# Drive Video Record Feature

**(F006930)**

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# 1 INTRODUCTION

## 1.1 Document Purpose

The Feature Implementation Specification (FIS) specifies the deployment of the logical functions of a feature to an electrical architecture. The FIS specifies all interactions between the ECUs of the electrical architecture required for the feature including the technical signals and the interfaces. It also gives interface and integration requirements, which are specific to the feature for the electrical architecture.

To get more information about the concept of feature, function and component level abstraction refer to the Ford RE Wiki.

## 1.2 Document Scope

This FIS describes the deployment of the feature <Drive Video Record> to the following electrical architecture(s):

| Electrical Architecture Name | Owner | Reference |
|---|---|---|
| FNV2.1 | YNIU6 | / |
| | | |

**Table 1-1: Electrical Architecture(s) referenced in this document**

## 1.3 Document Audience

The FIS is authored by <Emma Chen / Feature Owner Supervisor>. All Stakeholders, i.e., all people who have a valid interest in the feature implementation should read and, if possible, review the FIS. It needs to be guaranteed, that all stakeholders have access to the currently valid version of the FIS.

### 1.3.1 Stakeholder List

For the latest list of the function stakeholders and their roles & responsibilities refer to <TBD>.

## 1.4 Document Organization

### 1.4.1 Document Context

Refer to the Specification Structure page in the Ford RE Wiki to understand how the FIS relates to other Ford Requirements Documents and Specifications.

### 1.4.2 Document Structure

The structure of this document is explained below:

**Section 1** – Introduction – Giving an explanation how to use this document including responsibilities and the scope of the document. Additionally it contains the revision history and a list of unsettled but known issues that have to be consolidated in future versions. It explains the terminology and gives a clarification of the definitions, concepts and abbreviations used in the document.

**Section 2** – Feature Implementation Description – Giving an overview of the platform and listing assumptions, constraints or dependencies

**Section 3** – Feature Implementation Architecture – Describing 3 Architecture Views:

- Functional Architecture – Showing the logical architecture of functions
- Physical Architecture – Showing the physical architecture (first of all the E/E Architecture), which the Logical Functions get allocated to.
- Software Architecture – Showing the software architecture relevant for the feature (for features with in-house development only)

- Function Deployment – Presenting the allocation of logical functions and signals to the electrical and other components

**Section 4** – Deployment Specific Modeling –Modeling techniques providing additional detail on e.g. interface behavior

**Section 5** – Deployment Specific Requirements – Deployment specific requirements for ECUs, Network Communication, and Process

**Section 6** – List of Open Concerns

**Section 7** – Revision History

**Section 8** – Appendix - Presenting additional data mainly in a tabular form, e.g., a data dictionary

## 1.5 References

### 1.5.1 Ford Documents

The list of all Ford internal documents, which are directly related.

| Reference # | Title | Doc. ID | Revision | Document Location |
|---|---|---|---|---|
| 1 | Drive Video Record Feature B-Diagram | / | V1.0 | / |
| 2 | Drive Video Record Feature Level Specification | / | V1.5 | / |
| 3 | Drive Video Record UART Protocol | / | V1.1 | / |
| | | | | |

**Table 1-2: Ford internal Documents**

### 1.5.2 External Documents and Publications

The list of external documents could include books, reports and online sources.

| Reference # | Document / Publication |
|---|---|
| 1 | GBT 38892-2020 |
| | |

**Table 1-3: External documents and publications**

## 1.6 Glossary

### 1.6.1 Definitions

| Definition | Description |
|---|---|
| | |

**Table 1-4: Definitions used in this document**

### 1.6.2 Abbreviations

| Abbr. | Stands for | Description |
|---|---|---|
| DVR | Drive Video Record | |
| APIM | Auxiliary Protocol Interface Module | DVROnboardClient in DVR system |
| ECG | Enhanced Central Gateway | |
| FNV X.X | Fully Networked Vehicle Architecture X.X | |
| HMI | Human Machine Interface | |
| IDCM | Integrated Dash Camera Module | DVRServer in DVR system |
| POC | Powered On Cable | |

**Table 1-5: Abbreviations used in this document.**

# 2 FEATURE IMPLEMENTATION OVERVIEW

## 2.1 Description

The DVR system is designed for FNV2.1 and SYNC+ platform, it could support to capture the video of exterior environment automatically, and when collision happens, will capture/save a special video labeled as “emergency”, user could also trigger the video/image record manually to save the beautiful view or important scene, at the same time, the necessary information like VIN, date, time will be saved. Users could also preview/playback the video/image and config the system via the center stack or Ford APP, DVR will also provide vehicle monitor ability after ignition off. DVR user could save the data on an external TF card or download to a smart phone via Wi-Fi.

## 2.2 Input Requirements/Documents

| Reference | Section/Requirement | Description | Derived Requirement |
|---|---|---|---|
| **Feature/Function Requirements** | | | |
| 1 | Drive Video Record Feature B-Diagram | B Diagram of DVR feature | / |
| 2 | Drive Video Record Feature Level Specification | Feature & Function spec | / |
| 3 | Drive Video Record UART Protocol | DVR related ECU communication interface protocol | / |
| **Ford Engineering Standards** | | | |
| | | | |
| **Legal Regulations** | | | |
| 1 | GBT 38892-2020 | | / |
| **Industry Standards** | | | |
| | | | |
| **Other Sources** | | | |
| | | | |

**Table 6: Input Requirements/Documents**

## 2.3 Lessons Learned

DVR is a lead feature in Ford, so no lesson learned exist, benchmark study to other OEM is the reference for L&L.

## 2.4 Assumptions

Key DVR assumptions below:

1. IDCM and APIM communication relays on an internal connection, for DVR it’s UART over LVDS cable.
2. All DVR video or photo data saved by IDCM, should not be able to upload to Ford backend or any 3rd party cloud.

# 3 FEATURE IMPLEMENTATION ARCHITECTURE

## 3.1 Functional Architecture

### 3.1.1 Description

DVR feature contains several functions list below

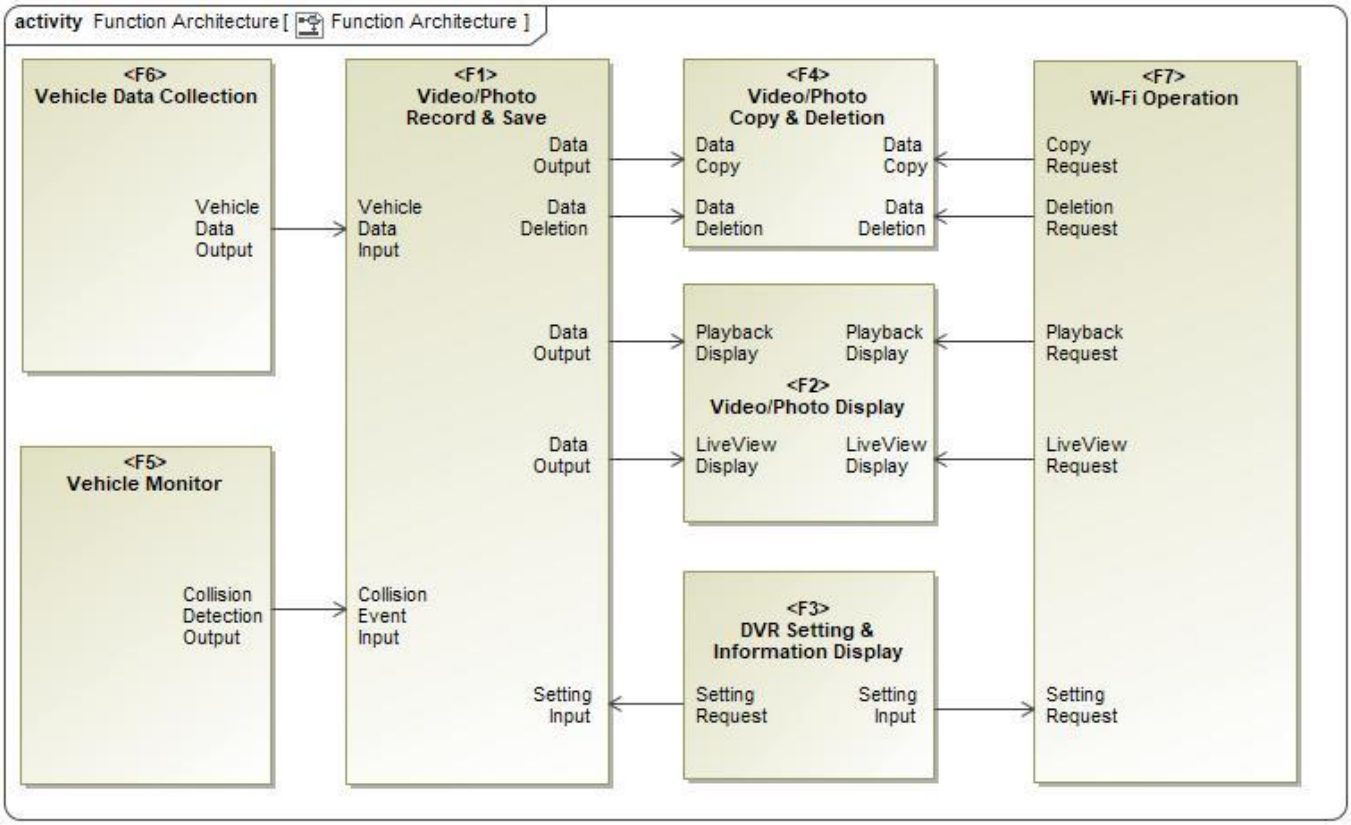



**Figure 3-1: Functional Architecture**

### 3.1.2 Function List

The following functions from the Global Feature & Function List are referenced in this Feature Implementation Specification:

| Function ID | Function Name | Function Description |
|---|---|---|
| / | Video & Photo Record and Saving | DVR video and photo data record and saving when event triggered like normal/emergency/manual record request. |

| | | |
|---|---|---|
| / | Video & Photo Display | DVR video and photo display in APIM or Ford APP, include live view and playback. |
| / | DVR Setting and Information Display | DVR function setting via APIM or Ford APP, and key information display. |
| / | Video & Photo Copy and Deletion | Copy DVR data from IDCM internal memory to TF card, or delete DVR data from TF card. |
| / | Vehicle Monitoring | Monitor vehicle collision event and record video when IGN off. |
| / | Vehicle Data Collection | Collect key vehicle data for video water mark and support emergency event detection. |
| / | Wi-Fi Connection & Communication | Support Wi-Fi connection to DVR user's smart phone, and communication between IDCM and Ford APP. |

**Table 3-1: List of Functions**

### 3.1.3 Signal List

Refer to < Drive Video Record UART Protocol >.

## 3.2 Physical Architecture

### 3.2.1 E/E Architecture

#### 3.2.1.1 E/E Architecture Variants

| E/E Architecture Variant Name | Variant Description | Variant Condition (optional) |
|---|---|---|
| FNV 2.1 | Work on FNV2.1 platform | Network Topology = FNV2.1 |

##### 3.2.1.1.1 E/E Architecture FNV2.1

This E/E Architecture variant FN2.1 supports APIM and APP works as HMI for DVR feature, APIM will collect DVR water mark information from ECG, IDCM outputs video to APIM and APP.

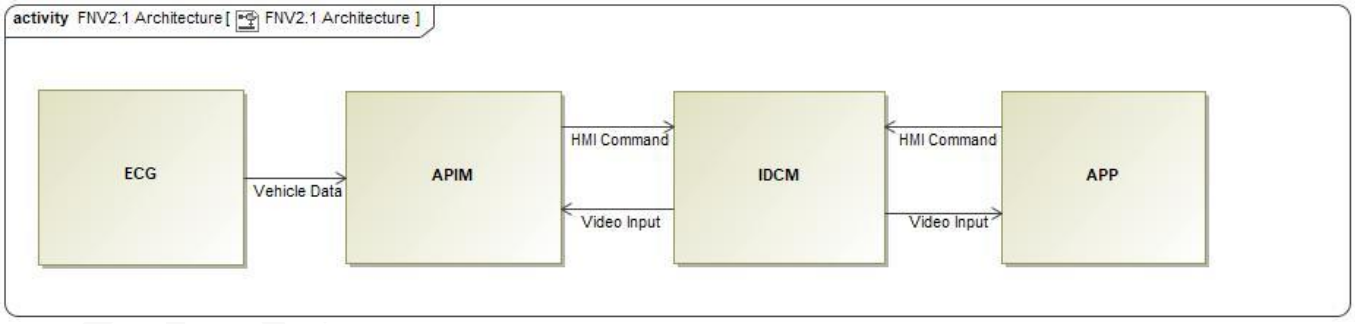



**Figure 3-2 E/E Architecture (SysML Style)**

#### 3.2.1.2 E/E Components

| Component Name | **Description** |
|---|---|
| APIM | Auxiliary Protocol Interface Module |
| ECG | Enhanced Center Gateway |
| IDCM | Integrated Dash Camera Module |
| Ford APP | Ford APP like FordPass/LinclonWay on Smart Phone |

**Table 3-2: Electrical Components**

#### 3.2.1.3 E/E Connections

| Connection Name | **Connection Type** | **Protocol**<br>Only if 'Connection Type' is "Network"/"RF-Digital" | **Description** | **Allocated Messages**<br>Only if 'Connection Type' is "Network"/"RF-Digital" | **Connected Nodes** |
|---|---|---|---|---|---|
| UART | Digital | n/a | UART connection between IDCM and APIM over FPD-Link | n/a | IDCM & APIM |
| WIFI | RF-Digital | n/a | WIFI connection between IDCM and smart phone | n/a | IDCM |
| LVDS | Analog | n/a | Event Notification Signal | n/a | |
| | | | | | |

**Table 3-3: E/E Connections**

#### 3.2.1.4 Signal List

Refer to < Drive Video Record UART Protocol >.

## 3.3 Function Deployment

### 3.3.1 Deployment Variants

| **Deployment Variant Name** | **Variant Description** | **Variant Condition** (optional) |
|---|---|---|
| FNV 2.1 | Work on FNV2.1 platform | Network Topology = FNV2.1 |

### 3.3.2 Function Allocation

| Component | Logical Function Name | Technology Function Name |
|---|---|---|
| IDCM<br>DVRServer | Video Record and Save | Save Location Allocation |
| | | Video Data Naming |
| | Video Watermark | Mandatory Data Collection |
| | | Optional Data collection |
| | | GPS Date Synchronization |
| | Normal Video Record | Normal Video Saving |
| | | Memory Check and Overwrite |
| | | Error Handling |
| | Emergency Video Record | Collision Detection |
| | | Emergency Video Saving |
| | | Error Handling |
| | Manual Video Record | Manual Command Receive |
| | | Manual Video Saving |
| | | Error Handling |
| | Video Liveview | Liveview Command Receive |
| | | Liveview Data Transfer |
| | Video/Photo Playback | Playback Command Receive |
| | | Playback List Creation |
| | | Playback Data Transfer |
| | | Video Stop |
| | | Video Play |
| | | Video Forward & Backward |
| | | Gear Position Protection |
| | DVR Setting | Setting Value Receive |
| | | Setting Value Take Effect |
| | Wi-Fi Setting | Wi-Fi SSID Receive |
| | | Wi-Fi SSID Take Effect |
| | | Wi-Fi Password Receive |
| | | Wi-Fi Password Take Effect |
| | DVR Data Copy to TF Card | TF Card Status Check |
| | | Copy File List Receive |
| | | Data Move from eMMC to TF Card |
| | | Data Move from eMMC to Smartphone |
| | | Smart Copy Command Receive |
| | DVR Data Delete from TF Card | Delete File Receive |
| | | Data Delete from TF Card |

| | | |
|---|---|---|
| | Vehicle Monitoring | Collision Detection |
| | | Emergency Video Saving |
| | | Notification to APIM |
| | Wi-Fi Connection | Connection Setup & Reconnection |
| | | Liveview Data send |
| | | Playback List Data Send |
| | | Playback Control |
| | | DVR Data Download |
| | DVR System Error Handling | Camera Sensor Error Handling |
| | | Internal Memory Error Handling |
| | | TF Card Error Handling |
| | | Wi-Fi Error Handling |
| APIM<br>DVROnboardClient | AR Feature Adaptation | AR Feature Work Status Judgement |
| | Vehicle Data Collection | GPS Date and Time Package |
| | | Internal Data Collection |
| | | CAN Data Collection |
| | | Vehicle Data Send to IDCM |
| | Normal Video Record Switch | Normal Video Record On/Off control Logic |
| | | Request Switch HMI |
| | DVR Launcher Interface | Main Page Launcher |
| | | Quick Panel Launcher |
| | | Local APP Launcher |
| | | Voice Control Launcher |
| | Video Liveview | Enter Liveview |
| | | Video Receive |
| | | Video display |
| | Video/Photo Playback | Enter Playback |
| | | Playback List Receive and Display |
| | | Video/Photo Playback Display |
| | | Screenshot Command |
| | | Last/Next File Command |
| | | Forward & Backward Command |

| | | |
|---|---|---|
| | | Play/Stop Command |
| | | Gear Position Pretection |
| | DVR Setting | Setting Value Command |
| | | Back to Default Value |
| | | IDCM Information Update & Display |
| | | Format TF Card Command |
| | DVR Data Copy to TF Card | Smart Copy Command |
| | | Copy List Create |
| | | Copy Status Display |
| | | Background Copy |
| | | Cancel Copy |
| | ~~DVR Data Copy to Smart Phone~~ | ~~Copy List Create~~ |
| | | ~~Copy Status Display~~ |
| | | ~~Background Copy~~ |
| | | ~~Cancel Copy~~ |
| | DVR Data Delete from TF Card | Delete List Create |
| | | Delete Status Display |
| | Vehicle Monitoring | Vehicle Monitoring Status Display |
| | DVR Status Display | DVR Status Icon Update |
| | | DVR Dash Card Image Update |
| | Manual Photo Record | Manual Photo Command – Soft Button |
| | | Manual Photo Command – Voice Control |
| | | Manual Photo Status Display |
| | Manual Video Record | Manual Video Command – Soft Button |
| | | Manual Video Command – Voice Control |
| | | Manual Video Stop Control |
| | | Manual Video Status Display |
| | | Other DVR Interface Disable |
| | Emergency Video Record | Emergency Video Status Display |

| | | |
|---|---|---|
| | | Other DVR Interface Disable |
| | DVR Error Display | DVR Error Status Display |
| APP DVROffboardClient | Wi-Fi Connection | Connection Setup & Reconnection |
| | | Wi-Fi Error Handling |
| | Video Liveview | Liveview Launcher |
| | | Liveview Display |
| | Video Playback | Playback List Display |
| | | Video Playback Control |
| | Video Download | DVR Data Download Receive and Save |
| | | Download Status Display |

**Table 3-4: Function Allocation Table (Basic)**

# 4 FEATURE IMPLEMENTATION MODELING

## 4.1 Component Interaction Diagrams

TBD

## 4.2 Component Interface Behavior Diagrams

*TBD*

# 5 FEATURE IMPLEMENTATION REQUIREMENTS

## 5.1 Functional Safety

Feature is not Function Safety critical – QM level. NA.

