Research & Vehicle Technology
"Infotainment Systems Product Development"

Feature – Sentinel

APIM Infotainment Subsystem Part Specific Specification (SPSS)

Version 1.0

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Version Date: April 20, 2022

FORD CONFIDENTIAL

Revision History

Date	Ver	Notes	
April 20, 2022	1.0	Initial Release	

Table of Contents

1 Overview

The purpose of this document is to describe the feature function requirements for “Sentinel” Feature. This document describes the usage of the Sentinel Feature in the vehicle from different actor’s perspective.

Sentinel feature is a connected intelligent system offering security services to the users against theft and intrusion inside the truck bed, cargo area and surrounding the vehicle particularly for commercial vehicle customers

Sentinel feature is an integrated security system that enables the user to

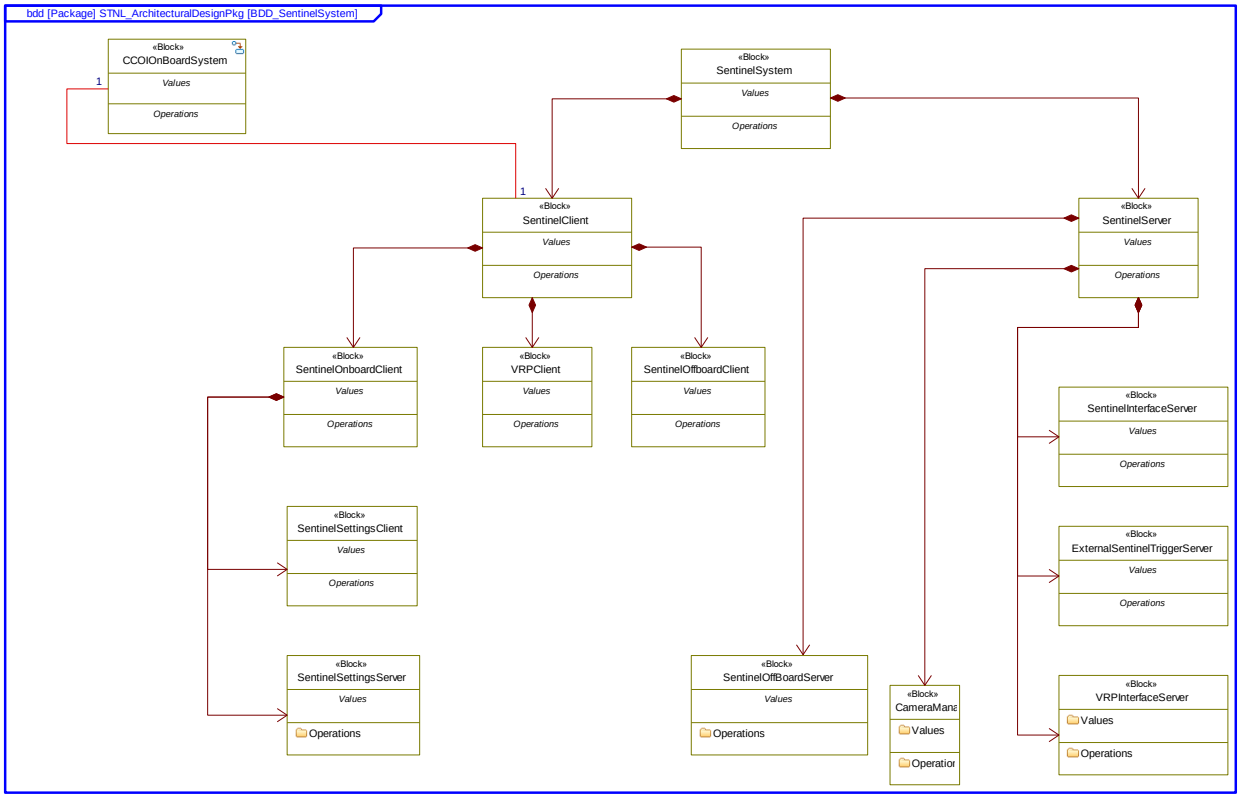
- Detect intruders using AJAR sensors (or any sensor in the combined sensor module), Perimeter sensors, as well as accelerometer sensor
- Send a notification to the user about the detected intrusion,
- Start recording the video feed from the vehicle cameras locally on the vehicle and on the cloud,
- Enable streaming directly to a subscription app on the customer’s mobile device.

The requirements on the functionality are described either as use cases or as conventional functional decomposition. This document only defines the functionality on an abstract level, focusing on what the system SHALL perform, not detailing how.
Model Year: MY23 and beyond
Region: TBD

2 Architectural Design

2.1 REQ-485486/A-SentinelSystem

Block Definition Diagram



2.2 STNL-CLD-REQ-485480/A-SentinalOnboardClient

The SentinalOnboardClient is responsible for the tasks listed below:

- Handling the Sentinel User settings.
- Provide playback options for locally stored Sentinel recordings.
- Externally triggered Start / Stop behavior.
- Linkage from Sentinel to other services e.g. Customer Connectivity Settings or Video Recording And Playback.

Please review the implementation guide/block diagram to locate the SeninalOnboardClient class.

2.3 STNL-CLD-REQ-407661/A-SentinelSettingsClient

The SentinelSettingsClient is responsible for the tasks listed below:

- Transmitting Sentinel Settings requests to the server.
- Handling the User inputs for Sentinel settings.

Please review the implementation guide/block diagram to locate the SentinelSettingsClient class.

2.4 STNL-CLD-REQ-407662/A-SentinalSettingsServer

The SentinelSettingsServer is responsible for the tasks listed below:

- Receiving Sentinel Settings requests from the client.

Please review the implementation guide/block diagram to locate the SentinelSettingsServer class.

2.5 STNL-CLD-REQ-485483/A-VRPClient

Please refer to requirement: “VRP-CLD-REQ-406930/A-Video Recording and Playback Interface Client” for further information about the responsibility.

2.6 Physical Mapping of Classes

The table below shows an example of how the logical classes that make up the Sentinel feature can be mapped into physical modules. This mapping is an example only and does not necessarily carryover to other carlines or vehicle architectures.

Logical Class	Physical Module (ECU)
SentinelOnboardClient	APIM
SentinelSettingsClient	APIM
SentinelSettingsServer	APIM
VRPClient	APIM

2.7 Logical Signal Mapping

The CAN signals mentioned throughout this document shall refer to the CAN signal’s logical name. The logical names shall be mapped to their actual CAN signal names. Please use the table below to perform the mapping. The InfoCAN database file is the master file for the actual CAN signal names. Note: There may be cases where the actual CAN signal name is used in this documentation.

Logical Name	CAN Signal Name	Tx	Rx
PerimeterAlarm_ST	Perimeter_Alarm_Status	GWM	APIM

2.8 Sentinel InterfaceClient Interface

2.8.1 STNL-IIR-REQ-407663/A-Sentinel InterfaceClient_Rx

The Sentinel interface client shall receive the following signals for the feature to work as needed.

