

## Application notes



### RAY2 - SNMP

**version 1.2**  
2019-12-5



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# 1. Simple Network Management Protocol in RAY2 Units

RAY2 utilises SNMP versions **SNMPv1** and **SNMPv2c** – using a **community string** for authentication, which is by default “**mwI-snmp**“, but can be changed. SNMP uses UDP protocol for communication; delivery checks are implemented from version 2 onwards.



## Note

The RAY2 MIB module complies with Severity level 3 validation.

By default RAY2 uses UDP port 161 (SNMP) for queries. The manager, which sends the query, dynamically chooses the source port. The use of destination port 161 is fixed. RAY2 replies from port 161 to the port dynamically selected by the manager.

RAY2 launches the SNMP agent automatically on start-up if enabled. RAY2 also sends alarm states (traps) to the manager via the port 162 (SNMPTRAP).



## Note

To see the RAY2 MIB table, download it from the RAY2 web interface (**Maintenance** → **Backup** → **SNMP MIB** → **Download**) and use any document reader you prefer.



## Note

Since RAY2 FW 2.2.5.0, the SNMP non-table items OIDs are defined in accordance with the RFC (ending '.0') - to improve SolarWinds compatibility. Keep this in mind when upgrading RAY2 firmware. Firmware versions < 2.2.5.0 are able to reply to SNMP queries with OIDs ending with .0, but the reply does not contain .0 in its OID. This works fine for example with Zabbix NMS. SolarWinds does not accept such replies.

## 1.1. RAY2 SNMP Settings

The SNMP agent is switched off by default. You can enable or disable it in the **Link Settings** → **Service access** → **Services** menu.

The screenshot shows the RAY2 web interface for a Microwave Link. The left sidebar contains a menu with options like Status, Link settings, General, Radio, Service access, Alarms, Switch settings, Status, Interface, QoS, Advanced, Tools, Maintenance, Live data, History, Logs, Programs, and Help. The main content area is titled 'Microwave Link' and shows the 'Service access' settings. The 'Services' tab is selected, and the 'SNMP' section is highlighted with a blue box. The 'SNMP' checkbox is checked, and the 'SNMP community string' is set to 'mwl-snmp'. The 'SNMP trap IP' is set to '10.10.10.1'. The 'LED indicators' checkbox is also checked.

Local		Peer	
Service channel	standard	standard	
IPv4 address - Local	10.10.0.79	10.10.0.80	
IPv4 address - Peer	192.168.169.170	192.168.169.169	
Netmask	24   255.255.255.0	24   255.255.255.0	
Gateway	10.10.0.1	10.10.0.1	
Management VLAN			
1st tag	<input type="checkbox"/> 1   802.1q	<input type="checkbox"/> 1   802.1q	
2nd tag	<input type="checkbox"/> 4094   802.1q	<input type="checkbox"/> 4094   802.1q	
Internal VLAN	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> 2	
Services			
Web server	on	on	
CLI (telnet)	<input type="checkbox"/>	<input type="checkbox"/>	
CLI (SSH)	on	on	
SNMP	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
SNMP community string	mwl-snmp	mwl-snmp	
SNMP trap IP	10.10.10.1	10.10.10.1	
Note: Individual SNMP traps can be activated at <a href="#">Alarms &gt; Config</a> .			
LED indicators	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
LLDP (Service IP info)	on	on	

Fig. 1.1: RAY2 SNMP settings

The SNMP community string is "mwl-snmp" by default, but can be changed to another string.

### 1.1.1. Alarm Status

All system alarms are listed on this screen. Inactive alarms are colored white with an "OK" text label. Active alarms are colored according to the severity of the alarm with a text message describing the measured value status.