## 5.2 Requirements on Components

High level functions breakdown:

DVR Function Layout.pdf

### 5.2.1 IDCM – DVRServer & APIM – DVROnboardClient

#### 5.2.1.1 Technology Function Normal Video Recording

##### 5.2.1.1.1 Function Interfaces

###### 5.2.1.1.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Normal_Record_Setting | Normal Video Record Switch | **UART msg**: APIM_NormalVideoSwitch_Enum [Type:0x14] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| | | | | |

**Table 5-1: Input Signal mappings of Function Normal Video Record**

###### 5.2.1.1.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Video_Record_Status | Video Record Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01] **Data ID**: #3 | NA. | NA. |
| | | | | |

**Table 5-2: Output Signal mappings of Function Normal Video Record**

###### 5.2.1.1.1.3 Parameters

NA.

###### 5.2.1.1.1.4 Interface Requirements

Refer to DVR UART protocol.

##### 5.2.1.1.2 Function Requirements

###### 5.2.1.1.2.1 Normal Video Record Start

Normal video record is disabled by default, IDCM should start normal video record when receive below setting from APIM:

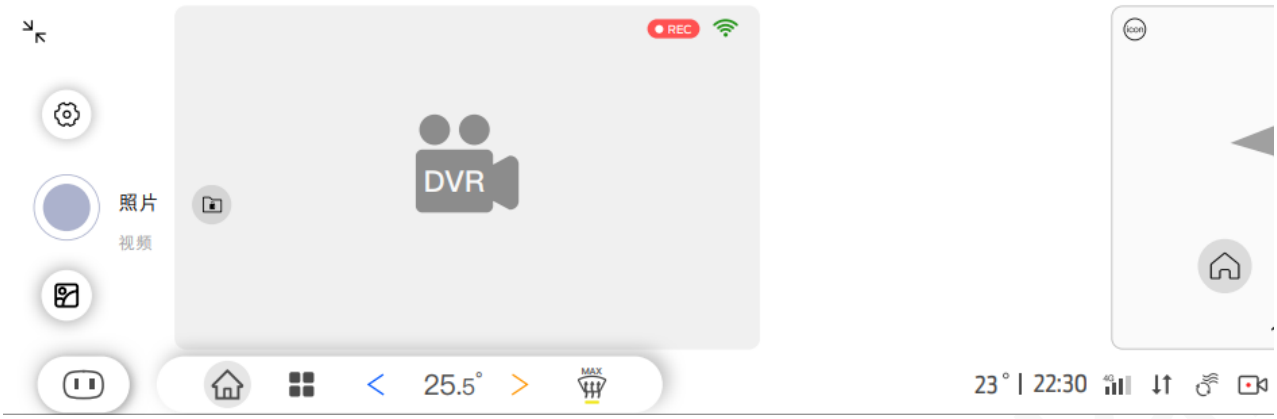
- *Normal Video Record Switch* is set to *Enabled*

During recording, IDCM should send below msg to APIM:

- *Video Record Status == Normal Recording*

APIM HMI control:

- The video recording icon – “REC” on live view page should be highlight.
- The DVR status icon should be set to recording status.




#### 5.2.1.1.2.2 Normal Video Record End

IDCM should stop normal video record when:

- *Normal Video Record Switch* is set to *Disabled*

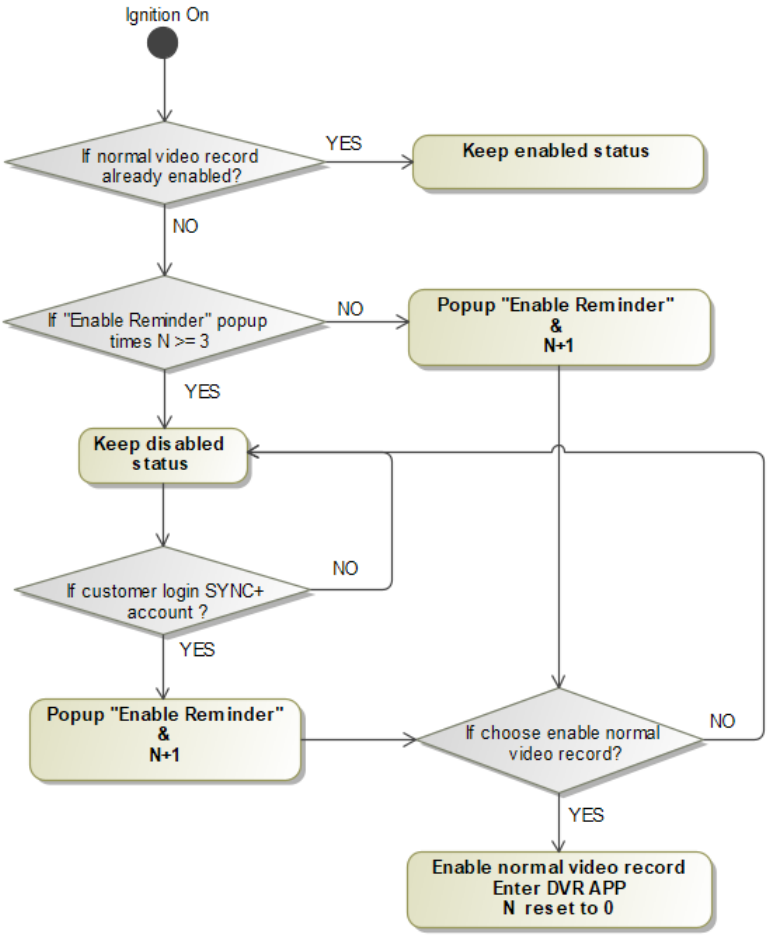
And *Video Record Status* should be set to *No Recording*.

APIM HMI updates:

- The video recording icon – “REC” on live view page should be disabled.
- The DVR status icon should be set to no recording status.


#### 5.2.1.1.2.3 Normal Video Record Enable Reminder

IDCM should stop normal video record when:




- N—Normal video record reminder times
  - N is 0 by default, max value is 255.
  - Every time If customer chooses to enable normal video record in the “Enable Reminder” or in DVR setting page, N should be reset to 0, and APIM needs to modify the setting value and send to IDCM, refer to section “DVR Parameter Setting” for setting details.

#### 5.2.1.1.2.4 Normal Video Record Attributes

- According to GB/T 38892, all normal video must be saved into eMMC and could not be modified or deleted.
- Normal video duration is 3 minutes and should be saved into eMMC “Normal Data” folder.

### 5.2.1.2 Technology Function Emergency Video Record

#### 5.2.1.2.1 Function Interfaces

##### 5.2.1.2.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Veh_Speed | Vehicle Speed | **UART msg**: APIM_VehicleSpeed_Int [Type:0x12] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| Veh_Brake_Status | Vehicle Brake Pedal Status | **UART msg**: APIM_Brake_Enum [Type:0x12] [Subtype:0x02] **Data ID**: #1 | NA. | NA. |
| Video_Recording_ Type | Type of Video | **UART msg**: IDCM_EmergencyVideoRsp_Int [Type:0x18] [Subtype:0x01] Data ID: #2 | NA. | NA. |

| | | | | |
|---|---|---|---|---|
| Video_Recording_Qty | Qty of Video | **UART msg**: IDCM_EmergencyVideoRsp_Int [Type:0x03] [Subtype:0x01] Data ID: #1 | NA. | NA. |
| | | | | |

**Table 5-3: Input Signal mappings of Function Emergency Video Record**

#### 5.2.1.2.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Video_Record_Status | Video Record Status | **UART msg**: IDCM_Heartbeat_Enum [Type:0x01] [Subtype:0x01] **Data ID**: #3 | NA. | NA. |
| Video_Recording_Timestamp | Video Recording Timer | **UART msg**: IDCM_RecordProgress_Int [Type:0x02] [Subtype:0x02] **Data ID**: #1 | NA. | NA. |
| Video_Recording_Type | Type of Video | **UART msg**: IDCM_EmergencyVideoInfo_Int [Type:0x03] [Subtype:0x01] Data ID: #2 | NA. | NA. |
| Video_Recording_Qty | Qty of Video | **UART msg**: IDCM_EmergencyVideoInfo_Int [Type:0x03] [Subtype:0x01] Data ID: #1 | NA. | NA. |
| | | | | |

**Table 5-4: Output Signal mappings of Function Emergency Video Record**

#### 5.2.1.2.1.3 Parameters

NA.

#### 5.2.1.2.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.2.2 Function Requirements

#### 5.2.1.2.2.1 Emergency Video Record Start

IDCM should has the ability to detect the vehicle collision base on below input and starts emergency video recording:

- IDCM Internal G-Sensor detection
- *Vehicle Speed* received from APIM periodically
- *Vehicle Brake Pedal Status* received from APIM

During emergency recording, IDCM should send below msg to APIM:

- *Video Record Status == Emergency Recording*

At the same time, IDCM should synchronize the recording timer to APIM periodically:

- *Video Recording Timer == "Corresponding recording timestamp" starts from 0*

APIM HMI updates:

- The live view page on APIM should be set to emergency recording status:
  a. A recording timer should be displayed, value should be same as *Video Recording Timer.*
  b. A reminder should be popup to customer that all other buttons on DVR live view page should be disabled.
- The DVR status icon should be set to recording status.


#### 5.2.1.2.2.2 Emergency Video Record End

After video recording complete, IDCM should send below message to APIM:

- *Video Record Status == "last available value"*
- *Qty of Video == 1*
- *Type of Video == Emergency Video*

IDCM should keep sending until receive APIM response:

- *Type of Video == Vehicle Monitor Video*
- *Qty of Video == "corresponding video number which were capture during vehicle monitor"*

APIM HMI updates:

- The live view page on APIM should be recovered to normal status.
- The DVR status icon should be set to no recording status.
- APIM should popup a completion reminder to customer.

#### 5.2.1.2.2.3 Emergency Video Record Attributes

- If normal video record is enabled, emergency video duration should contain 15 seconds collision detected and 30 seconds (default value) after collision detected. If normal video record is disabled, emergency video should only contain 30 seconds (default value) after collision detected.
- The "30 seconds" is configurable through DVR setting interface.
- Emergency video should be saved into eMMC "Key Data" folder.
- When emergency video recording, both manual video and photo record function should be disabled.

### 5.2.1.3 Technology Function Manual Photo Record

#### 5.2.1.3.1 Function Interfaces

##### 5.2.1.3.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Manual_Photo_Cmd | HMI Command | **UART msg**: APIM_HMICommand_Enum [Type:0x13] [Subtype:0x01]<br>**Data ID**: #1 | NA. | NA. |
| | | | | |

**Table 5-5: Input Signal mappings of Function Manual Photo Record**

##### 5.2.1.3.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Manual_Photo_Rsp | DVR Command Response | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01]<br>**Data ID**: #1 | NA. | NA. |

| | | | | |
|---|---|---|---|---|
| Manual_Photo_Rst | DVR Command Result | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01]<br>**Data ID**: #2 | NA. | NA. |
| | | | | |

**Table 5-6: Output Signal mappings of Function Manual Photo Record**

#### 5.2.1.3.1.3 Parameters

NA.

#### 5.2.1.3.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.3.2 Function Requirements

#### 5.2.1.3.2.1 Manual Photo Record Process

Once manual photo is triggered, APIM shall send below msg to IDCM:

- *HMI Command == Photo Capture*

Command Reception:
When IDCM receives the command, should response below msg:

- *DVR Command Response == Photo Capture*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

All the other command control logic in this FIS should follow the same command reception strategy: If *DVR Command Result == Command Reception Failed* or APIM could not receive this response in 2 seconds (reception timeout), APIM should try to send the command another 3 times, and if still get *DVR Command Result == Command Reception Failed or* reception timeout, APIM should pop up a command failure result to customer.

Command Execution:
If photo capture completes, IDCM should response command result:

- *DVR Command Response == Photo Capture*
- *DVR Command Result == Execution Succeed or Execution Failed*

APIM HMI control:

- APIM should play a “photo capture” sound when *DVR Command Result == Execution Succeed.*
- ~~APIM should pop up command success result to customer if *Execution Succeed*.~~
- APIM should pop up command failure result to customer if *Execution Failed*.

#### 5.2.1.3.2.2 Manual Photo Record Attributes

- Photos should be saved into eMMC “Key Data” folder
- Manual photo command delay protection:
  - If the second command triggered before APIM receive the first command execution result, APIM should disable the manual photo button temporary, and give reminder to customer.


  - And once APIM receives the last command execution result or command execution result is 2 seconds timeout, APIM should enable the manual photo button.

## 5.2.1.4 Technology Function Manual Video Record

### 5.2.1.4.1 Function Interfaces

#### 5.2.1.4.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** (*Optional)* |
|---|---|---|---|---|
| Manual_Video_Cmd | HMI Command | **UART msg**: APIM_HMICommand_Enum [Type:0x13] [Subtype:0x01] | NA. | NA. |

| | | | | |
|---|---|---|---|---|
| | | **Data ID**: #1 | | |
| | | | | |

**Table 5-7: Input Signal mappings of Function Manual Video Record**

#### 5.2.1.4.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Manual_Video_Rsp | DVR Command Response | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01]<br>**Data ID**: #1 | NA. | NA. |
| Manual_Video_Rst | DVR Command Result | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01]<br>**Data ID**: #2 | NA. | NA. |
| Video_Record_Status | Video Record Status | **UART msg**: IDCM_Heartbeat_Enum [Type:0x01] [Subtype:0x01]<br>**Data ID**: #3 | NA. | NA. |
| Video_Recording_Timestamp | Video Recording Timer | **UART msg**: IDCM_RecordProgress_Int [Type:0x02] [Subtype:0x02]<br>**Data ID**: #1 | NA. | NA. |
| | | | | |

**Table 5-8: Output Signal mappings of Function Manual Video Record**

#### 5.2.1.4.1.3 Parameters

NA.

#### 5.2.1.4.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.4.2 Function Requirements

#### 5.2.1.4.2.1 Manual Video Record Start

Once manual video is triggered, APIM shall send below msg to IDCM:

- *HMI Command == Video Capture*

Command Reception:
When IDCM receives the command, should response below msg:

- *DVR Command Response == Video Capture*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

Once IDCM receives the command successfully, IDCM should start manual video recording, and synchronize the recording timestamp to APIM periodically:

- *Video Record Status == Manual Recording*
- *Video Recording Timer == "Corresponding recording timestamp" starts from 1*

APIM HMI control:

- The live view page on APIM should be set to manual recording status:
  a. A recording timer should be displayed, value should be same as *Video Recording Timer.*
- The DVR status icon should be set to recording status.


