Research & Vehicle Technology
"Infotainment Systems Product Development"

Feature – Video Recording and Playback

Infotainment Subsystem Part Specific Specification (SPSS)

Version 1.1
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Revision History

Date	Version	Notes	
October 5, 2021	**1.0**	**Initial Release**	
November 2, 2021	**1.1**		
		MD-REQ-406933/B-Record_Request	semani4:error Detail Updated
		MD-REQ-411268/B-PauseRecord_Request	semani4:error Detail Updated
		MD-REQ-411284/B-ResumeRecord_Request	semani4:error Detail Updated
		MD-REQ-411285/B-StopRecord_Request	semani4:error Detail Updated
		MD-REQ-410717/B-ProtectRecordingProperty_Request	semani4:error Detail Updated
		MD-REQ-411553/B-PublishRecordingHeartBeat	semani4:revise Enumeration
		MD-REQ-411558/B-PublishRecordingStatusChange	semani4:revise api
		MD-REQ-410619/B-ListStorageDeviceInfo	Semani4:Enumeration updated for Test result,updated label
		MD-REQ-438986/B-FormatStorageDevice	semani4:no update
		MD-REQ-438987/B-TestStorageDevice	semani4:no update
		MD-REQ-410491/B-Delete_Specified	semani4:update in error detail
		MD-REQ-447577/B-Delete_Unprotected	semani4:no update
		MD-REQ-447578/B-ListRecordingsSessionSegments_Request	semani4:no update
		MD-REQ-410487/B-Playback_Request	semani4:no update
		MD-REQ-413548/B-PausePlayback_Request	semani4:no update
		MD-REQ-413549/B-StopPlayback_Request	semani4:no update
		MD-REQ-410618/B-ManagePlayback_Request	Semani4 :updated the API for SKIP delta remove Skip Direction
		MD-REQ-413550/B-PublishPlaybackStatus	semani4:no update
		MD-REQ-453078/B-ResumePlayback_Request	semani4:updated recording id to O
		MD-REQ-453178/B-ListRecordingsInfo_Request	semani4:Updated Description
		STR-850395/B-Activity Diagrams	semani4:created actvity and sequence diagram
		VRP-ACT-REQ-407066/B-Record	semani4:created actvity and sequence diagram
		VRP-ACT-REQ-462718/A-Playback	semani4:created actvity and sequence diagram
		STR-850397/B-Sequence Diagrams	Semani4:Addding Diagrams
		VRP-SD-REQ-461617/A-Record	semani4:created actvity and sequence diagram
		VRP-SD-REQ-462741/A-Playback	semani4:created actvity and sequence diagram
		VRP-FUN-REQ-407079/B-Management of Recordings	semani4: removed whitebox
		VRP-FUN-REQ-406917/B-Memory and Storage	semani4:removed white box view

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1   Overview

The Video Recording and Playback (VRP) allows to record the vehicle data (video and metadata) from the vehicle and store the recorded vehicle data on Storage Devices

The recorded vehicle data are available for the user as a playback in Vehicle or on Personal Devices.

The VRP receives requests to record/playback from the vehicle features. (Enhanced Dash Camera, Integrated Sentinel).

2 Architectural Design

2.1 VRP-CLD-REQ-406930/A-Video Recording and Playback Interface Client

The Video Recording and Play back Interface Client (VRPInterfaceClient) is responsible for the tasks listed below:

- Receiving VRP data and status from Server
- Displaying, Requesting, transmitting data and status for storage and Playback on user interface
- Receives user input and sends Request to the server

2.2 VRP-CLD-REQ-406931/A-Video Recording and Playback Server

The Video Recording and Play back Server (VRPInterfaceServer) is responsible for the tasks listed below:

- Monitoring and handling active VRP function and data.
- Receive Request from the Client
- Transmitting data and status to VRPInterfaceClient

2.3 Logical Signal Mapping

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

Logical Name	CAN Signal Name
IgnitionStatus_St	Ignition_Status

2.4 VRPInterfaceServer Interface

2.4.1 VRP-IIR-REQ-406932/B-VRPInterfaceServer

The VRPInterfaceServer shall communicate with the following APIs for the feature to work as needed.

2.4.1.1 MD-REQ-406933/B-Record_Request

The VRPInterfaceServer shall receive the start the video recording request via Record_Request.

Method Type	On-Change
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)
Retained	N/A or Yes, No

R/O	Name	Type	Literals	Value	Description
Request (_Rq)					
R	FeatureName	String		0-15 Characters	Feature name of requesting feature Size limit=15 charecters
R	DeviceSelectionStrategy	Enum			

			Specified_Only		0x0	Record only to Feature specified USB StorageDeviceID If StorageDeviceID not available/not connected then there will be an error and recording will not begin
			INCLUDE_PRETESTED		0x1	Record to any USB storage device that has been tested and verified as suitable for recording in the vehicle
			INCLUDE_ANY		0x2	Attempt to record to any USB Storage device currently connected, whether tested and verified or not. Only if device proves to be unsuitable, will there be an error.
O	StorageDevice_ID	String			0-36 Charecters	Storage device id to which data/video will be recorded to May be a UUID
O	RecordingMode	Enum				Mode to use for files creation and out of memory conditions. Continuous or loop.
			Continuous		0X0	Recording is performed continuously without any sort of loop back to overwrite earlier segment of the recording.
			Loop		0X1	Recording is performed in a loop mode. File segments are created of the

					specified segment duration, until the recording duration is reached. Then the system will "loop back" and overwrite the files for the first segment, then the second segment. This creates a recording of a set duration, consisting only of events that far back in time.
O	RecordingDurationTime	Int32	-	0-n seconds	Amount of time to record the camera view(s).
O	SegmentDuration	Int32	-	0-n seconds	Duration of each video segment. Note: Used if desired to make the video into smaller subsegments. (Required for loop mode) (not used for Sentinel)
O	OutofSpaceStararegy	Enum			Determines what VRP shall do when running out of space
			Terminate recording.	0X0	Stop recording and send out of space error
			Delete from older session only	0X1	Delete the unprotected oldest recording session in the memory for the requesting feature.
			Delete oldest from any session	0X2	Delete the oldest unprotected recording file in this recording session for the requesting feature.
	storage_limit_percent	Uint32			Percentage of the Total Storage Space that the feature should be limited to, for instance limit the feature to use only 80% of the total storage space.

o	IP Address	String			Optional IP address where the view will stream
o	Port Address	Unit32			Optional Port where the view will stream.
R	CameraViewName	String			Name of the view to be recorded as found in the camera manager published list of camera views
O	FrameRate	ENUM			This enumeration provides the list of supported Frame rates for camera configurations. The desired framerate should be specified when starting a recording, else the current camera setting will be used.
			FPS_30	0x0	
			FPS_15	0x1	
			FPS_10	0x2	
			FPS_60	0x3	
O	Resolution	ENUM		0-n mpix	Resolution of the video stream to record.
			RES_1280_BY_800	0x0	This is a high-resolution setting
			RES_640_BY_480	0x1	This is a medium resolution setting
			RES_480_BY_360	0x2	This is a low-resolution setting
			RES_1920_BY_1080	0x3	
			RES_1280_BY_720	0x4	
R	Bitrate	ENUM			This enumeration provides the list of supported Bitrates for camera configurations. The

								desired Bitrate should be provided when starting a recording, else the camera's current setting will be used.
			KBPS_10000					
			KBPS_5000					
			KBPS_1000					
O	RecordingName		String				UTF-8 encoded or 7-bit ASCII text	Optional name for the recording Session
R	MetadataToRecord		Enum					Repeating values
		Date	String				0X0	Date in mm-dd-yyyy format.
		Time	Int				0X1	Time of day in 24 hour format, like 21:15:12
		Vehicle Speed	Int				0X2	Vehicle Speed as displayed in the Instrument Panel, either in Miles per hour (mph) or kilometers per hour (km/h)
		Vehicle Location	ENUM				0X3	GNSS information on the Vehicle's location, including the information below
				Latitude	0X0			In degree format, DDD° MM' SS.S" [N / S]. Sample - 32° 18' 23.1" N
				Longitude	0X1			In degree format, DDD° MM' SS.S" [W / E]. Sample - 122° 36' 52.5" W
				Altitude	0X2			Feet or meters above Mean Sea Level (MSL)
				Heading	0X3			Compass direction
		VIN	String				0X4	The Vehicle Identification Number of the vehicle where the recording was made.
		Accelerator Pedal Position	String				0X5	A percentage interpretation of the Accelerator pedal position: 0% = released pedal.