2.8.1.1 MD-REQ-407665/A-IgnitionStatus_St

Message Type: Status

Signal used to indicate ignition state.

Name	Literals	Value	Description
Type	-	-	Indicates ignition state
	Unknown	0x0	
	Off	0x1	
	Accessory	0x2	
	Run	0x4	
	Start	0x8	
	Invalid	0xF	

2.8.1.2 MD-REQ-427641/A-PerimeterAlarm_ST

Message Type: Status
This Message is received to know the Status of the Perimeter Alarm

Name	Literals	Value	Description
Perimeter_Alarm_Status_ET			
	0x0	Disarmed	
	0x1	Prearmed	
	0x2	Armed	
	0x3	Activated	

3 General Requirements

3.1 STNL-REQ-407657/A-Powermode Condition

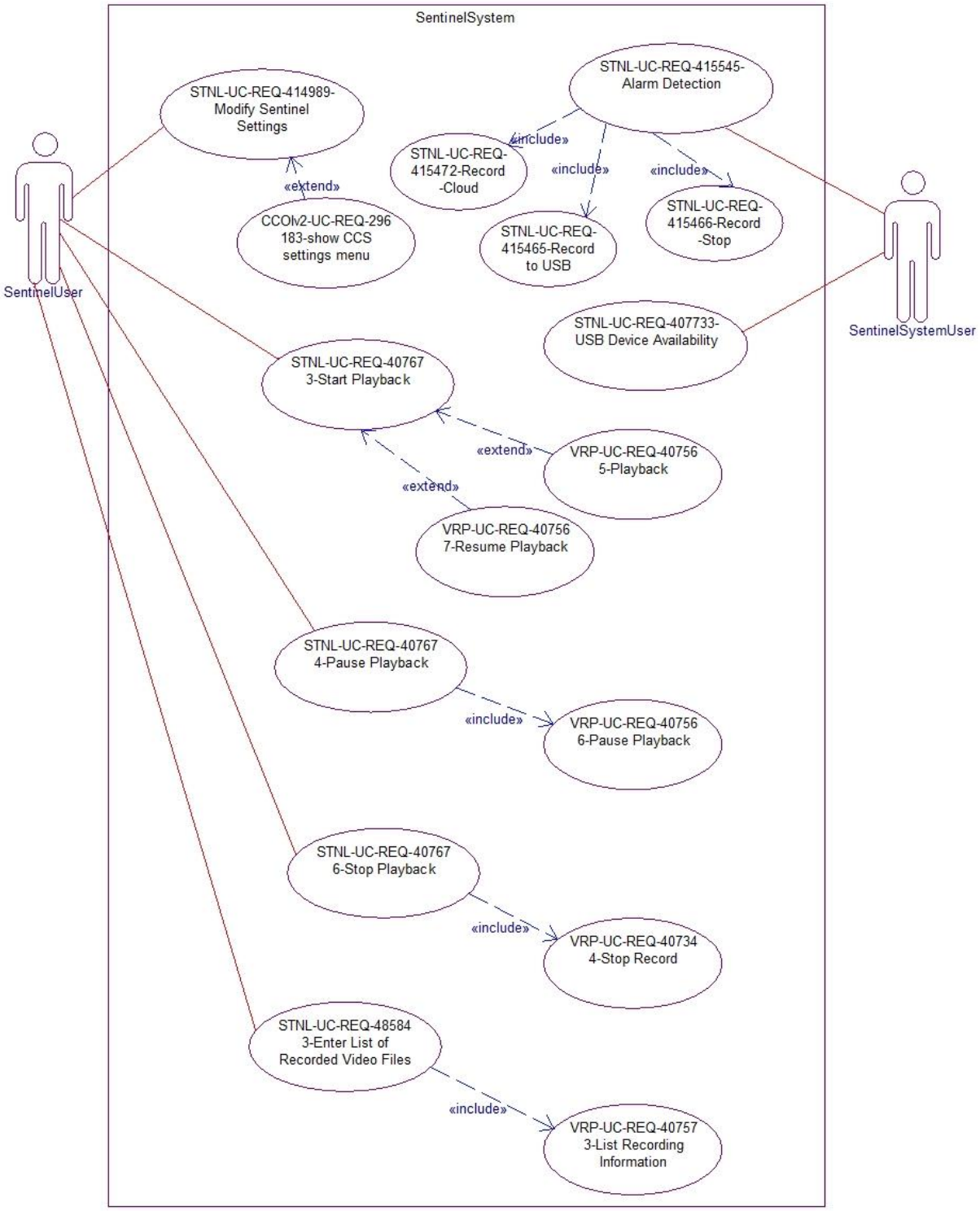
The SentinelOnboardClient shall allow the functionality defined by this SPSS when the Ignition_Status =ON.

Please refer to Requirement: “PWRMAN-FUN-REQ-486437/A-Sentinel / Integrated Security Cameras (ISC) Power Moding” for further details on Ignition = Off behavior.

4 Functional Definition

4.1 UCD-REQ-485484/A-Sentinel System

Use Case Diagram



4.2 STNL-FUN-REQ-407744/A-Sentinel Settings

4.2.1 Use Cases

4.2.1.1 STNL-UC-REQ-414989/A-Modify Sentinel Settings

Actors	Sentinel User
Pre-conditions	Ignitions is switched ON Multimedia System is ON
Scenario Description	The user enters the Sentinel settings menu and changes the current setting for storing videos on USB OR selecting a USB Device OR the Sentinel Reminders via << HMI Input >>.
Post-conditions	The Sentinel setting is changed to the user selected state. The user will be informed via <<HMI Output>>.
List of Exception Use Cases	E1 – Sentinel Feature is disabled in CCS menu: If the Sentinel feature is disabled in the CCS menu then the user will be informed via <<HMI Output>> and has the option to go to the CCS menu. E2 – The user changes the Sentinel Reminder setting while no suitable USB device is connected: If the user changes the Sentinel Reminder setting while while no suitable USB device is connected then the user will be informed via <<HMI Output>>.
Interfaces	G-HMI

