



**Research & Vehicle Technology**  
**“Infotainment Systems Product Development”**

**Feature – Trailer Perimeter Alarm**

**APIM Infotainment Subsystem Part Specific  
Specification (SPSS)**

Version: 1.1

**UNCONTROLLED COPY IF PRINTED**

Version Date: October 30, 2019

**FORD CONFIDENTIAL**



## Revision History

Date	Version	Notes
February 26, 2019	1.0	Initial Release
October 30, 2019	1.1	
	STR-617207/B-General Requirements	ndecia: Updated structure to add new requirement 369356
	TPA-REQ-342986/B-Missing Support Message Strategy	ndecia: Added timing detail for 5s for a missing message
	TPA-REQ-369356/A-Trailer Perimeter Alarm Configuration Parameter	ndecia: added requirement for configurable parameter to support feature



# Table of Contents

REVISION HISTORY .....	2
1 OVERVIEW .....	4
1.1 Feature Assumptions .....	4
1.2 Feature Operation .....	4
1.3 Logical Block Diagram.....	4
1.4 Terminology and Abbreviations.....	4
2 GENERAL REQUIREMENTS .....	5
2.1 TPA-REQ-342986/B-Missing Support Message Strategy .....	5
2.2 TPA-REQ-369356/A-Trailer Perimeter Alarm Configuration Parameter.....	5
3 ARCHITECTURAL DESIGN.....	6
3.1 TPA-CLD-REQ-342983/A-Trailer Perimeter Alarm Client .....	6
3.2 TPA-CLD-REQ-342984/A-Trailer Perimeter Alarm Server .....	6
3.3 Physical Mapping of Classes .....	6
3.4 TPA-IIR-REQ-342985/A-Interface Requirement.....	6
3.4.1 MD-REQ-342979/A-TrailerAlarmButton_St .....	6
3.4.2 MD-REQ-342980/A-TrailerAlarmSupport_St .....	6
4 FUNCTIONAL DEFINITION .....	7
4.1 TPA-FUN-REQ-342973/A-Update Trailer Perimeter Alarm Feature Setting.....	7
4.1.1 Requirements .....	7
4.1.2 Use Cases .....	7
4.1.3 WhiteBoxView .....	9
5 APPENDIX: REFERENCE DOCUMENTS.....	11



# 1 Overview

Trailer Perimeter Alarm is a feature that constantly monitors the electrical loads in trailer lights and provides an audible and visual advise for the user in the case the electrical load is significant different than the original value. This feature is linked with the vehicle alarm; TPA is armed when the vehicle alarm is requested to be armed. TPA feature is configurable via the Trailer Perimeter Alarm Client, a selectable button setting is available to turn ON and OFF the feature as the customer prefers. The Trailer Perimeter Alarm Client provides feature status, and warning information when feature is not supported.

## 1.1 Feature Assumptions

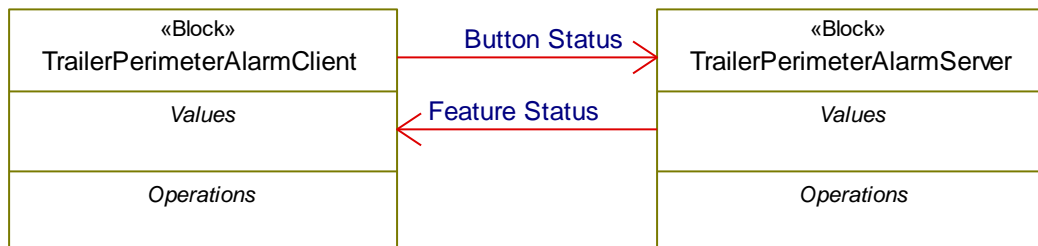
TPA feature is available only if following conditions are met:

- Ignition Status = OFF
- Trailer connected detected before Vehicle alarm is armed
- TPA Feature is set to ON via the Trailer Perimeter Alarm Client
- Trailer lights compatible.

## 1.2 Feature Operation

The scope of this specification outlines how the TPA setting is activated or deactivated, and any associated indications to the user if the feature cannot be supported due to an incompatible trailer being connected.

## 1.3 Logical Block Diagram



## 1.4 Terminology and Abbreviations

The following table lists terminologies that are used in this document along with a brief description.