		Braking Torque	String			0X6	Indication of braking force in newton*meters (nm). Includes braking applied by: - Driver request (brake pedal) - Adaptive Cruise Control system - Collision Mitigation by Braking (CMbB) system
							100% = maximum pedal.
		Braking Indication	Enum			0X7	Indicates if the driver is braking by pushing on the brake pedal refer BpedMove_D_Actl
				Driver	0X0		
				Autonomous	0X1		
				No Braking	0X2		
				Unknown	0X3		
		Perimeter Alarm Triggers	String			0X8	The current trigger for a perimeter alarm event. Refer to the signal PrmtrAlrmEvnt_D_Stat
R	EncryptVideo		Boolean				Should the recording be encrypted or not.
				No	0X0		
				Yes	0X1		
R	EncryptMetadata		Boolean				Should the metadata be encrypted or not.
				No	0X0		
				Yes	0X1		
R	PowerSeverity		Int32				Power severity level of the feature used to vote to keep the Video source to be powered. (not used by sentinel)
Record_Response (_Rsp)							
R	RequestStatus		Enumeration				
				RequestStatus_Success	0x0		SUCCESS
				RequestStatus_Fail	0x1		FAIL

R	ErrorDetail	Enumeration			
			None	0x0	No Error
			Command_not_Recognised	0x1	Unknown command in SOA request
			Unknown_Error	0x2	Failed due to an unexpected error
			Invalid_Request	0x3	Invalid request structure or parameters
			Not_Supported	0x4	Request cannot be supported by the particular camera view requested, for instance specifying a resolution that is not supported by the camera for that view.
			DEVICE_ID_NOT_Specified	0x5	Start Recording request was received with "Devices To Consider" set to specified only, but no device Id was provided
			Storage_Device_Not_Found	0x6	Requested Storage Device cannot be found.
			INSUFFICIENT_SPACE	0x7	Specified storage device does not have sufficient space for the recording or to begin a recording session.
			NO_PRETESTED_DEVICE_WITH_SPACE	0X8	This error occurs when the consumer requested a recording using the "Include_Pretested" option but no pre-tested devices were found, or none had sufficient space.
			SPECIFIED_DEVICE_IS_INVALID_FORMAT	0X9	This error is for invalid format for the USB device

				0xA	This error occurs when the consumer requested a recording using the "Include_Any" option but no suitable devices were found, or none had sufficient space.
			NO_SUITABLE_DEVICE_WITH_SPACE	0xA	
			CAMERA_VIEW_NOT_AVAILABLE	0xB	Requested Camera View is not available for streaming.
			CAMERA_VIEW_NOT_RESPONDING	0xC	Camera Controller is not responding.
			QUEUE_FULL	0XD	Request queue is full, try request again later.
			Encryption_Failure	0XE	Encryption Failure
R	RecordingID	String	-		The Id for the recording session
O	StorageDevice_ID	String	-	0-36 Charecters	Storage device id to which data/video will be recorded to

2.4.1.2   MD-REQ-411268/B-PauseRecord_Request

The VRPInterfaceServer shall receive a request to Pause the video recording via PauseRecord_Request.

Method Type	On-Change
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)
Retained	N/A or Yes, No

R/O	Name	Type	Literals	Value	Description
Request (_Rq)					
R	FeatureName	String		0-15 ASCII	Feature name of requesting feature Size limit=15 charecters
R	RecordingID	String	-		The Id for the recording session
Response (_Rsp)					
O	PauseRecord_Response	Int32	-		Pause recording of the Particular Session
	RequestStatus	Enumeration			
			RequestStatus_Success	0x0	SUCCESS

				RequestStatus_Fail	0x1	FAIL
R	ErrorDetail	Enumeration				
				None	0x0	No Error
				Command_not_Recognised	0x1	Unknown command in SOA request
				Unknown_Error	0x2	Failed due to an unexpected error
				Invalid_Request	0x3	Invalid request structure or parameters
				Not_Supported	0x4	Request cannot be supported by the particular camera view requested, for instance specifying a resolution that is not supported by the camera for that view.
				DEVICE_ID_NOT_Specified	0x5	Start Recording request was received with "Devices To Consider" set to specified only, but no device Id was provided
				Storage_Device_Not_Found	0x6	Requested Storage Device cannot be found.
				INSUFFICIENT_SPACE	0x7	Specified storage device does not have sufficient space for the recording or to begin a recording session.
				NO_PRETESTED_DEVICE_WITH_SPACE	0X8	This error occurs when the consumer requested a recording using the "Include_Pretested" option but no pre-tested devices were found, or none had sufficient space.
				SPECIFIED_DEVICE_IS_INVALID_FORMAT	0X9	This error is for invalid format for the USB device

				0xA	This error occurs when the consumer requested a recording using the "Include_Any" option but no suitable devices were found, or none had sufficient space.
			NO_SUITABLE_DEVICE_WITH_SPACE	0xA	This error occurs when the consumer requested a recording using the "Include_Any" option but no suitable devices were found, or none had sufficient space.
			CAMERA_VIEW_NOT_AVAILABLE	0xB	Requested Camera View is not available for streaming.
			CAMERA_VIEW_NOT_RESPONDING	0xC	Camera Controller is not responding.
			QUEUE_FULL	0XD	Request queue is full, try request again later.
			Encryption_Failure	0XE	Encryption Failure

2.4.1.3 MD-REQ-411284/B-ResumeRecord_Request

The VRPInterfaceServer shall receive a request to Resume the video recording via ResumeRecord_Request.

Method Type	On-Change				
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)				
Retained	N/A or Yes, No				

R/O	Name	Type	Literals	Value	Description
Request (_Rq)					
R	FeatureName	String		0-15 ASCII	Feature name of requesting feature Size limit=15 charecters
R	RecordingID	String	-		The Id for the recording session
Response (_Rsp)					
R	ResumeRecord_Response	Int32	-		Resume recording of the Particular Session
	RequestStatus	Enumeration			
			RequestStatus_Success	0x0	SUCCESS

				RequestStatus_Fail		0x1	FAIL
R	ErrorDetail		Enumeration				
				None		0x0	No Error
				Command_not_Recognised		0x1	Unknown command in SOA request
				Unknown_Error		0x2	Failed due to an unexpected error
				Invalid_Request		0x3	Invalid request structure or parameters
				Not_Supported		0x4	Request cannot be supported by the particular camera view requested, for instance specifying a resolution that is not supported by the camera for that view.
				DEVICE_ID_NOT_Specified		0x5	Start Recording request was received with "Devices To Consider" set to specified only, but no device Id was provided
				Storage_Device_Not_Found		0x6	Requested Storage Device cannot be found.
				INSUFFICIENT_SPACE		0x7	Specified storage device does not have sufficient space for the recording or to begin a recording session.
				NO_PRETESTED_DEVICE_WITH_SPACE		0X8	This error occurs when the consumer requested a recording using the "Include_Pretested" option but no pre-tested devices were found, or none had sufficient space.

			SPECIFIED_DEVICE_IS_INVALID_FORMAT	0X9	This error is for invalid format for the USB device
			NO_SUITABLE_DEVICE_WITH_SPACE	0xA	This error occurs when the consumer requested a recording using the "Include_Any" option but no suitable devices were found, or none had sufficient space.
			CAMERA_VIEW_NOT_AVAILABLE	0xB	Requested Camera View is not available for streaming.
			CAMERA_VIEW_NOT_RESPONDING	0xC	Camera Controller is not responding.
			QUEUE_FULL	0XD	Request queue is full, try request again later.
			Encryption_Failure	0XE	Encryption Failure

2.4.1.4   MD-REQ-411285/B-StopRecord_Request

The VRPInterfaceServer shall receive a request to Stop the entire Recording session via StopRecord_Request.

Method Type	On-Change
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)
Retained	N/A or Yes, No

R/O	Name	Type	Literals		Value	Description
StopRecord_Request (_Rq)						
R	FeatureName	String			0-15 ASCII	Feature name of requesting feature Size limit=15 charecters
R	RecordingID	String	-			The Id for the recording session
StopRecord_Response (_Rsp)						
o	Error Message	String				VRPInterfaceServer shall send an Error message with signature file failed for one or more views
R	RequestStatus	Enumeration				
			RequestStatus_Success		0x0	SUCCESS
			RequestStatus_Fail		0x1	FAIL
o	Recording_status	ENUM				

					0X0	Video Recorder Service is Ready to record a pre-reserved video stream.
				READY		
				RECORDING	0X1	Recording is in progress
				COMPLETE	0X2	Recording session has completed
				PAUSED	0X3	Recording is paused
				OUT_OF_SPACE	0X4	Recording terminated due to insufficient available storage Space
				FAILED	0X5	Active Recording terminated for an unanticipated reason
				RECORDING_SPACE_WARNING	0X6	Recording is still in progress, but device is running out of space.
				Stopped	0X7	Stopped due to a Stop Request
R	ErrorDetail		Enumeration			
				None	0x0	No Error
				Command_not_Recognised	0x1	Unknown command in SOA request
				Unknown_Error	0x2	Failed due to an unexpected error
				Invalid_Request	0x3	Invalid request structure or parameters
				Not_Supported	0x4	Request cannot be supported by the particular camera view requested, for instance specifying a resolution that is not supported by the camera for that view.
				DEVICE_ID_NOT_Specified	0x5	Start Recording request was received with "Devices To Consider" set to specified only, but no device Id was provided
				Storage_Device_Not_Found	0x6	Requested Storage Device cannot be found.
				INSUFFICIENT_SPACE	0x7	Specified storage device does not have sufficient space for the recording or to