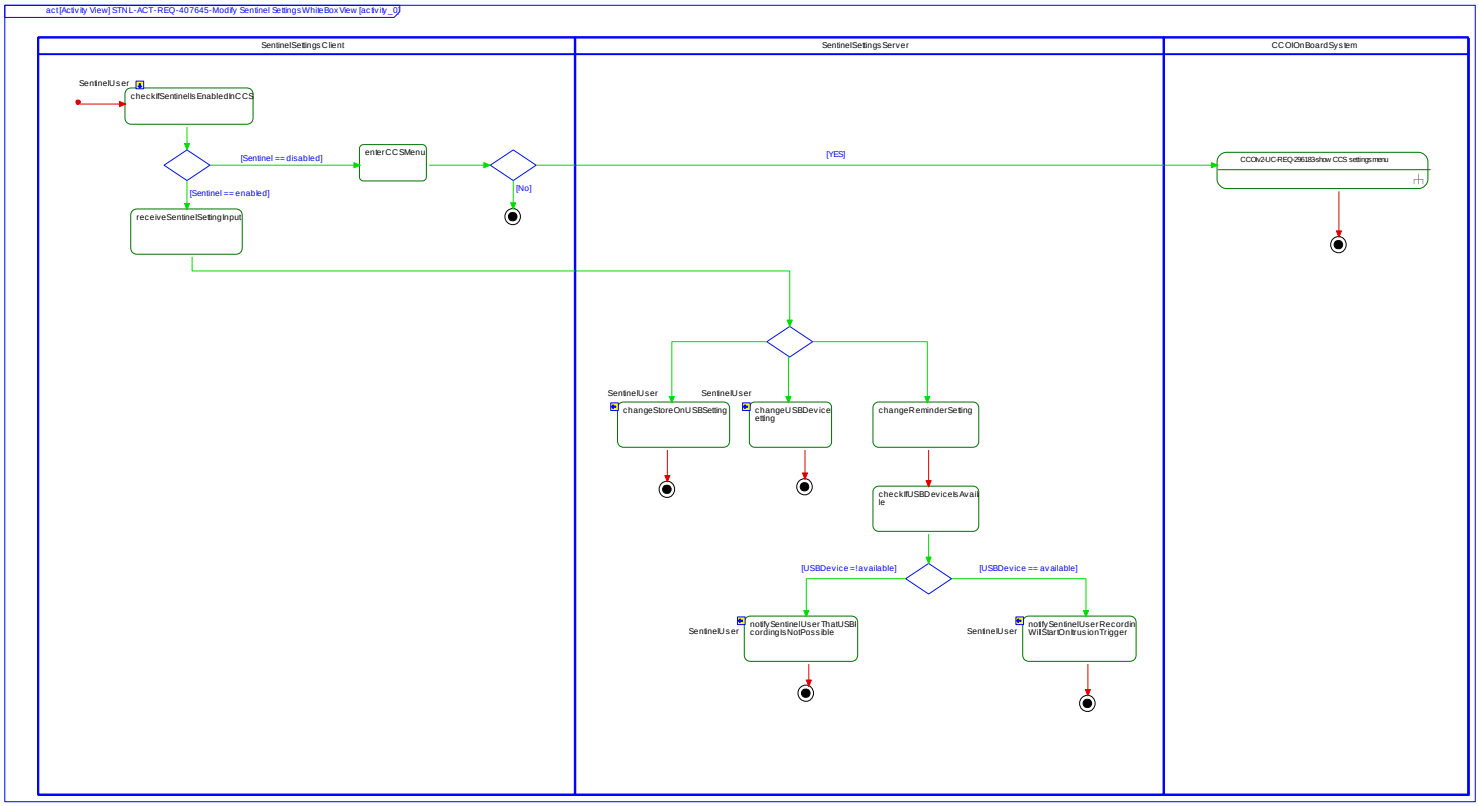
4.2.2 Requirements

4.2.3 White Box View

4.2.3.1 Activity Diagrams

4.2.3.1.1 STNL-ACT-REQ-407645/A-Modify Sentinel Settings

Activity Diagram



4.2.3.2 Sequence Diagrams

4.2.3.2.1 STNL-SD-REQ-407753/A-Modify Sentinel Setting

Constraints

Pre-Condition

Ignition is switched on.

Pre-Condition

Infotainment System is on.

Scenarios

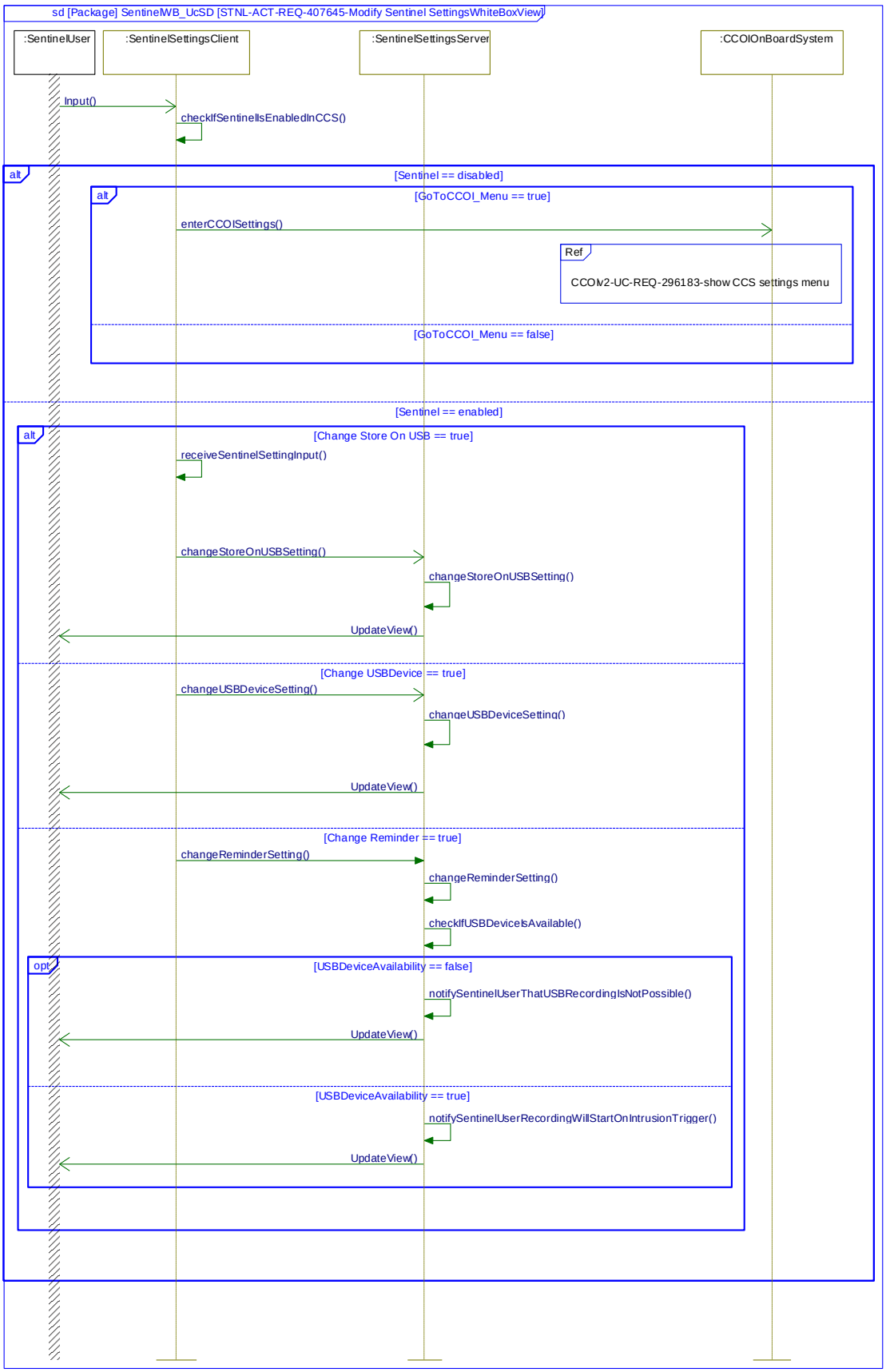
Normal Usage

The user enters the Sentinel settings and changes the Sentinel setting on the vehicle HMI.

