Application Note

IP horn loudspeaker & IP amplifier module – BVMS integration – v1.0

This Application Note describes how to integrate the IP horn loudspeakers or the IP amplifier module into Bosch BVMS software.

Related Products:
LHN-UC15L-SIP | LHN-UC15W-SIP | AMN-P15-SIP

Severity:
☐ Immediate action required
☐ Action strongly recommended
☒ Informative

Table of Contents

1.   Introduction

This Application Note describes how the IP horn loudspeaker, and the IP amplifier module can be integrated into BVMS (Bosch Video Management System). On the example of the wide-angle IP horn loudspeaker, it will be described how to do the configuration. The long throw horn loudspeaker and the amplifier module can be configured in almost the same way.

Products:

LHN-UC15L-SIP   =   IP horn loudspeaker 15W, long throw

LHN-UC15W-SIP   =   IP horn loudspeaker 15W, wide angle

AMN-P15-SIP   =   IP amplifier module 15W

The IP horn loudspeakers and the IP amplifier module can be used in Video Management Systems (VMS) which are based on the ONVIF standard. Main use is the audio support (live & trigger) from the VMS towards the IP horn loudspeakers and IP amplifier module, see below table for more details.

Audio Use cases / Features	IP Horn	IP Amp Module
1-way live audio from VMS	✔	✔
2-way live audio from and to VMS	✔	X (no microphone)
Start pre-recorded massage stored in the IP horn/amp without scripting (using ONVIF output)	✔	✔

Although ONVIF is a standard, there are differences on the actual support based upon the specific VMS. The VMS version tested together with the IP horn loudspeaker/amp module is BVMS 12.1 and BVMS 12.2.

Notice!
All devices need to have a static IP address or get an IP address from a DHCP server. Link local is not recommended by BVMS.

2. Abbreviations

VMS	Video Management Software
ONVIF	ONVIF stands for Open Network Video Interface Forum and it is a standard for the communication between different IP‑based security systems.
ONVIF Output	The ONVIF Output is a virtual control output in the Video Management System. It can be used to control the state of a virtual control input of the IP horn/amp via ONVIF.
ONVIF Streaming	Audio stream from the device (IP horn) to the VMS.
ONVIF Backchannel	ONVIF offers the option to send media back from the VMS to the client (IP horn loudspeaker/amp module).
BVMS Configuration Client	BVMS configuration software
BVMS Operator Client	BVMS operator (client) software

3.   Preparing the IP horn/amp

This chapter describes how to prepare the IP horn/amp when using it in combination with BVMS.

3.1.   Firmware

The firmware of the IP horn/amp needs to be updated to the firmware v2.0 (2.0.800) or later, to support ONVIF. It is recommended to use the latest firmware version. Please check the firmware release notes for more details about firmware compatibility.

You can get the latest firmware from the product page at www.boschsecurity.com.

Notice!
More details about the firmware update can be found in the application note "IP horn loudspeaker & IP amplifier module – Getting started".

3.2.   General Configuration

By default (factory reset) the speaker is not addable to the BVMS software. Below is described what needs to be prepared on the IP horn/amp side. The screenshots were made with the IP horn firmware v2.1 (2.1.868).

1.   Connect to the speaker:
     Open a browser and enter the IP address (https://IPaddress) or the host name (https://HOSTNAME.local) of the IP horn/amp and login with Username and Password of the administrative account.
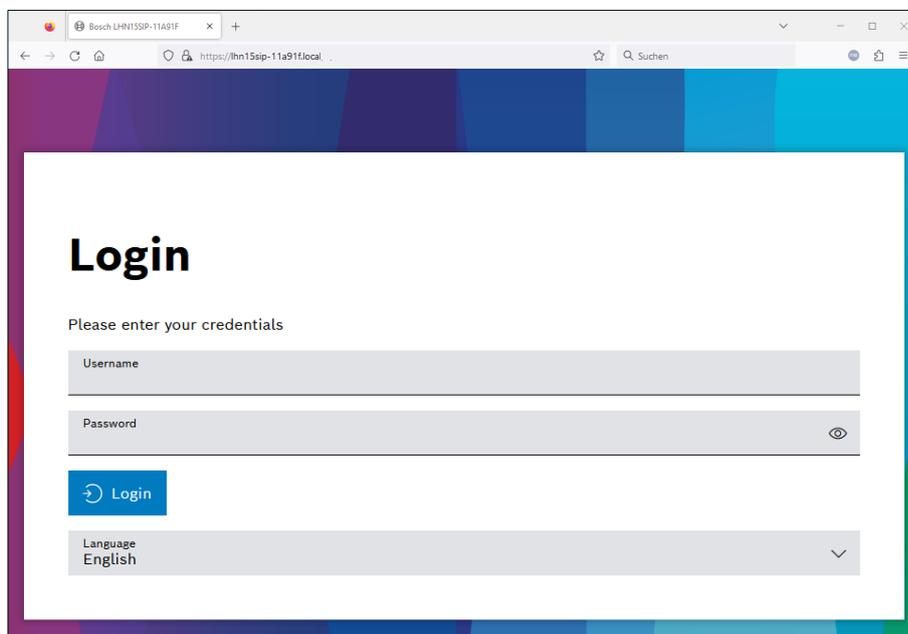
2. Adding a user:
   To activate the ONVIF interface, a ONVIF user needs to be added. Go to *Users* and create a *ONVIF operator* account dedicated for BVMS integration.
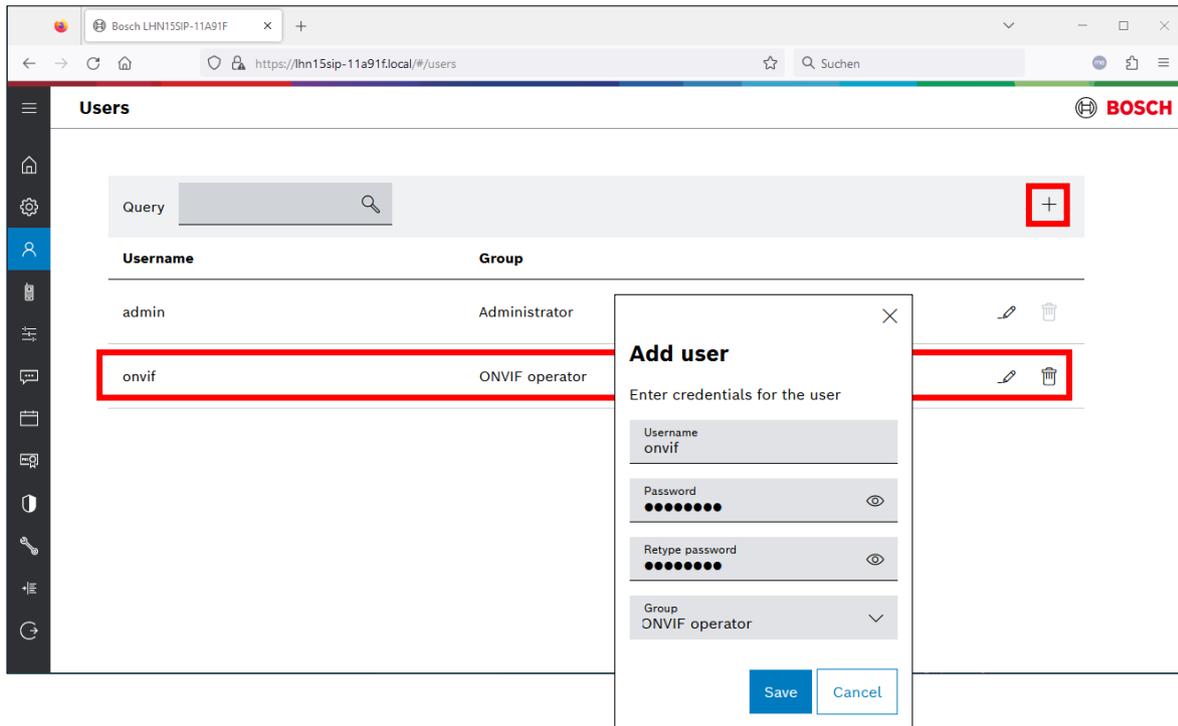
   Notice!
   These credentials will be needed for authentication on BVMS side.

3. Connection Policy:
   Both, BVMS and the IP horn/amp, support HTTP and HTTPS. By default, the IP horn/amp comes with HTTPS only enabled.
   The Connection protocol can be changed under *Security*. However, it is strongly recommended to use secure HTTPS connection when integrating with BVMS.
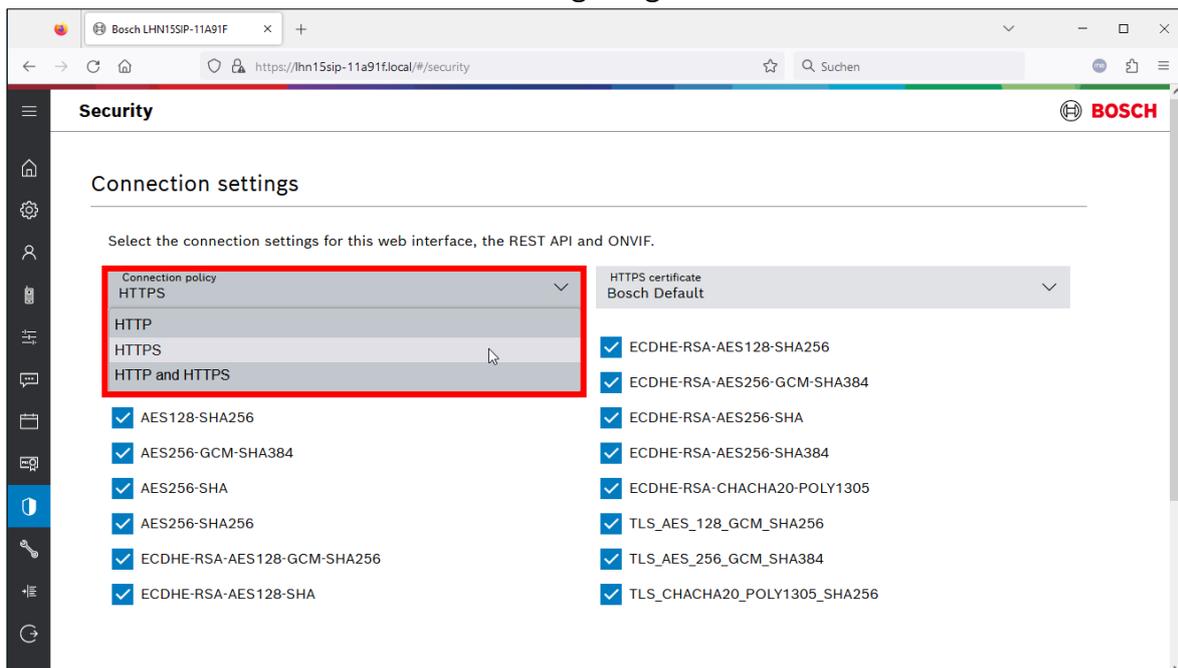
4. ONVIF Interface settings:
    The ONVIF interface settings on the *Generic settings* page encompasses crucial fields including HTTP Port, HTTPS Port, RTSP Port, and UDP Base Port. Users have the authority to change these ports in case needed.
    Any alterations to these ports require the user to click the *Save* button, prompting a restart of the ONVIF process and the reopening of the designated ports.