Term	Description
APIM	Accessory Protocol Interface Module
BCM	Body Control Module
CAN	Controller Area Network
CPU	Central Processing Unit
ECU	Electronic Control Unit
ITRM	Integrated Trailer Module
TLM	Trailer Lighting Module



## 2 General Requirements

### 2.1 TPA-REQ-342986/B-Missing Support Message Strategy

If the TrailerAlarmSupport\_St signal is missing for more than 5 seconds, the Trailer Perimeter Alarm Client shall assume the Trailer Perimeter Alarm feature is Not Supported. This means the feature is unable to be activated, and the Trailer Perimeter Alarm Client shall set the value to TPA Off in the TrailerAlarmButton\_St signal.

### 2.2 TPA-REQ-369356/A-Trailer Perimeter Alarm Configuration Parameter

The Trailer Perimeter Alarm Client shall have a configurable parameter to determine whether the Trailer Perimeter Alarm feature is to be supported. Refer to the Infotainment Diagnostic Specification for further details.



### 3 Architectural Design

#### 3.1 TPA-CLD-REQ-342983/A-Trailer Perimeter Alarm Client

The Trailer Perimeter Alarm Client is responsible for providing the status of the Trailer Perimeter Alarm feature setting to the Trailer Perimeter Alarm Server.

#### 3.2 TPA-CLD-REQ-342984/A-Trailer Perimeter Alarm Server

The Trailer Perimeter Alarm Server is responsible for providing the support status to the Trailer Perimeter Alarm Client of whether the connected trailer can support the Trailer Perimeter Alarm feature.

#### 3.3 Physical Mapping of Classes

The table below shows an example of how the logical classes that make up the Trailer Perimeter Alarm feature may be mapped into physical modules.

Logical Class	Physical Module (ECU)
TrailerPerimeterAlarmClient	APIM
TrailerPerimeterAlarmServer	ITRM

#### 3.4 TPA-IIR-REQ-342985/A-Interface Requirement

##### 3.4.1 MD-REQ-342979/A-TrailerAlarmButton\_St

Message Type: Status

This signal provides the status of the TPA feature setting button.

Name	Literals	Value	Description
TrailerAlarmButton_St	-	-	
	TpaOff	0x0	TPA Feature set to OFF
	TpaOn	0x1	TPA Feature set to ON

##### 3.4.2 MD-REQ-342980/A-TrailerAlarmSupport\_St

Message Type: Status

This signal contains the status of the Trailer Perimeter Alarm Support.

Name	Literals	Value	Description
TrailerAlarmSupport_St	-	-	
	NotSupported	0x0	TPA Feature Not Supported
	SupportedByBrakes	0x1	TPA Feature Supported
	SupportedByLights	0x2	TPA Feature Supported
	SupportedByBrakesAndLights	0x3	TPA Feature Supported



## 4 Functional Definition

### 4.1 TPA-FUN-REQ-342973/A-Update Trailer Perimeter Alarm Feature Setting

This function is used to update the Trailer Perimeter Alarm feature setting based on user input.

#### 4.1.1 Requirements

##### 4.1.1.1 TPA-REQ-342974/A-Button Status for Trailer Perimeter Alarm Setting

The Trailer Perimeter Alarm Client shall process user input for the Trailer Perimeter Alarm feature setting and update the TrailerAlarmButton\_St status accordingly to report TpaOn or TpaOff to the Trailer Perimeter Alarm Server upon activation or deactivation.

##### 4.1.1.2 TPA-REQ-342982/A-Setting Indication When Trailer Perimeter Alarm Not Supported

The Trailer Perimeter Alarm Client shall make the Trailer Perimeter Alarm feature setting unavailable and indicate status to the user upon activation attempt when receiving the TrailerAlarmSupport\_St status set to NotSupported.

The Trailer Perimeter Alarm Client shall also set the value to TPA Off in the TrailerAlarmButton\_St signal.