#### 5.2.1.4.2.2 Manual Video Record End

Command Execution:
If manual video recording completes with a defined timer (default value is 45s), IDCM should response command result:

- *DVR Command Response == Video Capture*
- *DVR Command Result == Execution Succeed or Execution Failed*
- *Video Record Status == "last available value"*

APIM HMI control:

- The live view page on APIM should be recovered to normal status.
- The DVR status icon should be set to no recording status.
- APIM should pop up command success result to customer if *Execution Succeed*.
- APIM should pop up command failure result to customer if *Execution Failed*.

#### 5.2.1.4.2.3 Manual Video Record Stop

Once manual video stop is triggered before a manual video recording event goes to the end, APIM shall input below msg:

- *HMI Command == Stop Video Capture*

Command Reception:
Once IDCM receives the command, and responses below msg:

- *DVR Command Response == Stop Video Capture*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

Once IDCM receives the command successfully, IDCM shall try to stop manual video recording and send out command result:

- *DVR Command Response == Stop Video Capture*
- *DVR Command Result == Execution Succeed or Execution Failed*
- *Video Record Status == "last available value"*

APIM HMI control when *Execution Succeed*:

- The live view page on APIM should be recovered to normal status.
- The DVR status icon should be set to corresponding status.
- APIM should pop up command success result to customer if *Execution Succeed*.
- APIM should pop up command failure result to customer if *Execution Failed*.

If customer stops video recording manually, IDCM does not need to feedback previous *Video Capture* command execution result anymore.

#### 5.2.1.4.2.4 Manual Video Record Attributes

- Manual video should be saved into eMMC "Key Data" folder.

### 5.2.1.5 Technology Function Video Watermark

#### 5.2.1.5.1 Function Interfaces

##### 5.2.1.5.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Veh_Speed | Vehicle Speed | **UART msg**: APIM_VehicleSpeed_Int [Type:0x12] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| Veh_VIN_Rsp | VIN Code | **UART msg**: APIM_VIN_ASCII [Type:0x12] [Subtype:0x03] **Data ID**: #1 | NA. | NA. |
| Veh_Gear | Vehicle Gear Position | **UART msg**: APIM_Watermark_Enum [Type:0x12] [Subtype:0x04] **Data ID**: #1 | NA. | NA. |
| Veh_Corenering_Lamp | Cluster Cornering Lamp Status | **UART msg**: APIM_Watermark_Enum [Type:0x12] [Subtype:0x04] **Data ID**: #2 | NA. | NA. |
| Veh_Seatbelt | Cluster Seatbelt Lamp Status | **UART msg**: APIM_Watermark_Enum [Type:0x12] [Subtype:0x04] **Data ID**: #3 | NA. | NA. |
| GPS_Year | Year Data | **UART msg**: APIM_Heartbeat_Enum [Type:0x11] [Subtype:0x01] **Data ID**: #2 | NA. | NA. |
| GPS_Month | Month Data | **UART msg**: APIM_Heartbeat_Enum [Type:0x11] [Subtype:0x01] **Data ID**: #3 | NA. | NA. |
| GPS_Day | Day Data | **UART msg**: APIM_Heartbeat_Enum [Type:0x11] [Subtype:0x01] **Data ID**: #4 | NA. | NA. |
| GPS_Hour | Hour Data | **UART msg**: APIM_Heartbeat_Enum [Type:0x11] [Subtype:0x01] **Data ID**: #5 | NA. | NA. |
| GPS_Min | Minute Data | **UART msg**: APIM_Heartbeat_Enum [Type:0x11] [Subtype:0x01] **Data ID**: #6 | NA. | NA. |
| GPS_Second | Second Data | **UART msg**: APIM_Heartbeat_Enum [Type:0x11] [Subtype:0x01] **Data ID**: #7 | NA. | NA. |
| | | | | |

**Table 5-9: Input Signal mappings of Function Manual Video Record**

##### 5.2.1.5.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Veh_VIN_Req | Request VIN | **UART msg**: IDCM_VINCodeReq_Int [Type:0x08] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| | | | | |

**Table 5-10: Output Signal mappings of Function Manual Video Record**

##### 5.2.1.5.1.3 Parameters

NA.

##### 5.2.1.5.1.4 Interface Requirements

Refer to DVR UART protocol.

#### 5.2.1.5.2 Function Requirements

##### 5.2.1.5.2.1 VIN Code Request

Whenever IGN on and IDCM goes into Full Power Mode (refer to < F006930_Drive Video Record Feature Level Specification> for the definition of Full Power Mode), IDCM should send below message to APIM to request VIN code update:

- *Request VIN == Request*

Once APIM receives the request, it should feedback the VIN code in ASCII format:

- *VIN Code == "Corresponding VIN number of the vehicle"*

#### 5.2.1.5.2.2 Video Watermark Attributes

- Except VIN code, all other watermark data should send out by APIM periodically to IDCM:
- IDCM shall save the input data list in this section and label them onto all video data, the latency between data input and label onto video should less than 100ms.
- Default display and UART timeout value definition:
  - Vehicle Speed: 0
  - VIN Code: AAAAAAAAAAAAAAAAA or last available value if ever got
  - Vehicle Gear Position: NA.
  - Cluster Cornering Lamp Status: Off
  - Cluster Seatbelt Lamp Status: Off
  - Year Data: 2000
  - Month Data: 01
  - Day Data: 01
  - Hour Data: 00
  - Minute Data: 00
  - Second Data: 00
- For GPS Timer data:
  - APIM should get GPS data from CAN bus as IVI system timer.
  - APIM should send IVI system timer to IDCM, if APIM failed to get GPS data from CAN bus, APIM should send IVI setting timer to IDCM.
- For Cluster Seatbelt Lamp Status:
  - APIM should send status of driver side seatbelt lamp to IDCM.

### 5.2.1.6 Technology Function Video Liveview

#### 5.2.1.6.1 Function Interfaces

##### 5.2.1.6.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Liveview_Page_Cmd | HMI Command | **UART msg**: APIM_HMICommand_Enum [Type:0x13] [Subtype:0x01]<br>**Data ID**: #1 | NA. | NA. |
| | | | | |

**Table 5-11: Input Signal mappings of Function Video Liveview**

##### 5.2.1.6.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Enter_Liveview_Rsp | DVR Command Response | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01]<br>**Data ID**: #1 | NA. | NA. |
| Enter_Liveview_Rst | DVR Command Result | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01]<br>**Data ID**: #2 | NA. | NA. |
| Video_Output_Page | Video Output Page | **UART msg**: IDCM_Heartbeat_Enum [Type:0x01] [Subtype:0x01]<br>**Data ID**: #2 | NA. | NA. |
| | | | | |

**Table 5-12: Output Signal mappings of Function Video Liveview**

#### 5.2.1.6.1.3 Parameters

NA.

#### 5.2.1.6.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.6.2 Function Requirements

#### 5.2.1.6.2.1 Liveview Page Enter Process

Liveview page is the default image of LVDS output from IDCM to APIM.

Once enter DVR Liveview page (DVR main page) is triggered, APIM shall input below msg:

- *HMI Command == Enter Live View Page*

Once IDCM receives the command, IDCM should response below msg:

- *DVR Command Response == Enter Live View Page*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*
- *Video Output Page == "last available value"*

APIM HMI control:

- The live view page on APIM should be displayed.
- APIM should display a loading animation:


After LVDS output switches to Liveview page, IDCM should feedback below command result:

- *DVR Command Response == Enter Live View Page*
- *DVR Command Result == Execution Succeed*
- *Video Output Page == Liveview Page*
  Or
- *DVR Command Result == Execution Failed*
- *Video Output Page == "last available value"*

APIM HMI control:

- APIM should hide the loading animation.
- APIM should display DVR main page normally if *Execution Succeed.*


- APIM should pop up command failure result to customer if *Execution Failed* or if APIM detects any LVDS input error:


### 5.2.1.7 Technology Function TF Card Detection

#### 5.2.1.7.1 Function Interfaces

##### 5.2.1.7.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| TF_Format_Cmd | HMI Command | **UART msg**: APIM_HMICommand_Enum [Type:0x13] [Subtype:0x01]<br>**Data ID**: #1 | NA. | NA. |
| | | | | |

**Table 5-13: Input Signal mappings of Function TF Card Detection**

##### 5.2.1.7.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| TF_Card_Status | TF Card Status | **UART msg**: IDCM_Heartbeat_Enum [Type:0x01] [Subtype:0x01]<br>**Data ID**: #10 | NA. | NA. |
| TF_Format_Rsp | DVR Command Response | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01]<br>**Data ID**: #1 | NA. | NA. |

| | | | | |
|---|---|---|---|---|
| TF_Format_Rst | DVR Command Result | **UART msg**:<br>IDCM_CommandRsp_Enum [Type:0x02]<br>[Subtype:0x01]<br>**Data ID**: #2 | NA. | NA. |
| | | | | |

**Table 5-14: Output Signal mappings of Function TF Card Detection**

#### 5.2.1.7.1.3 Parameters

NA.

#### 5.2.1.7.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.7.2 Function Requirements

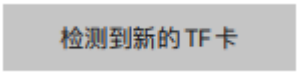
#### 5.2.1.7.2.1 TF Card Detection

APIM should keep monitoring TF card status in UART heartbeat message, before insert TF card, *TF Card Status == TF Pull Out* by default, After a new TF Card is inserted:

1. If *TF Card Status == TF Error:*
   - APIM should show a “TF error” reminder to customer:


2. If *TF Card Status == TF Need Format:*
   - APIM should ask customer to format the TF card.


3. If *TF Card Status == TF Inserted:*
   - When TF Card Status changes from *TF Pull Out* to *TF Inserted*, APIM should give reminder to customer that new card detected.




#### 5.2.1.7.2.2 TF Card Format

When customer chooses to format TF card, APIM should send below message to IDCM:

- *HMI Command == Format TF Card*

Command Reception:
When IDCM receives the command, should response below msg:

- *DVR Command Response == Format TF Card*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*
- *TF Card Status == TF Format Ongoing*

APIM HMI control:

- APIM should display a “formatting” reminder to customer*:*


Command Execution:
After format complete, IDCM should response command result:

- *DVR Command Response == Format TF Card*
- *DVR Command Result == Execution Succeed or Execution Failed*

APIM HMI control:

- APIM should pop up command success result to customer if *Execution Succeed*.
- APIM should pop up command failure result to customer if *Execution Failed*.

### 5.2.1.8 Technology Function Playback List Display

#### 5.2.1.8.1 Function Interfaces

##### 5.2.1.8.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** (*Optional)* |
|---|---|---|---|---|
| Playback_List_Cmd | HMI Command | **UART msg**: APIM_HMICommand_Enum [Type:0x13] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| Finger_Operation_Type | Finger Action Type | **UART msg**: APIM_HMICoordinate_Enum [Type:0x13] [Subtype:0x02] Data ID: #1 | NA. | NA. |
| Coordinate_X | X-Axis Coordinate | **UART msg**: APIM_HMICoordinate_Enum [Type:0x13] [Subtype:0x02] Data ID: #2 | NA. | NA. |
| Coordinate_Y | Y-Axis Coordinate | **UART msg**: APIM_HMICoordinate_Enum [Type:0x13] [Subtype:0x02] Data ID: #3 | NA. | NA. |
| | | | | |

**Table 5-15: Input Signal mappings of Function Playback List Display**

##### 5.2.1.8.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Playback_List_Rsp | DVR Command Response | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| Playback_List_Rst | DVR Command Result | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01] **Data ID**: #2 | NA. | NA. |
| Video_Output_Page | Video Output Page | **UART msg**: IDCM_Heartbeat_Enum [Type:0x01] [Subtype:0x01] **Data ID**: #2 | NA. | NA. |
| TF_Status | TF Card Status | **UART msg**: IDCM_Heartbeat_Enum [Type:0x01] [Subtype:0x01] **Data ID**: #10 | NA. | NA. |

| | | | | |
|---|---|---|---|---|
| List_Mode | File List Mode | **UART msg**:<br>IDCM_BrowseLocation_Int<br>[Type:0x02] [Subtype:0x04]<br>**Data ID**: #1 | NA. | NA. |
| Folder_Empty_Status | File Folder Status | **UART msg**:<br>IDCM_BrowseLocation_Int<br>[Type:0x02] [Subtype:0x04]<br>**Data ID**: #2 | NA. | NA. |
| Folder_Selected_Status | File Selected Status | **UART msg**:<br>IDCM_BrowseLocation_Int<br>[Type:0x02] [Subtype:0x04]<br>**Data ID**: #3 | NA. | NA. |
| File_Selected_Qty | Qty of Files Selected | **UART msg**:<br>IDCM_BrowseLocation_Int<br>[Type:0x02] [Subtype:0x04]<br>**Data ID**: #4 | NA. | NA. |
| | | | | |

**Table 5-16: Output Signal mappings of Function Playback List Display**

#### 5.2.1.8.1.3 Parameters

NA.

#### 5.2.1.8.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.8.2 Function Requirements

#### 5.2.1.8.2.1 Enter Normal Data Playback List Page

When customer wants to enter normal data playback list page, APIM shall input below msg:

- *HMI Command == Enter Normal Data Page*

Command Reception:
Once IDCM receives the command, should response below msg:

- *DVR Command Response == Enter Normal Data Page*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

APIM HMI control if *Command Reception Succeed*:

- APIM should enter the normal data playback list page.
- APIM should display a loading animation.


Command Execution:
After switch to normal data playback list page, IDCM should feedback below command result:

- *DVR Command Response == Enter Normal Data Page*
- *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically until customer leaves this page:

- *Video Output Page == Normal Data List Page*
- *File List Mode == List Mode*
- *File Folder Status == Empty or Not Empty*
- *File Selected Status == All Unselected*
- *Qty of Files Selected == 0x00*

APIM HMI control:

- If *File Folder Status == Empty:*
  - APIM should show empty folder reminder to customer:


- If *File Folder Status == Not Empty*
  - APIM should directly show the LVDS image*:*


#### 5.2.1.8.2.2 Enter Key Data Playback List Page

When customer wants to enter key data playback list page, APIM shall input below msg:

- *HMI Command == Enter Key Data Page*

Command Reception:
Once IDCM receives the command, should response below msg:

- *DVR Command Response == Enter Key Data Page*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

APIM HMI control if *Command Reception Succeed*:

- APIM should enter the key data playback list page.
- APIM should display a loading animation.

Command Execution:
After switch to key data playback list page, IDCM should feedback below command result:

- *DVR Command Response == Enter Key Data Page*
- *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically:

- *Video Output Page == Key Data List Page*
- *File List Mode == List Mode*
- *File Folder Status == Empty or Not Empty*
- *File Selected Status == All Unselected*
- *Qty of Files Selected == 0x00*

APIM HMI control:

- If *File Folder Status == Empty:*
  - APIM should show empty folder reminder to customer.
- If *File Folder Status == Not Empty*
  - APIM should directly show the LVDS image input.

#### 5.2.1.8.2.3 Enter TF Data Playback List Page

TF card status confirmation:
When customer wants to enter TF data playback list page, APIM should keep monitoring the TF card status:

1. *If TF Card Status == TF Pull Out:*
   - APIM should show a “No TF Card” reminder to customer:


2. *If TF Card Status == TF Error:*
   - APIM should stay in previous playback list page.
   - APIM should show a “TF error” reminder to customer:
3. *If TF Card Status == TF Need Format:*
   - APIM should show empty folder reminder to customer.


4. *If TF Card Status == TF Inserted, APIM should send below msg to IDCM:*
   - *HMI Command == Enter TF Data Page*

Command Reception:
Once IDCM receives the command, and responses below msg:

- *DVR Command Response == Enter TF Data Page*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

APIM HMI control if *Command Reception Succeed*:

- APIM should enter the TF data playback list page.
- APIM should display a loading animation.

Command Execution:
After switch to TF data playback list page, IDCM should feedback below command result:
- *DVR Command Response == Enter TF Data Page*
- *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically:
- *Video Output Page == TF Data List Page*
- *File List Mode == List Mode*
- *File Folder Status == Empty or Not Empty*
- *File Selected Status == All Unselected*
- *Qty of Files Selected == 0x00*

APIM HMI control:
- If *File Folder Status == Empty:*
  - APIM should show empty folder reminder to customer.
- If *File Folder Status == Not Empty*
  - APIM should directly show the LVDS image input.

#### 5.2.1.8.2.4 Playback List Scroll

When customer try to finger scroll up or down in the playback list page area, APIM shall send below msg to IDCM:
- *HMI Command == Scroll to Previous Page or Scroll to Next Page*

Once IDCM receives the command, should response below msg:
- *DVR Command Response == Scroll to Previous Page or Scroll to Next Page*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

After list page update to last or next page, IDCM should feedback below command result:
- *DVR Command Response == Scroll to Previous Page or Scroll to Next Page*
- *DVR Command Result == Execution Succeed or Execution Failed*

APIM HMI control:
- APIM should directly show the LVDS image input.