    By default, the ONVIF interface and the Web / API interface use the same HTTP and HTTPS ports. In this example different ports for the ONVIF interface are used:

5. Activate G.711 audio codec for talk down:
    G.711 is by default deactivated (for talk down) on the side of the IP horn/amp due to its lower audio quality compared to AAC. BVMS is only able to distribute audio using G.711. So, if you want to use the speaker function of the IP horn/amp you need to active this on the *Generic settings* page.
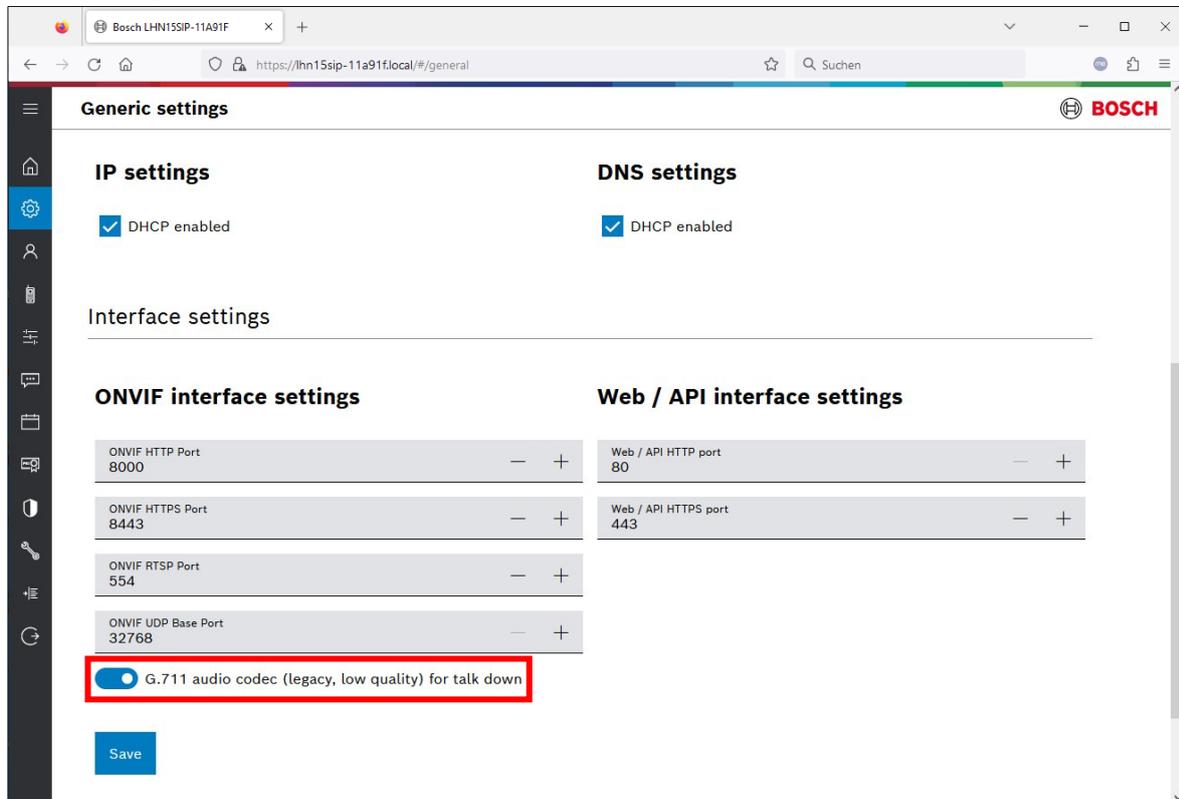
6. Microphone:
    If you want to use the microphone of the IP horn/amp, make sure that the microphone is switched on. If switched off, the microphone function will not be added into BVMS.
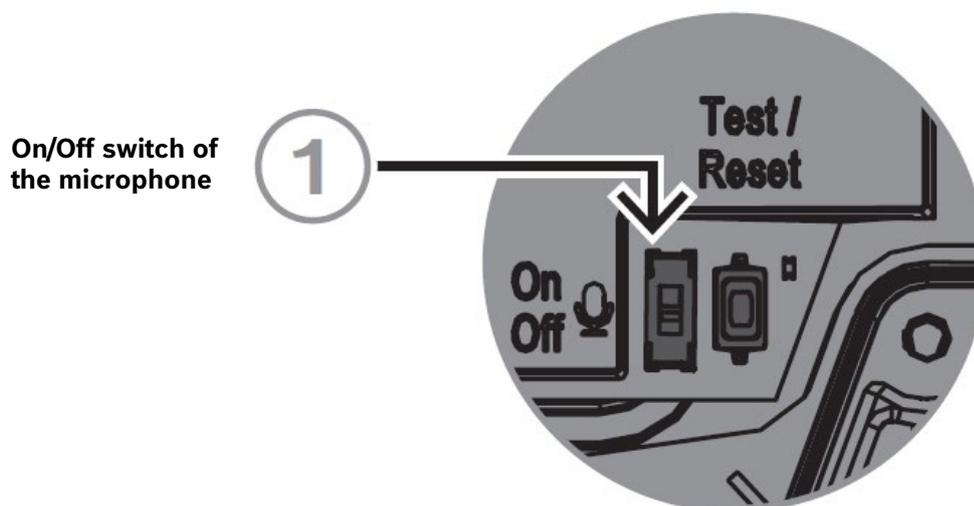
4.   Integration into BVMS
4.1.   Adding a loudspeaker to BVMS

This chapter describes how to add the IP horn/amp to BVMS 12.1 or BVMS 12.2.

Open BVMS Configuration Client:

1. As a prerequisite, basic BVMS initial configuration is required. On the **Devices** page, at least a single **VRM Device** should be added and properly configured.

    Notice!
    If required, please refer to the *BVMS Configuration Manual* for the details on how to add the Video Recording Manager to the system.

2. As the next step, at least single **Video Streaming Gateway (VSG)** instance must be installed, enabled, and configured in BVMS, as the standard component to connect ONVIF devices. The IP horn/amp will be added to BVMS as any other ONVIF camera/device.
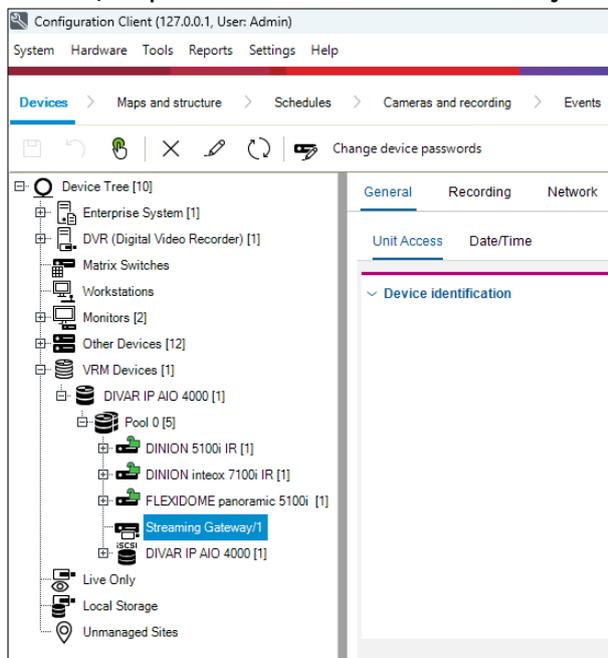
    Notice!
    If required, please refer to the *BVMS Configuration Manual* for the details on how to add the Video Streaming Gateway to the system.

3. On the **Devices** page, go to your VRM recording pool, right-Click on your **Streaming Gateway** instance and click on *Scan for ONVIF Encoders.*
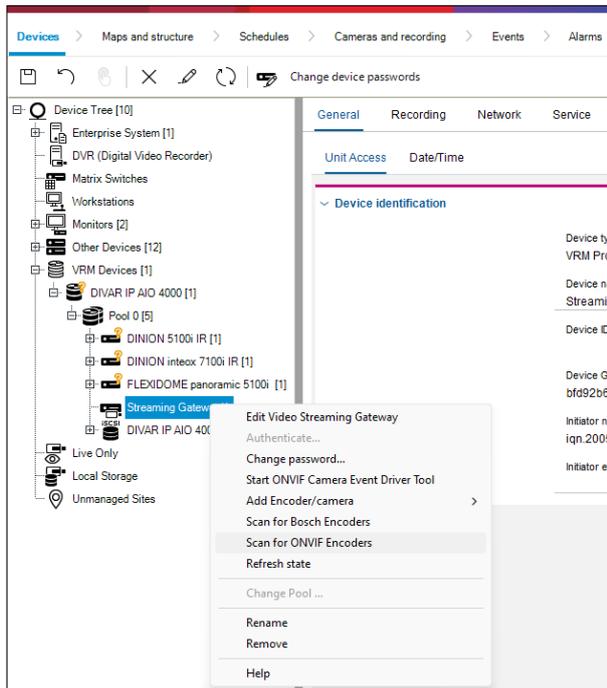
Notice!
This guide describes the process of adding the device using the automatic network scan option. If needed, you can also add the device manually, by selecting the option *Add Encoder/camera → ONVIF Encoder*.

