and high RSSI. As it can be seen in the picture below, it is easy to spot the affected areas in the spectrum. The scan is available based on customized parameters: start/stop frequency, band, step, channel mask and scan duration.





## Maintenance

The following management options are available from the Web interface, Maintenance section:

### Firmware, license and configuration management

The existing firmware, license or configuration can be viewed, downloaded or updated.

### Unit reboot

For remote reboot of the unit.

### Restore to factory settings

If needed, the unit can be restored to the factory default settings.

### Diagnostic card creation

In order to gather complete troubleshooting information and send it to the InfiNet Wireless technical support team, a diagnostic card must be created. This includes the configuration, system log messages, various output parameters, system messages, license information etc.

### Firmware

Firmware Version: H08S11-TDMAv2.1.11  
 Build Date: Apr 12 2019 09:37:32  
 Serial Number: 225871  
 Part Number: SkyMAN R5000-Omxbs/5.300.2x500  
 Platform: Processor: PPC460EX 1000 MHz  
 Uptime: 54 days 22:39:26  
 Last Reboot Reason: firmware upgrade

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## Remote commands

In addition, commands can be sent over the radio link to the remote unit. This is a useful feature when for example, the IP address of the remote unit is not reachable (it can be set to a different network class or not set at all) and its management becomes unavailable. In this case, the configuration of the remote unit can be checked using the remote commands. Information like routing table, ARP table, switch statistics etc can be queried and commands can be sent over the radio link in order to modify the existing configuration.

## Command Line Interface

The CLI represents a Unix-like command line interface used for the management and configuration of the device. CLI is available from the Web interface in the Command Line page or via Telnet or SSH connection. SSH is preferred because of the security features. Telnet is enabled by default, although the built-in SSH server requires activation using the command `"ssh start"`.

### MINT map

The `"mint map"` utility that displays information about all MINT neighbors for an easy tracking and troubleshooting, allows to estimate the signal level and current bitrate. The `"mint map detail"` command shows also additional information about each link, including the connection cost.

```
mint map detail

=====
Interface rf5.0  TDM (5 ms DL/UL:Auto) (RSSI=-43 Dist=1) (Sync Off)
Node  00043513724F  "Master", Id 25871, Nid 0, (Master)
Freq 5630, Band 20, Sid 10101010, autoBitrate 130000 (min 13000), Noise -92

-----
  Id      Name      Node      Level  Bitrate  Retry  Options
-----
  60755  Slave      00043523FA93  17/14   78/104   0/0    /S/
        load 3/2, pps 1/0, cost 51
        pwr 25/27, rssi -59/-53, snr 33/33
        dist 0.21
        H11v2.1.11, IP=10.10.10.2, up 2 days
  60756  Slave 2      00043523FA94  18/29   130/130   0/2    /S/
        load 8/5, pps 2/1, cost 51
        pwr 12.5/27, rssi -48/-23, snr 42/61
        dist 0.21
        H11v2.1.11, IP=192.168.103.37, up 02:00:06
-----

2 active neighbors
Total load: 11/7 (rx/tx), 18 (sum) Kbps
Total nodes in area: 3
```

Ltest

A utility for radio link testing, providing real-time monitoring of the current and maximum signal levels, retries, errors and throughput testing.

```
ltest rf5.0 00043523FA94

Unicast test to 000435230A20 via rf5.0 with priority 16 packet size 1024, reply size 1024, bitrate 117000,
reply bitrate 130000
rt - retries, up - undelivered packets, ua - undelivered acks

-----+-----+-----
| local | remote | est. |
| amp/max | rt%/avg | up%/avg | ua%/avg | amp/max | rt%/avg | up%/avg | ua%/avg | rtt |
|-----+-----+-----|
| 17/17 | 0/0 | 0/0 | 0/0 | 17/17 | 0/0 | 0/0 | 0/0 | 6.3 |
| 17/17 | 0/0 | 0/0 | 0/0 | 17/17 | 0/0 | 0/0 | 0/0 | 6.9 |
| 17/17 | 0/0 | 0/0 | 0/0 | 17/17 | 0/0 | 0/0 | 0/0 | 11 |
| 17/17 | 0/0 | 0/0 | 0/0 | 17/17 | 0/0 | 0/0 | 0/0 | 9.2 |
```

The command output for the software with TDMA technology support is limited by "amp/max" and "rtt" columns.

```
ltest rf5.0 00043523FA94

Unicast test to 00043523FA94 via rf5.0 with priority 16
packet size 1024, reply size 1024, bitrate 130000, reply bitrate 130000

-----+-----+-----
| local | remote | est. |
| amp/max | amp/max | rtt |
| dB | dB | ms |
|-----+-----+-----|
| 19/19 | 28/28 | 16 |
| 20/20 | 28/28 | 16 |
| 19/20 | 28/28 | 18 |
| 20/20 | 28/28 | 16 |
```

## Muffer

The Muffer module allows to perform rapid testing of the electromagnetic environment showing the radio links utilization efficiency, the sources of interference and their power. The following muffer modes are available:

### MAC

Analyzes data packets only.

### MAC2

Analyzes data packets and link-level ACK messages (if possible).

```
muffer rf5.0 mac2
Freq:5630 Band:20 ( CRC errors: 0 )
  4  (32/-61) 13000 (5630,20 MHz) N <00043523FA93 Slave( CRC errors: 0 )
  4  (41/-50) 13000 (5630,20 MHz) N <00043523FA94 Slave 2( CRC errors: 0 )
  5  (32/-62) 13000 (5630,20 MHz) N <00043523FA93 Slave( CRC errors: 0 )
  5  (41/-50) 13000 (5630,20 MHz) N <00043523FA94 Slave 2( CRC errors: 0 )
  6  (32/-62) 13000 (5630,20 MHz) N <00043523FA93 Slave( CRC errors: 0 )
  6  (41/-51) 13000 (5630,20 MHz) N <00043523FA94 Slave 2( CRC errors: 0 )
```

### MAC3

In addition to the mac2 mode, includes impulse noisy signals calculation. Displays the number of detected pulses, their average signal level and the number pulses per second.

### MYNET

Analyzes only packets from the given network.

### Sensor

Enables the spectrum analyzer mode, provides deep analysis of the radio emission sources. The information is displayed in an alphanumeric format.

### Statistics

Enables statistic mode which is used to estimate the link load for each client. The amount of packets sent and received, and the retransmissions are shown for each MAC address participating in the data exchange.

```
muffer stat

      MAC          Out/Rep    %   SNR      Drop/Err
rf5.0 00043523FA93 1191371/6343 00 31:27    255/0      Slave
rf5.0 00043523FA94 781232/38907 04 39:40    353/0      Slave 2
rf5.0 FFFFFFFFFFFF 2296443/0     00 00:00      0/0

Burst: Send 5344977+5667260 (max 50, avg 1), Recv 6430184+6706462 (max 63, avg 1)
PHS:   packets 5506380, bytes 110060320 (max 64, avg 19)
```



For more information about command syntax and scan result, please proceed to [WANFlex - Technical User Manual](#)