R/O						
						begin a recording session.
			NO_PRETESTED_DEVICE_WITH_SPACE	0X8		This error occurs when the consumer requested a recording using the "Include_Pretested" option but no pre-tested devices were found, or none had sufficient space.
			SPECIFIED_DEVICE_IS_INVALID_FORMAT	0X9		This error is for invalid format for the USB device
			NO_SUITABLE_DEVICE_WITH_SPACE	0xA		This error occurs when the consumer requested a recording using the "Include_Any" option but no suitable devices were found, or none had sufficient space.
			CAMERA_VIEW_NOT_AVAILABLE	0xB		Requested Camera View is not available for streaming.
			CAMERA_VIEW_NOT_RESPONDING	0xC		Camera Controller is not responding.
			QUEUE_FULL	0XD		Request queue is full, try request again later.
			Encryption_Failure	0XE		Encryption Failure
			RecordingID_Not_Inprogress	0XF		
R	RecordingID	String	-			The Id for the recording session

2.4.1.5 MD-REQ-410717/B-ProtectRecordingProperty_Request

The VRPInterfaceServer shall receive a request to protect file via FileProtectProperty_Request.

Method Type	On-Change
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)
Retained	N/A or Yes, No

R/O	Name	Type	Literals	Value	Description
Request (_Rq)					
R	FileProtectProperty_Request				
R	SegmentNumber	Int32	-	0-n	Segment number to be protected or unprotected, if not provided

R	RecordingID	String	-		The Id for the recording session
R	Protect	Boolean			
			NotReadOnly	0x0	
			ReadOnly	0x1	

Response (_Rsp)					
R	FileProtectProperty_Response	Int32	-		Resume recording of the Particular Session
	RequestStatus	Enumeration			
			RequestStatus_Success	0x0	SUCCESS
			RequestStatus_Fail	0x1	FAIL
R	ErrorDetail	Enumeration			
			None	0x0	No Error
			Command_not_Recognised	0x1	Unknown command in SOA request
			Unknown_Error	0x2	Failed due to an unexpected error
			Invalid_Request	0x3	Invalid request structure or parameters
			Not_Supported	0x4	Request cannot be supported by the particular camera view requested, for instance specifying a resolution that is not supported by the camera for that view.
			DEVICE_ID_NOT_Specified	0x5	Start Recording request was received with "Devices To

					Consider" set to specified only, but no device Id was provided
			Storage_Device_Not_Found	0x6	Requested Storage Device cannot be found.
			INSUFFICIENT_SPACE	0x7	Specified storage device does not have sufficient space for the recording or to begin a recording session.
			NO_PRETESTED_DEVICE_WITH_SPACE	0X8	This error occurs when the consumer requested a recording using the "Include_Pretested" option but no pre-tested devices were found, or none had sufficient space.
			SPECIFIED_DEVICE_IS_INVALID_FORMAT	0X9	This error is for invalid format for the USB device
			NO_SUITABLE_DEVICE_WITH_SPACE	0xA	This error occurs when the consumer requested a recording using the "Include_Any" option but no suitable devices were found, or none had sufficient space.
			CAMERA_VIEW_NOT_AVAILABLE	0xB	Requested Camera View is not available for streaming.
			CAMERA_VIEW_NOT_RESPONDING	0xC	Camera Controller is not responding.
			QUEUE_FULL	0XD	Request queue is full, try request again later.
			Encryption_Failure	0XE	Encryption Failure
R	RecordingID	String	-		The Id for the recording session

O	StorageDevice_ID	String	-		0-36 Charecte rs	Storage device id to which data/video will be recorded to

2.4.1.6   MD-REQ-411553/B-PublishRecordingHeartBeat

The VRP Function shall publish the video recording status via PublishRecordingHeartBeat

	Method Type	On-Change				
	QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)				
	Retained	N/A or Yes, No				

R/O	Name	Type	Literals	Value	Description
Request (_Rq)					
R	PublishRecordingHeartBeat	Boolean			the service will broadcast a ingt message to indicate that recording is active.
			Active	0X1	
			Inactive	0X0	
Response (_Rsp)					
	NA				

2.4.1.7   MD-REQ-411558/B-PublishRecordingStatusChange

The VRPInterfaceServer shall send PublishRecordingStatusChange to notify change in the status of recording.

	Method Type	On-Change				
	QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)				
	Retained	N/A or Yes, No				

R/O	Name	Type	Literals	Value	Description
Request (_Rq)					
R	PublishRecordingStatusChange	Structure	StreamRecordStatus		Broadcast the status of any in-progress recording requests as the status changes. Statuses may change from in-progress, to paused, back to in-progress, to completed, or may go into

					one of several failed states
	StreamRecordStatus	session_id	Int32		Identifies the recording request session.
		recording_status	ENUM		Status of the video recording
				READY	0X0	Video Recorder Service is Ready to record a pre-reserved video stream.
				RECORDING	0X1	Recording is in progress
				COMPLETE	0X2	Recording session has completed
				PAUSED	0X3	Recording is paused
				OUT_OF_SPACE	0X4	Recording terminated due to insufficient available storage Space
				FAILED	0X5	Recording terminated for an unanticipated reason
				RECORDING_SPACE_WARNING	0X6	Recording is still in progress, but device is running out of space.
				Stopped	0X7	
		View Name	String		Name of camera view being recorded or the word "metadata" to indicate the status of the data logging.
		Segment Number	Int		Number for the segment currently being recorded.
Response (_Rsp)					
	NA				

2.4.1.8   MD-REQ-410619/B-ListStorageDeviceInfo

The VRPInterfaceServer shall receive a request to start the video recording via ListStorageDeviceInfo

Note: Refer to the protofile for structure details as this interface is repeating structure inside a repeating structure

	Method Type	OnChange
	QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)
	Retained	N/A or Yes, No

R/O	Name		Type	Literals	Value	Description
Request (_Rq)						
R	StorageDevice_ID		string	-	0-36 Charecters	Storage device id to which data/video will be saved
R	FeatureName		String		0-15 ASCII	<mark>Feature name of requesting feature Size limit=15 charecters</mark>
Response (_Rsp)						
	RequestStatus		Enumeration			
				RequestStatus_Success	0x0	SUCCESS
				RequestStatus_Fail	0x1	FAIL
	StorageStatus		Structure			
		Label	String			Label for a storage Device
		Device_ID	string			Unique identifier of the storage device
		test_result	Enum			Indicates if the device was pre-tested for video recording and if so, the result of the test.
				NOT_TESTED	0x0	
				SUITABLE	0x1	
				NOT_SUITABLE	0x2	
				INVALID_DEVICE_FORMAT	0x4	
		TotalSpace	Integer			Total space of the storage device, in ? Mega Bytes (MB)?
		FreeSpace	Integer			Amount of unused space on the device.
		Feature Name	Repeated String			
		FeatureUnprotectedFileSpace	Repeated Integer			Amount of space used by

						unprotected files for the feature (available to be deleted during a recording session)
		FeatureProtectedFileSpace	Repeated Integer			Amount of space used by protected files for the feature (NOT available for deletion during recording sessions)
		OtherUsedSpace	Integer			Amount of space used by non-feature recording files (Also NOT available for deletion while recording)
		write_speed	Integer		Mega Bits per Sec	
R	ErrorDetail		Enumeration			
				None	0x0	No Error
				Command_not_Recognised	0x1	Unknown command in SOA request
				Unknown_Error	0x2	Failed due to an unexpected error
				Invalid_Request	0x3	Invalid request structure or parameters
				Not_Supported	0x4	Request cannot be supported by the particular camera view requested, for instance specifying a resolution that is not supported by the camera for that view.

