Research & Vehicle Technology
"Infotainment Systems Product Development"

Feature – EECS Audio Client

Infotainment Subsystem Part Specific Specification (SPSS)

Version 1.1
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FORD CONFIDENTIAL

Revision History

Date	Ver	Notes	
March 16, 2018	**1.0**	**Initial Release**	
November 1, 2018	**1.1**	**Updated Release**	
	EECS-DOC-513294/B- Physical Mapping of Classes		MBORREL4: Added SYNC4.1 as an EECS Audio Client

Table of Contents

1 Overview

1.1 Purpose

This document specifies the EECS requirements for both the Pan-European eCall & ERA-GLONASS in-vehicle system, specifically, those that apply to the EECSAudioClient.

1.2 Terminology and Abbreviations

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

Term	Description
112	European Union (and others) Primary Wireless Emergency Number
ACM	Audio Control Module
AHU	Audio Head Unit
AL-ACK	Application-Layer Acknowledgement
BCM	Body Control Module
CAN	Controller Area Network (General Network)
DSP	Digital Signal Processing Module
ECU	Electronic Control Unit
EECS	Embedded Emergency Calling System
EGNOS	European Geostationary Navigation Overlay Service
EOL	End of Line
ERA-GLONASS	Russian Accident Emergency Response System
EU	European Union
GLONASS	GLObal NAvigation Satellite System
GPS	Global Position System
GNSS	Global Navigation Satellite System
GSM	Global System for Mobile Communications
HMI	Human Machine Interface
HS-CAN	High Speed Controller Area Network
I-CAN	Infotainment Controller Area Network
LED	Light Emitting Diode
LL-ACK	Link-layer Acknowledgement
MSD	Minimum Set of Data
NAD	Network Access Device
PSAP	Public Safety Answering Point
RCM	Restraints Control Module
TCU	Telematics Control Unit
UMTS	Universal Mobile Telecommunications System (3rd Generation)
VIN	Vehicle Identification Number
Voice Prompt	A pre-recorded audio message that can be played to the occupant or operator