4. Find and select the IP horn/amp device on the list of detected ONVIF devices. Use the option *Assign* to add it to the BVMS configuration and click *Next >>.*
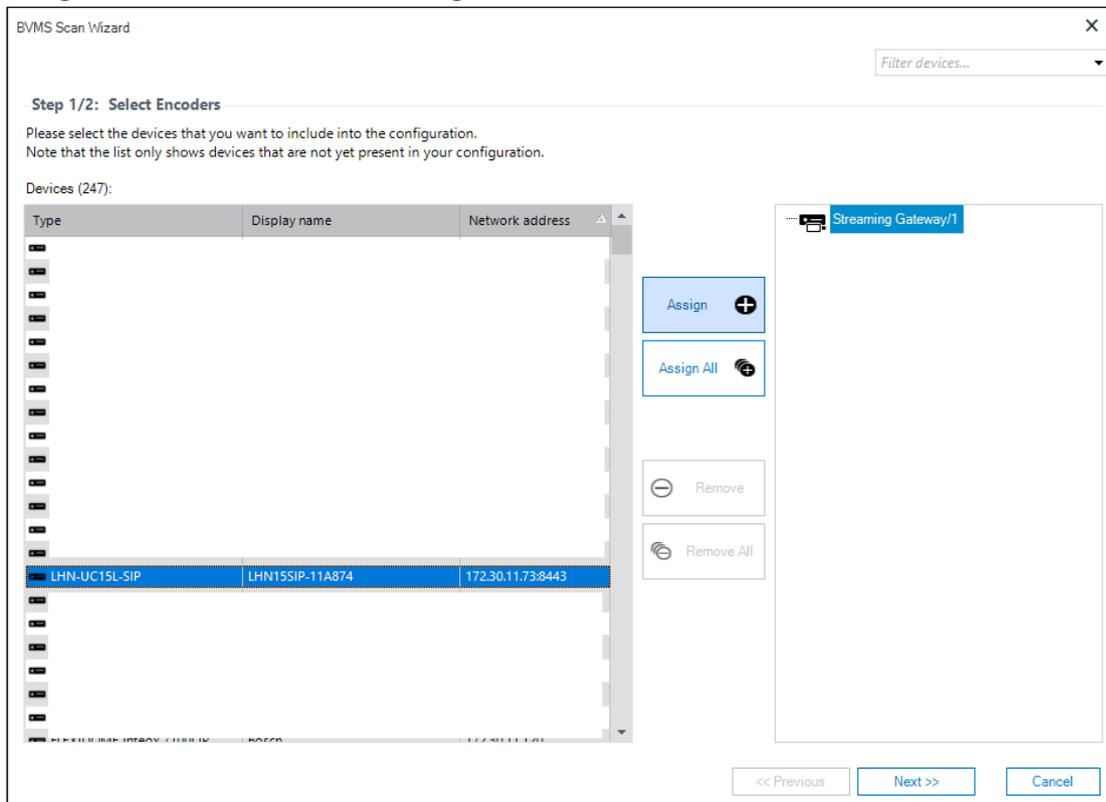
5. Type in the ONVIF user credentials of the user created in the IP horn/amp. Verify the authentication status with the green unlocked symbol. Then click *Finish*.
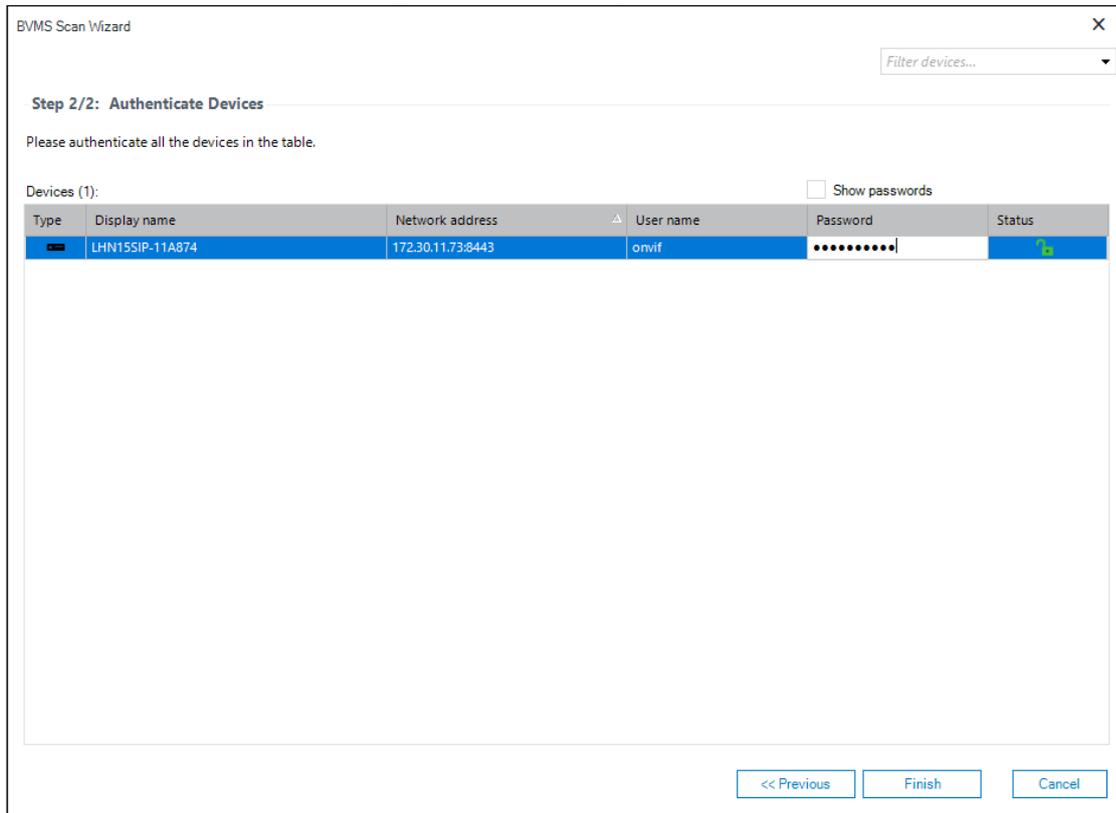
6. Find your added IP horn/amp under the Streaming Gateway, right-click on the added device and click **Edit ONVIF Encoder** option:
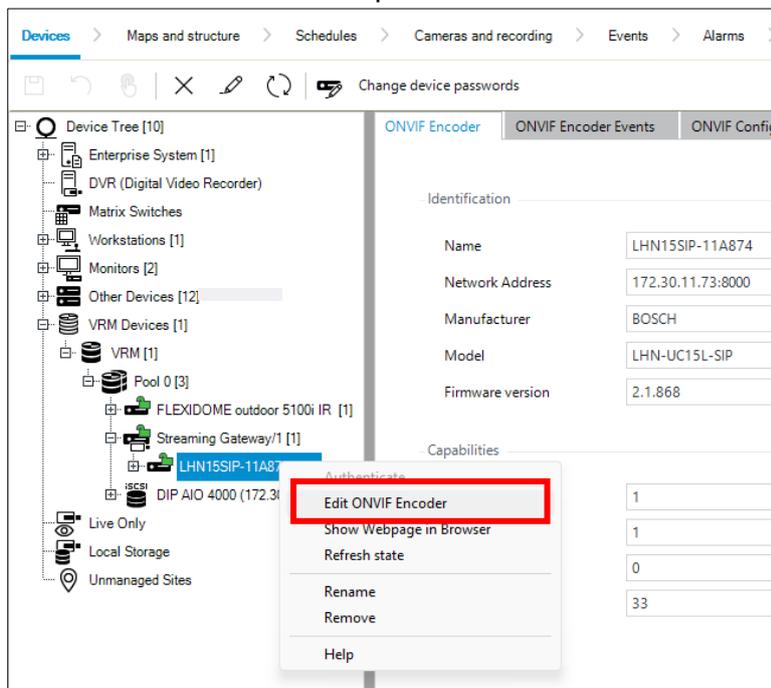
7. Verify the configuration and if needed, configure the communication parameter. It is highly recommended to use secured (HTTPS) connection to connect the speaker. In such case, make sure that the option **Secure connection** is selected and afterwards verify, that the proper port is set. When enabling Secure connection option, BVMS by default sets the network port to 443. It might be required to change this value respectively to the speaker settings. In this example the port **8443** is used for HTTPS ONVIF connection.

   It is also recommended to select *Profile S* as ONVIF profile. Although there is no specific ONVIF profile for loudspeakers, the *Profile S* is the one which fits best.

8. The IP horn/amp is now successfully added under the Streaming Gateway. Verify the basic parameters of the added device:
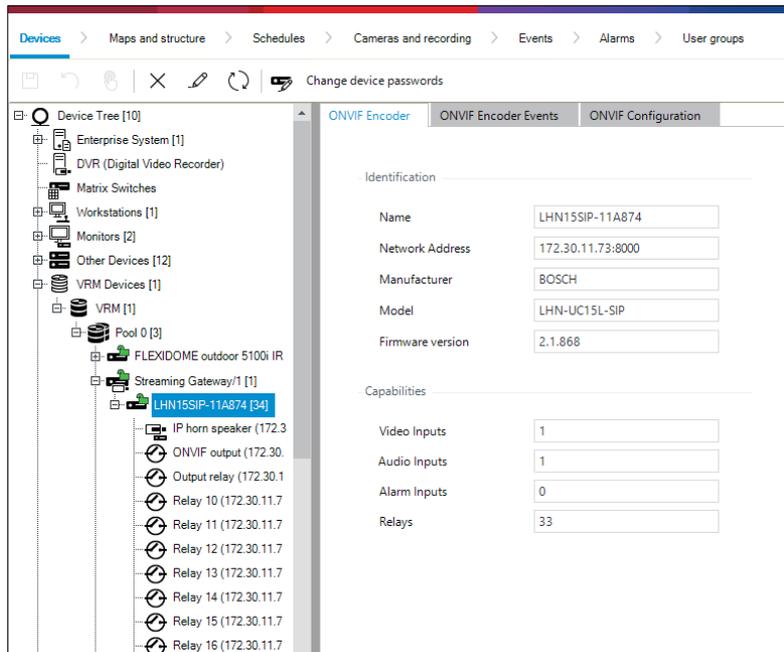
In the Device Tree, you can find the following items for the device:

-   Camera item: Will be used later in the Operator Client to display an icon of the speaker and for the audio intercom.
-   Relays: Control outputs (1-32 are virtual and the 33rd is the physical GPO of the IP horn/amp).

9. All the devices and elements that will be used, need to be assigned to a Logical Tree (and/or one of the folders or maps there). For this purpose, switch to the **Maps and structure** tab and drag and drop the needed elements from the Device Tree to the Logical Tree. In the example below, the IP speaker items were moved to the *IP horn speaker* folder. A folder can be (optionally) created by right-clicking on the *Logical Tree* root node and selecting *Add folder*.
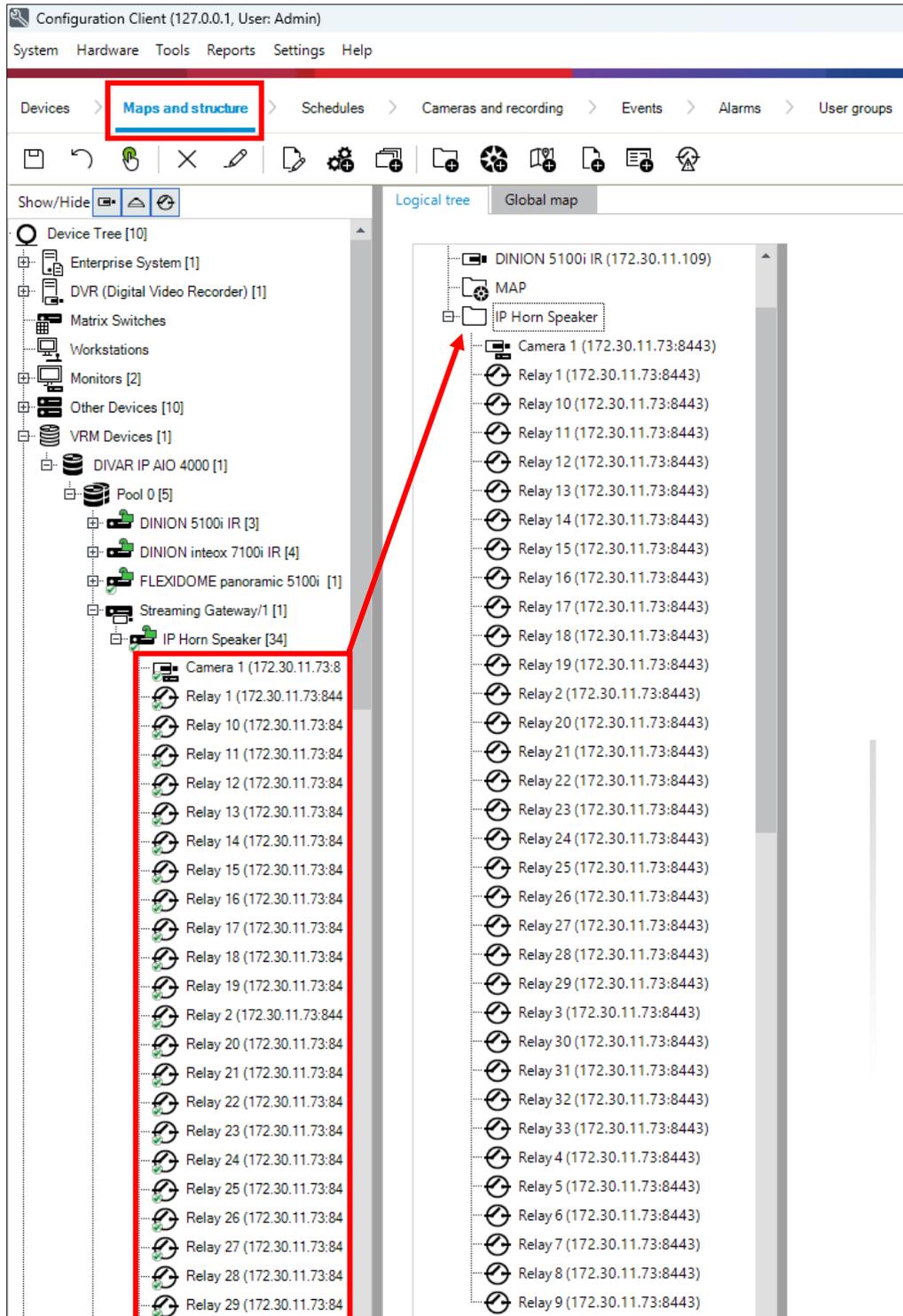
Notice!
If needed, consider renaming any device or item in the Logical Tree.