Post-Condition

The Sentinel setting is changed according to the user selected mode.

Sequence Diagram



4.3 STNL-FUN-REQ-422311/A-Video Playback

4.3.1 Use Cases

4.3.1.1 STNL-UC-REQ-485843/A-Enter List of Recorded Video Files

Actors	Sentinel User
Pre-conditions	Infotainment System is On.
Scenario Description	The user enters the list of recorded video files via <<HMI Input>>.
Post-conditions	The list of recorded video files is visible to the user via <<HMI output>>.
List of Exception Use Cases	E1: The list is empty – If the list of recorded video files is empty then the user will be informed via <<HMI Output>>. Post-Condition: Empty list information is presented to the user via <<HMI output>>.
Interfaces	G-HMI;

4.3.1.2 STNL-UC-REQ-407673/A-Start Playback

Actors	Sentinel User
Pre-conditions	Infotainment System is On. The user has entered the list of stored video files on the USB device.
Scenario Description	The user starts playing a recorded video file from the local storage device.
Post-conditions	The recorded video file is played back and visible to the user via <<HMI output>>.
List of Exception Use Cases	E1: A video file in pause state is active – If a video file is active in pause state then the video playback will be re-started. Post-Condition: The paused video file is played back and visible to the user via <<HMI output>>.
Interfaces	G-HMI;

4.3.1.3 STNL-UC-REQ-407674/A-Pause Playback

Actors	Sentinel User
Pre-conditions	Infotainment System is On. Video playback of a stored video file is active.
Scenario Description	The user pauses the currently played video file via <<HMI Input>>.
Post-conditions	The currently played video file is paused. The user is informed via <<HMI Output>>.
List of Exception Use Cases	
Interfaces	G-HMI;

4.3.1.4 STNL-UC-REQ-407676/A-Stop Playback

Actors	Sentinel User
Pre-conditions	Infotainment System is On. Video playback of a stored video file is active.
Scenario Description	The user stops the currently played video file via <<HMI Input>>.
Post-conditions	The currently played video file is stopped. The list of stored video files on the USB device is shown via <<HMI Output>>.
List of Exception Use Cases	
Interfaces	G-HMI;

4.3.2 Requirements

4.3.2.1 STNL-REQ-407681/A-Playback

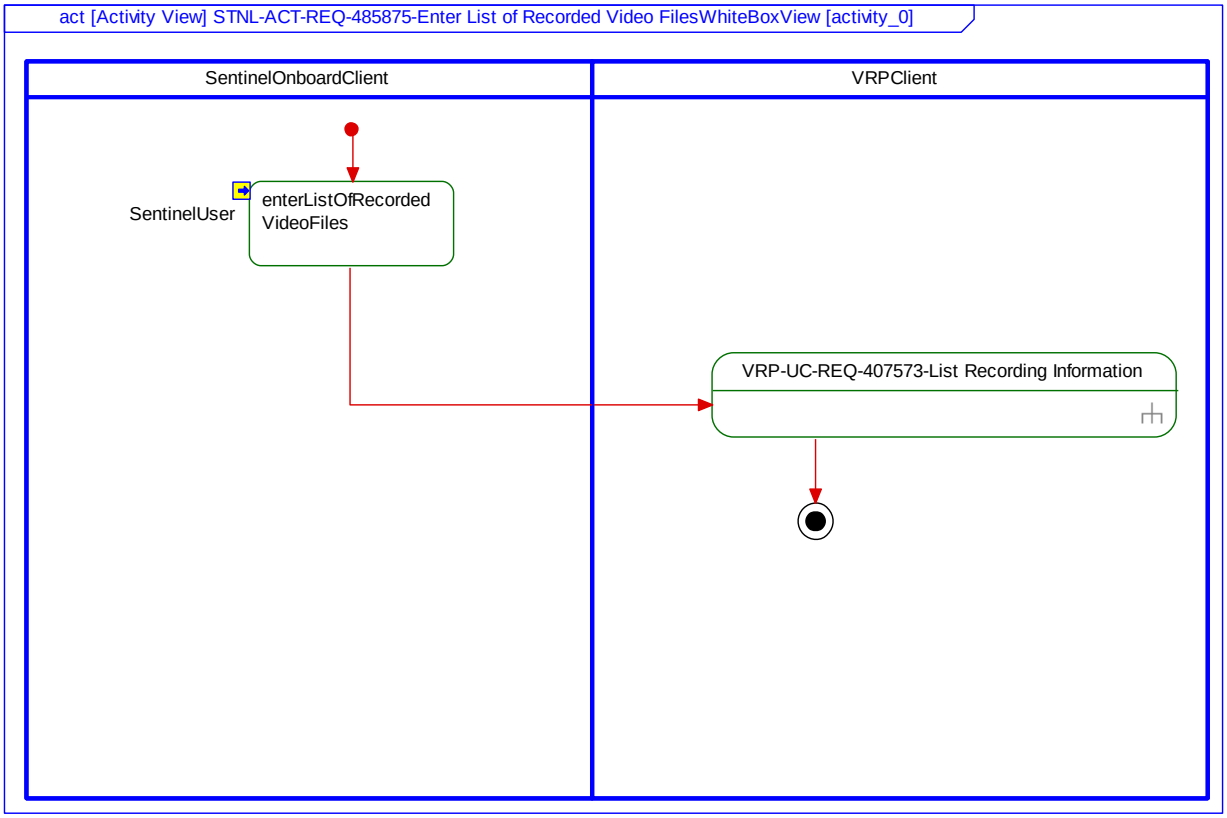
The SentinelClient shall utilize the playback functions defined in “VRP-FUN-REQ-407058/A-Video Controls” and “VRP-REQ-407065/A-Playback” within the “Feature – Video Recording and Playback Infotainment Subsystem Part Specific Specification (SPSS)”.