#### 5.2.1.8.2.5 Enter Edit Mode

When customer chooses Edit Mode but press APIM “Edit” soft button, APIM shall send below msg to IDCM:
- *HMI Command == File Edit Mode*

Once IDCM receives the command, should response below msg:
- *DVR Command Response == File Edit Mode*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

After enter Edit Mode, IDCM should feedback below command result:
- *DVR Command Response == File Edit Mode*
- *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically:
- *File List Mode == Edit Mode*
- *File Folder Status == Not Empty*
- *File Selected Status == All Unselected*
- *Qty of Files Selected == 0x00*

APIM HMI control:
- APIM HMI should enter Edit Mode status:


- APIM should highlight the *Qty of Files Selected* to customer to identify how many files are selected.
- The file in list should be selectable by single file or by date or by whole folder

#### 5.2.1.8.2.6 Exit Edit Mode

When customer chooses to exit Edit Mode, APIM shall send below msg to IDCM:

- *HMI Command == File List Mode*

Once IDCM receives the command, should response below msg:

- *DVR Command Response == File List Mode*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

After exit Edit Mode, IDCM should feedback below command result:

- *DVR Command Response == File List Mode*
- *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically:

- *File List Mode == List Mode*
- *File Folder Status == Not Empty*
- *File Selected Status == All Unselected*
- *Qty of Files Selected == 0x00*

APIM HMI control:

- APIM HMI should exit Edit Mode status.

#### 5.2.1.8.2.7 Select All Files

When customer pressed “select all” button, APIM shall send below msg to IDCM:

- *HMI Command == Select All File*

Once IDCM receives the command, should response below msg:

- *DVR Command Response == Select All File*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

After files selected, IDCM should feedback below command result:

- *DVR Command Response == Select All File*
- *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically:

- *File List Mode == Edit Mode*
- *File Folder Status == Not Empty*
- *File Selected Status == All Selected*
- *Qty of Files Selected == corresponding numbers of file selected*

APIM HMI control:

- APIM HMI should change the corresponding HMI button to “unselect all” button:


- APIM should highlight the *Qty of Files Selected* to customer to identify how many files already be selected.

#### 5.2.1.8.2.8 Unselect All Files

When customer pressed “unselect all” button, APIM shall send below msg to IDCM:

- *HMI Command == Unselect All File*

Once IDCM receives the command, should response below msg:

- *DVR Command Response == Unselect All File*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

After files unselected, IDCM should feedback below command result:

- *DVR Command Response == Unselect All File*
- *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically:

- *File List Mode == Edit Mode*
- *File Folder Status == Not Empty*
- *File Selected Status == All Unselected*
- *Qty of Files Selected == 0x00*

APIM HMI control:

- APIM HMI should change the corresponding HMI button to “select all” button.
- APIM should highlight the *Qty of Files Selected* to customer as 0 file is selected.

#### 5.2.1.8.2.9 Select or Unselect One File

APIM should send the corresponding HMI coordinate value to IDCM when customer clicking on playback list page area:

- *Finger Action Type == Pressed* or *Released*
  Finger touch process should contain: *Pressed → Released,* APIM should send out the status separately to IDCM.
- *X-Axis Coordinate == “Finger X Coordinate”*
- *Y-Axis Coordinate == “Finger Y Coordinate”*

IDCM should set corresponding file to be selected or unselected status according to the X and Y coordinates, and keep updating below information to APIM:

- *File List Mode == Edit Mode*
- *File Folder Status == Not Empty*
- *File Selected Status:*
  - == *All Selected* if all files in currently folder are selected.
    APIM should change the corresponding HMI button to “unselect all” status.
  - == *All Unselected* if all files in currently folder are unselected.
    APIM should keep the corresponding HMI button as “select all” status.
  - == *0xFF* for other cases.
    APIM should keep the corresponding HMI button as “select all” status.
- *Qty of Files Selected == corresponding numbers of file selected*
  APIM should highlight the *Qty of Files Selected* to customer after selection.

#### 5.2.1.8.2.10 Select Files By Date

APIM should send the corresponding HMI coordinate value to IDCM when customer clicking on any of the playback list page:

- *Finger Action Type == Pressed* or *Released*
  Finger touch process should contain: *Pressed → Released,* APIM should send out the status separately to IDCM.
- *X-Axis Coordinate == "Finger X Coordinate"*
- *Y-Axis Coordinate == "Finger Y Coordinate"*

IDCM should set corresponding files to selected or unselected status according to the files recording date, and keep updating below information to APIM:

- *File List Mode == Edit Mode*
- *File Folder Status == Not Empty*
- *File Selected Status:*
  - == *All Selected* if all files in currently folder are selected.
    APIM should change the corresponding HMI button to "unselect all" status.
  - == *All Unselected* if all files in currently folder are unselected.
    APIM should keep the corresponding HMI button as "select all" status.
  - == *0xFF* for other cases.
    APIM should keep the corresponding HMI button as "select all" status.
- *Qty of Files Selected == corresponding numbers of file selected*
  APIM should highlight the *Qty of Files Selected* to customer after selection.

#### 5.2.1.8.2.11 Playback List Display Attributes

- If DVR stops at any playback list page more than 3 minutes without any action, APIM should request IDCM go back to live view page, refer to "Video Liveview" section for details.
- Normal data playback list page should only contain normal video.
- Key data playback list page should contain manual photo / manual video or emergency video, and there should be labels to distinguish different data types.
- TF data playback list will only contain data copied from Normal data or Key data folder.
- All above data should be sorted by time in reverse order.
- Playback list should update automatically if new data created.
- Playback list should not contain the files which could not be replayed.
- If customer leaves current playback list page, the file chosen list should be cleared automatically:
  - *File List Mode == List Mode*
  - *File Folder Status == Not Empty*
  - *File Selected Status == All Unselected*
  - *Qty of Files Selected == 0x00*

### 5.2.1.9 Technology Function Data Copy to TF

#### 5.2.1.9.1 Function Interfaces

##### 5.2.1.9.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Data_Copy_Cmd | HMI Command | **UART msg**: APIM_HMICommand_Enum [Type:0x13] [Subtype:0x01]<br>**Data ID**: #1 | NA. | NA. |
| | | | | |

**Table 5-17: Input Signal mappings of Function Data Copy to TF**

##### 5.2.1.9.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Data_Copy_Rsp | DVR Command Response | **UART msg**:<br>IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01]<br>**Data ID**: #1 | NA. | NA. |

| | | | | |
|---|---|---|---|---|
| Data_Copy_Rst | DVR Command Result | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01]<br>**Data ID**: #2 | NA. | NA. |
| File_Operation_Type | Operation Type | **UART msg**: IDCM_FileOptProgress_Int[Type:0x02] [Subtype:0x03]<br>**Data ID**: #1 | NA. | NA. |
| Total_File_Number | Total Files Selected | **UART msg**: IDCM_FileOptProgress_Int[Type:0x02] [Subtype:0x03]<br>**Data ID**: #2 | NA. | NA. |
| Qty_Completed | Qty of Complete | **UART msg**: IDCM_FileOptProgress_Int[Type:0x02] [Subtype:0x03]<br>**Data ID**: #3 | NA. | NA. |
| Percent_Completed | Operation Progress | **UART msg**: IDCM_FileOptProgress_Int[Type:0x02] [Subtype:0x03]<br>**Data ID**: #4 | NA. | NA. |
| Video_Output_Page | Video Output Page | **UART msg**: IDCM_Heartbeat_Enum [Type:0x01] [Subtype:0x01]<br>**Data ID**: #2 | NA. | NA. |
| TF_Card_Status | TF Card Status | **UART msg**: IDCM_Heartbeat_Enum [Type:0x01] [Subtype:0x01]<br>**Data ID**: #10 | NA. | NA. |
| | | | | |

**Table 5-18: Output Signal mappings of Function Data Copy to TF**

#### 5.2.1.9.1.3 Parameters

NA.

#### 5.2.1.9.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.9.2 Function Requirements

#### 5.2.1.9.2.1 Copy Start

Pre-condition:
When APIM HMI is in Edit Mode at normal data or key data playback list page:

- *Video Output Page == Normal Data List Page or Key Data List Page*
- *File List Mode == Edit Mode*
- *File Folder Status == Not Empty*
- *File Selected Status:*
  - == *All Selected* if all files in currently folder are selected.
  - ~~== *All Unselected* if all files in currently folder are unselected.~~
  - == *0xFF* for other cases.
- *Qty of Files Selected == corresponding numbers of file selected*

After customer presses “copy” button, APIM should check the TF card status before send TF copy command to IDCM:

1. *If TF Card Status == TF Pull Out:*
   - APIM should show a “No TF Card” reminder to customer and stop copy process.


2. *If TF Card Status == TF Error:*
   - APIM should show a “TF error” reminder to customer and stop copy process.

3. *If TF Card Status == TF Need Format:*
   - APIM should ask customer to format the TF card, refer to “TF Card Format” section for the definition of TF card format process, and APIM should exist copy process.
4. *If TF Card Status == TF Inserted:*

APIM should send below msg to IDCM:
- *HMI Command == TF Card Copy*

Command Reception:
Once IDCM receives the command, should response below msg:
- *DVR Command Response == TF Card Copy*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

After IDCM receives the command successfully, APIM and IDCM HMI should go back to List Mode automatically:
- *Video Output Page == Normal Data List Page or Key Data List Page*
- *File List Mode == List Mode*
- *File Folder Status == Not Empty*
- *File Selected Status == All Unselected*
- *Qty of Files Selected == 0x00*

and IDCM should start data copy process, and synchronize the status to APIM periodically:
- *Operation Type == File Copy*
- *Total Files Selected == Total files number which are selected to copy in Edit Mode*
- *Qty of Complete == Files number which are already copied to TF card successfully*
- *Operation Progress == Files copying progress*

APIM HMI control:
- During copy process, the DVR status icon should be set to copying status.
- APIM should display a copying reminder to customer *according to above information.*

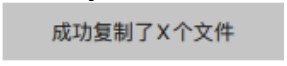

#### 5.2.1.9.2.2 Copy End

Command Execution:
After IDCM completes the whole copy process, IDCM should feedback below command result:
- *DVR Command Response == TF Card Copy*
- *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM:
- *Operation Type == File Copy*
- *Total Files Selected == Total files number which are selected to copy in Edit Mode*
- *Qty of Complete == Total files number which are selected to copy in Edit Mode*
- *Operation Progress == 0x64(100%)*

If *Execution Failed*, IDCM should update below information to APIM:
- *Operation Type == File Copy*
- *Total Files Selected == Total files number which are selected to copy in Edit Mode*
- *Qty of Complete == Files number which are already copied to TF card successfully*
- *Operation Progress == Files copying progress when failed*

APIM HMI control:
- The DVR status icon should be set to previous status.
- APIM should pop up command success result to customer if *Execution Succeed*, also need to highlight how many files copied to TF card successfully:




- APIM should pop up command failure result to customer if *Execution Failed*, also need to highlight how many files failed to copy:


#### 5.2.1.9.2.3 Copy Stop

Customer could stop copy process by press the “cancellation” button, APIM shall send below message to IDCM:

- *HMI Command == TF Card Copy Stop*

Command Reception:
Once IDCM receives the command, should response below msg:

- *DVR Command Response == TF Card Copy Stop*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

Command Execution:
After IDCM stops the copy process, IDCM should feedback below command result:

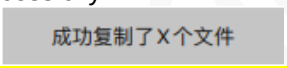
- *DVR Command Response == TF Card Copy Stop*
- *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM:

- *Operation Type == File Copy*
- *Total Files Selected == Total files number which are selected to copy in Edit Mode*
- *Qty of Complete == Files number which are already copied to TF card successfully*
- *Operation Progress == Files copying progress when stop*

APIM HMI control:

- The DVR status icon should be set to previous status.
- APIM should pop up command success result to customer if *Execution Succeed*, also need to highlight how many files copied to TF card successfully:




If customer stops copy process manually, IDCM does not need to feedback previous TF Card Copy command execution result anymore.

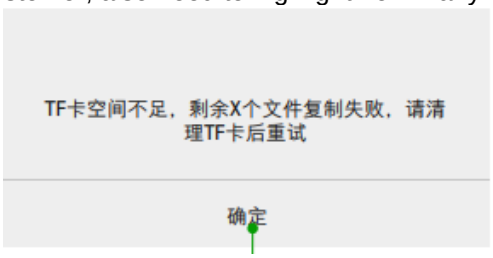
#### 5.2.1.9.2.4 TF Card Memory Full

IDCM should keep monitoring the TF card memory status to confirm if enough space to continue the copy operation, if TF memory full, IDCM should feedback below message to APIM during copying:

- *DVR Command Response == TF Card Copy*
- *DVR Command Result == Execution Failed*
- *Operation Type == File Copy*
- *Total Files Selected == Total files number which are selected to copy in Edit Mode*
- *Qty of Complete == Files number which are already copied to TF card successfully*
- *Operation Progress == Files copying progress when stop*
- *TF Card Status == TF Full*

APIM HMI control:

- APIM should give reminder to customer, also need to highlight how many files failed to copy to TF card.




- Then APIM should stop the copy process and go back to playback list page.

#### 5.2.1.9.2.5 Smart Copy

Refer to “Copy Start” , “Copy End” , “Copy Stop” and “TF Card Memory Full” sections for Smart Copy function implementation.
The differences of smart copy:

- The *HMI Command* and *DVR Command Response* should be *Smart Copy.*

- Smart Copy function will directly copy the newest two normal videos to TF card, so the *Total Files Selected* is 2.

#### 5.2.1.9.2.6 Data Copy Attributes

- If a data copy event is not completed, APIM should not trigger another copy or deletion request to IDCM.
- If a copying activity already ongoing, customer choose “Smart Copy” on live view page or “Edit” button on any playback list page, the copying progress will be displayed again.
- In Edit Mode, if *File Selected Status == All Unselected, customer could not trigger data copy.*

### 5.2.1.10 Technology Function Data Deletion from TF

#### 5.2.1.10.1 Function Interfaces

##### 5.2.1.10.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** (*Optional)* |
|---|---|---|---|---|
| Data_Delete_Cmd | HMI Command | **UART msg**: APIM_HMICommand_Enum [Type:0x13] [Subtype:0x01]<br>**Data ID**: #1 | NA. | NA. |
| | | | | |
| | | | | |

**Table 5-19: Input Signal mappings of Function Data Deletion from TF**

##### 5.2.1.10.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Data_Delete_Rsp | DVR Command Response | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01]<br>**Data ID**: #1 | NA. | NA. |
| Data_Delete_Rst | DVR Command Result | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01]<br>**Data ID**: #2 | NA. | NA. |
| File_Operation_Type | Operation Type | **UART msg**: IDCM_FileOptProgress_Int[Type:0x02] [Subtype:0x03]<br>**Data ID**: #1 | NA. | NA. |
| Total_File_Number | Total Files Selected | **UART msg**: IDCM_FileOptProgress_Int[Type:0x02] [Subtype:0x03]<br>**Data ID**: #2 | NA. | NA. |
| Qty_Completed | Qty of Complete | **UART msg**: IDCM_FileOptProgress_Int[Type:0x02] [Subtype:0x03]<br>**Data ID**: #3 | NA. | NA. |
| Percent_Completed | Operation Progress | **UART msg**: IDCM_FileOptProgress_Int[Type:0x02] [Subtype:0x03]<br>**Data ID**: #4 | NA. | NA. |
| Video_Output_Page | Video Output Page | **UART msg**: IDCM_Heartbeat_Enum [Type:0x01] [Subtype:0x01]<br>**Data ID**: #2 | NA. | NA. |
| TF_Card_Status | TF Card Status | **UART msg**: IDCM_Heartbeat_Enum [Type:0x01] [Subtype:0x01]<br>**Data ID**: #10 | NA. | NA. |
| | | | | |

**Table 5-20: Output Signal mappings of Function Data Deletion from TF**

##### 5.2.1.10.1.3 Parameters

NA.