10. In the next step, make sure that all the changes are saved, and the recent configuration is activated.

To do that, first click on the *Save Changes* button…
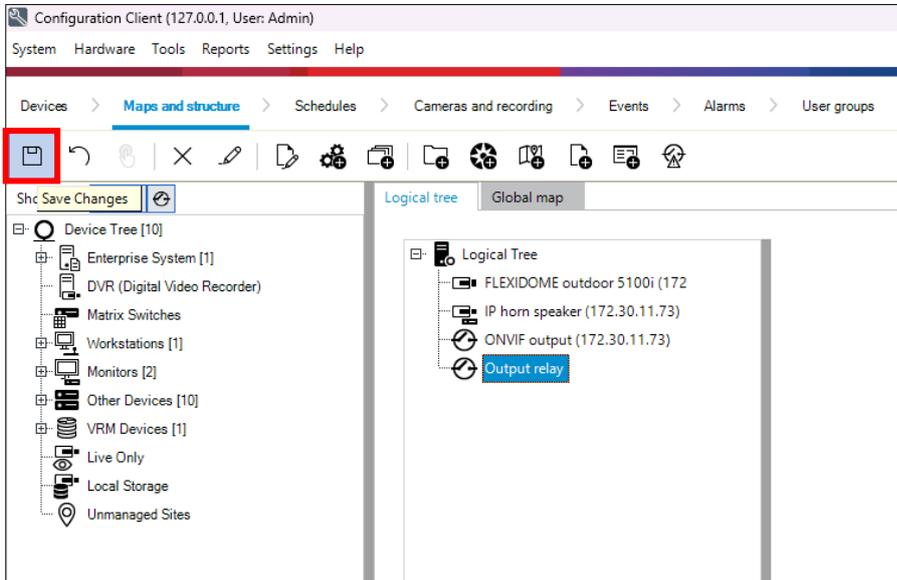
…and afterwards activate the configuration.
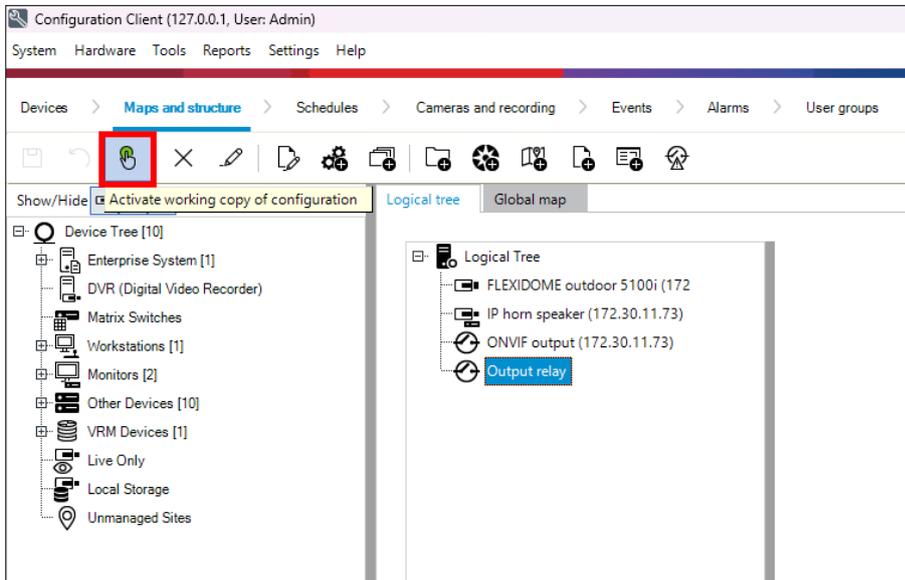
Notice!
BVMS allows flexible assignment of ONVIF events and states to the available input/output items. To do that, *ONVIF Camera Event Driver Tool* can be used. You can open it by going back to the **Devices** page and right-clicking on the Streaming Gateway instance.
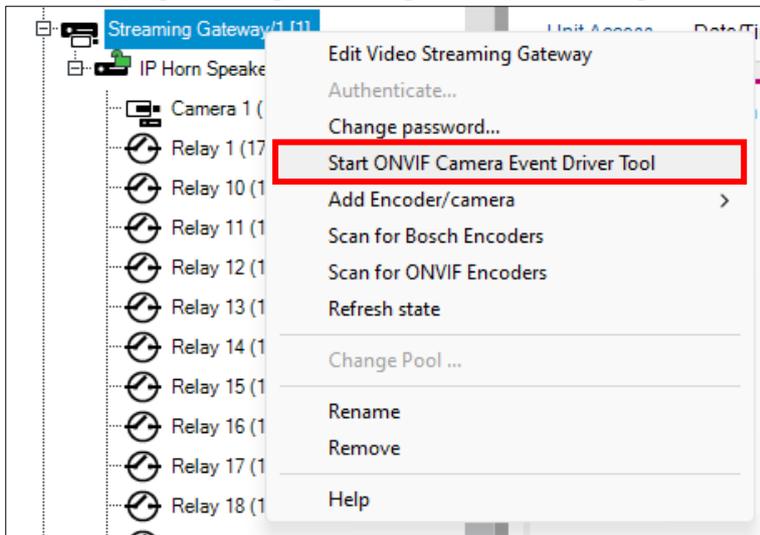
Use the *Edit* option next to your device to customize assigned events.
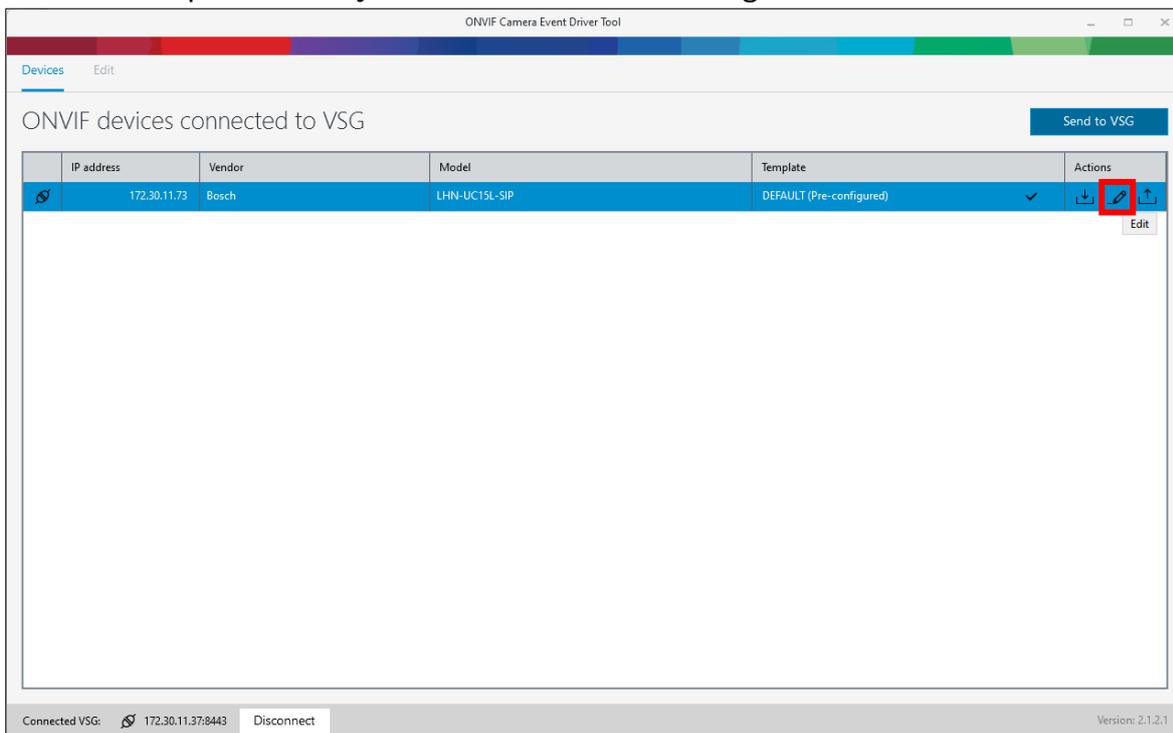
In the example below – *ONVIF output 1* is mapped to the *Relay 2* of the device. Such mapping is possible either by manual entering of *Source* and *Data* information in the columns or by drag and drop of incoming Live ONVIF events from the table on the right-hand side.

4.2. Video Stream of the IP horn/amp

The ONVIF standard does not have a device type specifically for audio only. Therefore, the IP horn/amp is added as a camera. However, the icon displayed in the "Live Stream" clarifies that it is a speaker.