			DEVICE_ID_NOT_Specified	0x5	Start Recording request was received with "Devices To Consider" set to specified only, but no device Id was provided
			Storage_Device_Not_Found	0x6	Requested Storage Device cannot be found.
			INSUFFICIENT_SPACE	0x7	Specified storage device does not have sufficient space for the recording or to begin a recording session.
			NO_PRETESTED_DEVICE_WITH_ SPACE	0X8	This error occurs when the consumer requested a recording using the "Include_Prete sted" option but no pre-tested devices were found, or none had sufficient space.
			SPECIFIED_DEVICE_IS_INVALID _FORMAT	0X9	This error is for invalid format for the USB device
			NO_SUITABLE_DEVICE_WITH_S PACE	0xA	This error occurs when the consumer requested a recording using the "Include_Any" option but no suitable devices were found, or none had sufficient space.
			CAMERA_VIEW_NOT_AVAILABLE	0xB	Requested Camera View

		CAMERA_VIEW_NOT_RESPONDING	0xC	is not available for streaming.
		CAMERA_VIEW_NOT_RESPONDING	0xC	Camera Controller is not responding.
		QUEUE_FULL	0XD	Request queue is full, try request again later.
		Encryption_Failure	0XE	Encryption Failure

2.4.1.9 MD-REQ-438986/B-FormatStorageDevice

The VRPInterfaceServer shall receive a request to Format a storage Device via FormatStorageDevice

Method Type	OnChange
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)
Retained	N/A or Yes, No

R/O	Name		Type	Literals	Value	Description
Request (_Rq)						
R	StorageDevice_ID		String	-	0-36 Charecters	Storage device id to which data/video will be saved
R	FeatureName		String		0-15 ASCII	Feature name of requesting feature Size limit=15 charecters
Response (_Rsp)						
	RequestStatus		Enumeration			
				RequestStatus_Success	0x0	SUCCESS
				RequestStatus_Fail	0x1	FAIL
	StorageStatus		Structure			
		Device_ID	string			Unique identifier of the storage device
		test_result	Enum			Indicates if the device was pre-tested for video recording and if so, the result of the test.
				NOT_TESTED	0x0	
				SUITABLE	0x1	
				NOT_SUITABLE	0X2	
		TotalSpace	Integer			Total space of the storage device, in ? Mega Bytes (MB)?
		FreeSpace	Integer			Amount of unused space on the device.

		FeatureUnprotectedFileSpace	Integer				Amount of space used by unprotected files for the feature (available to be deleted during a recording session)
		FeatureProtectedFileSpace	Integer				Amount of space used by protected files for the feature (NOT available for deletion during recording sessions)
		OtherUsedSpace	Integer				Amount of space used by non-feature recording files (Also NOT available for deletion while recording)
		write_speed	Integer			Mega Bits per Sec	
R	ErrorDetail		Enumeration				
				None	0x0		No Error
				Command_not_Recognised	0x1		Unknown command in SOA request
				Unknown_Error	0x2		Failed due to an unexpected error
				Invalid_Request	0x3		Invalid request structure or parameters
				Not_Supported	0x4		Request cannot be supported by the particular camera view requested, for instance specifying a resolution that is not supported by the camera for that view.
				DEVICE_ID_NOT_Specified	0x5		Start Recording request was received with "Devices To Consider" set to specified only, but no device Id was provided
				Storage_Device_Not_Found	0x6		Requested Storage Device cannot be found.
				INSUFFICIENT_SPACE	0x7		Specified storage device does not have sufficient space for the recording or to begin a recording session.
				NO_PRETESTED_DEVICE_WITH_SPACE	0X8		This error occurs when the consumer requested a recording using the "Include_Pretested" option but no pre-tested devices were found, or none had sufficient space.
				SPECIFIED_DEVICE_IS_INVALID_FORMAT	0X9		This error is for invalid format for the USB device

			NO_SUITABLE_DEVICE_WITH_SPACE	0xA	This error occurs when the consumer requested a recording using the "Include_Any" option but no suitable devices were found, or none had sufficient space.
			CAMERA_VIEW_NOT_AVAILABLE	0xB	Requested Camera View is not available for streaming.
			CAMERA_VIEW_NOT_RESPONDING	0xC	Camera Controller is not responding.
			QUEUE_FULL	0XD	Request queue is full, try request again later.
			Encryption_Failure	0XE	Encryption Failure

2.4.1.10 MD-REQ-438987/B-TestStorageDevice

The VRPInterfaceServer shall receive a request to Test the Storage device Via TestStorageDevice

Method Type	OnChange
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)
Retained	N/A or Yes, No

R/O	Name	Type	Literals		Value	Description
Request (_Rq)						
R	StorageDevice_ID	String	-		0-36 Charecters	Storage device id to which data/video will be saved
Response (_Rsp)						
	RequestStatus	Enumeration				
			RequestStatus_Success		0x0	SUCCESS
			RequestStatus_Fail		0x1	FAIL
	test_result	Enum				Indicates if the device was pre-tested for video recording and if so, the result of the test.
			NOT_TESTED		0x0	
			SUITABLE		0x1	
			NOT_SUITABLE		0X2	
R	ErrorDetail	Enumeration				
			None		0x0	No Error
			Command_not_Recognised		0x1	Unknown command in SOA request
			Unknown_Error		0x2	Failed due to an unexpected error
			Invalid_Request		0x3	Invalid request structure or parameters

				Not_Supported	0x4	Request cannot be supported by the particular camera view requested, for instance specifying a resolution that is not supported by the camera for that view.
				DEVICE_ID_NOT_Specified	0x5	Start Recording request was received with "Devices To Consider" set to specified only, but no device Id was provided
				Storage_Device_Not_Found	0x6	Requested Storage Device cannot be found.
				INSUFFICIENT_SPACE	0x7	Specified storage device does not have sufficient space for the recording or to begin a recording session.
				NO_PRETESTED_DEVICE_WITH_SPACE	0X8	This error occurs when the consumer requested a recording using the "Include_Pretested" option but no pre-tested devices were found, or none had sufficient space.
				SPECIFIED_DEVICE_IS_INVALID_FORMAT	0X9	This error is for invalid format for the USB device
				NO_SUITABLE_DEVICE_WITH_SPACE	0xA	This error occurs when the consumer requested a recording using the "Include_Any" option but no suitable devices were found, or none had sufficient space.
				CAMERA_VIEW_NOT_AVAILABLE	0xB	Requested Camera View is not available for streaming.
				CAMERA_VIEW_NOT_RESPONDING	0xC	Camera Controller is not responding.
				QUEUE_FULL	0XD	Request queue is full, try request again later.
				Encryption_Failure	0XE	Encryption Failure

2.4.1.11 MD-REQ-410491/B-Delete_Specified

The VRPInterfaceServer shall receive a request to Delete the video recording via Delete_Specified.

	Method Type	OnChange
	QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)
	Retained	N/A or Yes, No

R/O	Name	Type	Literals	Value	Description
DeleteSpecified_Request (_Rq)					
o	Segment_number	Int32	-	0-n	Number of the segment where the playback should start, if not provided, then will play from the first segment still available.
R	RecordingID	String	-		The Id for the recording session
DeleteSpecified_**Response (_Rsp)**					
	RequestStatus	Enumeration			
			RequestStatus_Success	0x0	SUCCESS
			RequestStatus_Fail	0x1	FAIL
R	ErrorDetail	Enumeration			
			None	0x0	No error to report
			Command_not_Recognised	0x1	Unknown command in SOA request
			Unkown_Error	0x2	Failed due to an unexpected error
			Invalid_Request	0x3	Invalid request structure or parameters
			StorageDevice_Error	0x4	Desired Storage device has an error
			SIGNATURE_VERIFICATION_FAILED	0x5	System could not verify the signature file for the recording. File cannot be played back within the

					vehicle. Tampering or file corruption may have occurred.
		QUEUE_FULL		0x6	Request queue is full, try request again later.

2.4.1.12 MD-REQ-447577/B-Delete_Unprotected

The VRPInterfaceServer shall receive a request to Delete the video recording that is unprotected in a storage device via Delete_Unprotected.

Method Type	OnChange
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)
Retained	N/A or Yes, No

R/O	Name	Type	Literals	Value	Description
DeleteUnprotected_Request (_Rq)
R	FeatureName	String		0-15 ASCII	Feature name of requesting feature Size limit=15 charecters
R	StorageDevice_ID	String	-	0-36 Charecters	Storage device id to which data/video will be recorded to
o	Delete to Percent	Integer		0-n MB	Delete unprotected filed until feature occupies that percentage of total space.
DeleteUnprotected_Response (_Rsp)
	RequestStatus	Enumeration			
			RequestStatus_Success	0x0	SUCCESS
			RequestStatus_Fail	0x1	FAIL
R	ErrorDetail	Enumeration			
			None	0x0	No error to report

			Command_not_Recognised	0x1	Unknown command in SOA request
			Unkown_Error	0x2	Failed due to an unexpected error
			Invalid_Request	0x3	Invalid request structure or parameters
			StorageDevice_Error	0x4	Desired Storage device has an error
			SIGNATURE_VERIFICATION_FAILED	0x5	System could not verify the signature file for the recording. File cannot be played back within the vehicle. Tampering or file corruption may have occurred.
			QUEUE_FULL	0x6	Request queue is full, try request again later.

2.4.1.13 MD-REQ-447578/B-ListRecordingsSessionSegments_Request

The VRPInterfaceServer shall receive a request to list the video recordings via ListRecordingsSessionSegments_Request.

