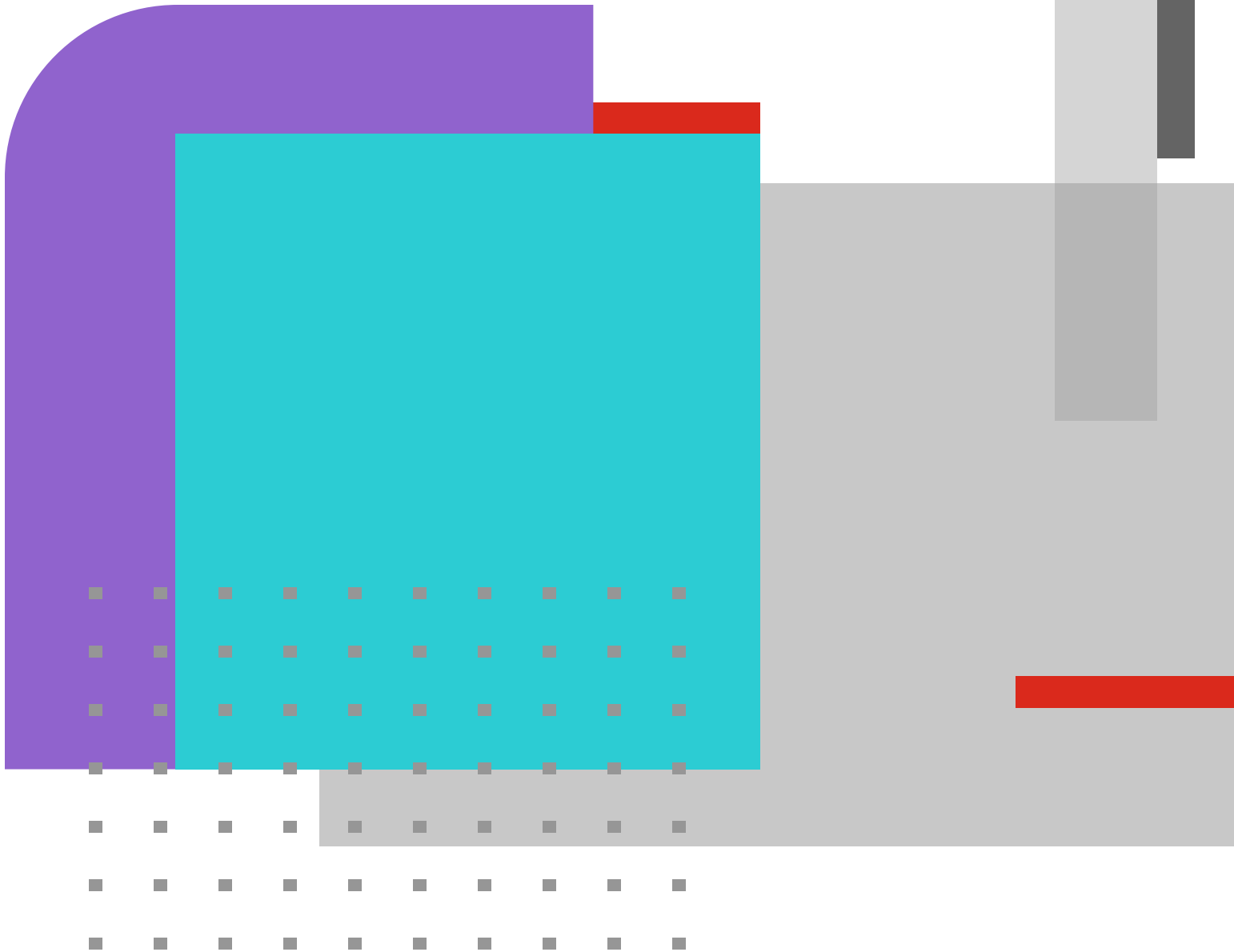


APPLICATION NOTES

# Using Electronic Shelf Label (ESL) USB Radio Systems With FortiAP Access Points Managed by FortiGate



## Abstract

These application notes describe a solution for supporting Hanshow and SES Imagotag Electronic Shelf Label (ESL) systems with supported FortiAP Access Point (AP) hardware that is managed by a FortiGate Next-Generation Firewall. ESL USB dongles from either manufacturer are plugged into supported FortiAP models and configured to allow ESL client devices to communicate through the FortiAP and to the wider network. Information in these application notes has been verified through internal testing and joint work with the relevant ESL solution providers.

## Introduction

These application notes describe the configuration steps necessary within Fortinet APs to enable them to work as a host for USB-based Electronic Shelf Label (ESL) systems. Supported Fortinet models are primarily indoor Wi-Fi 6 models (FAP-231F, FAP-431F, FAP-433F) with USB dongles from Hanshow as well as SES Imagotag.

Testing of the configured system has verified the following functionality:

- Traffic generated from the ESL system to the ESL tags is received correctly.
- Traffic generated from ESL tags sent to the ESL system is received correctly.
- Wi-Fi operation for the Fortinet system operates correctly.