Open the **BVMS Operator Client** and drag and drop the *Camera* item of the IP horn/amp into the camera layout.
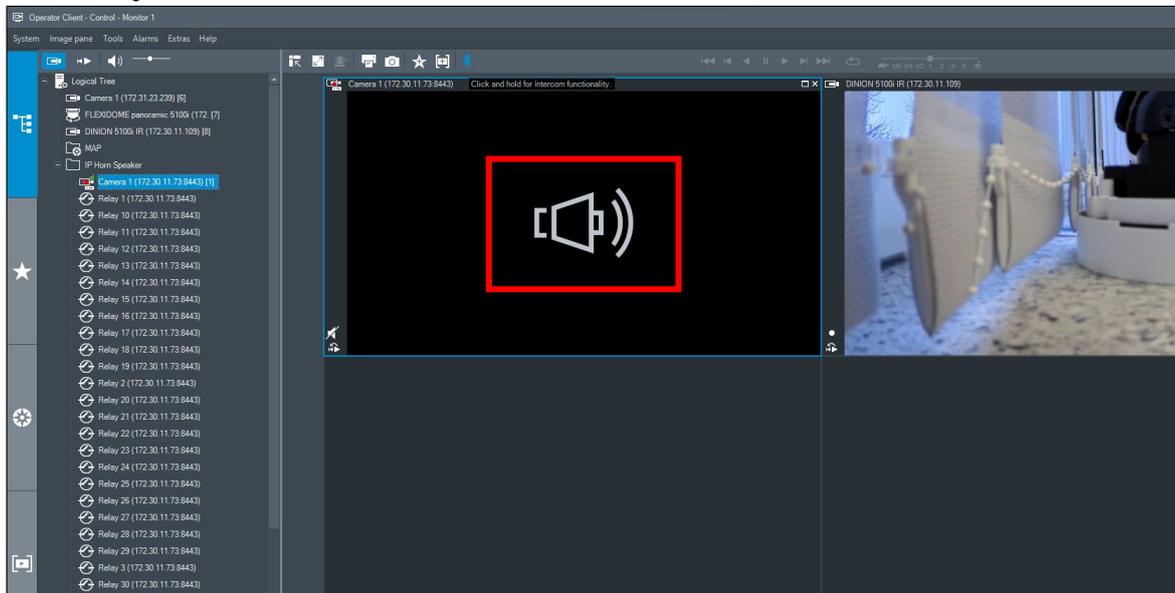
4.3.   Start pre-recorded messages of the IP horn/amp via ONVIF Output

In BVMS there are 33 ONVIF outputs available. The first 32 outputs are virtual outputs and can be configured to trigger rules in the IP horn/amp. The 33rd output is the physical GPO of the IP horn/amp.

In this example ONVIF output 1 will trigger an audio file stored on the IP horn/amp.

1. Adding a rule for starting a message:
    Log into the IP horn/amp, go to *Rules* and click on *+* to add a rule.
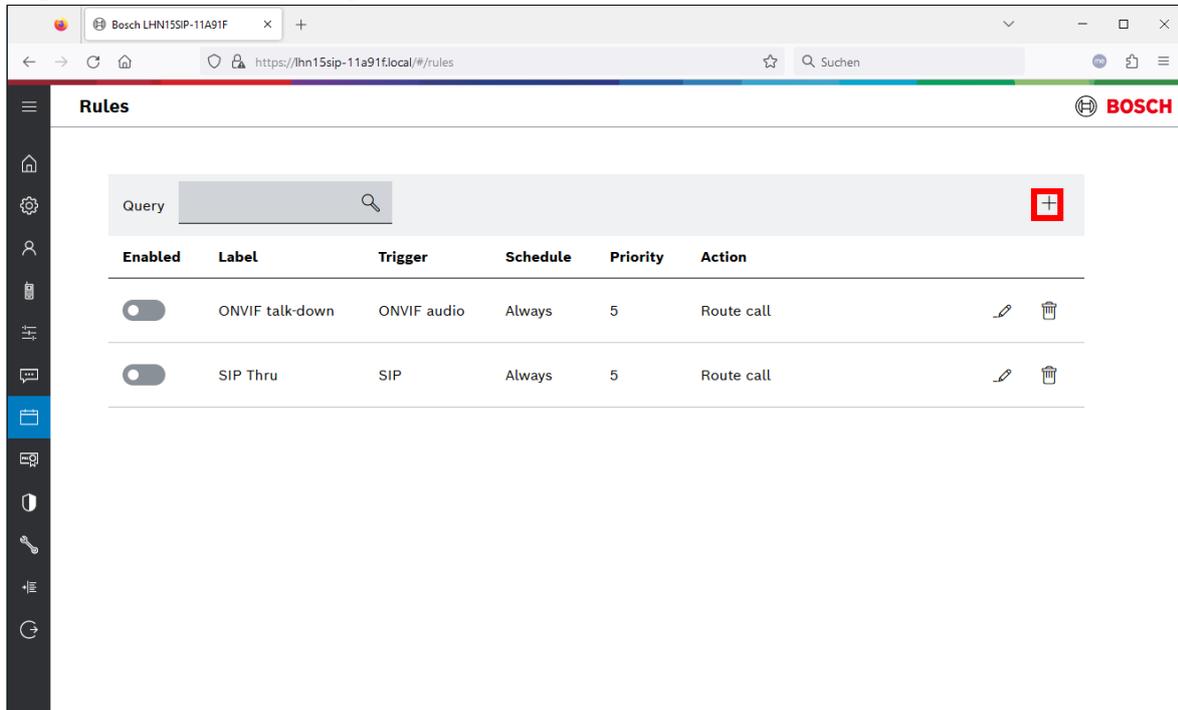
2. Rule details
   - Trigger type: ONVIF output
   - Trigger-end stops the action instantly: If the message shall be played once to its end, let the checkbox unchecked and make the contact closure shorter than the message.
   - Action type: Start message
   - Repeat count: 1
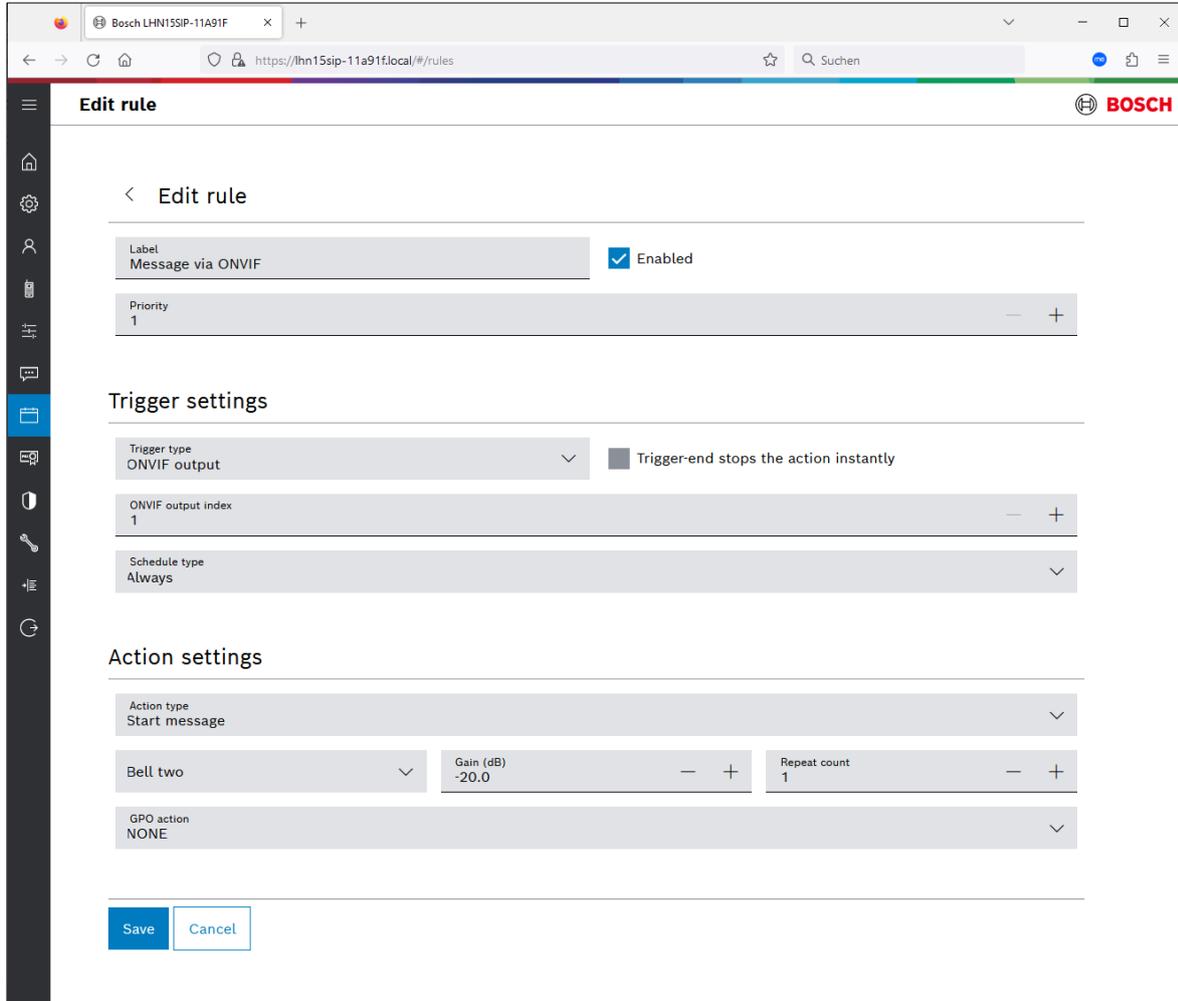
Rule overview:
Make sure, that the rule is enabled.
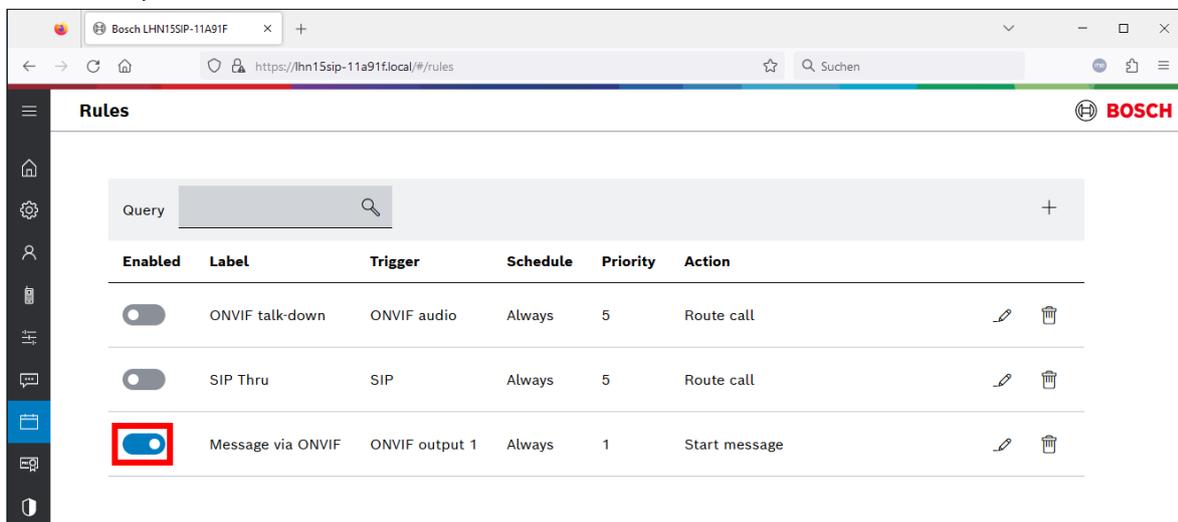
How to enable Output 1-32:
ONVIF Output 1-32 can only be used for triggering rules on the IP horn/amp. The IP horn/amp is configured with ONVIF output 1 starting a message (bell) in the IP horn/amp.