	Method Type	On-Change			
	QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)			
	Retained	N/A or Yes, No			
R/O	**Name**	**Type**	**Literals**	**Value**	**Description**
Request (_Rq)					
R	session_id	String			

Response (_Rsp)

	RequestStatus	Enumeration			
			RequestStatus_Success	0x0	SUCCESS
			RequestStatus_Fail	0x1	FAIL
R	ErrorDetail	Enumeration			
			None	0x0	No Error
			Command_not_Recognised	0x1	Unknown command in SOA request
			Unkown_Error	0x2	Failed due to an unexpected error
			Invalid_Request	0x3	Invalid request structure or parameters
			Not_Supported	0x4	Request cannot be supported by the particular camera view requested, for instance specifying a resolution that is not supported by the camera for that view.
			Storage_Full	0x5	Desired Storage device is full
			Storage_Device_Not_Found	0x6	Requested Storage Device cannot be found.
			CAMERA_VIEW_NOT_AVAILABLE	0x7	Requested Camera View is not available for streaming.
			CAMERA_VIEW_NOT_RESPONDING	0x8	Camera Controller is not responding.
			QUEUE_FULL	0x9	Request queue is full, try

						request again later.
R	session ID		String	-		The Id for the recording session
	Recording session segment		ENUM			
		segment_number	INT		0X0	
		date_time_created	Int		0X1	
		Total Duration_time	Int		0X2	0-nSec
		Protected			0X3	
		Camera Views			0X4	

2.4.1.14 MD-REQ-410487/B-Playback_Request

The VRPInterfaceServer shall receive a request to start the video Playback via VRPPlayback_Request.

Method Type	One-Shot (Synch or A-Synch), or Fire&Forget
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)
Retained	N/A or Yes, No

R/O	Name	Type	Literals	Value	Description
Playback_Request (_Rq)					
R	CameraViewName	String		0-15 ASCII	Name of the camera view to be "played".
o	Segment_number	Int32	-	0-n	Number of the segment where the playback should start, if not provided, then will play from the first segment still available.
R	RecordingID	String	-		The Id for the recording session
Playback_Response (_Rsp)					
R	RecordingID	String	-		The Id for the recording session
R	RequestStatus	Enumeration			

R/O	Name	Type	Literals	Value	Description
			RequestStatus_Success	0x0	SUCCESS
			RequestStatus_Fail	0x1	FAIL
R	ErrorDetail	Enumeration			
			None	0x0	No error to report
			Command_not_Recognised	0x1	Unknown command in SOA request
			Unkown_Error	0x2	Failed due to an unexpected error
			Invalid_Request	0x3	Invalid request structure or parameters
			StorageDevice_Error	0x4	Desired Storage device has an error
			SIGNATURE_VERIFICATION_FAILED	0x5	System could not verify the signature file for the recording. File cannot be played back within the vehicle. Tampering or file corruption may have occurred.
			QUEUE_FULL	0x6	Request queue is full, try request again later.

2.4.1.15 MD-REQ-413548/B-PausePlayback_Request

The VRPInterfaceServer shall receive a request to pause the video via PausePlayback_Request.

Method Type	One-Shot (Synch or A-Synch), or Fire&Forget	
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)	
Retained	N/A or Yes, No	

R/O	Name	Type	Literals	Value	Description
PausePlayback_Request (_Rq)					
R	RecordingID	String	-		The Id for the recording session
PausePlayback_Response (_Rsp)					
R	RecordingID	String	-		The Id for the recording session

R	RequestStatus	Enumeration			
			RequestStatus_Success	0x0	SUCCESS
			RequestStatus_Fail	0x1	FAIL
R	ErrorDetail	Enumeration			
			None	0x0	No error to report
			Command_not_Recognised	0x1	Unknown command in SOA request
			Unkown_Error	0x2	Failed due to an unexpected error
			Invalid_Request	0x3	Invalid request structure or parameters
			StorageDevice_Error	0x4	Desired Storage device has an error
			SIGNATURE_VERIFICATION_FAILED	0x5	System could not verify the signature file for the recording. File cannot be played back within the vehicle. Tampering or file corruption may have occurred.
			QUEUE_FULL	0x6	Request queue is full, try request again later.

2.4.1.16 MD-REQ-413549/B-StopPlayback_Request

The VRPInterfaceServer shall receive a request to Stop the Playback via StopPlayback_Request.

Method Type	One-Shot (Synch or A-Synch), or Fire&Forget
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)
Retained	N/A or Yes, No

R/O	Name	Type	Literals	Value	Description
StopPlayback_Request **(_Rq)**					
R	RecordingID	String	-		The Id for the recording session
StopPlayback_Response **(_Rsp)**					
R	RecordingID	String	-		The Id for the recording session
R	RequestStatus	Enumeration			
			RequestStatus_Success	0x0	SUCCESS
			RequestStatus_Fail	0x1	FAIL
R	ErrorDetail	Enumeration			
			None	0x0	No error to report
			Command_not_Recognised	0x1	Unknown command in SOA request

		Unkown_Error		0x2	Failed due to an unexpected error
		Invalid_Request		0x3	Invalid request structure or parameters
		StorageDevice_Error		0x4	Desired Storage device has an error
		SIGNATURE_VERIFICATION_FAILED		0x5	System could not verify the signature file for the recording. File cannot be played back within the vehicle. Tampering or file corruption may have occurred.
		QUEUE_FULL		0x6	Request queue is full, try request again later.

2.4.1.17 MD-REQ-410618/B-ManagePlayback_Request

The VRPInterfaceServer shall receive a request to Manage Play back via ManagePlayback_Request.

Method Type	One-Shot (Synch or A-Synch), or Fire&Forget
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)
Retained	N/A or Yes, No

R/O	Name	Type	Literals	Value	Description
ManagePlayback_Request (_Rq)					
O	Skip_Delta	Int32		-n to n	Optional. Time to skip in seconds. It can take negative values
O	goto_time	Int32	-	0-nTh sec	Optional. Jump to the specified time of the recording.
O	goto_segment	Int32			Optional. Jump to the beginning of the specified segment of the recording.
o	RecordingID	String	-		The Id for the recording session
ManagePlayback_Response (_Rsp)					
R	RecordingID	String	-		The Id for the recording session
R	RequestStatus	Enumeration			
			RequestStatus_Success	0x0	SUCCESS
			RequestStatus_Fail	0x1	FAIL
R	ErrorDetail	Enumeration			
			None	0x0	No error to report

			Command_not_Recognised	0x1	Unknown command in SOA request
			Unkown_Error	0x2	Failed due to an unexpected error
			Invalid_Request	0x3	Invalid request structure or parameters
			StorageDevice_Error	0x4	Desired Storage device has an error
			SIGNATURE_VERIFICATION_FAILED	0x5	System could not verify the signature file for the recording. File cannot be played back within the vehicle. Tampering or file corruption may have occurred.
			QUEUE_FULL	0x6	Request queue is full, try request again later.

2.4.1.18 MD-REQ-413550/B-PublishPlaybackStatus

The VRPInterfaceServer shall receive a request to publish playback status via PublishPlayback_Status.

Method Type	One-Shot (Synch or A-Synch), or Fire&Forget	
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)	
Retained	N/A or Yes, No	

R/O	Name	Type	Literals	Value	Description
PublishPlaybackStatus _**Request (_Rq)**					
R	broadcast_request	ENUM			
R			SUBSCRIBE	0X0	Consumer wishes to subscribe and activate the broadcast, if not already broadcasting.
O			UNSUBSCRIBE	0X1	Consumer wishes to unsubscribe from the broadcast. If subscriber count is zero then broadcast will stop.
PublishPlayback_Response (**_Rsp)**					
R	RecordingID	String	-		The Id for the recording session

R	PlaybackStatus	Enumeration			
			Playback_Ready	0x0	
			Playback_Inprogress	0x1	
			Paused	0x2	
			Complete	0x3	If playback of the segment is complete
			Aborted	0x4	Reading a file that could be aborted
			Failed	0X6	If the playback could not start due to error or unavailability of a view or segment or an unforeseen reason
			Stopped	0X7	If playback was stopped by a request
R	ErrorDetail	Enumeration			
			None	0x0	No error to report
			Command_not_Recognised	0x1	Unknown command in SOA request
			Unkown_Error	0x2	Failed due to an unexpected error
			Invalid_Request	0x3	Invalid request structure or parameters
			StorageDevice_Error	0x4	Desired Storage device has an error
			SIGNATURE_VERIFICATION_FAILED	0x5	System could not verify the signature file for the recording. File cannot be played back within

					the vehicle. Tampering or file corruption may have occurred.
`		QUEUE_FULL		0x6	Request queue is full, try request again later.