## Hanshow System

Hanshow provides leading Internet-of-Things (IoT) devices and digital store solutions with a cloud-based configuration and management server. A wide variety of available label units offer features including full-color display and long battery life.

Fortinet wireless solution interoperability was tested on the following models:

- USB Model HS\_C09978

## SES Imagotag System

The VUSION Retail IoT Cloud platform combines ESLs, which run on an IoT ultra-low-power communication infrastructure. The labels feature high-resolution color displays, sensors, active NFC, ultra-high-speed data transfer, and LED-flashing.

Fortinet wireless solution interoperability was tested on the following models:

- APG2-USB1-A

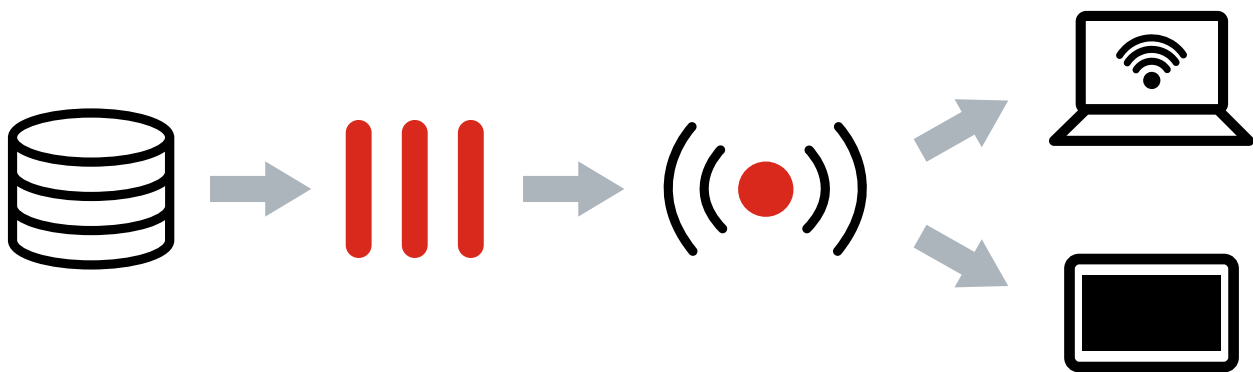


Figure 1: General architecture

## Equipment and Software Validation

### Hanshow

Equipment	Software
FortiAP Model 231F	FortiOS 7.0 and higher; FortiAP 7.0 and higher
FortiAP Model 431F	FortiOS 7.0 and higher; FortiAP 7.0 and higher
FortiAP Model 433F	FortiOS 7.0 and higher; FortiAP 7.0 and higher
FortiAP Model 421E	FortiOS 7.0 and higher; FortiAP 7.0 and higher
FortiAP Model 423E	FortiOS 7.0 and higher; FortiAP 7.0 and higher
FortiAP Model 231G	FortiOS starting 7.0.8, 7.2.1, 7.4.0, and higher; FortiAP 7.2.1, 7.4.0, and higher
FortiAP Model 233G	FortiOS starting 7.0.8, 7.2.1, 7.4.0, and higher; FortiAP 7.2.1, 7.4.0, and higher
FortiAP Model 431G	FortiOS starting 7.0.8, 7.2.1, 7.4.0, and higher; FortiAP 7.2.1, 7.4.0, and higher
FortiAP Model 433G	FortiOS starting 7.0.8, 7.2.1, 7.4.0, and higher; FortiAP 7.2.1, 7.4.0, and higher
Hanshow Model HS_C09978	All firmware versions

### SES Imagotag

Equipment	Software
FortiAP Model 231F	FortiOS 7.0 and higher; FortiAP 7.0 and higher
FortiAP Model 431F	FortiOS 7.0 and higher; FortiAP 7.0 and higher
FortiAP Model 433F	FortiOS 7.0 and higher; FortiAP 7.0 and higher
FortiAP Model 231G	FortiOS starting 7.0.8, 7.2.1, 7.4.0, and higher; FortiAP 7.2.1, 7.4.0 and higher
FortiAP Model 233G	FortiOS starting 7.0.8, 7.2.1, 7.4.0, and higher; FortiAP 7.2.1, 7.4.0 and higher
FortiAP Model 431G	FortiOS starting 7.0.8, 7.2.1, 7.4.0, and higher; FortiAP 7.2.1, 7.4.0 and higher
FortiAP Model 433G	FortiOS starting 7.0.8, 7.2.1, 7.4.0, and higher; FortiAP 7.2.1, 7.4.0 and higher
SES Imagotag Model APG2-USB1-A	All firmware versions