1. From the BVMS Operator Client, select the output associated to the *ONVIF output 1* of the device and activate it using the right-click and *On* option or by double clicking on it. In the example below, relay was renamed accordingly (using Configuration Client).
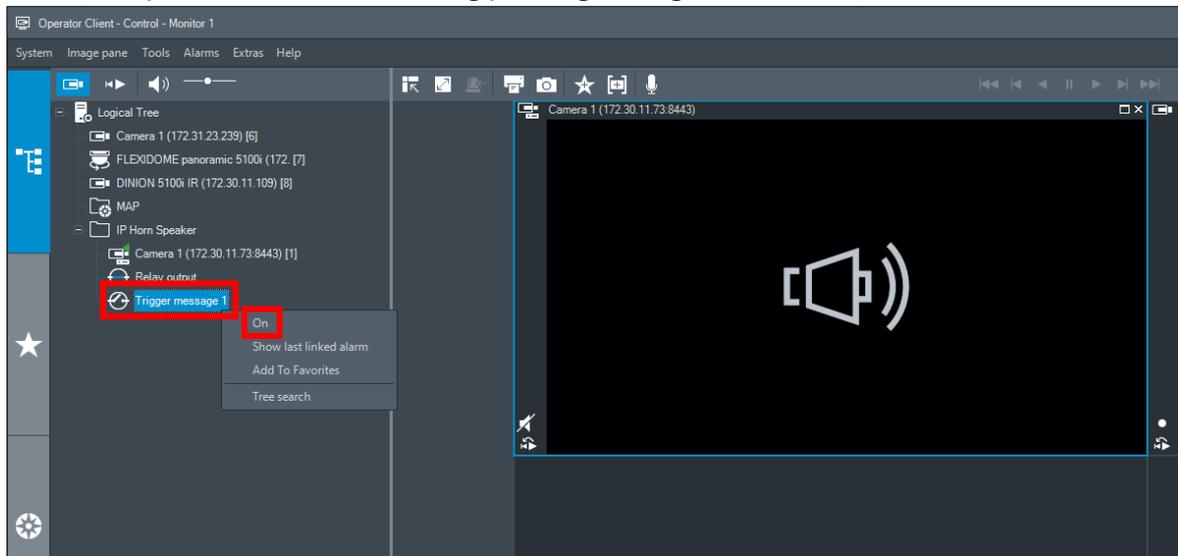
Notice!
By default, ONVIF outputs are operated in a mono-stable way – after activation the virtual output, it will be automatically set back to disabled. If you want to change this behavior, you can do this with the BOSCH configuration Manager.
The physical GPO can be turned off again by a double-click or right-click and select the *Off* option.

2. Go to the *Rules* page of the IP horn/amp. Here you can see, that the rule is *Running,* and the message is playing.
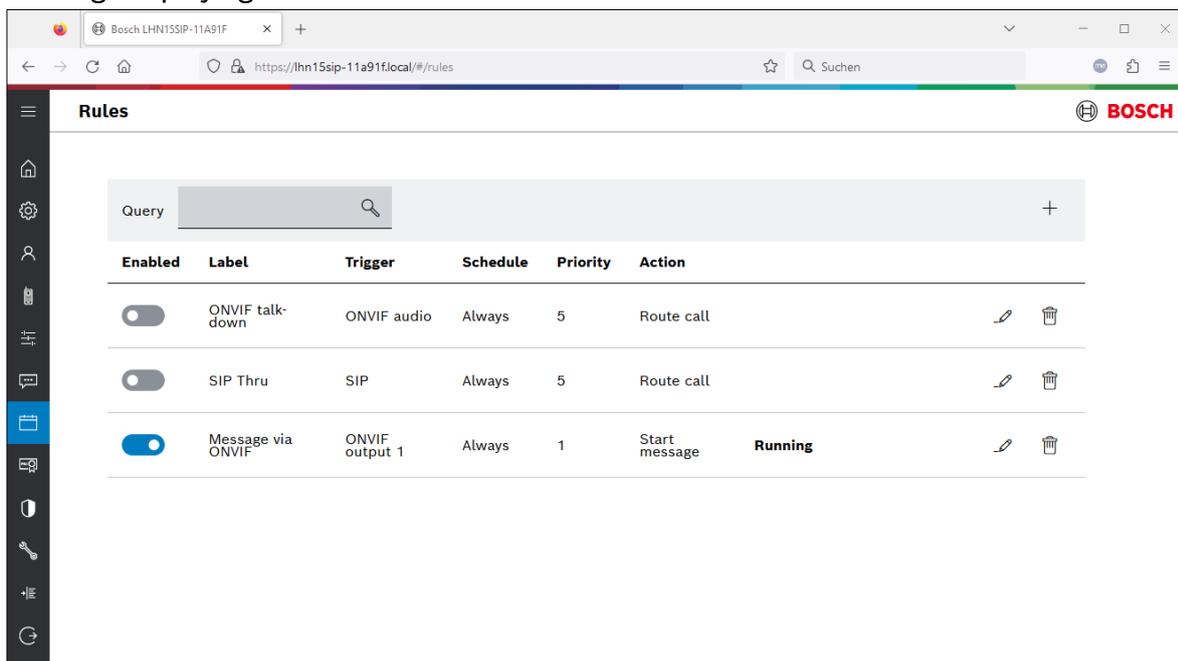
How to test the 33rd output:

1. Select the relay associated to the 33rd (physical) output and activate it using the right-click and *On* option or by double clicking on it. When activated, the icon will indicate closed state.
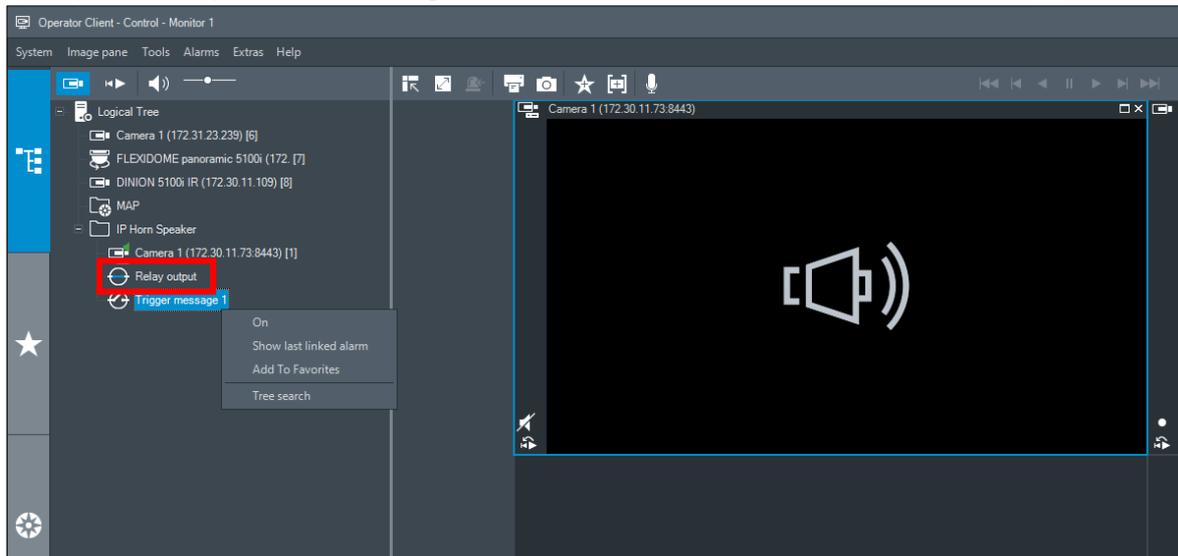
   Respectively, double-click again to turn it off or right-click and select the *Off* option.

2. Go to the *Maintenance* page of the IP horn/amp. Here you can see that the GPO has turned active.
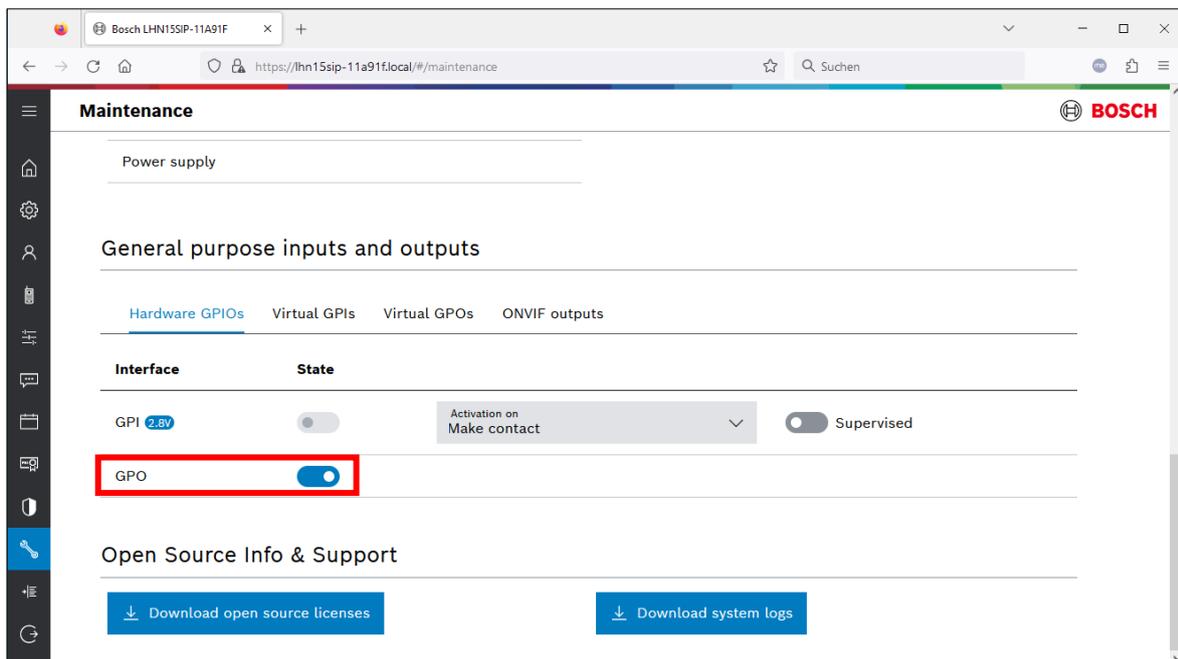
4.4.   Audio from the IP horn to the VMS via ONVIF Streaming

This part describes how to configure and test the audio from the IP horn to the VMS.

Notice!
This function is only available for the IP horn.

Setting up the Microphone in BVMS and testing the Microphone Stream in BVMS:

The microphone is not bound to the rule engine. There is no need to activate the ONVIF Stream via the rules page of the IP horn. Thus, recording without interruption by a rule is possible. As soon as the credentials for the ONVIF operator are set and the speaker is added to the Logical Tree and available in the Operator Client, the microphone stream can be opened via the VMS, and you can retrieve and listen to it.