2 Architectural Design

2.1 EECS-SV-REQ-284425/A-IBD_EECSSystem

EECS System Block Diagram

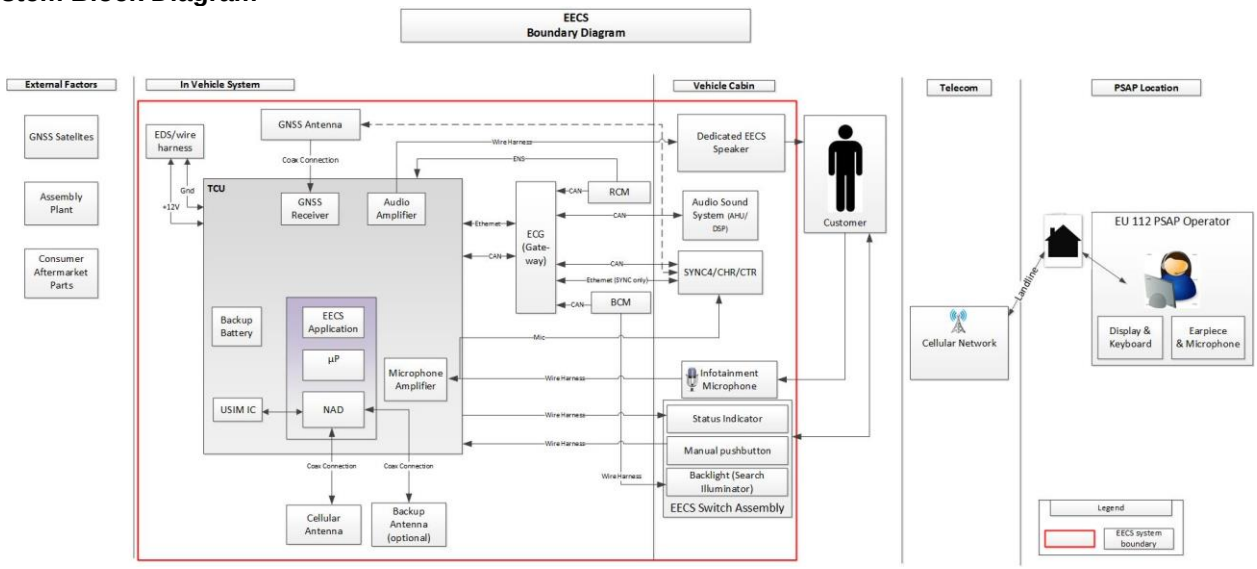


Figure: EECS System Block Diagram

2.2 EECS-CLD-REQ-284426/A-EECS Server

Responsibility: The EECS Server is responsible for determining when to place an emergency call. The EECS Server communicates on the vehicle system interface bus with other system parts to perform operations associated with the emergency calling process, such as audio muting and feedback to the vehicle occupant.

The EECS Server also has direct interaction with the vehicle occupant through a microphone and speaker interface.

Review the implementation guide/static view/block diagram to locate the EECS Server object.

2.3 EECS-CLD-REQ-284431/A-EECS Audio Client

Responsibility: The EECS Audio Client has following roles for the EECS feature:

1. Mute all audio to the vehicle when directed from the EECS Server

Review the implementation guide/static view/block diagram to locate the EECS Audio Client object.

2.4 Physical Mapping of Classes

The table below shows an example of how the two logical classes that make up the EECS feature can be mapped into physical modules. This mapping example is specific to the FNV2 architecture and does not necessarily carryover to other vehicle architectures.

Logical Class	Physical Module (ECU)
EECS Server	TCU
EECS Audio Client	ex. AHU, DSP, SYNC4.1

2.5 EECSAudioClient Interface

2.5.1 EECS-IIR-REQ-300078/A-EECSAudioClient_Rx

The EECSAudioClient_Rx represents all the EECS feature related signals received by the EECSAudioClient object. The below table represents the mapping of the logical signal names (as described in this specification) to the global GSDB signal names.

Logical Signal Name	Parameter Name	GSDB Signal Name
EmergencyCallMute_St	Status	EmgcyCallMute_D_Stat

Note: GSDB signal names are reference only. The Global Signal Database (GSDB) is the master for all signals. If there is a conflict bring to the module D&R's attention.

2.5.1.1 MD-REQ-297754/A-EmergencyCallMute_St

Message Type: Status

This signal is used to mute/unmute infotainment audio due to an active event/emergency call.

Name	Literals	Value	Description
Status	-	-	Signal to mute infotainment audio.
	Null	0x0	No action
	EmergencyCallUnmute	0x1	Sent when there is no active muting event.
	AutomaticEmergencyCallMute	0x2	Sent during an active muting event. The vehicles audio amplification source shall be muted.
	ManualEmergencyCallMute	0x3	Sent during an active muting event. The vehicles audio amplification source shall be muted.

3 Functional Definition

3.1 EECS-FUN-REQ-300079/A-EECS Emergency Event Behavior

3.1.1 Use Cases

3.1.1.1 EECS-UC-REQ-285030/A-EECS Event Initiated

Actors	Vehicle Occupant Infotainment System Telematics System
Pre-conditions	EECS is configured On (without faults) A phone is paired and connected to the Infotainment System Phone is in an active call
Scenario Description	An EECS event is triggered
Post-conditions	Active phone call is ended Phone is disconnected from Infotainment System (remains paired) All Phone Connection Methods are disabled in the Infotainment System Infotainment System is muted EECS event process is started
List of Exception Use Cases	
Interfaces	Infotainment System
Notes	Prior to the EECS event the phone will disconnect from the Infotainment System and the Phone Connection Method being used (Bluetooth, GAL, Carplay, etc.) will be disabled, however any pairing or device registration methods will remain intact.