#### 5.2.1.10.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.10.2 Function Requirements

#### 5.2.1.10.2.1 Deletion Start

Pre-condition:
When APIM HMI is in Edit Mode at TF data playback list page:

- *Video Output Page == TF Data List Page*
- *File List Mode == Edit Mode*
- *File Folder Status == Not Empty*
- *File Selected Status:*
  - == *All Selected* if all files in currently folder are selected.
  - ~~== *All Unselected* if all files in currently folder are unselected.~~
  - == *0xFF* for other cases.
- *Qty of Files Selected == corresponding numbers of file selected*

If customer presses “delete” button and triggers data deletion from TF card process, APIM should send below msg to IDCM:

- *HMI Command == TF Card Delete*

Command Reception:
Once IDCM receives the command, should response below msg:

- *DVR Command Response == TF Card Delete*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

After IDCM receives the command successfully, IDCM & APIM HMI should go back to List Mode automatically:

- *Video Output Page == TF Data List Page*
- *File List Mode == List Mode*
- *File Folder Status == Not Empty*
- *File Selected Status == All Unselected*
- *Qty of Files Selected == 0x00*

Then IDCM should start data deletion process, and synchronize the status to APIM periodically:

- *Operation Type == File Deletion*
- *Total Files Selected == Total files number which are selected to delete in Edit Mode*
- *Qty of Complete == Files number which are already deleted from TF card successfully*
- *Operation Progress == Files deleting progress*

APIM HMI control:

- During deletion process, the DVR status icon should be set to deleting status. 
- APIM should display a deleting reminder to customer *according to above information.*


#### 5.2.1.10.2.2 Deletion End

Command Execution:
After IDCM completes the whole deletion process, IDCM should feedback below command result:

- *DVR Command Response == TF Card Delete*
- *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM:

- *Operation Type == File Deletion*
- *Total Files Selected == Total files number which are selected to delete in Edit Mode*
- *Qty of Complete == Total Files Selected*
- *Operation Progress == 0x64(100%)*

APIM HMI control:

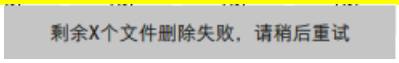
- The DVR status icon should be set to previous status.
- APIM should pop up command success result to customer if *Execution Succeed*, also need to highlight how many files deleted from TF card successfully:


If *Execution Failed*, IDCM should update below information to APIM:

- *Operation Type == File Deletion*
- *Total Files Selected == Total files number which are selected to delete in Edit Mode*
- *Qty of Complete == Number of files complete deletion*
- *Operation Progress == Files deletion progress when stop*

APIM HMI control:

- APIM should pop up command failure result to customer if *Execution Failed*:




#### 5.2.1.10.2.3 Deletion Stop

Customer could stop deletion process by press the “cancellation” button, APIM shall send below message to IDCM:

- *HMI Command == TF Card Delete Stop*

Command Reception:
Once IDCM receives the command, should response below msg:

- *DVR Command Response == TF Card Delete Stop*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

Command Execution:
After IDCM stops the deletion process, IDCM should feedback below command result:

- *DVR Command Response == TF Card Delete Stop*
- *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM:

- *Operation Type == File Deletion*
- *Total Files Selected == Total files number which are selected to delete in Edit Mode*
- *Qty of Complete == Files number which are already deleted from TF card successfully*
- *Operation Progress == Files deleting progress*

APIM HMI control:

- The DVR status icon should be set to previous status.
- APIM should pop up command success result to customer if *Execution Succeed*, also need to highlight how many files deleted from TF card.

If customer stops deletion process manually, IDCM does not need to feedback TF Card Delete command execution result anymore.

#### 5.2.1.10.2.4 Data Deletion Attributes

- If a data deletion event is not completed, APIM should not trigger another copy or deletion request to IDCM again.
- If a deletion activity already ongoing, customer choose “Smart Copy” on live view page or “Edit” button on any playback list page, the deletion progress will be displayed again.
- In Edit Mode, if *File Selected Status == All Unselected, customer could not trigger data deletion.*

### 5.2.1.11 Technology Function Data Playback Control

#### 5.2.1.11.1 Function Interfaces

#### 5.2.1.11.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** (*Optional)* |
|---|---|---|---|---|
| Data_Playback_Cmd | HMI Command | **UART msg**: APIM_HMICommand_Enum [Type:0x13] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| Finger_Operation_Type | Finger Action Type | **UART msg**: APIM_HMICoordinate_Enum [Type:0x13] [Subtype:0x02] Data ID: #1 | NA. | NA. |
| Coordinate_X | X-Axis Coordinate | **UART msg**: APIM_HMICoordinate_Enum [Type:0x13] [Subtype:0x02] Data ID: #2 | NA. | NA. |
| Coordinate_Y | Y-Axis Coordinate | **UART msg**: APIM_HMICoordinate_Enum [Type:0x13] [Subtype:0x02] Data ID: #3 | NA. | NA. |
| Display_Position | DVR Display Position | **UART msg**: APIM_Heartbeat_Enum [Type:0x11] [Subtype:0x01] Data ID: #8 | NA. | NA. |
| Veh_Gear | Vehicle Gear Position | **UART msg**: APIM_Watermark_Enum [Type:0x12] [Subtype:0x04] **Data ID**: #1 | NA. | NA. |
| | | | | |

**Table 5-21: Input Signal mappings of Function Playback Control**

#### 5.2.1.11.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Data_Playback_Rsp | DVR Command Response | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| Data_Playback_Rst | DVR Command Result | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01] **Data ID**: #2 | NA. | NA. |
| Video_Output_Page | Video Output Page | **UART msg**: IDCM_Heartbeat_Enum [Type:0x01] [Subtype:0x01] **Data ID**: #2 | NA. | NA. |
| TF_Status | TF Card Status | **UART msg**: IDCM_Heartbeat_Enum [Type:0x01] [Subtype:0x01] **Data ID**: #10 | NA. | NA. |
| List_Mode | File List Mode | **UART msg**: IDCM_BrowseLocation_Int [Type:0x02] [Subtype:0x04] **Data ID**: #1 | NA. | NA. |
| Folder_Empty_Status | File Folder Status | **UART msg**: IDCM_BrowseLocation_Int [Type:0x02] [Subtype:0x04] **Data ID**: #2 | NA. | NA. |
| Gear_P_Block | Gear P Protection | **UART msg**: IDCM_PlaybackRsp_Int [Type:0x02] [Subtype:0x05] **Data ID**: #1 | NA. | NA. |
| | | | | |

**Table 5-22: Output Signal mappings of Function Playback Control**

#### 5.2.1.11.1.3 Parameters

NA.

#### 5.2.1.11.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.11.2 Function Requirements

#### 5.2.1.11.2.1 Gear Position “R” Handling

Pre-condition:

- *Vehicle Gear Position == P*
- *Video Output Page == Video Playing Page*
- Video playback ongoing: *Video Output Page == Video Playing Page*

Anytime when *Vehicle Gear Position* changes to R:

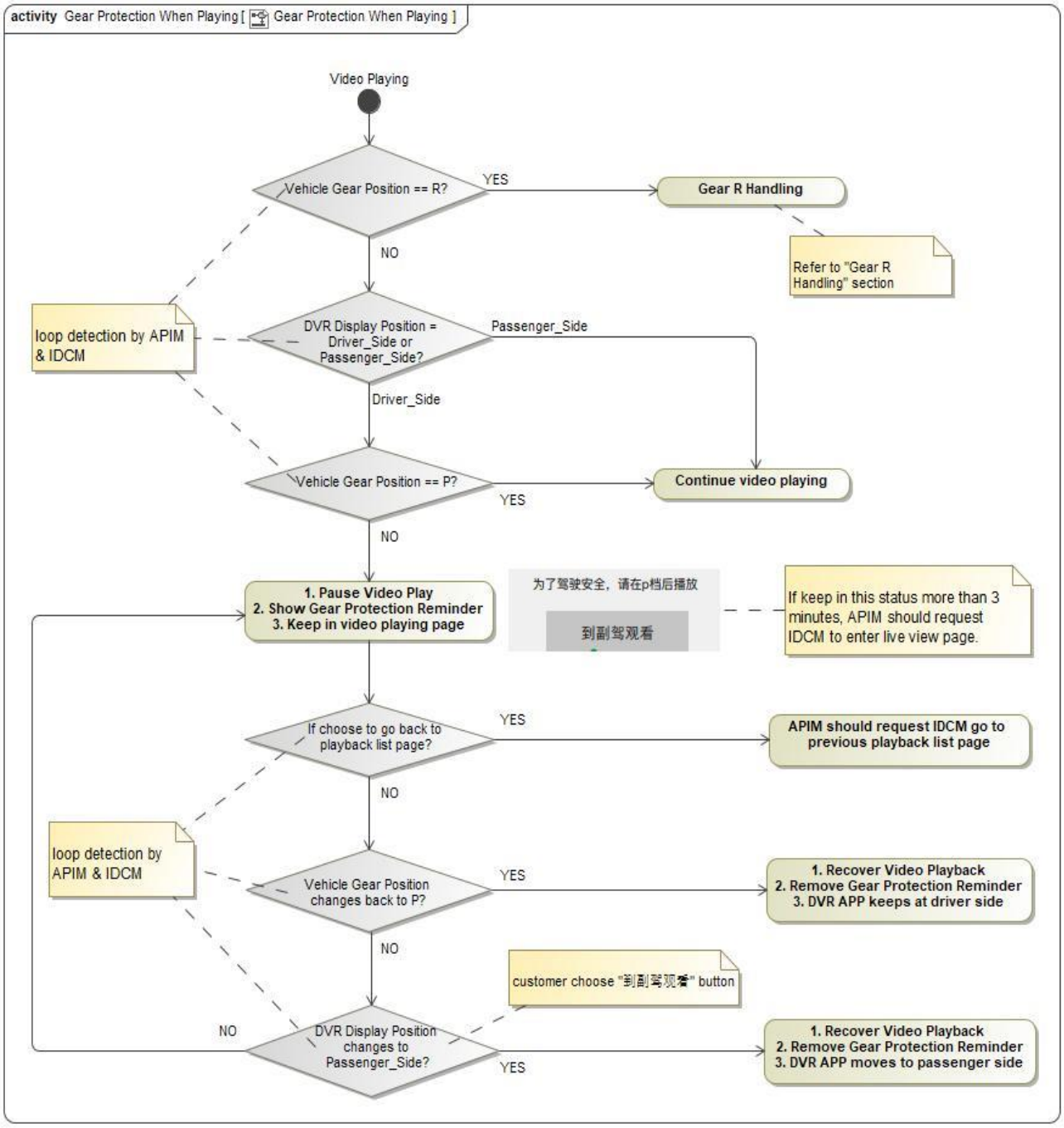
- IDCM should pause video play.
- APIM should display “360° Camera” or “Rear Camera” image, DVR display page should be masked.

Then if *Vehicle Gear Position* changes back to P:

- IDCM should keep video pause status in playback page.
- APIM should remove “360° Camera” or “Rear Camera” image, DVR display page should be recovered.

#### 5.2.1.11.2.2 Gear Position “P” Protection When Video Playing

APIM & IDCM should follow below gear position protection strategy:




### 5.2.1.11.2.3 Select Video to Play

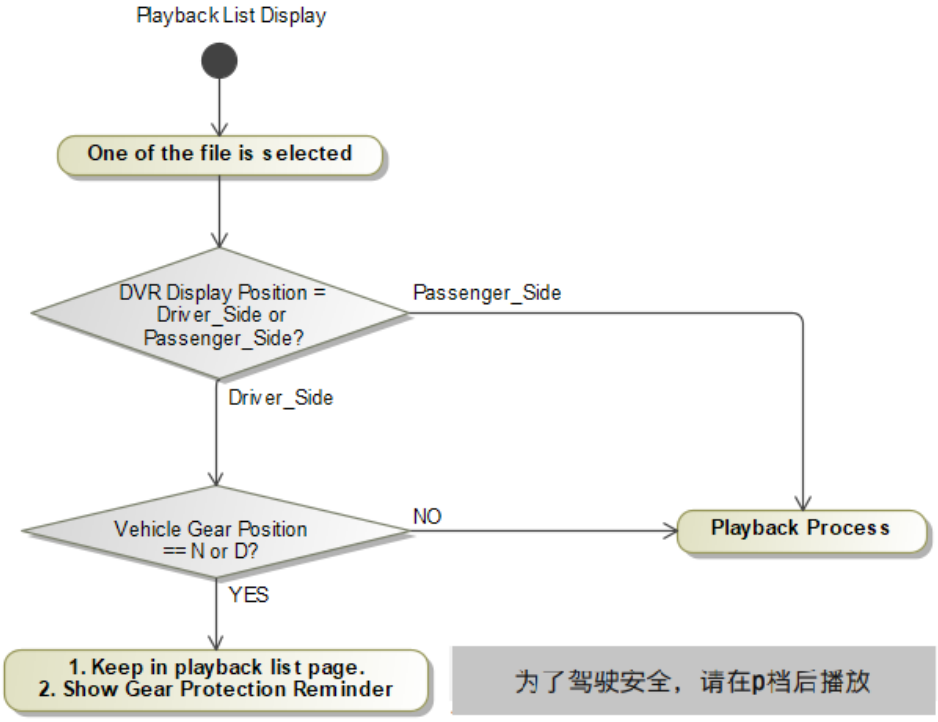
Pre-condition:
When DVR is in List Mode at one of the data playback list page:

- *Video Output Page == Normal Data List Page* or *Key Data List Page* or *TF Data List Page*
- *File List Mode == List Mode*
- *File Folder Status == Not Empty*

APIM should send the corresponding HMI coordinate value to IDCM when customer clicking on playback list page area:

- *Finger Action Type == Pressed* or *Released*
  Finger touch process should contain: *Pressed → Released,* APIM should send out the status separately to IDCM.
- *X-Axis Coordinate == "Finger X Coordinate"*
- *Y-Axis Coordinate == "Finger Y Coordinate"*

Command Reception:
IDCM should check if the received X and Y coordinates match to one of the file areas, also need to check DVR display position and vehicle gear position status:

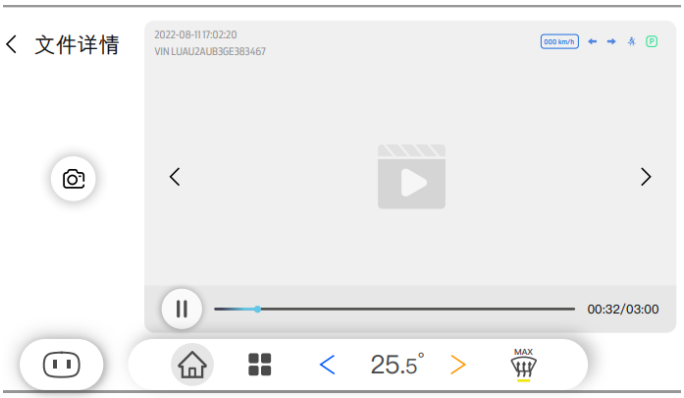



1. Normal playback scenario:
   If
   - *DVR Display Position == Passenger_Side*
     *Or*
   - *DVR Display Position == Driver_Side && Vehicle Gear Position == P*

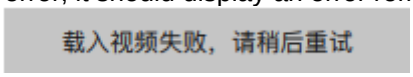
IDCM should start video playing and update below status to APIM:
- *Video Output Page == Video Playing Page*

APIM HMI control:
- A loading animation should be displayed before video is displayed, the duration of the loading progress depends on how long does IDCM need to switch to video playback image.


- APIM HMI should change to video playback page if *Video Output Page == Video Playing Page*




- If APIM detects any LVDS input error, it should display an error reminder to customer:



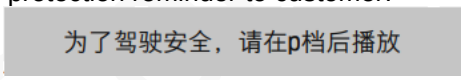

  And request IDCM go back to previous playback list page, refer to “Playback List Display” section for details.
- If data in TF card is under playback, and TF card is pulled out suddenly:
  - *TF Card Status == TF Pull Out*

  APIM should display a reminder to customer, and request IDCM go back to normal data playback list page, refer to “Playback List Display” section for details


2. Gear position protection:
   If
   - *DVR Display Position == Driver_Side && Vehicle Gear Position == N or D*

IDCM should send below message to APIM and keep in playback list page:
- *Gear P Protection == Yes*
- *Video Output Page == Normal Data List Page* or *Key Data List Page* or *TF Data List Page*

Then APIM should display below gear protection reminder to customer:




#### 5.2.1.11.2.4 Select Photo to Play

Photo playback is not limited by gear position protection strategy, the playback process is same as “Select Video to Play” section, APIM HMI should change to photo replay page if *Video Output Page == Photo Playing Page:*


#### 5.2.1.11.2.5 Playback Position Control

When customer tries to move DVR APP display position from Driver side to Passenger side, APIM should update display page and send the status to IDCM:
- *DVR Display Position == Passenger_Side*

When customer tries to move DVR APP display position from Passenger side to Driver side:
1. If *Vehicle Gear Position == P,* APIM should update display page and send the status to IDCM:

- *DVR Display Position == Driver_Side*

2. If *Vehicle Gear Position == N or D*, APIM should keep display page at passenger side and display a reminder:


### 5.2.1.11.2.6 Start or Pause Video Play

Pre-condition:
When APIM HMI is at video playback page:

- *Video Output Page == Video Playing Page*

APIM should send the corresponding HMI coordinate value to IDCM when customer clicking on video playback page area:

- *Finger Action Type == Pressed* or *Released*
  Finger touch process should contain: *Pressed → Released,* APIM should send out the status separately to IDCM.
- *X-Axis Coordinate == "Finger X Coordinate"*
- *Y-Axis Coordinate == "Finger Y Coordinate"*

Command Reception:
IDCM should start or pause the video playback if the X and Y coordinates match to the "Play" button area.