#### 4.1.2 Use Cases

##### 4.1.2.1 **TPA-UC-REQ-342975/A-User Activates Trailer Perimeter Alarm Setting**

Actors	Trailer Perimeter Alarm User, Trailer Perimeter Alarm Server, Trailer Perimeter Alarm Client
Pre-conditions	Trailer connected detected Trailer lights compatible Trailer Perimeter Alarm feature is set to OFF
Scenario Description	User makes selection to set Trailer Perimeter Alarm feature to ON
Post-conditions	Trailer Perimeter Alarm feature setting is set to ON
List of Exception Use Cases	
Notes	
Interfaces	HMI

##### 4.1.2.2 **TPA-UC-REQ-342976/A-User Deactivates Trailer Perimeter Alarm Setting**

Actors	Trailer Perimeter Alarm User, Trailer Perimeter Alarm Server, Trailer Perimeter Alarm Client
Pre-conditions	Trailer connected detected Trailer lights compatible Trailer Perimeter Alarm feature is set to ON
Scenario Description	User makes selection to set Trailer Perimeter Alarm feature to OFF
Post-conditions	Trailer Perimeter Alarm feature setting is set to OFF
List of Exception Use Cases	
Notes	
Interfaces	HMI

**4.1.2.3 TPA-UC-REQ-342981/A-Trailer Perimeter Alarm Setting Unavailable**

<b>Actors</b>	Trailer Perimeter Alarm User, Trailer Perimeter Alarm Server, Trailer Perimeter Alarm Client
<b>Pre-conditions</b>	Trailer connected detected Trailer lights incompatible
<b>Scenario Description</b>	User attempts to make selection to set Trailer Perimeter Alarm feature to ON
<b>Post-conditions</b>	Trailer Perimeter Alarm feature setting is unavailable to be activated by user and indication is given that the feature is not supported
<b>List of Exception Use Cases</b>	
<b>Notes</b>	
<b>Interfaces</b>	HMI