3.1.1.2 EECS-UC-REQ-285031/A-EECS Event Completed

Actors	Vehicle Occupant Infotainment System Telematics System
Pre-conditions	EECS is configured On (without faults) A phone was paired and connected to the Infotainment System prior to EECS event EECS event is active
Scenario Description	EECS event is completed
Post-conditions	All prior Phone Connection Methods are enabled (only if they were originally enabled before the EECS event occurred) in the Infotainment System Infotainment System is unmuted
List of Exception Use Cases	
Interfaces	Infotainment System
Notes	After the EECS event has completed the Phone Connection Method that was used (Bluetooth, GAL, Carplay, etc.) will be re-enabled, and any pairing or device registration methods will remain intact. Please see the the appropriate SPSS (Bluetooth, GAL, Carplay, etc.) for the connection attempts/steps taken after the method has been enabled.

3.1.2 Requirements

3.1.2.1 EECS Audio Muting

3.1.2.1.1 EECS-FUR-REQ-300080/A-Audio System Muting - EECS Event

The EECSAudioClient shall be muted when an EECS event is indicated by the EECSServer. An EECS event shall be sent from the EECSServer to the EECSAudioClient via *EmergencyCallMute_St* with a state of 'AutomaticEmergencyCallMute'.

The EECSAudioClient shall complete the muting within 1 second of receiving indication of the EECS event from the EECSServer. Chimes shall not be muted during an EECS event but shall be played from the Cluster backup chime source as the front in-vehicle speakers will be unavailable during an EECS event.

The EECSAudioClient shall set the AHU_Chime_Supported = Not Supported during an EECS event. This ensures that chimes are transferred to the Cluster so Chimes can still be played during an EECS infotainment muting event.

The EECSAudioClient shall not check for speaker faults during an EECS event.

3.1.2.1.2 EECS-FUR-REQ-300081/A-Audio System Muting - Malfunction

The EECSAudioClient shall be muted when an EECS muting event is indicated by the EECSServer. When indicated, an EECS muting event shall be sent from the EECSServer to the EECSAudioClient via *EmergencyCallMute_St* with a state of 'ManualEmergencyCallMute'.

An example of an EECS muting event is when the EECSServer needs to indicate an EECS malfunction to the user via voice prompt.

The EECSAudioClient shall complete the muting within 1 second of receiving indication of the muting event from the EECSServer. Chimes shall not be muted during an EECS muting event but shall be played from the Cluster backup chime source as the front in-vehicle speakers will be unavailable during an EECS muting event.

The EECSAudioClient shall set the AHU_Chime_Supported = Not Supported during an EECS muting event. This ensures that chimes are transferred to the Cluster so Chimes can still be played during an EECS infotainment muting event.

The EECSAudioClient shall not check for speaker faults during an EECS event.