**RAY2** Microwave Link **RACOM**

Local: RAY2-17U / 14:33 / **Alarm** Link: OK Peer: RAY2-17Lv / 14:33

**Status** **Acknowledge** **Config**

	Local	Peer
Inside temperature	51.0 °C is over limit 10 °C	OK
Voltage min	OK	OK
Voltage max	OK	OK
RSS	OK	OK
SNR	OK	OK
BER	OK	OK
Net bitrate	358.85 Mbps is under limit 360 Mbps	OK
Air link	OK	OK
Eth1 link	OK	disabled
Eth2 link	disabled	disabled
WiFi management	OK	OK

Note: Alarm history is recorded in [Logs](#).

[Refresh](#)

Info: Configuration successfully saved.

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Fig. 1.2: Alarms – Status screen

Alarm severity scale:

- critical
- major
- minor
- warning
- information
- OK (cleared)
- acknowledged (confirmed)



#### Note

If you click on the "Alarm" text (if any Alarm is UP) on the top of the screen (next to the exclamation mark), you will be redirected to this Alarms – Status screen.

### 1.1.2. Alarm Acknowledge

Alarm acknowledgement is a way to let the operator confirm the system is in alarm state. Only an active alarm can be acknowledged.

Multiple selection of active alarms (to acknowledge groups of alarms) can be performed using Shift or Ctrl keys.

The screenshot shows the RAY2 web interface for alarm management. The top status bar indicates a local alarm at 11:24 and a single link. The left sidebar contains navigation menus for Status, Link settings, Switch settings, Tools, and Help. The main content area is titled 'Alarm acknowledge' and features a table of active alarms. The table has columns for Name, State, From, To, Ack, User, and Comment. The following table represents the data shown in the screenshot:

Name	State	From	To	Ack	User	Comment
Inside temperature	OK					
Voltage min	OK					
Voltage max	OK					
RSS	Alarm	2019-11-18 09:47:44				
SNR	Alarm	2019-11-18 11:18:55				
BER	OK					
Net bitrate	Ack	2019-11-18 09:47:44		2019-11-18 11:24:32	admin	
Air link	Alarm	2019-11-18 09:47:45				
Eth1 link	OK					
Eth2 link	OK					
WiFi management	OK					

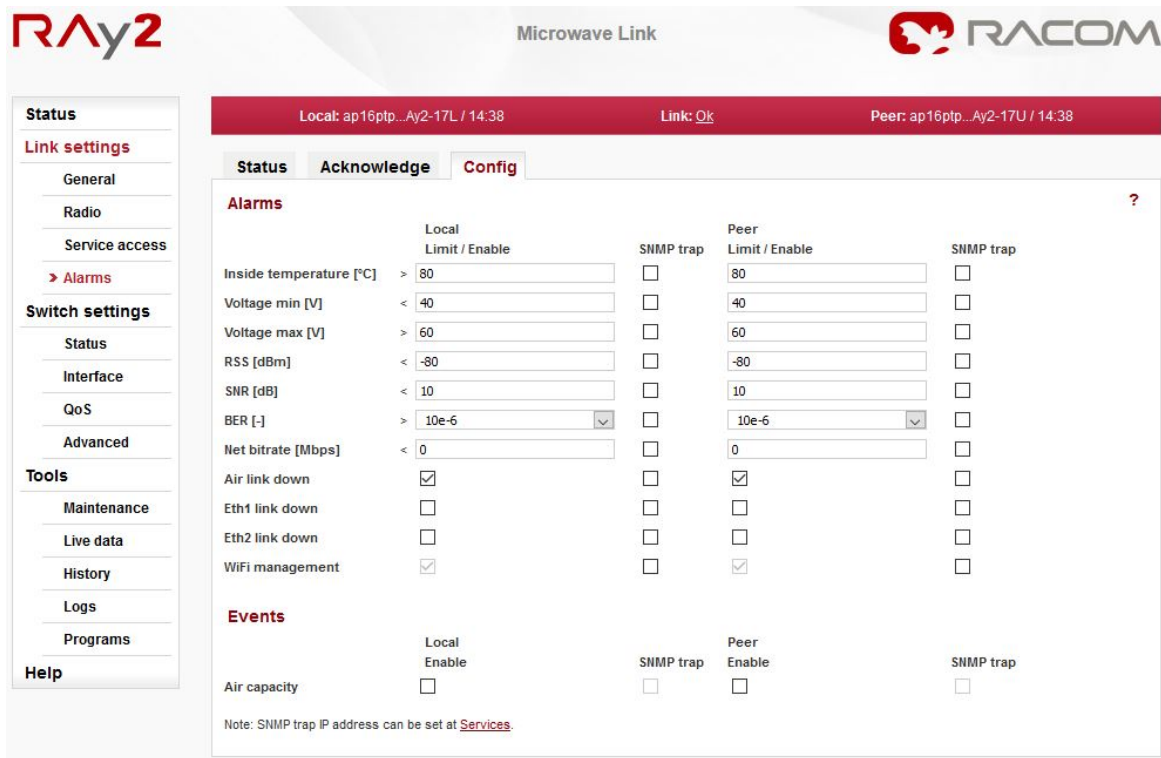
Below the table is a 'Comment' input field and two buttons: 'Acknowledge' and 'Refresh'.