### 5.2.1.11.2.7 Video Forward or Backward

Pre-condition:
When APIM HMI is at video playback page:

- *Video Output Page == Video Playing Page*

APIM should send the corresponding HMI coordinate value to IDCM when customer's finger sliding on video playback page area:

- *Finger Action Type == Pressed* or *Moving* or *Released*
  Finger touch process should contain: *Pressed → Moving → Released,* APIM should send out the status separately to IDCM.
- *X-Axis Coordinate == "Finger X Coordinate"*
- *Y-Axis Coordinate == "Finger Y Coordinate"*

Command Reception:
IDCM should relocate the video playing timestamp if the X and Y coordinates match to the video playing progress bar area.

### 5.2.1.11.2.8 Play Last or Next Data

Pre-condition:
When APIM HMI is at video or photo playback page:

- *Video Output Page == Video Playing Page* or *Photo Playing Page*

APIM should send the corresponding HMI coordinate value to IDCM when customer clicking on video playback page area:

- *Finger Action Type == Pressed* or *Released*
  Finger touch process should contain: *Pressed → Released,* APIM should send out the status separately to IDCM.
- *X-Axis Coordinate == "Finger X Coordinate"*

- *Y-Axis Coordinate == "Finger Y Coordinate"*

Command Reception:
IDCM should play the previous or next data if the X and Y coordinates match to the last or next button area.

#### 5.2.1.11.2.9 Screenshot

Pre-condition:
When APIM HMI is at video playback page:
- *Video Output Page == Video Playing Page*

APIM should send below command to IDCM when customer try to screenshot:
- *HMI Command == Video Screenshot*

Command Reception:
When IDCM receives the command, should response below msg:
- *DVR Command Response == Video Screenshot*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

Command Execution:
If screenshot completes, IDCM should response command result:
- *DVR Command Response == Video Screenshot*
- *DVR Command Result == Execution Succeed or Execution Failed*

APIM HMI control:
- APIM should play a "photo capture" sound when *DVR Command Result == Execution Succeed.*
- ~~APIM should pop up command success result to customer if *Execution Succeed*.~~


- APIM should pop up command failure result to customer if *Execution Failed*.
- If customer wants to check the screenshot photo by click the screenshot diagram, APIM should request IDCM go back to key data playback list page, refer to "Playback List Display" section for details

#### 5.2.1.11.2.10 Copy Playback Data to TF

Pre-condition:
When APIM HMI is at video playback page:
- *Video Output Page == Video Playing Page or Photo Playing Page*

APIM & IDCM should follow the process defined in section "Data Copy to TF" to copy currently file to TF card.

#### 5.2.1.11.2.11 Delete Playback Data from TF

Pre-condition:
When APIM HMI is at video playback page:
- *Video Output Page == Video Playing Page or Photo Playing Page*

APIM & IDCM should follow the process defined in section "Data Deletion from TF" to delete currently file from TF card.

#### 5.2.1.11.2.12 Data Playback Control Attributes

- If DVR stops at video pause status or photo display status more than 3 minutes, APIM should request IDCM go back to live view page, refer to "Video Liveview" section for details.
- When launched to playback page, video should start to play automatically.

- Watermark information should be displayed when playback.

### 5.2.1.12 Technology Function DVR Parameter Setting

#### 5.2.1.12.1 Function Interfaces

##### 5.2.1.12.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** (*Optional)* |
|---|---|---|---|---|
| Normal_Video_Switch | Normal Video Record Switch | **UART msg**: APIM_NormalVideoSwitch_Enum [Type:0x14] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| Vehicle_Monitor_Switch | Vehicle Monitor Function Switch | **UART msg**: APIM_VehicleMonitorSwitch_Enum [Type:0x14] [Subtype:0x02] **Data ID**: #1 | NA. | NA. |
| Emergency_Video_Duration | Emergency Video Duration | **UART msg**: APIM_SetEmergencyDuration_Enum [Type:0x14] [Subtype:0x03] **Data ID**: #1 | NA. | NA. |
| G-Sensor Sensitive | G-Sensor Collide Sensitive | **UART msg**: APIM_SetCollideSensitive_Enum [Type:0x14] [Subtype:0x04] **Data ID**: #1 | NA. | NA. |
| Setting_Reset_Cmd | HMI Command | **UART msg**: APIM_HMICommand_Enum [Type:0x13] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| Request_DVR_Parameter | Request Type | **UART msg**: APIM_ReqDVRInformation_Enum [Type:0x14] [Subtype:0x08] **Data ID**: #1 | NA. | NA. |
| | | | | |

**Table 5-23: Input Signal mappings of Function DVR Parameter Setting**

##### 5.2.1.12.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Normal_Video_Switch_Rsp | Normal Video Switch Response | **UART msg**: IDCM_NormalVideoSwitch_Enum [Type:0x04] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| Vehicle_Monitor_Switch_Rsp | Vehicle Monitor Switch Response | **UART msg**: IDCM_VehicleMonitorSwitch_Enum [Type:0x04] [Subtype:0x02] **Data ID**: #1 | NA. | NA. |
| Emergency_Video_Duration_Rsp | Emergency Video Duration Response | **UART msg**: IDCM_SetEmergencyDuration_Enum [Type:0x04] [Subtype:0x03] **Data ID**: #1 | NA. | NA. |
| Gsensor_Sensitive_Rsp | Collision Detection Sensitive Level | **UART msg**: IDCM_SetCollideSensitive_Enum [Type:0x04] [Subtype:0x04] **Data ID**: #1 | NA. | NA. |
| Setting_Reset_Rsp | DVR Command Response | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| Setting_Reset_Rst | DVR Command Result | **UART msg**: IDCM_CommandRsp_Enum [Type:0x02] [Subtype:0x01] **Data ID**: #2 | NA. | NA. |

| | | | | |
|---|---|---|---|---|
| Video_Record_Status | Video Record Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01]<br>**Data ID**: #3 | NA. | NA. |
| | | | | |

**Table 5-24: Output Signal mappings of Function DVR Parameter Setting**

#### 5.2.1.12.1.3 Parameters

NA.

#### 5.2.1.12.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.12.2 Function Requirements

#### 5.2.1.12.2.1 DVR Parameter Update

Pre-condition:
When enter DVR setting page, APIM should send below command to IDCM to request newest setting value:

- *Request Type == Request DVR Parameter*

Command Feedback:
When IDCM receives the command, should response below msg:

- *Normal Video Switch Response == "Currently saved value"*
- *Vehicle Monitor Switch Response == "Currently saved value"*
- *Emergency Video Duration Response == "Currently saved value"*
- *Collision Detection Sensitive Level == "Currently saved value"*

APIM HMI control:

- APIM should update all the setting value on HMI.

#### 5.2.1.12.2.2 Normal Video Switch Setting

Once setting value is changed, APIM shall send below msg to IDCM:

- *Normal Video Record Switch == "New setting value"*

IDCM should update the setting data and response below msg:

- *Normal Video Switch Response == "New setting value"*
- *Video Record Status == Normal Recording*

APIM HMI control:

- APIM should display a reminder to customer that normal recording is enabled if *"New setting value"* is *"Enable".*
- The DVR status icon should be set to recording status if *"New setting value"* is *"Enable".*

#### 5.2.1.12.2.3 Vehicle Monitor Switch Setting

Once setting value is changed, APIM shall input below msg:

- *Vehicle Monitor Function Switch == "New setting value"*

IDCM should update the setting data and response below msg:

- *Vehicle Monitor Switch Response == "New setting value"*

#### 5.2.1.12.2.4 Emergency Video Duration Setting

Once setting value is changed, APIM shall input below msg:

- *Emergency Video Duration == "New setting value"*

IDCM should update the setting data and response below msg:

- *Emergency Video Duration Response == "New setting value"*

#### 5.2.1.12.2.5 Collision Detection Sensitive Setting

Once setting value is changed, APIM shall input below msg:

- *G-Sensor Collide Sensitive == "New setting value"*

IDCM should update the setting data and response below msg:

- *Collision Detection Sensitive Level == "New setting value"*

#### 5.2.1.12.2.6 Setting Value Reset

When setting reset is triggered by customer, APIM shall input below msg:

- *HMI Command == DVR Setting Reset*

Command Reception:
When IDCM receives the command, should response below msg:

- *DVR Command Response == DVR Setting Reset*
- *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

APIM HMI control:

- APIM should display a resetting animation:


Command Execution:
If setting reset completes, IDCM should response command result:

- *DVR Command Response == DVR Setting Reset*
- *DVR Command Result == Execution Succeed or Execution Failed*

APIM HMI control:

- APIM should pop up command success result to customer if *Execution Succeed*.
- APIM should pop up command failure result to customer if *Execution Failed*.

#### 5.2.1.12.2.7 DVR Parameter Setting Attributes

- If setting value feedback from IDCM is not same as APIM input, APIM should update the setting value to the feedback value from IDCM which means failed to change the DVR parameter setting.

### 5.2.1.13 Technology Function DVR Wi-Fi Setting

#### 5.2.1.13.1 Function Interfaces

##### 5.2.1.13.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** (*Optional)* |
|---|---|---|---|---|
| WIFI_Hotspot_Switch | Wi-Fi Hotspot Switch | **UART msg**: APIM_WiFiHotspotSwitch_Enum [Type:0x14] [Subtype:0x05] **Data ID**: #1 | NA. | NA. |
| WIFI_SSID_Setting | DVR Wi-Fi SSID | **UART msg**: APIM_SetWiFiSSID_Enum [Type:0x14] [Subtype:0x06] **Data ID**: #1 | NA. | NA. |
| WIFI_PWD_Setting | DVR Wi-Fi Password | **UART msg**: APIM_SetEmergencyDuration_Enum [Type:0x14] [Subtype:0x07] **Data ID**: #1 | NA. | NA. |
| Request_WiFi_Parameter | Request Type | **UART msg**: APIM_ReqDVRInformation_Enum [Type:0x14] [Subtype:0x08] **Data ID**: #1 | NA. | NA. |
| | | | | |

**Table 5-25: Input Signal mappings of Function DVR Wi-Fi Setting**

##### 5.2.1.13.1.2 Outputs

| Logical Signal Name | Technical Signal Name | Mapping Details *(Conditional)* | Publisher Interface | Connection *(Optional)* |
|---|---|---|---|---|
| WIFI_Hotspot_Switch_Rsp | Wi-Fi Hotspot Switch Response | **UART msg**: IDCM_WiFiHotspotSwitch_Enum [Type:0x05] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| WIFI_SSID_Setting_Rsp | DVR Wi-Fi SSID Response | **UART msg**: IDCM_SetWiFiSSID_Enum [Type:0x05] [Subtype:0x02] **Data ID**: #1 | NA. | NA. |
| WIFI_PWD_Setting_Rsp | DVR Wi-Fi Password Response | **UART msg**: IDCM_SetWiFiPSWD_Enum [Type:0x05] [Subtype:0x03] **Data ID**: #1 | NA. | NA. |
| WIFI_Connect_Status | Wi-Fi Connection Status | **UART msg**: IDCM_Heartbeat_Enum [Type:0x01] [Subtype:0x01] **Data ID**: #5 | NA. | NA. |
| | | | | |

**Table 5-26: Output Signal mappings of Function DVR Wi-Fi Setting**

#### 5.2.1.13.1.3 Parameters

NA.

#### 5.2.1.13.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.13.2 Function Requirements

#### 5.2.1.13.2.1 DVR Wi-Fi Information Update

Pre-condition:
When enter DVR Wi-Fi setting page, APIM should send below command to IDCM to request newest setting value:

- *Request Type == Request DVR WiFi Information*

Command Feedback:
When IDCM receives the command, should response below msg:

- *Wi-Fi Hotspot Switch Response == "Currently saved value"*
- *DVR Wi-Fi SSID Response == "Currently saved value"*
- *DVR Wi-Fi Password Response == "Currently saved value"*

APIM HMI control:

- APIM should update all the setting value on HMI.

#### 5.2.1.13.2.2 DVR Wi-Fi Switch Setting Process

Once setting value is changed, APIM shall input below msg:

- *Wi-Fi Hotspot Switch == "New setting value"*

IDCM should update the setting data and response below msg:

- *Wi-Fi Hotspot Switch Response == "New setting value"*

APIM HMI control:

- If *"New setting value"* is *Enable*, IDCM should update the Wi-Fi connection status in heartbeat msg:
  - *Wi-Fi Connection Status == No Connection* or *Connection Successful* or *Initializing*
- If *"New setting value"* is *Disable*, IDCM should update the Wi-Fi connection status in heartbeat msg:
  - *Wi-Fi Connection Status == Hotspot Disabled*

#### 5.2.1.13.2.3 DVR Wi-Fi SSID Setting Process

Once setting value is changed and customer wants to save the setting, APIM shall input below msg:

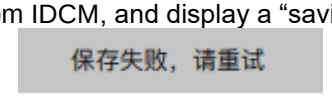
- *DVR Wi-Fi SSID == "New setting value"*

IDCM should update the setting data and response below msg:

- *DVR Wi-Fi SSID Response == "New setting value"*

APIM HMI control:

- If setting value feedback from IDCM is not same as APIM input, APIM should update the setting value according to the feedback value from IDCM, and display a “saving failed” reminder to customer:




- If setting value feedback from IDCM is same as APIM input, APIM should display a “saving ok” reminder.

#### 5.2.1.13.2.4 DVR Wi-Fi Password Setting Process

Once setting value is changed and customer wants to save the setting, APIM shall input below msg:

- *DVR Wi-Fi Password == “New setting value”*

IDCM should update the setting data and response below msg:

- *DVR Wi-Fi Password Response == “New setting value”*

APIM HMI control:

- If setting value feedback from IDCM is not same as APIM input, APIM should update the setting value according to the feedback value from IDCM, and display a “saving failed” reminder to customer:
- If setting value feedback from IDCM is same as APIM input, APIM should display a “saving ok” reminder.

#### 5.2.1.13.2.5 DVR Wi-Fi Connection Reminder

APIM should keep monitoring the DVR Wi-Fi connection status, if:

- *Wi-Fi Connection Status == Connection Successful*

APIM should display a connection reminder to customer:


#### 5.2.1.13.2.6 DVR Wi-Fi Setting Attributes

- DVR Wi-Fi hotspot should be disabled by default whenever IDCM switches to Full Power Mode.
- The SSID and password of DVR Wi-Fi hotspot should be created randomly by IDCM, and saved in APIM & IDCM local memory.

## 5.2.1.14 Technology Function DVR System Setting

### 5.2.1.14.1 Function Interfaces

#### 5.2.1.14.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Request_System_Information | Request Type | **UART msg**: APIM_ReqDVRInformation_Enum [Type:0x14] [Subtype:0x08] **Data ID**: #1 | NA. | NA. |
| | | | | |

**Table 5-27: Input Signal mappings of Function DVR System Setting**

#### 5.2.1.14.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| IDCM_SW_Version | IDCM SW Version | **UART msg**: IDCM_SystemInfoRsp_Int [Type:0x06] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| EMMC_Storage | IDCM eMMC Storage | **UART msg**: IDCM_SystemInfoRsp_Int [Type:0x06] [Subtype:0x01] **Data ID**: #2 | NA. | NA. |
| TF_Storage | IDCM TF Card Storage | **UART msg**: IDCM_SystemInfoRsp_Int [Type:0x06] [Subtype:0x01] **Data ID**: #3 | NA. | NA. |
| TF_Size | TF Card Size | **UART msg**: IDCM_SystemInfoRsp_Int [Type:0x06] [Subtype:0x01] **Data ID**: #4 | NA. | NA. |

| | | | | |
|---|---|---|---|---|
| EMMC_Failure | eMMC Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01]<br>**Data ID**: #9 | NA. | NA. |
| TF_Failure | TF Card Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01]<br>**Data ID**: #10 | NA. | NA. |
| | | | | |

**Table 5-28: Output Signal mappings of Function DVR System Setting**

#### 5.2.1.14.1.3 Parameters

NA.

#### 5.2.1.14.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.14.2 Function Requirements

#### 5.2.1.14.2.1 DVR System Information Update

Pre-condition:
When APIM HMI changes to DVR system information page, APIM should send below command to IDCM to request newest setting value:

- *Request Type == Request System Information*

Command Feedback:
When IDCM receives the command, should response below msg:

- *IDCM SW Version == "Currently SW version"*
- *IDCM eMMC Storage== "Currently eMMC storage status"*
- *IDCM TF Card Storage == "Currently TF Card storage status"*
- *TF Card Size == "Currently TF Card Size"*

APIM HMI control:

- APIM should calculate the memory margin according to IDCM feedback and update the storage information to customer.


#### 5.2.1.14.2.2 DVR System Information Attributes

eMMC and TF card error status display strategy:

- If *eMMC Status == Error*, the local storage area should be set to grey color.
- If *eMMC Status == EOL*, the local storage area should be displayed normally.
- If *TF Card Status == TF Error*, the TF storage area should be set to grey color.
- If *TF Card Status == TF Need Format*, the TF storage area should be set to grey color.
- If *TF Card Status == TF Pull Out*, the TF storage area should be hide.