3.1.2.1.3 EECS-FUR-REQ-300082/A-Audio System Un-Muting

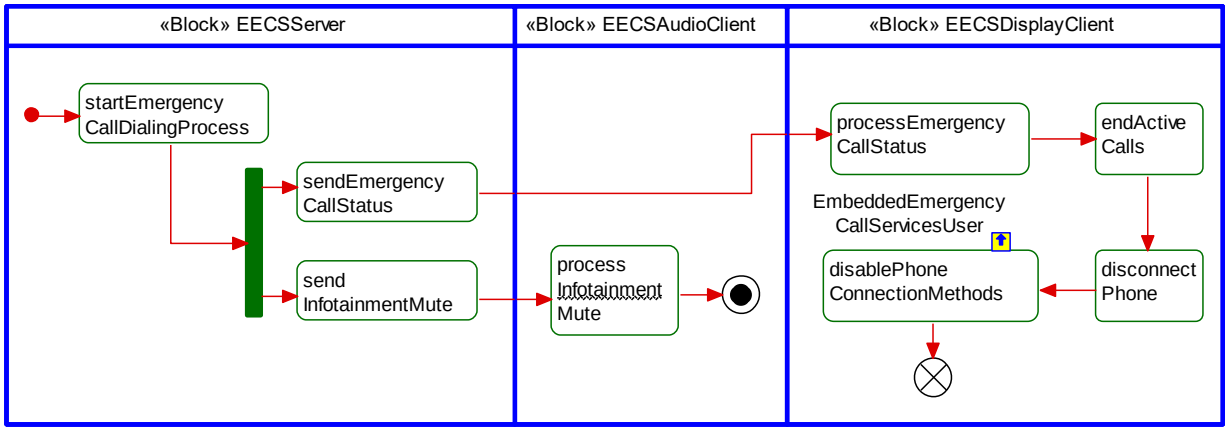
The EECSAudioClient shall be un-muted when an EECS event or muting event has ended as indicated by the EECSServer. The EECSAudioClient shall un-mute when the EECSServer sends *EmergencyCallMute_St* with a state of 'EmergencyCallUnMute', 'Null', or if the CAN signal has been missing for more than 5 seconds.

3.1.3 White Box View

3.1.3.1 Activity Diagrams

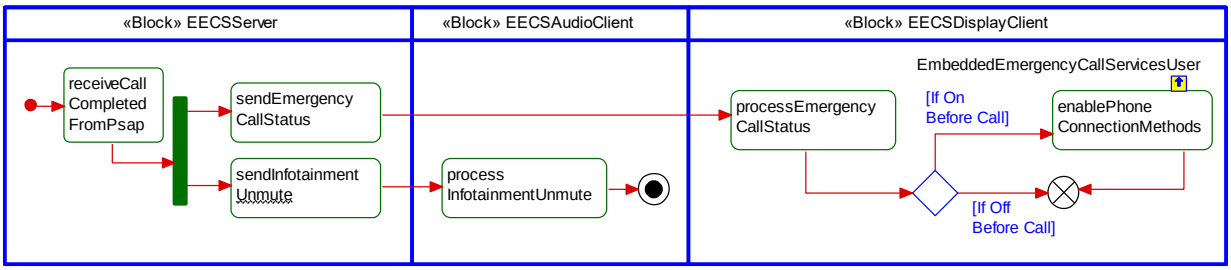
3.1.3.1.1 EECS-ACT-REQ-284657/A-EECS Event Initiated

Activity Diagram



3.1.3.1.2 EECS-ACT-REQ-284658/A-EECS Event Completed

Activity Diagram



3.1.3.2 Sequence Diagrams

3.1.3.2.1 EECS-SD-REQ-284661/A-EECS Event Initiated

Constraints

Pre-Condition

Ignition is in Run or Start

EECS is configured On (without faults)

A phone is paired and connected to the Infotainment System and in an active call

Scenarios

Normal Usage

An EECS event is triggered (manual or automatic)