Fig. 1.3: Alarm Acknowledge screen



### 1.1.3. Alarm Config

The link diagnostic system monitors the operation of the unit. It generates various output of events - system warnings and alarms. The event is always written to the system log and indicated in the status bar and Alarm – Status screen. Some events have adjustable thresholds. Events with no adjustable thresholds may either be Enabled or Disabled. If they are Disabled, the system event is not activated even if the system status is changed. For each event you can choose whether the SNMP trap should be sent if the event occurs.



Local		SNMP trap	Peer	
Limit / Enable			Limit / Enable	
Inside temperature [°C]	> 80	<input type="checkbox"/>	80	<input type="checkbox"/>
Voltage min [V]	< 40	<input type="checkbox"/>	40	<input type="checkbox"/>
Voltage max [V]	> 60	<input type="checkbox"/>	60	<input type="checkbox"/>
RSS [dBm]	< -80	<input type="checkbox"/>	-80	<input type="checkbox"/>
SNR [dB]	< 10	<input type="checkbox"/>	10	<input type="checkbox"/>
BER [-]	> 10e-6	<input type="checkbox"/>	10e-6	<input type="checkbox"/>
Net bitrate [Mbps]	< 0	<input type="checkbox"/>	0	<input type="checkbox"/>
Air link down	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Eth1 link down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eth2 link down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WiFi management	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

	Local	SNMP trap	Peer	SNMP trap
	Enable		Enable	
Air capacity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: SNMP trap IP address can be set at [Services](#).

Fig. 1.4: Alarm Config screen

Configurable Alarms / Events:

Inside temperature [°C]	Temperature inside the unit (on the modem board)
Voltage min [V]	Supply voltage Lower threshold
Voltage max [V]	Supply voltage Upper threshold
RSS [dBm]	Received Signal Strength
SNR [dB]	Signal to Noise Ratio
BER [-]	Bit Error Rate is registered at the receiving end; instantaneous value
Net bitrate [Mbps]	The system warning is generated when the radio channel current transfer capacity drops below the set threshold
Air link down	Radio link interruption
Eth1/Eth2 link down	Corresponding user Eth link (Eth1/Eth2) on station interrupted

WiFi management	Warning is generated when WiFi passphrase is not set or WiFi adapter is permanently enabled
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Air capacity	Event is generated when Net bitrate of the air channel changes (e.g. because of ACM operation)
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### Note

For all these traps, there are also special OIDs for the alarm states. The states can be one of "n/a", "up", "down", "ack". See the Application "Alarms" within the RAY2 template.

## Revision History

Revision 1.0 2017-11-28

First issue

Revision 1.1 2019-9-5

FW 2.2.5.0

Revision 1.2 2019-11-29

SNMP non-table items OID now defined in accordance with RFC (ending '.0') related issues.