PublishPlaybackStatus _**Status (_ST)**					
R	RecordingID	String	-		The Id for the recording session
R	Playback_Status	ENUM			
O			PLAYBACK_INPROGRESS		
			PAUSED		
R			COMPLETE		Played the recording to the end.
O			FAILED		A failure occurred during playback

2.4.1.19 MD-REQ-406934/A-IgnitionStatus_St

Message Type: Status

Signal used to indicate ignition state.

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

2.4.1.20 MD-REQ-453078/B-ResumePlayback_Request

Method Type	
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)
Retained	N/A or Yes, No

R/O	**Name**	**Type**	**Literals**		**Value**	**Description**

ResumePlayback_Request (_Rq)					
R	RecordingID	String	-		The Id for the recording session
ResumePlayback_Response (_Rsp)					
o	RecordingID	String	-		The Id for the recording session
R	RequestStatus	Enumeration			
			RequestStatus_Success	0x0	SUCCESS
			RequestStatus_Fail	0x1	FAIL
R	ErrorDetail	Enumeration			
			None	0x0	No error to report
			Command_not_Recognised	0x1	Unknown command in SOA request
			Unkown_Error	0x2	Failed due to an unexpected error
			Invalid_Request	0x3	Invalid request structure or parameters
			StorageDevice_Error	0x4	Desired Storage device has an error
			SIGNATURE_VERIFICATION_FAILED	0x5	System could not verify the signature file for the recording. File cannot be played back within the vehicle. Tampering or file corruption may have occurred.
			QUEUE_FULL	0x6	Request queue is full, try request again later.

2.4.1.21 MD-REQ-453178/B-ListRecordingsInfo_Request

The VRPInterfaceServer shall receive a request to list the video recordings via ListRecordingsInfo_Request.

Method Type	On-Change				
QoS Level	Default (unless otherwise specified, ex. 0, 1, 2)				
Retained	N/A or Yes, No				
R/O	**Name**	**Type**	**Literals**	**Value**	**Description**
Request(_Rq)					
R	FeatureName	String		0-15 ASCII	Limit the returned list to just those files for the specified feature. If blank or null, recordings for all features will be returned

o	StorageDevice_id	String			0-36 Charecters	Unique identifier of the storage device, like a USB device id.
o	start_date	Date				Filter the returned list to just those files recorded on or after this date.
o	end_date	Date				Filter the returned list to just those files recorded on or before this date.
o	protected	Boolean				If true filter the returned list to only recordings that are fully or partially protected recordings, else include files regardless of protected status.
			No		0X0	
			Yes		0X1	
Response (_Rsp)						
	RequestStatus	Enumeration				
			RequestStatus_Success		0x0	SUCCESS
			RequestStatus_Fail		0x1	FAIL
R	ErrorDetail	Enumeration				
			None		0x0	No Error
			Command_not_Recognised		0x1	Unknown command in SOA request
			Unkown_Error		0x2	Failed due to an unexpected error
			Invalid_Request		0x3	Invalid request structure or parameters
			Not_Supported		0x4	Request cannot be supported by the particular camera view requested, for instance specifying a resolution that is not supported by the

						camera for that view.
			Storage_Full		0x5	Desired Storage device is full
			Storage_Device_Not_Found		0x6	Requested Storage Device cannot be found.
			CAMERA_VIEW_NOT_AVAILABLE		0x7	Requested Camera View is not available for streaming.
			CAMERA_VIEW_NOT_RESPONDING		0x8	Camera Controller is not responding.
			QUEUE_FULL		0x9	Request queue is full, try request again later.
	Recordings	ENUM				
		String	recording_session_id		0x0	
		ENUM	MetadataToRecord		0x1	
		INT	segment_number		0x2	
		INT	Storage_Id		0x3	
		Int	date_time_created		0X4	
		Int	total_size		0X5	In MB
		Int	Total Duration_time		0X6	0-n Sec
		String	Recording session Name		0X7	
		Enum	Protection Info		0X8	
				Partially protected	0X0	
				Fully Protected	0X1	
				Not protected	0X2	
			Total_Segments			
	Camera Views	Repeating string				
	Encrypt Video	Boolean				Should the recording be encrypted or not.
			No		0X0	
			Yes		0X1	
	EncryptMetadata	Bollean				Should the metadata be encrypted or not.

			No		0X0	
			Yes		0X1	
R	MetadataToRecord	Enum				Repeating values
		String	Date		0X0	Date in mm-dd-yyyy format.
		Int	Time		0X1	Time of day in 24 hour format, like 21:15:12
		Int	Vehicle Speed		0X2	Vehicle Speed as displayed in the Instrument Panel, either in Miles per hour (mph) or kilometers per hour (km/h)
		ENUM	Vehicle Location		0X3	GNSS information on the Vehicle's location, including the information below
				Latitude	0X0	
				Longitude	0X1	
				Altitude	0X2	
				Heading	0X3	
		String	VIN		0X4	The Vehicle Identification Number of the vehicle where the recording was made
		String	Accelerator Pedal Position		0X5	A percentage interpretation of the Accelerator pedal position: 0% = released pedal. 100% = maximum pedal.
		String	Braking Torque		0X6	Indication of braking force in newton*meters (nm). Includes braking applied by: - Driver request (brake pedal) - Adaptive Cruise Control system - Collision Mitigation by Braking (CMbB) system

		Enum	Braking Indication		0X7	Indicates if the driver is braking by pushing on the brake pedal refer BpedMove_D_Actl
				Driver	0X0	
				Autonomous	0X1	
				No Braking	0X2	
				Unknown	0X3	
		String	Perimeter Alarm Triggers		0X8	The current trigger for a perimeter alarm event. Refer to the signal PrmtrAlrmEvnt_D_Stat

2.5 Physical Mapping of Classes

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

Logical Class	Physical Module (ECU)
VRPInterfaceServer	Sync,PDC
VRPInterfaceClient	ECG /module requesting VRP data

3 General Requirements

3.1 VRP-REQ-406926/A-Powermode Condition

The VRPInterfaceClient and Server shall allow the functionality defined by this SPSS when the Ignition_Status =ON/OFF/ Remote Start Mode. Currently, these are possible ignition states the function is available. Monitoring of the Ignition CAN signal is not defined for this feature

3.2 VRP-REQ-406927/A-Feature Configuration

The VRPInterfaceServer shall have a configurable parameter to determine whether the vehicle supports this Feature. This Configuration parameter shall be set by the Diagnostics DID DE09 (12 Start Byte 3 Start Bit 0=Disabled 1=Enabled) programmed at the End of line.

3.3 REQ-409549/A-VRP Capability

If different features request to Record/playback at the same time, the VRPInterfaceServer shall process the requests from them but shall record/playback for only the feature that came first and the rest of the requests shall be rejected.

3.4 REQ-437838/A-VRP when Vehicle in Valet Mode

While the vehicle is in Valet Parking Mode the VRPInterfaceServer shall allow functionality in on Key ON and it shalll:
- Allow recording
- Not allow playback
- Not allow File Management
.

3.5 VRP-REQ-407075/A-Playback Data

3.5.1 REQ-409548/A-Playback Data Capability

For Playback the VRPInterfaceServer shall process all the requests from different/parallel camera views but the user shall be able to see only one playback video at a time and the VRPInterfaceServer shall allow switching between the videos.

3.5.2 REQ-409550/A-Playback Data

If the video and metadata are encrypted, the VRPInterfaceServer shall allow playback of the video and metadata only in the same functions/devices which requested the record.

Else if the video is not encrypted the VRPInterfaceServer shall playback the video as requested by the Features as referenced in the Video_Recording_and_Playback_ CyberSecurity_Spec.

3.6 VRP-REQ-407076/A-Record Data

3.6.1 VRP-REQ-406924/A-Record Data Capability

The VRPInterfaceServer shall record one or multiple parallel video streams for different camera views.

The VRPInterfaceServer shall record the following vehicle Data:

- Video Stream of the available camera views in the vehicle
- Metadata like Date, Time, received from the Feature and
  any other data that is requested by the Feature, that the VRPInterfaceServer can receive CAN signal information for this data via the Record_Request API
  Example:
    1. Location

2. Date and Time
3. Vehicle speed
4. Vehicle Identification Number (VIN)
5. Acceleration Pedal Position
6. Brake Torque and Indication
7. Perimeter Alarm Trigger
8. Record Frequency

Note:

For Integrated/Enhanced Dash Camera Feature: Location, Vehicle speed, VIN, Acceleration Pedal Position, Date and Time,
- For Integrated Sentinel Feature: Date, Time, Perimeter Alarm Trigger

3.6.2 REQ-409525/A-Record Mode and Duration Type

The VRPInterfaceServer shall record vehicle data for specific record mode and duration type as following:
- Continuous Recording:
  - o Limited Duration: for certain video duration/length
  - o Unlimited Duration: Up to the available storage or receive request to Stop the record

3.7 VRP-REQ-407086/A-Passive/ Active Mode

The VRPInterfaceServer shall consider the request as:
- Passive mode, if Record_Request is received with IPport or IPaddress
- Active mode, if Record_Request is received without IPport or IPaddress

3.8 VRP-FUN-REQ-407069/A-Encryption,Decryption and Digital Signatures

The VRPInterfaceServer shall Encrypt, Decrypt, calculate checksums, create and verify Digital Signatures to Videos and Metadata using the requirements from the Video Recorder and Playback Security Requirements Version 1.4 spec.