1. Make sure that the microphone of the IP horn is activated.
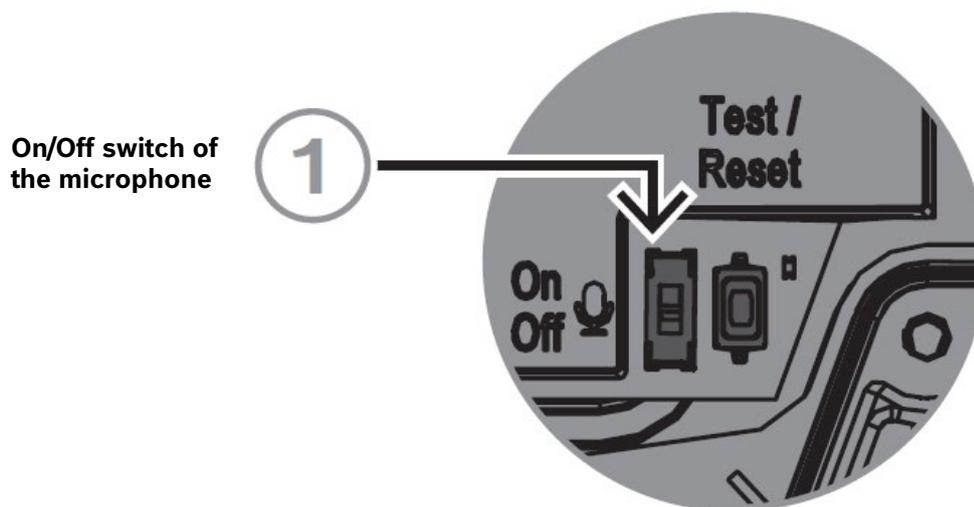
2. Go to the Configuration Client. Audio support for the device should be enabled in the system. Go to **Cameras and recording** tab, select the **VRM** option, find your device(s) on the list and select the audio path.
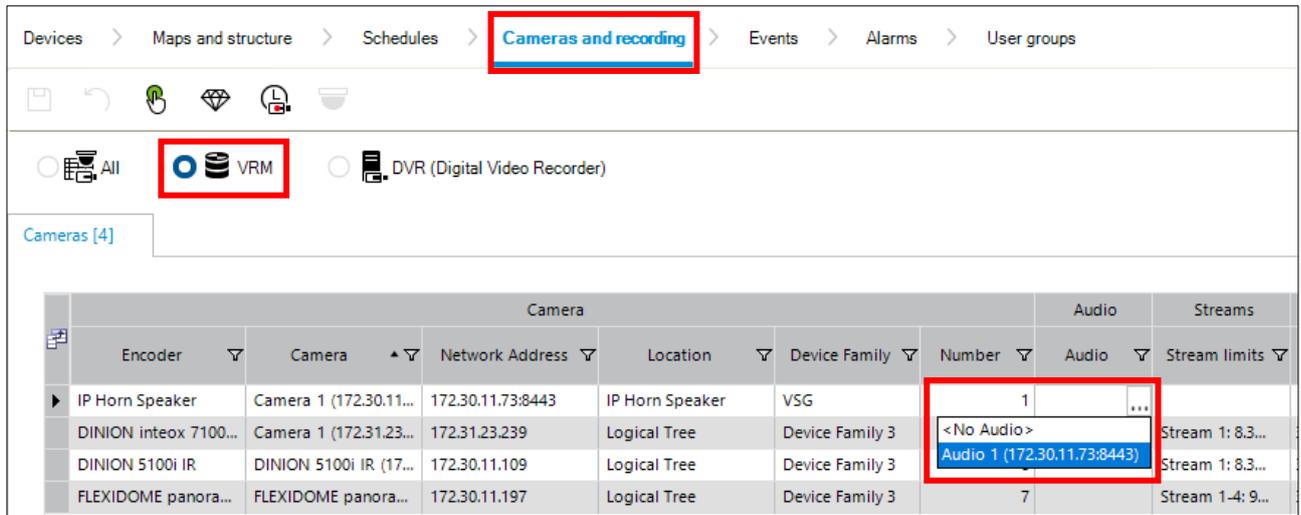
Notice!
When the audio path is selected, both incoming audio and intercom features will be available within BVMS for the device.

3. Testing the microphone stream:
- Open the Operator Client
- To listen to the microphone stream, open the IP speaker view in the camera layout and make sure it's the active window (indicated by the blue frame around it) and activate the audio using the button (loudspeaker icon) on the lower, left-hand side of the camera view:
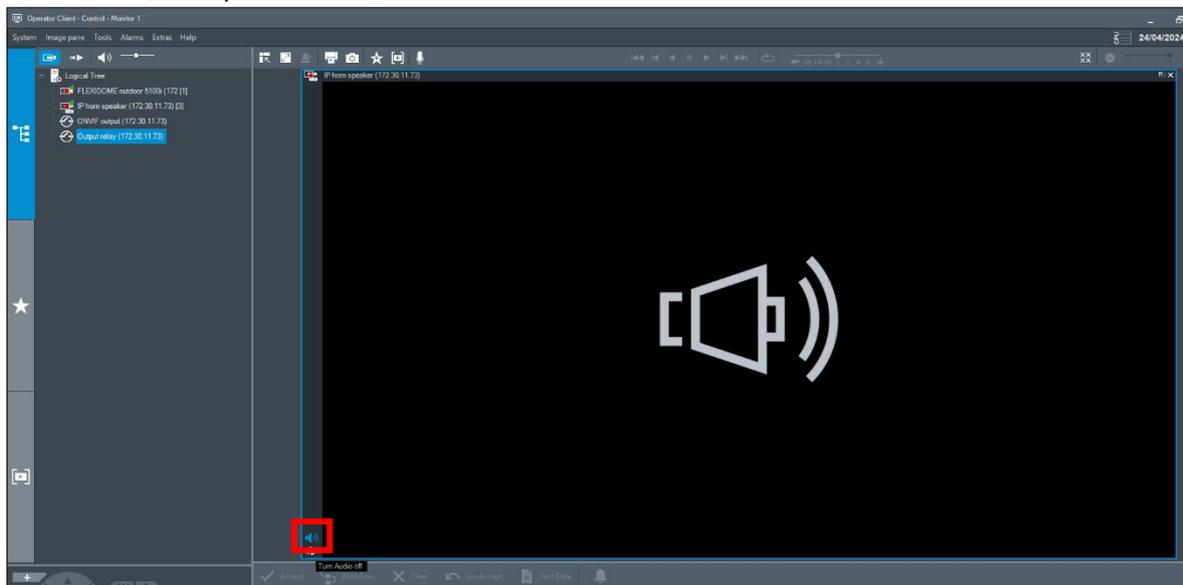
4.5.   Audio from the VMS to the IP horn/amp via ONVIF Backchannel

This part describes how to configure and test the audio from the VMS to the IP horn/amp. To send audio to the IP horn/amp a ONVIF operator and a rule need to be configured.