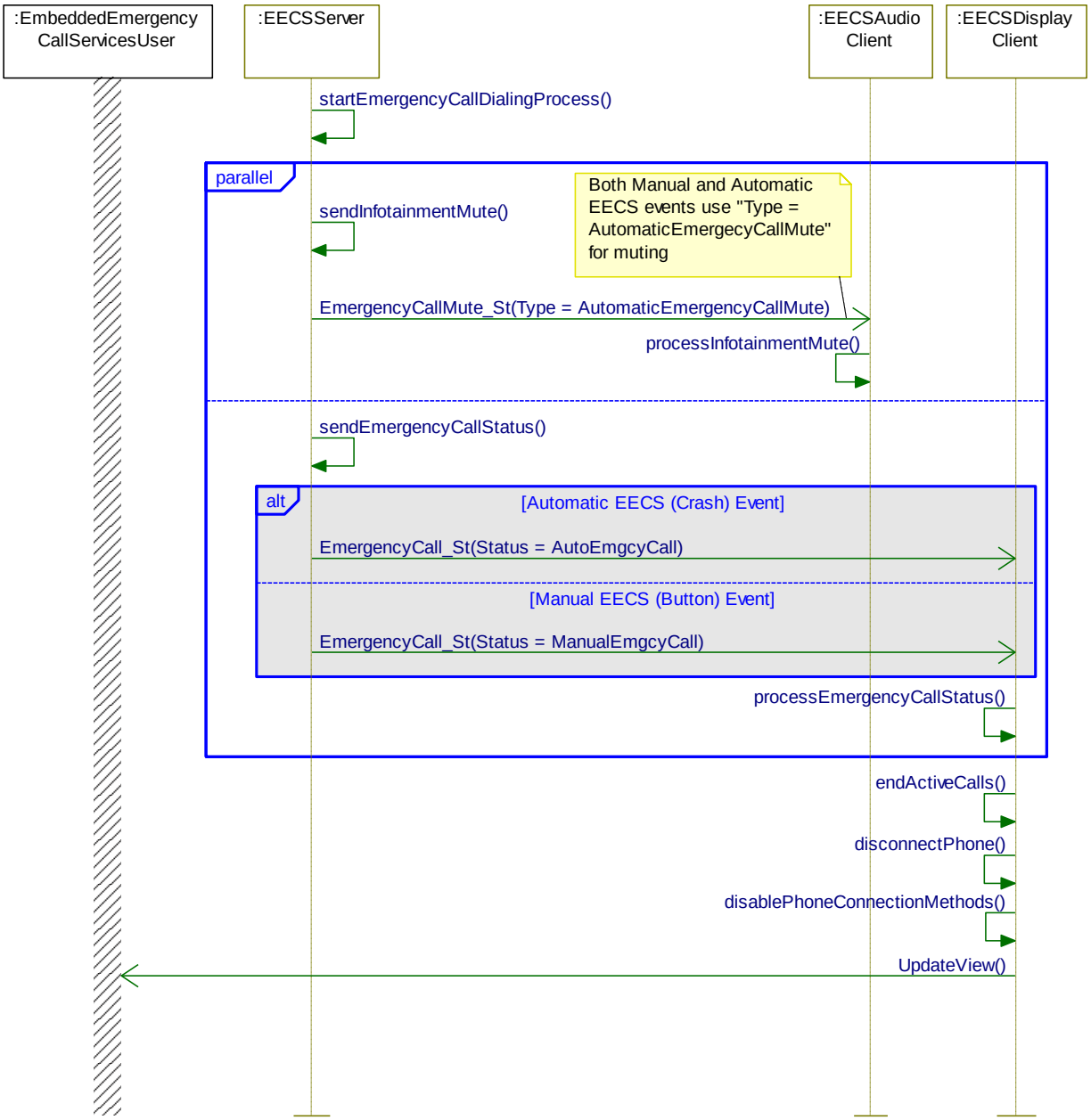
Post-Condition

The active phone call is ended and the phone is disconnected from Infotainment System (but still remains paired)

All Phone Connection Methods are disabled in the Infotainment System

Infotainment System is muted and the EECS process is started

Sequence Diagram



3.1.3.2.2 EECS-SD-REQ-284662/A-EECS Event Completed

Constraints

Pre-Condition

Ignition is in Run or Start

EECS is configured On (without faults)

A phone was paired and connected to the Infotainment System prior to the currently active EECS event