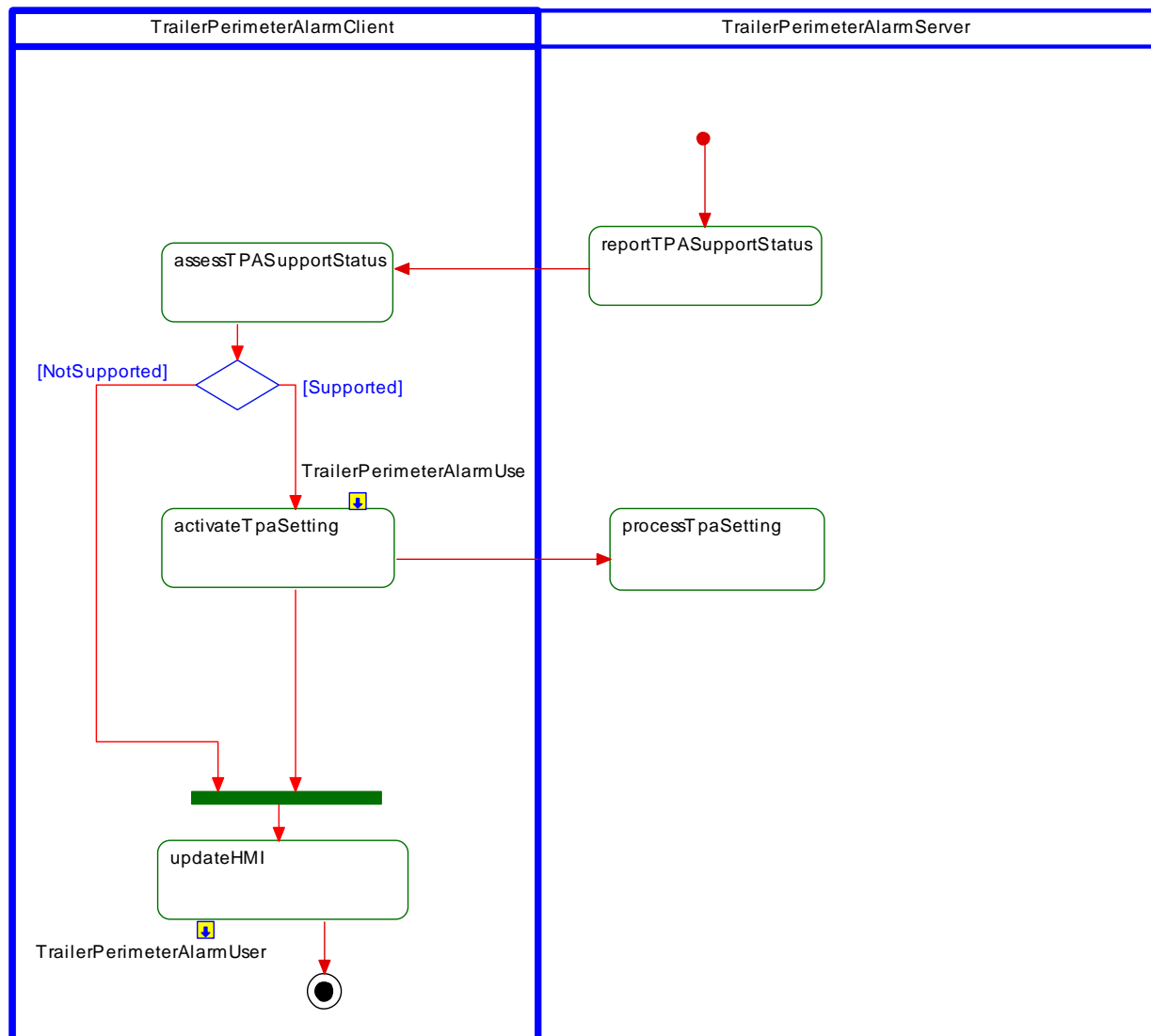




### 4.1.3 WhiteBoxView

#### 4.1.3.1 TPA-ACT-REQ-342977/A-User Activates Trailer Perimeter Alarm Setting

##### Activity Diagram



#### 4.1.3.2 TPA-SD-REQ-342978/A-User Activates Trailer Perimeter Alarm Setting

##### Scenarios

###### Normal Usage

User makes selection to set Trailer Perimeter Alarm feature to ON

##### Constraints

###### Pre-condition

Trailer connected detected

Trailer lights compatible

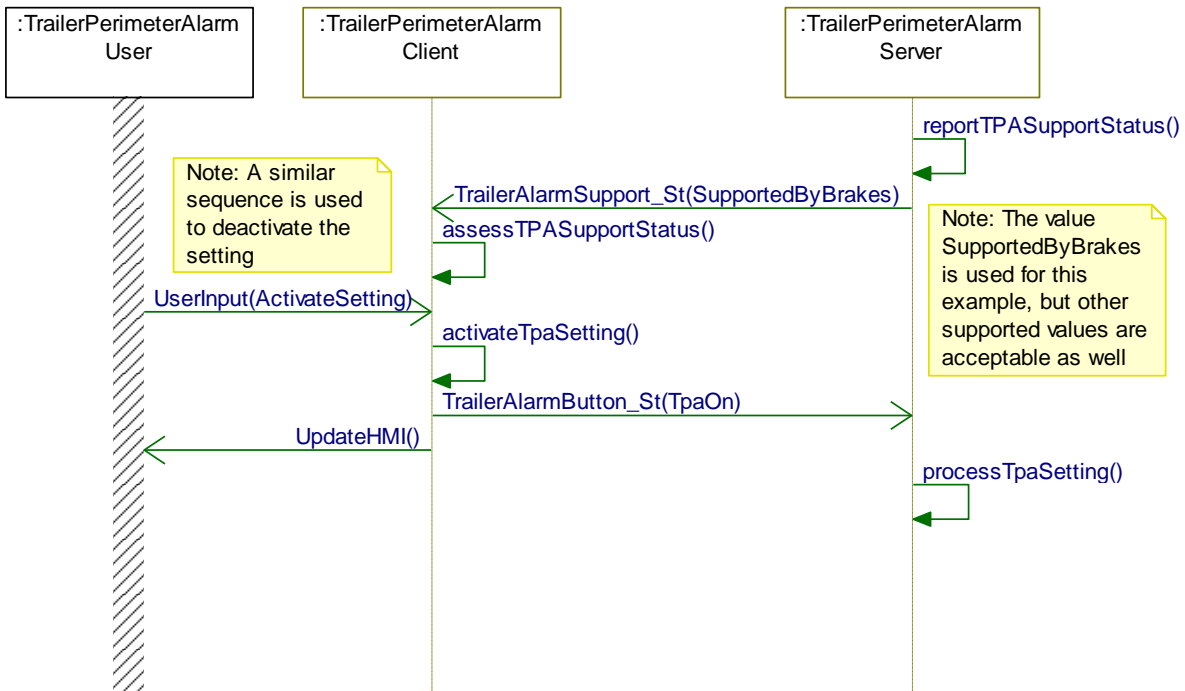
Trailer Perimeter Alarm feature is set to OFF

###### Post-condition

Trailer Perimeter Alarm feature setting is set to ON



## Sequence Diagram





## 5 Appendix: Reference Documents

Reference #	Document Title
1	TPA Feature Spec.docx
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	