4.3.3 White Box View

4.3.3.1 Activity Diagrams

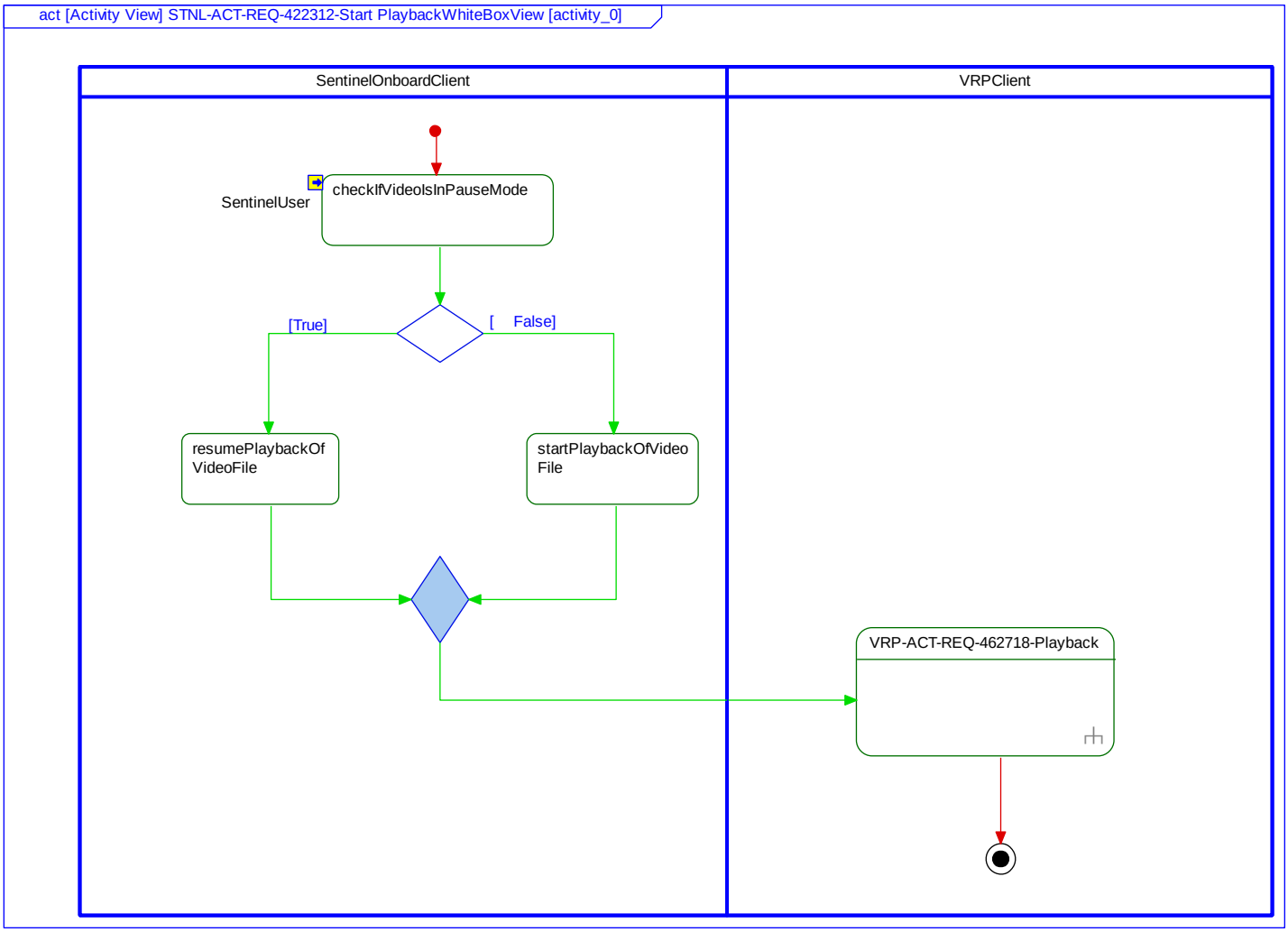
4.3.3.1.1 STNL-ACT-REQ-485875/A-Enter List of Recorded Video Files

Activity Diagram



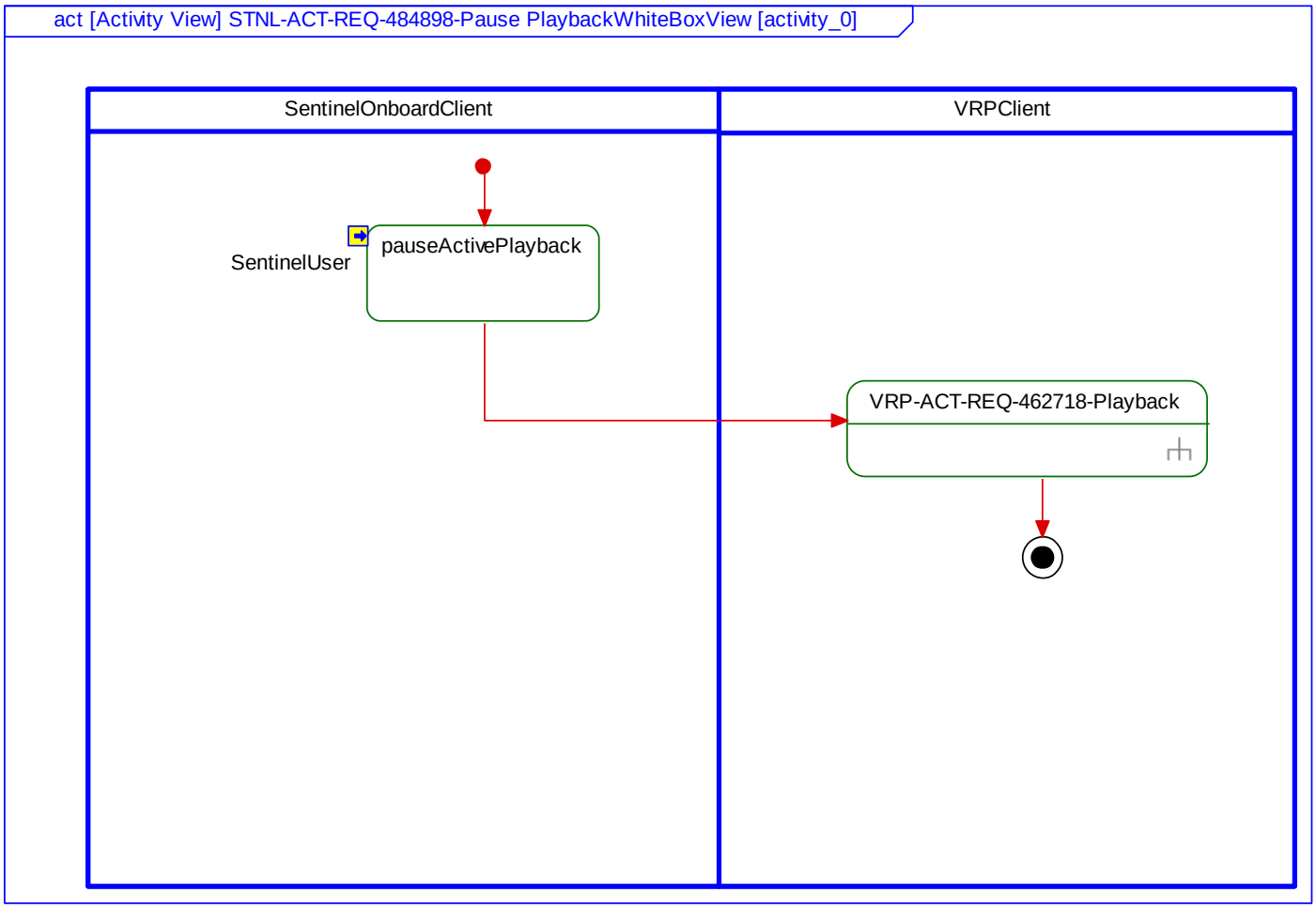
4.3.3.1.2 STNL-ACT-REQ-422312/A-Start Playback