## 5.2.1.15 Technology Function Vehicle Monitor

### 5.2.1.15.1 Function Interfaces

#### 5.2.1.15.1.1 Inputs

| Logical Signal Name | Technical Signal Name | Mapping Details *(Conditional)* | Subscriber Interface | Connection *(Optional)* |
|---|---|---|---|---|
| Video_Recording_Type | Type of Video | **UART msg**: IDCM_EmergencyVideoRsp_Int [Type:0x18] [Subtype:0x01] Data ID: #2 | NA. | NA. |
| Video_Recording_Qty | Qty of Video | **UART msg**: IDCM_EmergencyVideoRsp_Int [Type:0x03] [Subtype:0x01] Data ID: #1 | NA. | NA. |
| | | | | |

**Table 5-29: Input Signal mappings of Function Vehicle Monitor**

#### 5.2.1.15.1.2 Outputs

| Logical Signal Name | Technical Signal Name | Mapping Details *(Conditional)* | Publisher Interface | Connection *(Optional)* |
|---|---|---|---|---|
| Video_Recording_Type | Type of Video | **UART msg**: IDCM_EmergencyVideoInfo_Int [Type:0x03] [Subtype:0x01] Data ID: #2 | NA. | NA. |
| Video_Recording_Qty | Qty of Video | **UART msg**: IDCM_EmergencyVideoInfo_Int [Type:0x03] [Subtype:0x01] Data ID: #1 | NA. | NA. |
| | | | | |

**Table 5-30: Output Signal mappings of Function Vehicle Monitor**

#### 5.2.1.15.1.3 Parameters

NA.

#### 5.2.1.15.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.15.2 Function Requirements

#### 5.2.1.15.2.1 Video Capture Reminder

When IDCM is in standby power mode and vehicle monitor function is enabled, it should keep monitor the vehicle status via internal G-Sensor, if collision happening, IDCM should wakeup itself to do video recording, after recording complete, IDCM should go back to standby mode.

If vehicle monitor videos are captured during last standby mode, IDCM should send the video number to APIM when enter full power mode next time via IDCM_EmergencyVideoInfo_Int message:

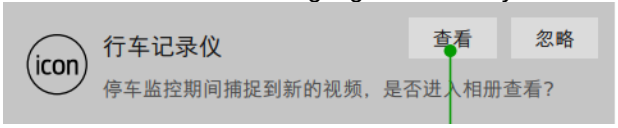
- *Type of Video == Vehicle Monitor Video*
- *Qty of Video == "corresponding video number which were capture during vehicle monitor"*

IDCM should keep sending until receive APIM response via IDCM_EmergencyVideoRsp_Int message:

- *Type of Video == Vehicle Monitor Video*
- *Qty of Video == "corresponding video number which were capture during vehicle monitor"*

APIM HMI control:

- APIM should display a reminder to customer to highlight how many videos were captured during IGN off.




- Customer could enter key data playback list to review the vehicle monitor video, refer to section "Playback List Display".

#### 5.2.1.15.2.2 Vehicle Monitor Attributes

- The video duration should be same as emergency video (default 30s) and configurable via DVR setting.
- All vehicle monitor videos should be save into IDCM key data folder.
- APIM should only give reminder once in one ignition on cycle.

### 5.2.1.16 Technology Function DVR Backdoor Command

#### 5.2.1.16.1 Function Interfaces

##### 5.2.1.16.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** (*Optional)* |
|---|---|---|---|---|
| Engineering_Mode | Engineering Mode Request | **UART** msg: APIM_BackDoorReq_Enum [Type:0x15] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| Clear_EMMC_Data | Clear Data Request | **UART** msg: APIM_BackDoorReq_Enum [Type:0x15] [Subtype:0x01] **Data ID**: #2 | NA. | NA. |
| Veh_Monitor_Timer_Change | Veh_Monitor Timer Request | **UART** msg: APIM_BackDoorReq_Enum [Type:0x15] [Subtype:0x01] **Data ID**: #3 | NA. | NA. |
| Veh_Monitor_Counter_Change | Veh_Monitor Counter Request | **UART** msg: APIM_BackDoorReq_Enum [Type:0x15] [Subtype:0x01] **Data ID**: #4 | NA. | NA. |
| | | | | |

**Table 5-31: Input Signal mappings of Function DVR Backdoor Command**

##### 5.2.1.16.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| Engineering_Mode_Rsp | Engineering Mode Response | **UART msg**: IDCM_BackDoorRsp_Enum [Type:0x09] [Subtype:0x01] **Data ID**: #1 | NA. | NA. |
| Clear_EMMC_Data_Rsp | Clear Data Response | **UART msg**: IDCM_BackDoorRsp_Enum [Type:0x09] [Subtype:0x01] **Data ID**: #2 | NA. | NA. |
| Veh_Monitor_Timer_Change_Rsp | Veh_Monitor Timer Response | **UART msg**: IDCM_BackDoorRsp_Enum [Type:0x09] [Subtype:0x01] **Data ID**: #3 | NA. | NA. |
| Veh_Monitor_Counter_Change_Rsp | Veh_Monitor Counter Response | **UART msg**: IDCM_BackDoorRsp_Enum [Type:0x09] [Subtype:0x01] **Data ID**: #4 | NA. | NA. |
| Engineering_Mode | Engineering Mode Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01] **Data ID**: #4 | NA. | NA. |
| | | | | |

**Table 5-32: Output Signal mappings of Function DVR Backdoor Command**

##### 5.2.1.16.1.3 Parameters

NA.

##### 5.2.1.16.1.4 Interface Requirements

Refer to DVR UART protocol.

#### 5.2.1.16.2 Function Requirements

This section is designed for backdoor commands for DVR, this serves for Ford internal use cases like disable video record or modify eMMC data. All the backdoor commands should be triggered via APIM engineering mode HMI.

##### 5.2.1.16.2.1 Engineering Mode Control

IDCM Engineering Mode definition:

- In this mode, IDCM should not support any video/photo recording, it's mainly used at Ford plant.
- APIM should set IDCM to this mode when:
    a. Vehicle is in Factory mode
    b. Vehicle is in transport mode

APIM shall send below msg to IDCM to enable Engineering Mode:

- *Engineering Mode Request == Enable*

IDCM should enter Engineering Mode and response below msg:

- *Engineering Mode Response == Enable*
- *Engineering Mode Status == Enabled*

#### 5.2.1.16.2.2 Clear IDCM eMMC Data

When anyone wants to clear the data saved in IDCM eMMC, APIM shall send below msg to IDCM:

- *Clear Data Request == Request*

If IDCM starts to clear the data in eMMC, IDCM should disable all video record function, and response below msg:

- *Clear Data Response == Succeed*

APIM will not need to wait a finally result of data clear as this may need a long time.

If IDCM fails to start data clear, it should feedback:

- *Clear Data Response == Failed*

#### 5.2.1.16.2.3 Change Vehicle Monitor Timer & Counter

When Ford engineer wants to change the vehicle monitor duration via APIM M2 config, APIM shall send below msg to IDCM:

- *Veh_Monitor Timer Request == "New vehicle monitor days value"*
- *Veh_Monitor Counter Request == "New vehicle monitor video counter value"*

IDCM should change the value and response below msg:

- *Veh_Monitor Timer Response == "New vehicle monitor days value"*
- *Veh_Monitor Counter Response == "New vehicle monitor video counter value"*

## 5.2.1.17 Technology Function DVR Error Handling

### 5.2.1.17.1 Function Interfaces

#### 5.2.1.17.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| NA. | NA. | NA. | NA. | NA. |
| | | | | |

**Table 5-33: Input Signal mappings of Function DVR Error Handling**

#### 5.2.1.17.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| IDCM_System_Error | Video Record Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01] **Data ID**: #3 | NA. | NA. |
| G-Sensor_Failure | G-Sensor Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01] **Data ID**: #6 | NA. | NA. |
| Image_Sensor_Failure | Image Sensor Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01] **Data ID**: #8 | NA. | NA. |
| DVR_WiFi_Failure | Wi-Fi Connection Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01] **Data ID**: #5 | NA. | NA. |
| EMMC_Failure | eMMC Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01] | NA. | NA. |

| | | | | |
|---|---|---|---|---|
| | | **Data ID**: #9 | | |
| EMMC_EOL | eMMC Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01]<br>**Data ID**: #9 | NA. | NA. |
| Lens_Block | Lens Block Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01]<br>**Data ID**: #7 | NA. | NA. |
| TF_Format | TF Card Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01]<br>**Data ID**: #3 | NA. | NA. |
| TF_Failure | TF Card Status | **UART msg**: IDCM_Heartbeat_Int [Type:0x01] [Subtype:0x01]<br>**Data ID**: #10 | NA. | NA. |
| IDCM_Upgrade_Failure | IDCM Upgrade Status | **UART msg**: IDCM_UpgradeStatus_Int [Type:0x07] [Subtype:0x01]<br>**Data ID**: #1 | NA. | NA. |
| | | | | |

**Table 5-34: Output Signal mappings of Function DVR Error Handling**

#### 5.2.1.17.1.3 Parameters

NA.

#### 5.2.1.17.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.17.2 Function Requirements

#### 5.2.1.17.2.1 DVR Error Definition

Below table lists the DVR system error type:

| Error Type | Detection Source | Error ID | Error Name | HMI Msg ID | HMI Reminder* | APIM Status Icon* |
|---|---|---|---|---|---|---|
| **DVR System** | IDCM | 0x01 | IDCM System Error | Msg #1 | 系统故障，录像功能可能受影响 ，请联系经销商。 | DVR Error |
| **IDCM HW** | | 0x02 | IDCM G-Sensor Failure | Msg #1 | Refer to Msg #1 | DVR Error |
| | | 0x03 | IDCM Mic Failure | / | / | DVR Error |
| | | 0x04 | IDCM Image Sensor Failure | Msg #1 | Refer to Msg #1 | DVR Error |
| | | 0x05 | IDCM Wi-Fi Failure | Msg #2 | 行车记录仪 WIFI 故障，请联系经销商。 | N |
| **EMMC** | | 0x06 | IDCM EMMC Failure | Msg #1 | Refer to Msg #1 | DVR Error |
| | | 0x07 | IDCM EMMC EOL | Msg #4 | 请插入 TF 卡以继续使用行车记录仪功能 | DVR Error |
| **Camera** | | 0x08 | IDCM Lens Block | Msg #3 | 摄像头前方有物体遮挡，请及时清理。 | N |
| **TF Card** | | 0x09 | TF Need Format | Msg #5 | 请格式化 TF 卡以支持行车记录仪功能，点击确认后所有卡内数据将被清除 | N |
| | | 0x0A | TF Card Failure | Msg #6 | 无法识别设备，请更换新的 TF 卡 | N |
| **IDCM SW Update** | | 0x0B | IDCM Update Failed | Msg #7 | 行车记录仪升级失败 | N |
| **Video Display** | APIM | 0x0C | DVR LVDS Failure | Msg #8 | 视频画面显示失败，请联系经销商。 | DVR Error |
| **UART Comm** | | 0x0D | DVR UART Failure | Msg #1 | Refer to Msg #1 | DVR Error |

Table 5-35: Output Signal mappings of Function DVR Error Handling

*HMI reminder: the Chinese reminder display strategy should follow the specific program IVI HMI UE design.
*APIM Status Icon: Refer to “DVR Status Icon Control” section for the definition of DVR Error.

#### 5.2.1.17.2.2 Error #0x01 IDCM System Error

When any IDCM critical internal error happening, like SoC failure / OS error... IDCM should send below msg to APIM:

- *Video Record Status == System Failure*

If this status keeps same more than 3 continuous UART heartbeat message:

- APIM should display Msg #1.
- “REC” icon on live view page should be disabled.
- APIM should set DVR DTC.

#### 5.2.1.17.2.3 Error #0x02 IDCM G-Sensor Failure

When IDCM G-Sensor error happening, IDCM should send below msg to APIM:

- *G-Sensor Status == Error*

If this status keeps same more than 3 continuous UART heartbeat message:

- APIM should display Msg #1.
- APIM should set DVR DTC.

#### 5.2.1.17.2.4 Error #0x03 IDCM Mic Failure

Reserved section.

#### 5.2.1.17.2.5 Error #0x04 IDCM Image Sensor Failure

When IDCM image sensor error happening, IDCM should send below msg to APIM:

- *Image Sensor Status == Error*

If this status keeps same more than 3 continuous UART heartbeat message:

- APIM should display Msg #1.
- APIM should set DVR DTC.

#### 5.2.1.17.2.6 Error #0x05 IDCM Wi-Fi Failure

When IDCM Wi-Fi error happening, IDCM should send below msg to APIM:

- *Wi-Fi Connection Status == Error*

If this status keeps same more than 3 continuous UART heartbeat message:

- APIM should display Msg #2.
- The Wi-Fi icon on live view page should be set to error status.
- APIM should set DVR DTC.

#### 5.2.1.17.2.7 Error #0x06 IDCM EMMC Failure

When IDCM eMMC error happening, IDCM should send below msg to APIM:

- *eMMC Status == Error*

If this status keeps same more than 3 continuous UART heartbeat message:

- APIM should display Msg #1.
- APIM should set DVR DTC.
- APIM should disable all data copy command button
- APIM should disable manual photo and manual video button

#### 5.2.1.17.2.8 Error #0x07 IDCM EMMC EOL

When IDCM eMMC EOL(End of Life) happening, IDCM should send below msg to APIM:

- *eMMC Status == EOL*

If this status keeps same more than 3 continuous UART heartbeat message:

- APIM should set DVR DTC.

Especially, if *TF Card Status == TF Error* at the same time:

- APIM should display Msg #4.

#### 5.2.1.17.2.9 Error #0x08 IDCM Lens Block

Lens block detection definition:
- Scenario: More than 80% of the lens is blocked.
- The recall should be more than 98%.
- The false detection should be less than 3%.

When IDCM detects lens block, should send below msg to APIM:
- *Lens Block Status == Blocked*

If this status keeps same more than 3 continuous UART heartbeat message:
- APIM should display Msg #3.

#### 5.2.1.17.2.10 Error #0x09 TF Need Format

When need to format TF card, IDCM should send below msg to APIM:
- *TF Card Status == TF Need Format*

If this status keeps same more than 3 continuous UART heartbeat message:
- APIM should display Msg #5.

Refer to “TF Card Format” section for the definition of TF card format process.

#### 5.2.1.17.2.11 Error #0x0A TF Card Failure

When IDCM detects a broken TF card, IDCM should send below msg to APIM:
- *TF Card Status == TF Error*

If this status keeps same more than 3 continuous UART heartbeat message:
- APIM should display Msg #6.

#### 5.2.1.17.2.12 Error #0x0B IDCM Update Failed

When IDCM SW update is failed, IDCM should send below msg to APIM:
- *IDCM Upgrade Status == Update Failed*

If this status keeps same more than 3 continuous UART heartbeat message:
- APIM should display Msg #7.

#### 5.2.1.17.2.13 Error #0x0C DVR LVDS Failure

When APIM detects LVDS failure:
- APIM should display Msg #8.
- APIM should set DVR DTC.

#### 5.2.1.17.2.14 Error #0x0D DVR UART Failure

When APIM detects UART heartbeat msg timeout:
- APIM should display Msg #1.
- APIM should set DVR DTC.

#### 5.2.1.17.2.15 APIM Error Message Display Priority

- Error #0x01 to #0x0D may happen at the same time.
- Msg #1 may map to different Error type.
- Priority of all Msg display if happening at the same time: Msg #1 > Msg #4 > Msg #8 > Msg #3 > Msg #2 > Msg #6 > Msg #5 > Msg #7, and they should popup one by one according to this priority.