4 Functional Definition

4.1 VRP-FUN-REQ-407058/A-Video Controls

4.1.1 Use Cases

4.1.1.1 VRP-UC-REQ-453237/A-Record

Actors	VRPInterfaceClient, VRPInterfaceServer, USB
Pre-conditions	Powermode Conditions are met VRPInterfaceServer is ON Connection Established to the client USB device Connected Specified Storage Device ID is Available
Scenario Description	Once the VRPInterfaceServer receives an API from the client to start Recording the Recording session will start The VRPInterfaceServer will start recording Video, Meta data received from the client and the Send
Post-conditions	Recording session shall start
List of Exception Use Cases	USB disconnected, Connection lost with the client
Interfaces	VSAInterfaceClient, VSAInterfaceServer, Ethernet CAN, USB

4.1.1.2 VRP-UC-REQ-407060/A-Pause Record

Pause Recording Session

Actors	VRPInterfaceClient, VRPInterfaceServer, USB
Pre-conditions	Powermode Conditions are met VRPInterfaceServer is ON Connection Established to the client USB device Connected Specified Storage Device ID is Available Recording Session in progress
Scenario Description	Once the VRPInterfaceServer receives an API from the client to Pause Recording the Recording session shall pause. The VRPInterfaceServer will Pause recording Video, Meta data that is being received from the client, Send the Pause recording status or Failure status
Post-conditions	Recording session shall Pause
List of Exception Use Cases	USB disconnected, Connection lost with the client

Interfaces	VSAInterfaceClient, VSAInterfaceServer, Ethernet CAN, USB

4.1.1.3 VRP-UC-REQ-406919/A-Resume Record

Resume Recording Session

Actors	VRPInterfaceClient, VRPInterfaceServer, USB
Pre-conditions	Powermode Conditions are met VRPInterfaceServer is ON Connection Established to the client USB device Connected Specified Storage Device ID is Available Recording session Paused
Scenario Description	Once the VRPInterfaceServer receives a signal from the client to Resume Recording the Recording session will restart The VRPInterfaceServer will restart recording Video, Meta data received from the client, Send the resume recording status
Post-conditions	Recording session will restart
List of Exception Use Cases	USB disconnected, Connection lost with the client
Interfaces	InterfaceClient, InterfaceServer, Ethernet CAN, USB

4.1.1.4 VRP-UC-REQ-407344/A-Stop Record

Stop Recording Session

Actors	VRPInterfaceClient, VRPInterfaceServer, USB
Pre-conditions	Powermode Conditions are met VRPInterfaceServer is ON Connection Established to the client USB device Connected Specified Storage Device ID is Available Recording session inprogress
Scenario Description	Once the VRPInterfaceServer receives an API from the client to Stop Recording the Recording session will restart The VRPInterfaceServer will restart recording Video, Meta data received from the client, Send the stop recording status
Post-conditions	Recording session shall Stop

List of Exception Use Cases	USB disconnected, Connection lost with the client
Interfaces	Ethernet CAN, USB

4.1.1.5 VRP-UC-REQ-407565/A-Playback

Playback Request

Actors	VRPInterfaceClient, VRPInterfaceServer, USB
Pre-conditions	Powermode Conditions are met VRPInterfaceServer is ON Connection Established to the client USB device Connected Specified Storage Device ID is Available File Available
Scenario Description	When Playback_Request is received and if the Playback Conditions are true, the VRPInterfaceServer shall: • send the Status as ready via PublishPlaybackStatus • Read the specified file • Decrypt the specified video / metadata (if encrypted) using the saved encryption Key • Send the video and metadata associated with the specific Storage device and Feature to the VRPInterfaceClient. • Update playback status to inprogress via PublishPlaybackStatus. • Update playback status to complete via PublishPlaybackStatus once playback of the segment is complete If Decryption fails during playback then update playback status to Decryption failed via PublishPlaybackStatus
Post-conditions	Video Playback including the metadata
List of Exception Use Cases	USB disconnected, Connection lost with the client File corrupted or incaccessable
Interfaces	Ethernet CAN, USB

4.1.1.6 VRP-UC-REQ-407566/A-Pause Playback

Pause Playback Request

Actors	VRPInterfaceClient, VRPInterfaceServer, USB
Pre-conditions	Powermode Conditions are met VRPInterfaceServer is ON Connection Established to the client USB device Connected Specified Storage Device ID is Available File Available Playback in progress

Scenario Description	Once the VRPInterfaceServer receives an API from the client to Pause Playback a specific video The VRPInterfaceServer shall Pause playing Video Send the pause Playback status
Post-conditions	Playback is paused.
List of Exception Use Cases	USB disconnected, Connection lost with the client File corrupted or incaccessable
Interfaces	Ethernet CAN, USB

4.1.1.7 VRP-UC-REQ-407567/A-Resume Playback

Resume Playback Request

Actors	VRPInterfaceClient, VRPInterfaceServer, USB
Pre-conditions	Powermode Conditions are met VRPInterfaceServer is ON Connection Established to the client USB device Connected Specified Storage Device ID is Available File Available Playback Paused
Scenario Description	Once the VRPInterfaceServer receives an API from the client to resume Playback of a specific video The VRPInterfaceServer shall restart playing Video and display Meta data associated with the particular file Send the resume Playback status
Post-conditions	Resume Video Playback including the metadata
List of Exception Use Cases	USB disconnected, Connection lost with the client File corrupted or in accessible
Interfaces	Ethernet CAN, USB

4.1.1.8 VRP-UC-REQ-407568/A-Stop Playback

Actors	VRPInterfaceClient, VRPInterfaceServer, USB
Pre-conditions	Powermode Conditions are met VRPInterfaceServer is ON Connection Established to the client USB device Connected Specified Storage Device ID is Available File Available Playback In-progress, Playback in resume state or playback in paused state
Scenario Description	If the Stop Playback Conditions are true, the VRPInterfaceServer shall: • stop the specified playback (video and metadata)

	• send a success response via StopPlayback_Request • send stopped status via PublishPlaybackStatus The playback session is complete and a resume of the session is not possible at this point. Else if Stop Playback Condition is false the server shall respond with the failure message via StopPlayback_Request with the reason of the failure.
Post-conditions	Video Playback shall be stopped
List of Exception Use Cases	USB disconnected, Connection lost with the client File corrupted or in accessible
Interfaces	Ethernet CAN, USB

4.1.1.9 *VRP-UC-REQ-407090/A-Create New Folders and File naming*

Actors	VRPInterfaceClient, VRPInterfaceServer, USB
Pre-conditions	Powermode Conditions are met VRPInterfaceClient is ON VRPInterfaceServer is On USB storage Device Connected

Scenario Description	The VRPInterfaceServer shall create the following folder structure in the specified Storage Device once it receives the Record_Request API from the client and as specified/received from the Record_Request API.
	
	    • Feature folder: **FeatureName**
	
	        o New Folder inside the Feature Folder:
	
	        Date_Time_RecordName
	
	            ▪ Video file inside the new folder:
	
	            Date_Time_Segment_CameraView_Format
	
	            ▪ Metadata file inside the new folder:
	
	            Date_Time_Segment_Format
	
	            ▪ Video Signature file inside the new folder:
	
	            Date_Time_Segment_CameraView_Format_Signature
	
	            ▪ Metadata Signature file inside the new folder:
	
	             Date_Time_Segment_Format_Signature
	
	             ▪ Encryption file inside the new folder:
	
	            Date_Time_Format_Encryptiontype
	
	In case of multiple parallel recordings for cameras views, the VRPInterfaceServer shall record multiple video files/ video signature files, one metadata file, one metadata file signature file and one encryption file for a particular session.

Post-conditions	New Folder/File is created inside the storage device

List of Exception Use Cases	USB disconnected, Connection lost with the client File corrupted or in accessible
Interfaces	USB, Ethernet

4.1.2 Requirements

4.1.2.1 *VRP-REQ-453257/A-Record*

If the Stop Playback Conditions are true, the VRPInterfaceServer shall:
- stop the specified playback (video and metadata)
- send a success response via StopPlayback_Request
- send stopped status via PublishPlaybackStatus

The playback session is complete and a resume of the session is not possible at this point.

Else if Stop Playback Condition is false the server shall respond with the failure message via StopPlayback_Request with the reason of the failure.