1. Adding a rule for ONVIF talk-down (audio from the VMS to the IP horn/amp via ONVIF backchannel):
    By default there is the "ONVIF talk-down" rule available, which needs to be activated to be able to route audio from and to the IP horn/amp through the VMS. The pre-defined rule is just there for quick and easy configuration. But depending on the project needs either this rule or another rule can be used.
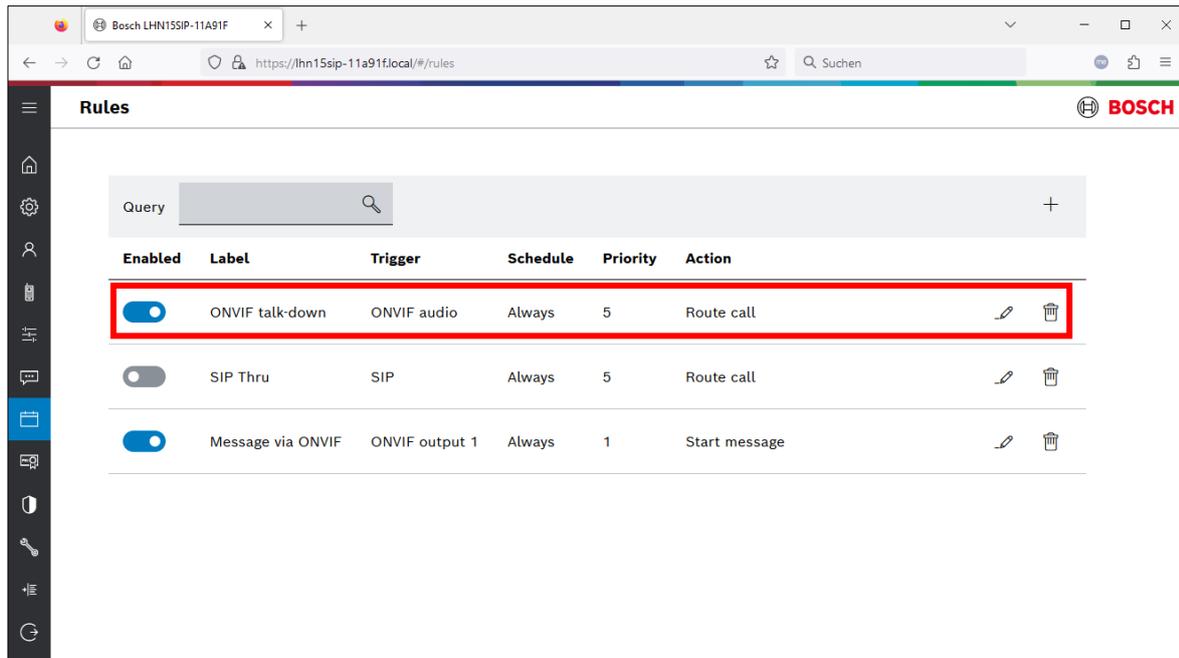
Details of the default rule:
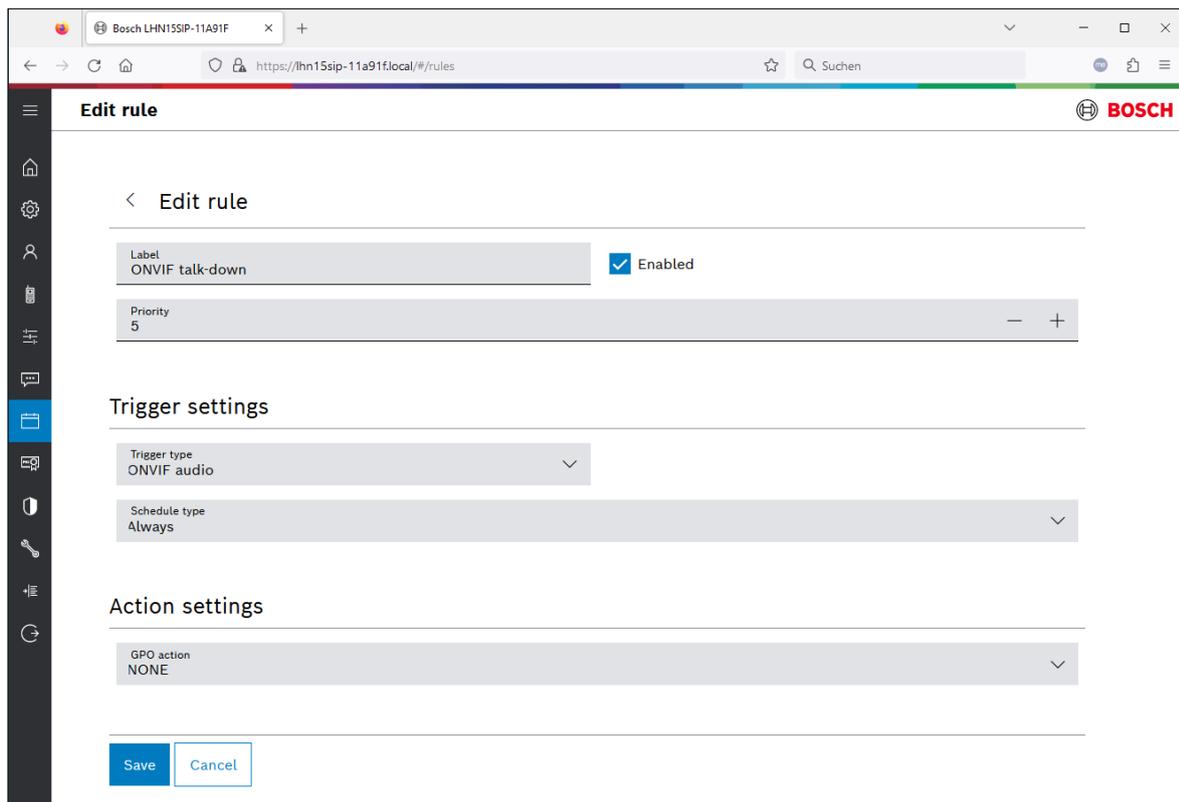
Notice!
G.711 is by default deactivated for talk down on the side of the IP horn/amp. For BVMS integration, please activate G.711 on the *Generic settings* page.
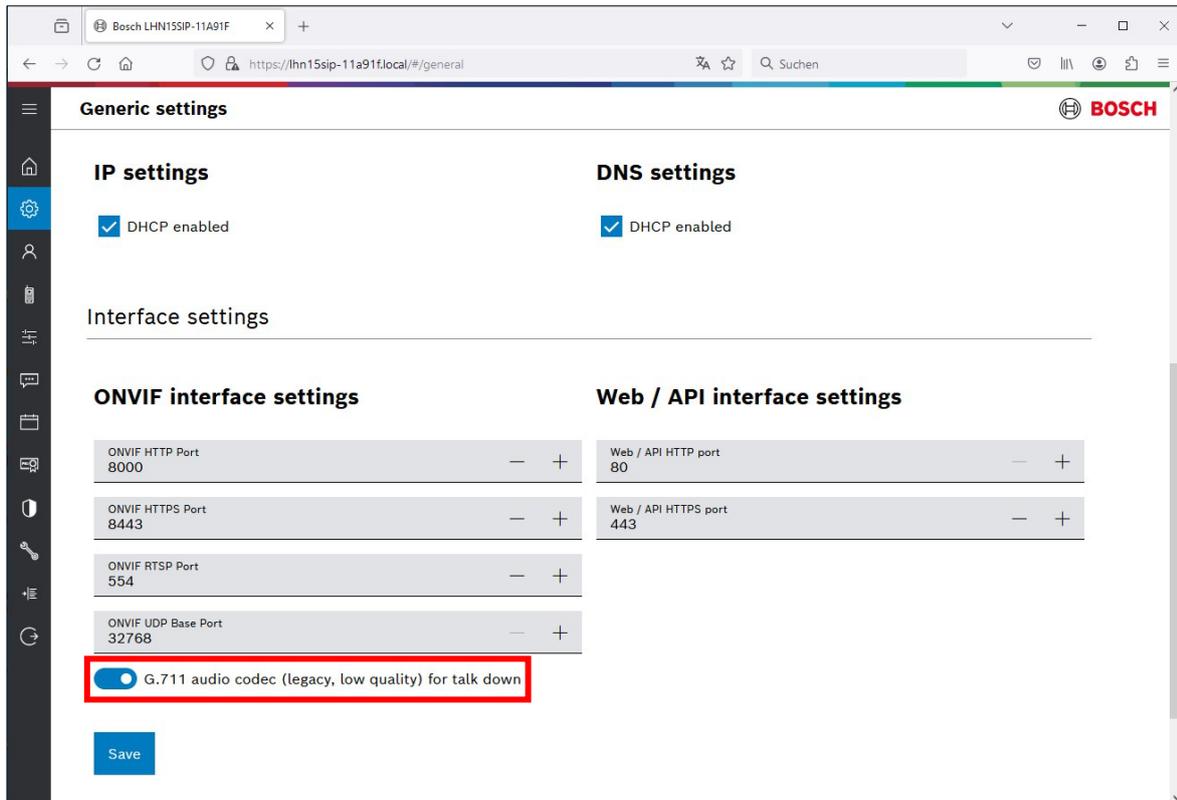
2. Testing the audio from the VMS to the IP horn/amp:
    - Open the Operator Client application.
    - Open the device in the camera view.
    - By pressing the *Intercom* button, the audio will be routed to the IP horn/amp.
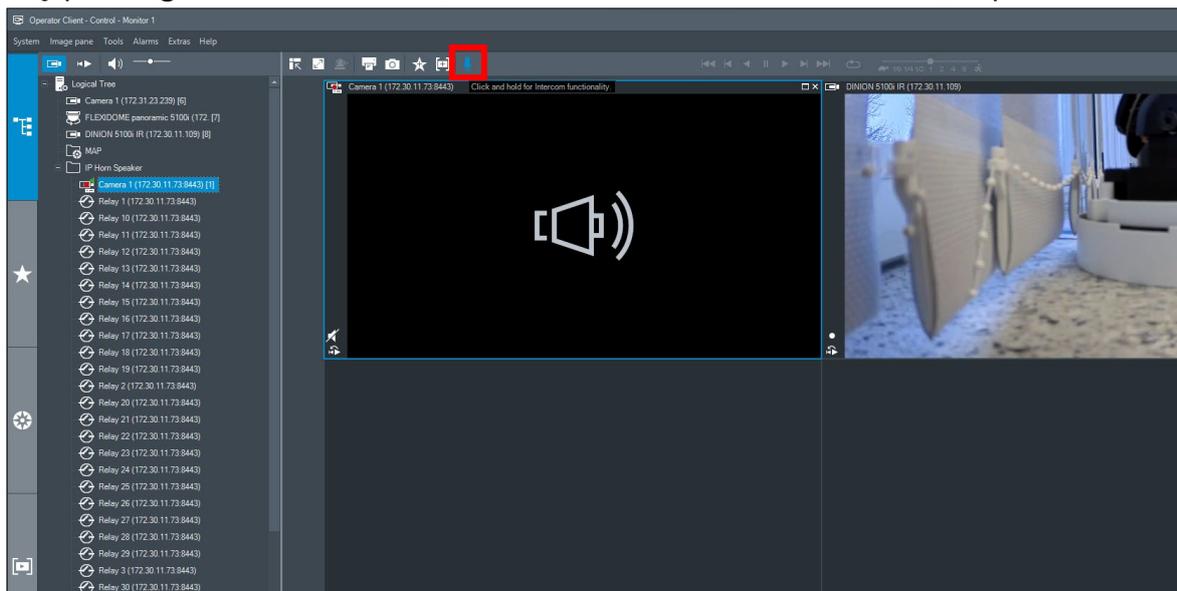
3. On the Rules page of the IP horn/amp you can check if the audio is routed:
    - Go to *Rules*.
    - The state of the *ONVIF talk-down* rule changes to **Running.**

4.6.   Audio-linking between a camera and the IP horn

Starting with BVMS 12.2 it is also possible to link the audio input (microphone) and output (speaker) between any configured devices. As a result, it is possible to use the IP horn as the audio device for all the nearby cameras. The operator can simply hear the audio from the microphone of the speaker as well as can use the audio backchannel / intercom feature directly to the speaker when other camera view is opened in the BVMS Operator Client. To configure it, please follow the steps described below:

1. Open the BVMS Configuration Client and go to the **Cameras and recording** page.

2. In the *Cameras* table, use the *Audio* column to link the audio input/output of the other device.
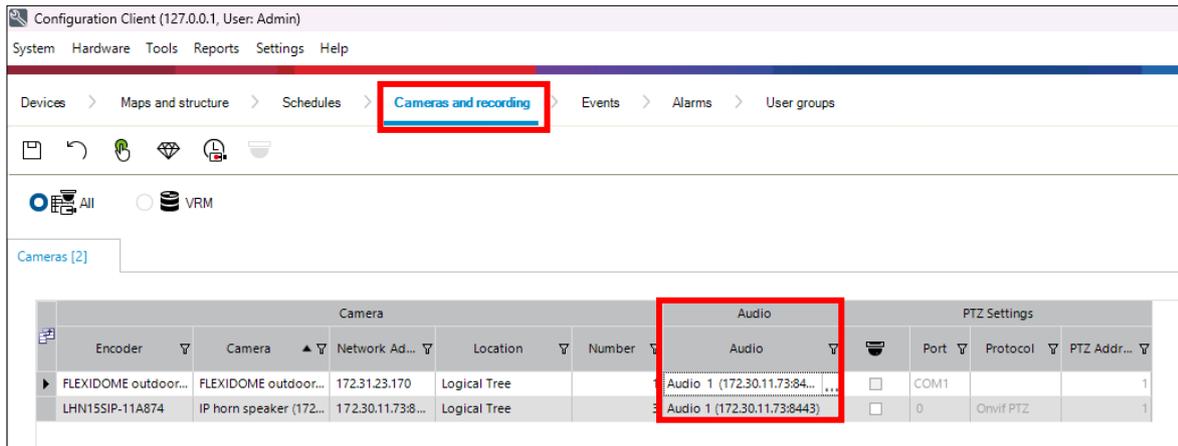
3. To use the IP horn speaker as the audio device of the camera, for each camera row select it in the audio column, as in the example given below:
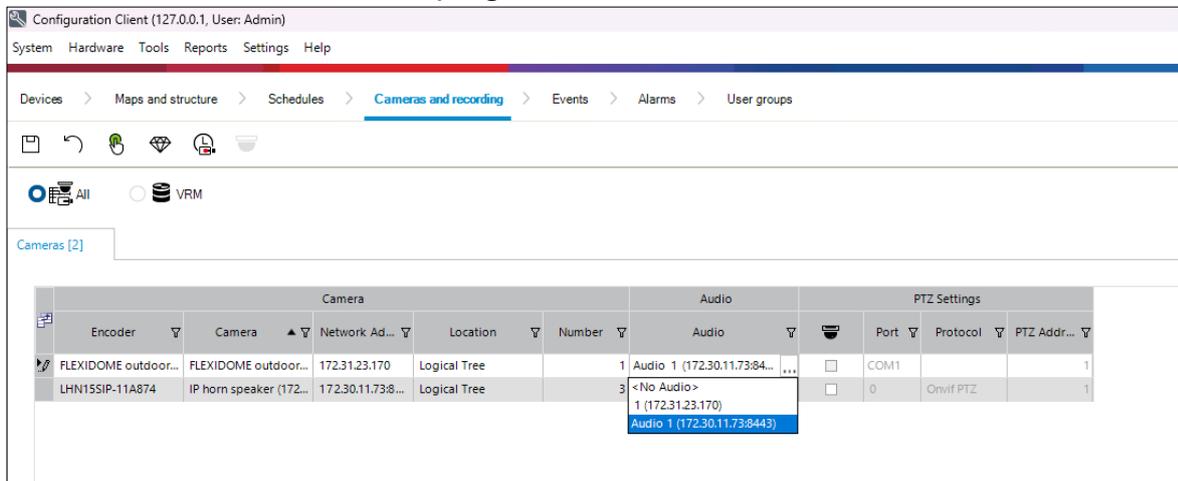
4. Save and activate the configuration.

5. Now, going back to the BVMS Operator Client, whenever the camera is opened in the Live View mode:
    - Enabling audio will result in hearing the audio from the microphone of the IP horn
    - Using intercom feature will result in announcement sent to the IP horn instead of the camera

5.   Document history

Release date	Documentation version	Reason
2024-06	V1.0	1st edition

6.   Notice of liability

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