#### 5.2.1.17.2.16 DVR DTC

When APIM needs to set DVR DTC, below DTC should be enabled:

| | |
|---|---|
| **DTC Number** | 0x915E04(B115E-04) |
| **Root Description** | This is the DTC for Drive Video Record feature (aka dash camera), which includes IDCM module error / LVDS error / UART communication error. |
| **Failure Type Byte Description** | System Internal Failure |
| **ECU Connector Pin** | J15-4 |
| **Continuous Monitoring Supported** | yes |
| **Monitoring Cycle** | Ignition in RUN |

| | |
|---|---|
| **Test Run Criteria** | Test is performed if 1 and 2 and 3 and 4 are true:<br>1. Key in Run.<br>2. Voltage is between 10 and 16 volts.<br>3. DE03 Byte6 Bit6（DVR） == 0x01.<br>4. IDCM (DVR camera) is Assembled and LVDS connected. |
| **Test Period** | Once every 1000ms |
| **Fault Detection Counter Increment Value** | 127 |
| **Fault Detection Counter Decrement Value** | 255 |
| **Pass / Fail Criteria** | Fail: Set DTC when APIM receives UART error msg from IDCM or APIM detects LVDS/UART failure. Read DID 0xFE80(History DVR System Error Information) for detail failure type.<br>Pass: Set when no UART error msg is received or no LVDS/UART failure is detected. |
| **Action Taken By ECU in Response To Fault** | Give HMI error popup to customer, log DTC. |
| **Fault Symptom Recognized by Vehicle Occupants** | Customer can't use some of the DVR functions. |
| **Extended Data Record used for Aging Counter** | 0x02 |
| **Counter Value when Aged** | 80 |
| **Special Considerations** | DE03 Byte6 Bit6（DVR） == 0x01 |
| **Extended Data Records Supported** | 0x02,0x10 |
| **Reported via Control Routines** | 0x0202 |

### 5.2.1.17.2.17 DVR DID

There are two DVR DIDs:

- History DVR System Error Information DID, which will snapshot the error status when DVR DTC is set:

| | |
|---|---|
| **Core DataIdentifier Information** | |
| **DataIdentifier Value** | 0xFE80 |
| **DataIdentifier Name** | History DVR System Error Information |
| **DataIdentifier Size (bytes)** | 2 |
| **DataIdentifier Type** | unsigned |
| **DataIdentifier Comments** | This DID identifies the detail DVR system error information when DTC B115E-04 is reported last time. |
| **Read Information (Service ReadDataByIdentifier - 0x22** | |
| **Readable in Sessions** | 0x01 0x03 0x60 |
| **DataIdentifier Format Information** | |

| Byte | Bit | Parameter Info | 0 Meaning | 1 Meaning |
|---|---|---|---|---|
| 1 | 7 | IDCM System Error | FALSE | TRUE |
| 1 | 6 | IDCM G-Sensor Failure | FALSE | TRUE |
| 1 | 5 | IDCM Mic Failure - Reserved | FALSE | TRUE |
| 1 | 4 | IDCM Image Sensor Failure | FALSE | TRUE |
| 1 | 3 | IDCM Wi-Fi Failure | FALSE | TRUE |
| 1 | 2 | IDCM EMMC Failure | FALSE | TRUE |
| 1 | 1 | IDCM EMMC EOL | FALSE | TRUE |

| | | | | |
|---|---|---|---|---|
| 1 | 0 | DVR LVDS Failure | FALSE | TRUE |
| 2 | 7 | DVR UART Failure | FALSE | TRUE |
| 2 | 6 | Reserved | FALSE | TRUE |
| 2 | 5 | Reserved | FALSE | TRUE |
| 2 | 4 | Reserved | FALSE | TRUE |
| 2 | 3 | Reserved | FALSE | TRUE |
| 2 | 2 | Reserved | FALSE | TRUE |
| 2 | 1 | Reserved | FALSE | TRUE |
| 2 | 0 | Reserved | FALSE | TRUE |

- Realtime DVR System Error Information DID, which will record the error status occurring now:

| | |
|---|---|
| **Core DataIdentifier Information** | |
| **DataIdentifier Value** | 0xFE81 |
| **DataIdentifier Name** | Realtime DVR System Error Information |
| **DataIdentifier Size (bytes)** | 2 |
| **DataIdentifier Type** | unsigned |
| **DataIdentifier Comments** | This DID identifies the detail DVR system error information which are occuring now. |
| **Read Information (Service ReadDataByIdentifier - 0x22** | |
| **Readable in Sessions** | 0x01 0x03 0x60 |
| **DataIdentifier Format Information** | |

| Byte | Bit | Parameter Info | 0 Meaning | 1 Meaning |
|---|---|---|---|---|
| 1 | 7 | IDCM System Error | FALSE | TRUE |
| 1 | 6 | IDCM G-Sensor Failure | FALSE | TRUE |
| 1 | 5 | IDCM Mic Failure - Reserved | FALSE | TRUE |
| 1 | 4 | IDCM Image Sensor Failure | FALSE | TRUE |
| 1 | 3 | IDCM Wi-Fi Failure | FALSE | TRUE |
| 1 | 2 | IDCM EMMC Failure | FALSE | TRUE |
| 1 | 1 | IDCM EMMC EOL | FALSE | TRUE |
| 1 | 0 | DVR LVDS Failure | FALSE | TRUE |
| 2 | 7 | DVR UART Failure | FALSE | TRUE |
| 2 | 6 | Reserved | FALSE | TRUE |
| 2 | 5 | Reserved | FALSE | TRUE |
| 2 | 4 | Reserved | FALSE | TRUE |
| 2 | 3 | Reserved | FALSE | TRUE |
| 2 | 2 | Reserved | FALSE | TRUE |
| 2 | 1 | Reserved | FALSE | TRUE |
| 2 | 0 | Reserved | FALSE | TRUE |

### 5.2.1.17.2.18 Other DVR Error

- If APIM failed to launch DVR APP, should give reminder to customer:

## 5.2.1.18 Technology Function APIM HMI Control

### 5.2.1.18.1 Function Interfaces

#### 5.2.1.18.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| NA. | NA. | NA. | NA. | NA. |
| | | | | |

**Table 5-36: Input Signal mappings of Function DVR Status Icon Control**

#### 5.2.1.18.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| NA. | NA. | NA. | NA. | NA. |
| | | | | |

**Table 5-37: Output Signal mappings of Function DVR Status Icon Control**

#### 5.2.1.18.1.3 Parameters

NA.

#### 5.2.1.18.1.4 Interface Requirements

Refer to DVR UART protocol.

### 5.2.1.18.2 Function Requirements

#### 5.2.1.18.2.1 DVR Status Icon Control

There are four icon types:

| **ID** | **Type** | **Icon (Example Image)** |
|---|---|---|
| A | No recording |  |
| B | Recording |  |
| C | Copying or Deleting |  |
| D | DVR Error |  |

**Table 5-38: APIM DVR Status Icon Types**

- No Recording type:
  - Customer disables normal video recording function, refer to “DVR Parameter Setting” section.
  - Neither emergency video record nor manual video record happening, refer to “Emergency Video Record” and “Manual Video Record” sections.
- Recording type:
  - Customer enables normal video recording function, refer to “DVR Parameter Setting” section.
  - Either emergency video record or manual video record happening, refer to “Emergency Video Record” and “Manual Video Record” sections.
- Copying or Deleting type:
  - Either data copy or data deletion happening, refer to “Data Copy to TF” and “Data Deletion from TF” sections
- DVR Error type:
  - DVR error happening, refer to “DVR Error Handling” section for details.

#### 5.2.1.18.2.2 DVR Status Icon Display Priority

The four icon types should follow below priority to display if preconditions happen at the same time:

- D > C > B = A

#### 5.2.1.18.2.3 Display Minimize Control

When DVR display is minimized to APIM background, APIM should update the status to IDCM in heartbeat message:

- *DVR Display Position == Hide_Minimize*

DVR app should keep at previous display status, especially if minimization happens when video playback, IDCM should pause video play.

When DVR display is recovered to APIM foreground, APIM should update the status to IDCM in heartbeat message:

- *DVR Display Position == Driver_Side or Passenger_Side*

DVR app should recover to previous display status, especially if minimization happens when video playback, IDCM should keep video pause when recover.

If DVR stops at any playback list page or video pause status more than 3 minutes when running in background, APIM should request IDCM go back to live view page.

### 5.2.1.19 Technology Function DVR Voice Control

#### 5.2.1.19.1 Function Interfaces

##### 5.2.1.19.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| NA. | NA. | NA. | NA. | NA. |
| | | | | |

**Table 5-39: Input Signal mappings of Function DVR Voice Control**

##### 5.2.1.19.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| NA. | NA. | NA. | NA. | NA. |
| | | | | |

**Table 5-40: Output Signal mappings of Function DVR Voice Control**

##### 5.2.1.19.1.3 Parameters

NA.

##### 5.2.1.19.1.4 Interface Requirements

Refer to DVR UART protocol.
APIM voice control spec.

#### 5.2.1.19.2 Function Requirements

##### 5.2.1.19.2.1 DVR Voice Control Command List

Below table lists the DVR voice control command list:

| **序号** | **语音指令** | **前置条件** | **HMI 前端动作** | **tts 回复** |
|---|---|---|---|---|
| 1 | 打开行车记录仪 | 打开成功 | 进入 DVR APP 主界面 | 已开启行车记录仪应用 |
| | | 打开失败 | 全局弹出 toast : "行车记录仪开启失败，请稍后重试" | 行车记录仪打开失败 |
| 2 | 关闭行车记录仪 | 退出成功 | 退出 DVR APP | 已关闭行车记录仪应用 |
| | | 关闭失败 | 无动作 | 行车记录仪关闭失败 |

| | | | | |
|---|---|---|---|---|
| 3 | 我要拍照 | 拍照成功 | 1. 播放“咔嚓”声<br>2.全局 Toast 提示“拍照成功” | 拍照成功 |
| | | 拍照失败 | 1.全局 Toast 提示“拍照失败” | 拍照失败 |
| | | 紧急或手动录像过程中 | 无动作 | 正在录像中，请稍后再试 |
| 4 | 我要录像 | 当前处于 DVP APP 主界面 | 1. 需要显示相应的手动录像的进度画面<br>2. 45 秒规定时限的录像自然完成后，TTS 播报“录像成功”或者“录像失败"，同时全局 Toast 提示“录像成功”或者“录像失败" | 录像已开始 |
| | | 紧急或手动录像过程中 | 无动作 | 正在录像中，请稍后再试 |
| | | 当前处于非 DVP APP 主界面 | 1、不需要进入 DVR 界面，但是需要开始手动录像<br>2、45 秒规定时限的录像自然完成后，TTS 播报“录像成功”或者“录像失败"，同时全局 Toast 提示“录像成功”或者“录像失败" | 录像已开始 |
| 5 | 停止录像 | 当前处于 DVP APP 主界面 | 1. 需要显示相应的手动录像的完成画面。<br>2. 录像停止后，全局 Toast 提示“录像成功”或者“录像失败" | “录像成功”或者“录像失败” |
| | | 当前处于非 DVP APP 主界面 | 1. 不需要进入 DVR 界面，但是需要停止录像<br>2. 录像停止后，全局 Toast 提示“录像成功”或者“录像失败" | “录像成功”或者“录像失败” |
| | | 当前还未开启手动录像 | 无动作 | 您还未开始录像 |

Refer to APIM voice control spec for more details design.

## 5.2.1.20 Technology Function Interactive with AR

### 5.2.1.20.1 Function Interfaces

#### 5.2.1.20.1.1 Inputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| NA. | NA. | NA. | NA. | NA. |
| | | | | |

**Table 5-41: Input Signal mappings of Function Interactive with AR**

#### 5.2.1.20.1.2 Outputs

| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection** *(Optional)* |
|---|---|---|---|---|
| NA. | NA. | NA. | NA. | NA. |
| | | | | |

**Table 5-42: Output Signal mappings of Function Interactive with AR**

#### 5.2.1.20.1.3 Parameters

NA.

#### 5.2.1.20.1.4 Interface Requirements

Refer to DVR UART protocol.

APIM AR Feature spec

#### 5.2.1.20.2 Function Requirements

##### 5.2.1.20.2.1 Confliction between DVR and AR

In below scenarios, AR feature should be disabled due to video resource conflict:

- DVR video playback list page is displayed: refer to “Playback List Display” section for details.
- DVR video playback is ongoing: refer to “Data Playback Control” section for details.

AR feature should give reminder to customer, refer to AR feature spec for details.

##### 5.2.1.20.2.2 Cooperation between DVR and AR

When below DVR errors defined in section “DVR Error Handling” is received by APIM:

- Error #0x01 IDCM System Error
- Error #0x04 IDCM Image Sensor Failure
- Error #0x08 IDCM Lens Block
- Error #0x0C DVR LVDS Failure

AR feature should give reminder to customer, refer to AR feature spec for details.

#### 5.2.1.21 Technology Function DVR/IDCM SW Upgrade

TBD

### 5.2.2 APP – DVROffboardClient

#### 5.2.2.1 Technology Function DVR Wi-Fi Connection

TBD

#### 5.2.2.2 Technology Function Video Liveview

TBD

#### 5.2.2.3 Technology Function Data Playback

TBD

#### 5.2.2.4 Technology Function Data Copy to Smartphone

TBD

## 5.3 Requirements on Connections

### 5.3.1 Networks

#### 5.3.1.1 “CAN Bus xxx”

***NA.***

##### 5.3.1.1.1 Protocol Requirements

***NA.***

##### 5.3.1.1.2 Electrical Requirements

***NA.***

#### 5.3.1.2 “LIN Bus xxx”

***NA.***

#### 5.3.1.2.1 Protocol Requirements

##### 5.3.1.2.1.1 Schedule Table

*NA.*

#### 5.3.1.2.2 Electrical Requirements

*NA.*

### 5.3.1.3 “Ethernet xxx”

*NA.*

### 5.3.2 HW I/Os

POC interface over FPD-Link will support DVR(IDCM) power management, the detail pin definition should follow APIM HW design.

### 5.3.2.1 “HW I/O xxx”

## 5.4 Requirements on Development Process

# 6 OPEN CONCERNS

| ID | Concern Description | e-Tracker Reference | Status | Solution |
|---|---|---|---|---|
| 1 | How to support IDCM diagnostic? What event should be record via APIM diagnostic? | | Closed | Via UART heartbeat message |
| 2 | How to support IDCM SWDL via APIM? Will need to support OTA via APIM? | | Open | TBD |
| 3 | How to support DVR data analytics? What event should be record? | | Open | TBD |
| 4 | | | | |

**Table 6-1: Open Concerns**

# 7 REVISION HISTORY

| Revision | Date | Description | Responsible |
|---|---|---|---|
| 1.0 | Oct.09, 2022 | Initial version release | YNIU6 |
| 1.1 | Dec.26, 2022 | • Section 5.2.1 update according to <F006930_Drive Video Record Feature UART Protocol v1.2> and <【CX771&CX821】UE_行车记录仪_v4.0.0_20221216> | YNIU6 |
| 1.2 | Jan.09, 2022 | • Section 5.2.1.2.2.1 update timer synchronization from 0 second<br>• Section 5.2.1.9.2.1 update data copy process<br>• Section 5.2.1.10.2.1 update data deletion process<br>• Section 5.2.1.12.2.1 wording typo<br>• Section 5.2.1.7.2.1 Update TF card detection description.<br>• Add section 5.2.1.17 DVR Error Handling<br>• Add section 5.2.1.18 APIM HMI Control<br>• Update section 5.2.1.5.2.2 seatbelt lamp status<br>• Add section 5.2.1.19 DVR Voice Control<br>• Add section 5.2.1.20 Interactive with AR<br>• Add section 5.2.1.1.2.3 Normal Video Record Enable Reminder<br>• Add page display timeout strategy in section 5.2.1.8.2.11 and section 5.2.1.11.2.6<br>• Add special case in section 5.2.1.11.2.2 Start or Pause Video Play<br>• Update section 5.2.1.9 Data Copy to TF<br>• Update section 5.2.1.8.2.3 Enter TF Data Playback List Page<br>• Update section 5.2.1.10.2.2 Deletion End<br>• Update section 5.2.1.11 Data Playback Control<br>• Update section 5.2.1.14 DVR System Setting<br>• Update section 5.2.1.15 Vehicle Monitor<br>• Update section 5.2.1.2.2.2 Emergency Video Record End<br>• Update section 5.2.1.16.2.2 Clear IDCM eMMC Data<br>• | YNIU6 |

# 8 APPENDIX

## 8.1 Data Dictionary

### 8.1.1 Logical Signals

*NA.*

### 8.1.2 Logical Parameters

*NA.*

### 8.1.3 Technical Signals

*NA.*

#### 8.1.3.1 GSDB Signals

*NA.*

#### 8.1.3.2 HW I/Os

*NA.*

#### 8.1.3.3 Diagnostic Interfaces

*Refer to section 5.2.1.17 DVR Error Handling.*

##### 8.1.3.3.1 DTCs

*Refer to section 5.2.1.17 DVR Error Handling.*

##### 8.1.3.3.2 DIDs

*Refer to section 5.2.1.17 DVR Error Handling.*

### 8.1.4 Technical Parameters

*NA.*

### 8.1.5 Mappings

*NA.*

### 8.1.6 Technical Interfaces

Defines in DVR UART protocol spec.

#### 8.1.6.1 AIS Interfaces

*NA.*

##### 8.1.6.1.1 Publisher Interfaces

##### 8.1.6.1.2 Subscriber Interfaces

#### 8.1.6.2 AUTOSAR Ports

*NA.*

### 8.1.7 Messages/APIs

#### 8.1.7.1 CAN Bus “<Bus Name>”

*NA.*

#### 8.1.7.2 LIN Bus “<Bus Name>”

#### 8.1.7.3 AUTOSAR Interfaces

*NA.*

#### 8.1.7.4 SOA Service Contracts

*NA.*

### 8.1.8 Encoding Types

*NA.*