Scenarios

Normal Usage

EECS event is completed

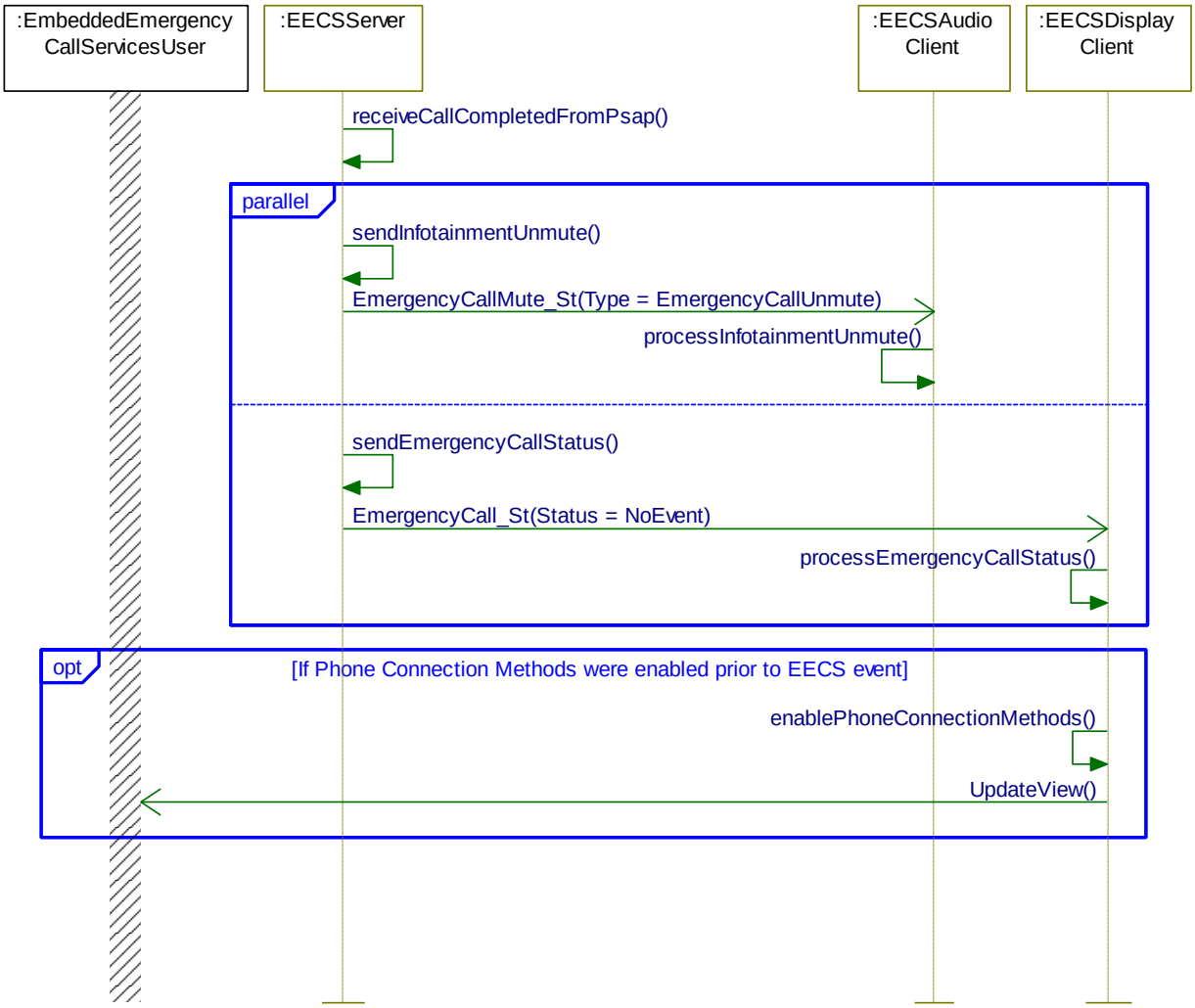
Post-Condition

Phone remains disconnected from the Infotainment System (but remains paired)

All Phone Connection Methods are enabled in the Infotainment System

Infotainment System is unmuted

Sequence Diagram



4 Appendix: Reference Documents

Reference #	Document Title
1	
2	
3	
4	
5	
6	
7	
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