## Configuring FortiAP

### Hanshow

This section shows the necessary steps to configure the Hanshow HS\_C09978 dongle and connect to a FortiAP and allow that dongle traffic to be passed upstream to the Hanshow system. Configuration is done in the FortiOS CLI and involves changing parameters in the relevant wireless profile. In the example below, the profile is named Dongle\_Example, but this would be replaced with the applicable profile in a live system. Additionally, the ESL system will need to be mapped to an SSID for the system to function correctly. In this example we are using an SSID named MySSID. [The example values that would not match configuration of a local system are called out in red below for clarity.]

```
# config wireless-controller
wtp-profile (wtp-profile) # edit Dongle_Example
(Dongle_Example) # config lan
(lan) # set port-esl-mode ?
    offline Offline. ( default mode)
    nat-to-wan NAT WTP ESL port to WTP WAN port.
    bridge-to-wan Bridge WTP ESL port to WTP WAN port.
    bridge-to-ssid Bridge WTP ESL port to SSID.
# set port-esl-mode bridge-to-ssid
(lan) # set port-esl-ssid "MySSID"
```



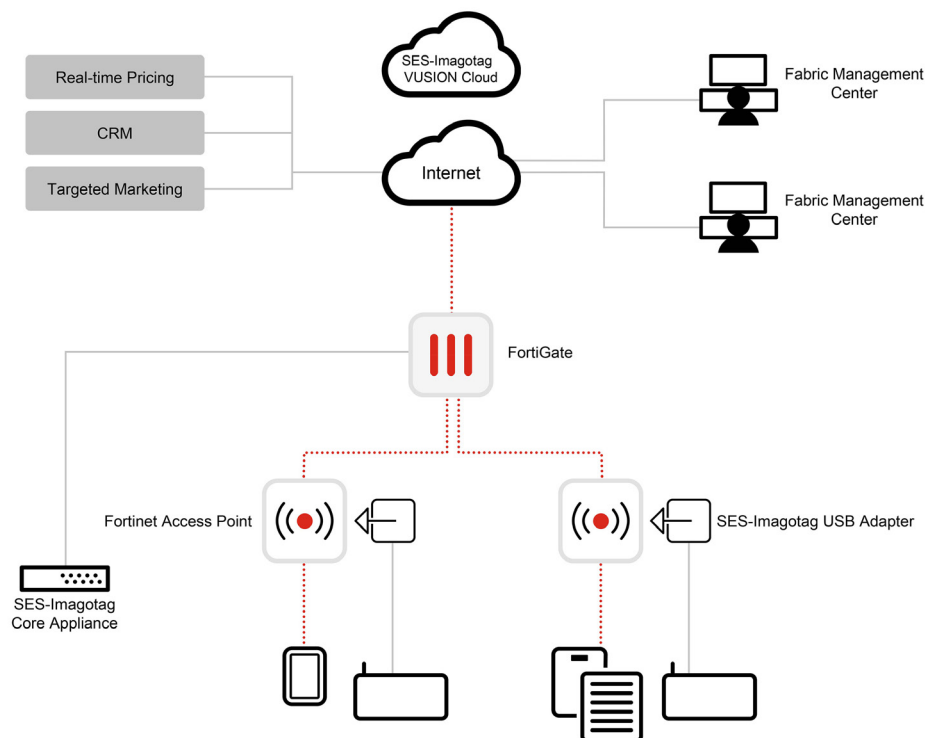
## SES Imagotag

This section shows the necessary steps to configure the SES Imagotag APG2-USB1-A dongle and connect to a FortiAP and allow that dongle traffic to be passed upstream to the SES Imagotag system. Configuration is done in the FortiOS CLI and involves changing parameters in the relevant wireless profile. In the example below, the profile is named `Dongle_Example`, but this would be replaced with the applicable profile in a live system. For the SES Imagotag unit to function, `scd-enable` must be turned on and the output power should be set to something other than A. The ESL channel may be set as desired. In this example we use the manufacturer's recommended value of 10 and "B." Additionally, the ESL system's FQDN will need to be set. In our example below, we use `example.server.sesimagotag.fortiap.com`. [The example values that would not match configuration of a local system are called out in red below for clarity.]

```
# config wireless-controller wtp-profile
(wtp-profile) # edit Dongle_Example
(Dongle_Example) # config esl-ses-dongle
(esl-ses-dongle) # show
config esl-ses-dongle
set scd-enable enable
set esl-channel 10
set output-power B
set apc-fqdn "example.server.sesimagotag.fortiap.com"
set apc-port 7354
```

## Configuring the ESL System

ESL system configuration should follow the recommended settings per the manufacturer being used. There are no unique ESL solution settings required when using Fortinet APs. Please refer to the relevant documentation for the ESL solution of choice when setting up and configuring the system.



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## Interoperability Testing

Interoperability compliance testing covered feature functionality, serviceability, and performance testing.

### Test Results

ESL tags were able to successfully communicate through the USB dongle back to the ESL server system. Display changes were executed with no issues found during testing.

### Support

If you have any issues with this setup or functionality, please contact your Fortinet TAC representative.

### Conclusion

Fortinet wireless access points can be successfully integrated with ESL solutions from both Hanshow and/or SES Imagotag. This provides complete Wi-Fi and ESL solutions that leverage a single hardware platform (Fortinet AP) installed in the ceiling. An ESL vendor-provided USB gateway dongle is plugged into the USB port on the AP. Following the steps outlined in this document will allow the ESL solution to pass traffic from shelf labels back to the controlling management platform.