Activity Diagram



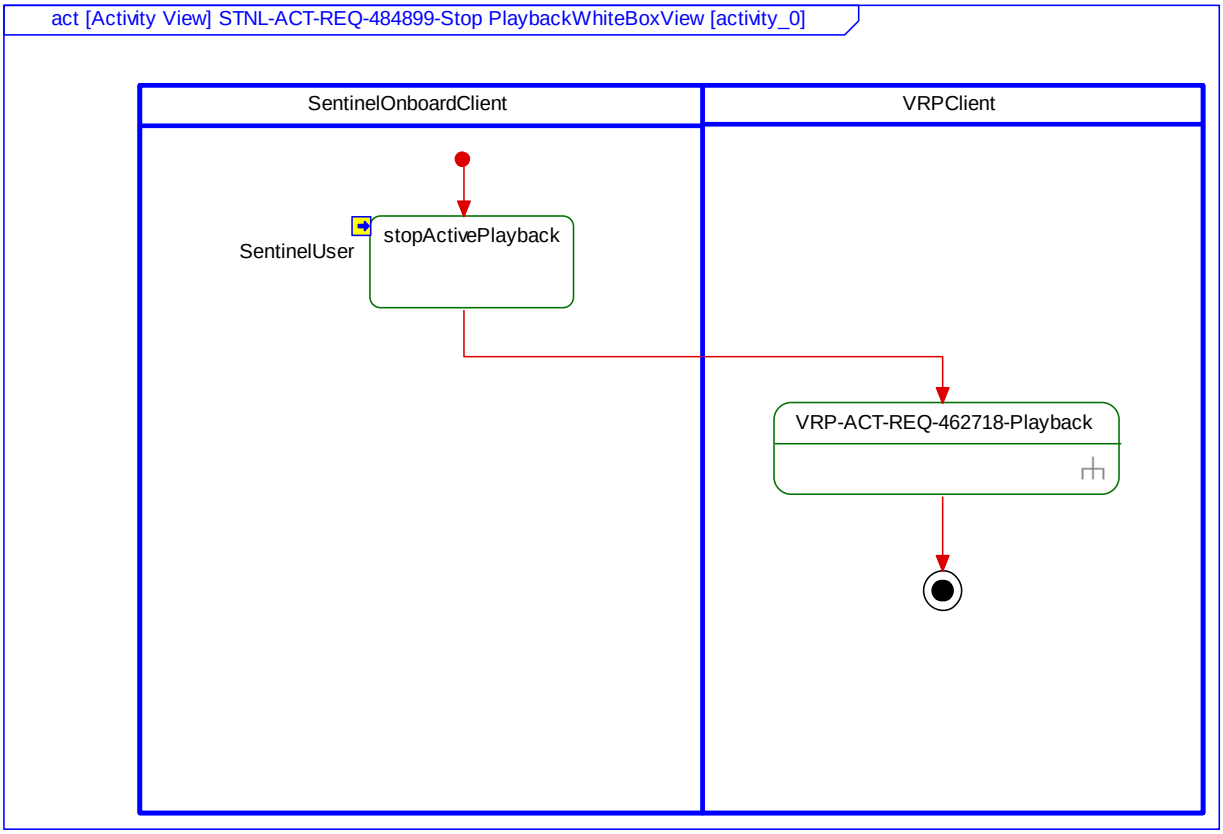
4.3.3.1.3 STNL-ACT-REQ-484898/A-Pause Playback

Activity Diagram



4.3.3.1.4 STNL-ACT-REQ-484899/A-Stop Playback

Activity Diagram



4.3.3.2 Sequence Diagrams

4.3.3.2.1 STNL-SD-REQ-485874/A-Enter List of Recorded Video Files

Constraints

Pre-Condition

At least one recorded video file is available on the USB storage device.

Scenarios

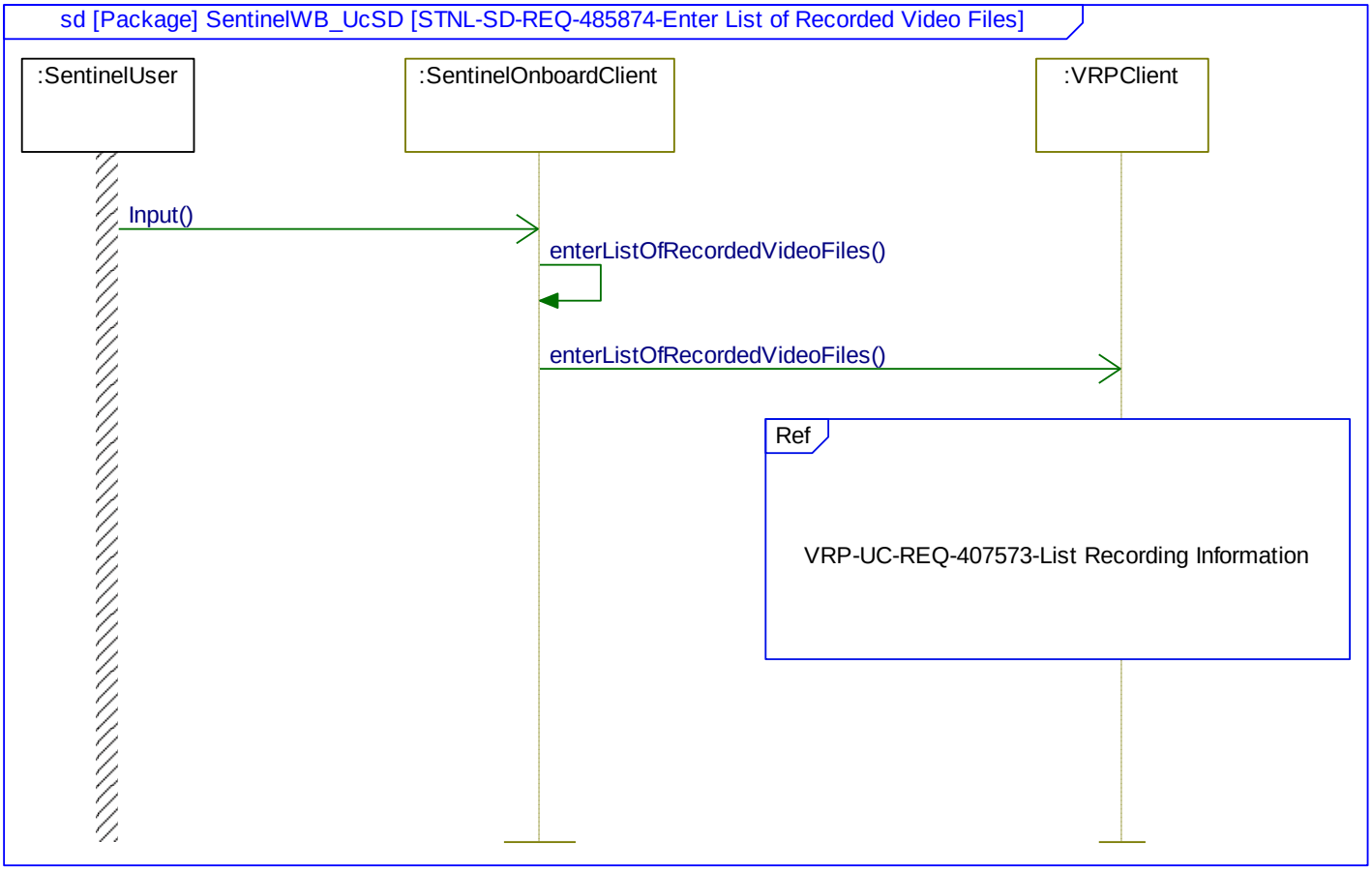
Normal Usage

The user enters the list of recorded video files.

Post-Condition

The list of recorded video files is visible to the user.

Sequence Diagram



4.3.3.2.2 STNL-SD-REQ-422313/A-Start Playback

Constraints

Pre-Condition

At least on recorded video file is available on the Mass Storage Device.

Pre-Condition

The recorded video file is in stop or pause mode.

Scenarios

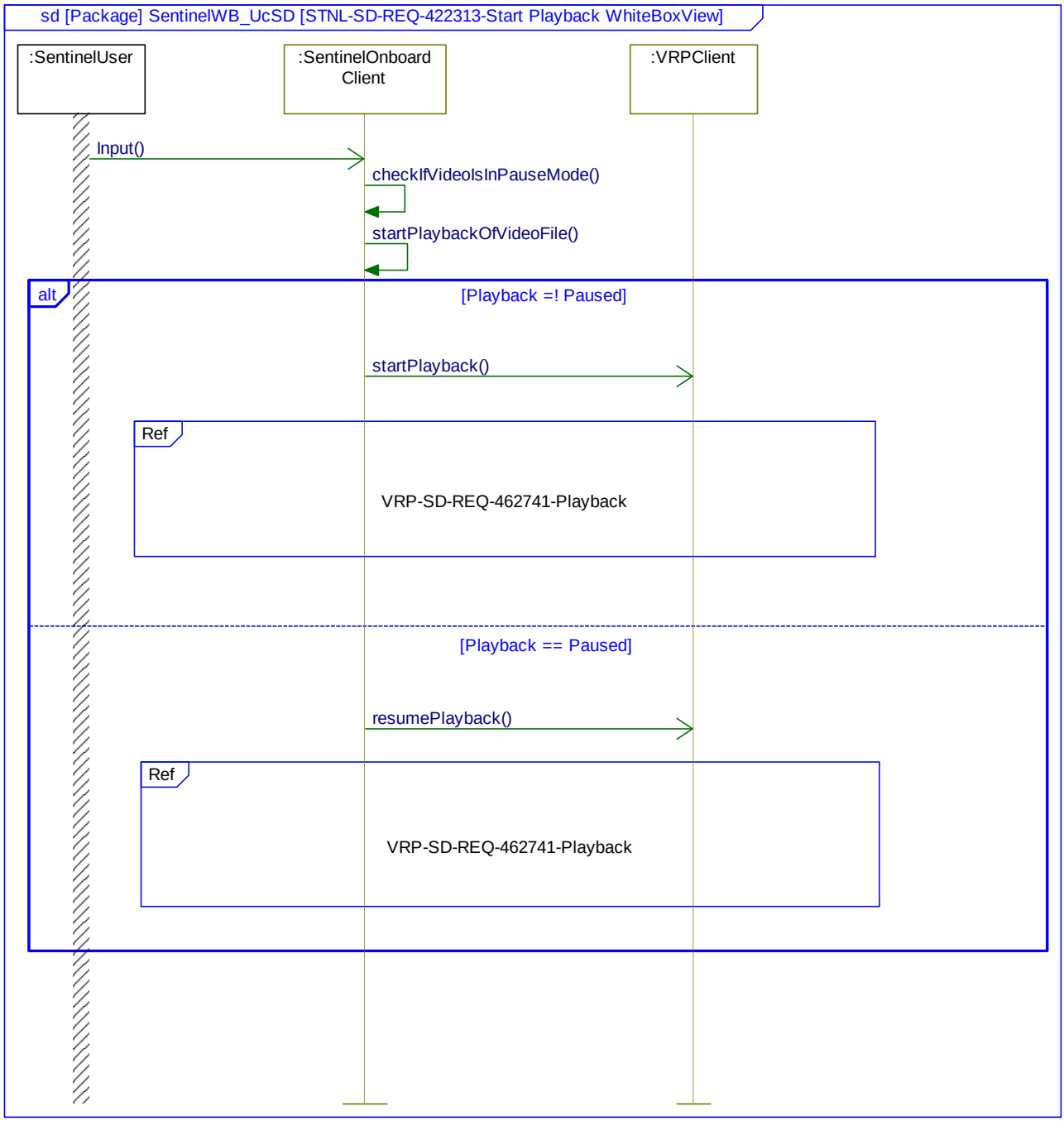
Normal Usage

The user starts the playback of a recorded video file.

Post-Condition

The Playback is started or resumed.

Sequence Diagram



4.3.3.2.3 STNL-SD-REQ-485112/A-Pause Playback

Constraints

Pre-Condition

A recorded video file is in play mode.

Scenarios

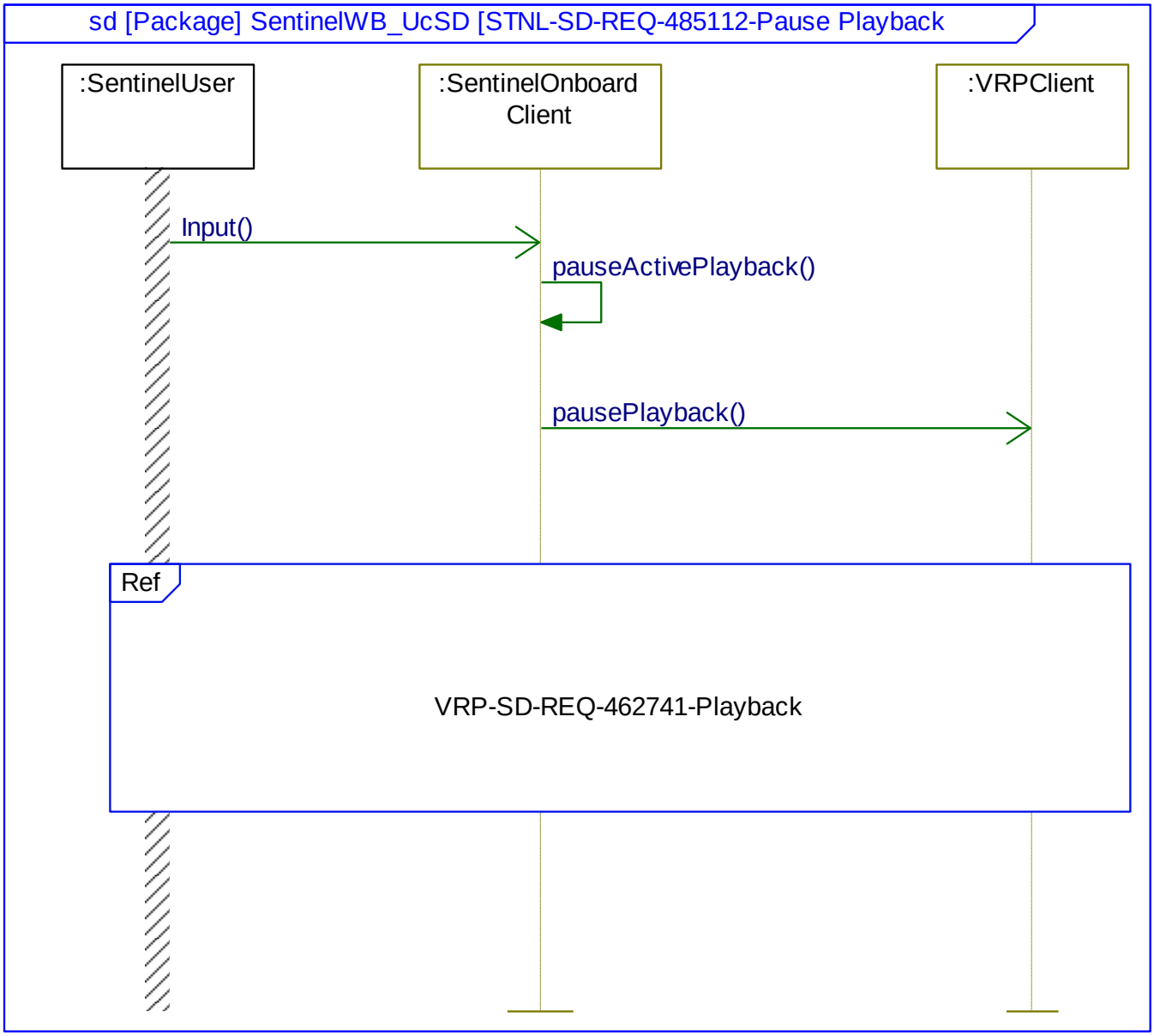
Normal Usage

The user pauses the playback of a recorded video file.

Post-Condition

The active playback is paused.

Sequence Diagram



4.3.3.2.4 STNL-SD-REQ-485113/A-Stop Playback

Constraints

Pre-Condition

A recorded video file is in play mode.

Scenarios

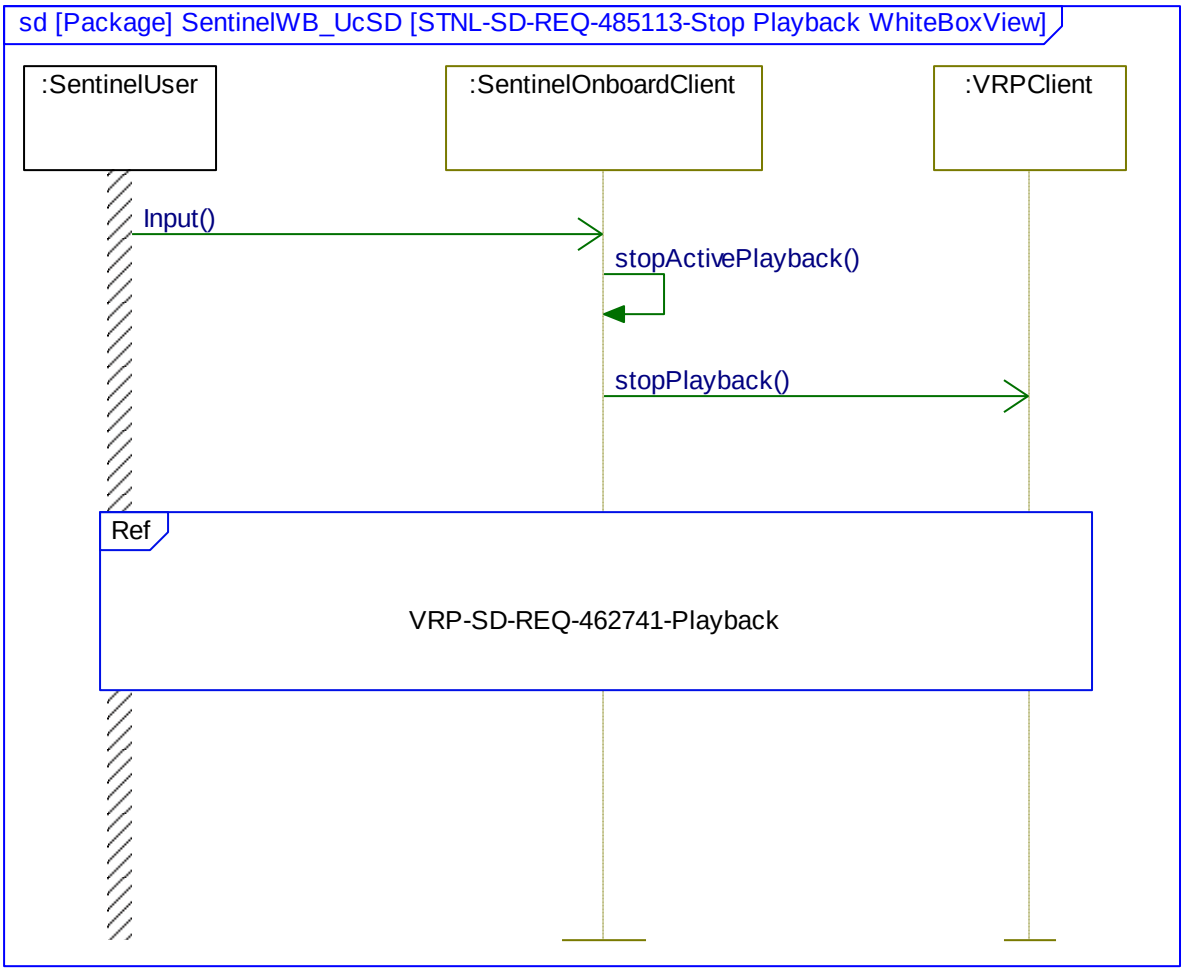
Normal Usage

The user stops the playback of a recorded video file.

Post-Condition

The Playback is stopped.

Sequence Diagram



4.4 STNL-FUN-REQ-407732/A-Record Video

4.4.1 Requirements

4.4.1.1 STNL-REQ-492417/A-Record Video to USB

For further details on Video Recording to a local storage device triggered by an intrusion detection event, please refer to requirement: “VRP-FUN-REQ-407058/A-Video Controls”.

5 Appendix: Reference Documents

Reference #	Document Title
1	Power Management APIM SPSS
2	Video Recording and Playback SPSS
3	H90_SYNC4_Sentinel Specification
4	
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