4.1.2.1.1 VRP-REQ-409349/A-Record Conditions

The VRPInterfaceServer shall respond to the VRPInterfaceClient that the server is ready to record via PublishRecordingStatusChange for video input and record if the following conditions are met:
- Storage Device is available and if the storage device is Specified only then check available space is greater than the minimum available space using the F-REQ-435545/A-Determine Available_Space on a Storage Device as refereed in VideoRecoderService

Or
- Storage Device is available or, if the storage device to consider is "Include Pretested" or "Include Any" then check available space is greater than Expected Recording Space using the F-REQ-435544/A-Determine Expected_Recording_Space as referred in VideoRecoderService

4.1.2.1.2 VRP-REQ-409350/A-Vehicle Data Request- Passive/ Active Mode

If the recoding conditions are met and the Record is classified as Passive Mode the VRPInterfaceServer shall:
- Connect to the IP port / IP address specified in Record_Request
- shall start recording meta data and Video stream from one or more Camera views Via Record_Request API from the VRPInterfaceClient.
- send response through the Record_Request API with the status of recoding to the VRPInterfaceClient

Else if the recoding conditions are met and the Record is classified as Active Mode the VRPInterfaceServer shall:
- For all the other views where IP address is not available VRPInterfaceServer shall, send request to the CameraManager to start video streams (reserved) with StartStreamRq as referred in the IR-REQ-404260/C-StartStream in the CameraManagerService Spec
- start recording meta data and Video stream from one or more Camera views Via Record_Request API from the VRPInterfaceClient.
- send response through the Record_Request API with the status of recoding to the VRPInterfaceClient

4.1.2.1.3 VRP-REQ-409353/A-Create New Folders and File Naming

The VRPInterfaceServer shall create the following folder structure in the specified Storage Device once it receives the Record_Request API from the client and as specified/received from the Record_Request API.

- Feature folder: **FeatureName**
    - New Folder inside the Feature Folder: **Date_Time_RecordName**
        - Video file inside the new folder: **Date_Time_Segment_CameraView_Format**
        - Metadata file inside the new folder: **Date_Time_Segment_Format**

- ▪ Video Signature file inside the new folder: **Date_Time_Segment_CameraView_Format_Signature**
- ▪ Metadata Signature file inside the new folder: **Date_Time_Segment_Format_Signature**
- ▪ Encryption file inside the new folder: **Date_Time_Format_Encryptiontype**

In case of multiple parallel recordings for cameras views, the VRPInterfaceServer shall record multiple video files/ video signature files, one metadata file, one metadata file signature file and one encryption file for a particular session.

Note: Folder/ file Name shall not exceed 255 charecters

4.1.2.1.4 VRP-REQ-409356/A-Record Status in Recording State

When the Record Session is in-progress, the VRPInterfaceServer shall broadcast a heartbeat message every 500ms via PublishRecordingHeartBeat that the recording is active.

4.1.2.1.5 VRP-REQ-409357/A-Record Status Change

The VRPInterfaceServer shall broadcast the change of status of the record session and status of each file recorded via PublishRecordingStatusChange.
The change of status shall be either one of the following:

- READY
- RECORDING
- COMPLETE
- PAUSED
- OUT_OF_SPACE
- FAILED
- RECORDING_SPACE_WARNING

When the PublishRecordingStatusChange responds with the parameter RECORDING_SPACE_WARNING the VRPInterfaceServer shall alert the user with an indication that recording is still in progress, but device is running out of space.

4.1.2.1.6 VRP-REQ-409351/A-Record Format

The VRPInterfaceServer shall be able record Videos in MP4 format when it gets the Request via Record_Request.

4.1.2.1.7 VRP-REQ-409352/A-Record Metadata

The VRPInterfaceServer shall record the metadata as received from the Record_Request API.
- o Date
- o Time
- o Vehicle Speed
- o Vehicle Location
- o VIN
- o Accelerator Pedal Position
- o Braking Torque
- o Driver Braking Indication
- o Perimeter Alarm Triggers

The VRPInterfaceServer shall record the metadata with a Configurable recording Frequency with the initial value of 200 ms.
Note: Refer to VideoRecorderService F-REQ-410435/A-Metadata / Data Logging for more details.

4.1.2.1.8 VRP-REQ-409354/A-Metadata and Video Association

The VRPInterfaceServer shall synchronize between the Metadata and Video as following: link video (videos in case of multiple videos stream) with allocated metadata.

4.1.2.1.9 VRP-REQ-409358/A-Metadata and Video Synchronization

The VRPInterfaceServer shall synchronize the time base of all recorded metadata and videos

4.1.2.2   VRP-REQ-407062/A-Pause Record

4.1.2.2.1   VRP-REQ-409110/A-Pause Recording Session Conditions

When PauseRecord_Request is received, the VRPInterfaceServer shall verify the following Pause Recording conditions:
- o   The specified record session ID is valid
- o   and/or the recording is in-progress or Paused state

4.1.2.2.2   VRP-REQ-409111/A-Pause Recording Session

If PauseRecord_Request is received and :
If the Pause Recording Conditions are true, the VRPInterfaceServer shall:
- Pause the specified recording video
- Pause the recording metadata
- Send PublishRecordStatusChange per VRP-REQ-409357/A-Record Status Change

Else (one of the Pause Recording Conditions are false) Respond with failure status via PauseRecord_Request.

Note:
The VRPInterfaceServer shall keep receiving the video stream / Buffered Video but shall not record in paused state.

4.1.2.2.3   VRP-REQ-409339/A-Failure During the Pause Recording Session

If one of the following conditions is detected during the pause recording session:

- o   Specified Storage Device is not available or
- o   Camera View per Record_request is unavailable or
- o   Connection Error has occurred or

 the VRPInterfaceServer shall stop the recording session and PauseRecord_Request responds with the FeatureID, RecordingID, Failure and the reason of the failure.

4.1.2.3   VRP-REQ-407063/A-Resume Record

4.1.2.3.1   VRP-REQ-409341/A-Resume Conditions

When ResumeRecording_Request is received, the VRPInterfaceServer shall verify the following Resume Record Conditions**:**
- The specified record Session ID is valid
- The session is in Pause Record state

4.1.2.3.2   VRP-REQ-409342/A-Resume Paused Session

If the Resume Conditions are true and receives the ResumeRecord_Request the VRPInterfaceServer shall Resume the specified paused recording video.
The VRPInterfaceServer shall:
- Resume recording the video stream
- Resume recording metadata
- Send PublishRecordStatusChange per VRP-REQ-409357/A-Record Status Change

Else (one of the resume recording onditions are false) Respond with failure status via ResumeRecord_Request.

4.1.2.4   VRP-REQ-407064/A-Stop Record

4.1.2.4.1   VRP-REQ-409359/A-Stop Recording Conditions

When StopRecord_Request is received, the VRPInterfaceServer shall verify the following **Stop Recording conditions:**

- The specified record session ID is valid
- The specified record session is in Record/ Pause Record State

4.1.2.4.2 VRP-REQ-409360/A-Stop Recording Process

If the Stop Recording Conditions are true and receives the StopRecord_Request, the VRPInterfaceServer shall
- o stop the specified paused recording/recording video
- o Stop recording metadata and send the stop recording status.
- o Send PublishRecordStatusChange per VRP-REQ-409357/A-Record Status Change
- o Respond with Request status and repeating Record_Status structure per view.
- o send an Error message with signature file failed for one or more views.

Else (one of the Stop Recording Conditions is false) and recording fails to stop VRPInterfaceServer and respond via StopRecord_Request indicating that there was a failure or error detail.

4.1.2.5 VRP-REQ-407065/A-Playback

4.1.2.5.1 VRP-REQ-409343/A-Play Back Conditions

When **Playback_Request** is received, the VRPInterfaceServer Function shall verify the below Playback Conditions:
- The specified Storage device is available
- The requested segment for playback is valid
- The requested view is present
- The signature of the segment is Verified

If the above conditions are not met then the VRPInterfaceServer shall send the Failure message as status if the request has not been processed along with the reason of the failure.
If the above conditions are met the send a success response via **Playback_Request** along with the recording ID.

4.1.2.5.2 VRP-REQ-409345/A-Playback Data

When Playback_Request is received and if the Playback Conditions are true, the VRPInterfaceServer shall:
- send the Status as ready via PublishPlaybackStatus
- Read the specified file
- Decrypt the specified video / metadata (if encrypted) using the saved encryption Key
- Send the video and metadata associated with the specific Storage device and Feature to the VRPInterfaceClient.
- Update playback status to inprogress via PublishPlaybackStatus.
- Update playback status to complete via PublishPlaybackStatus once playback of the segment is complete

If Decryption fails during playback then update playback status to Decryption failed via PublishPlaybackStatus.

4.1.2.5.3 VRP-REQ-409346/A-Playback Status is Terminated

When the duration of the file specified is terminated, the VRPInterfaceServer shall send the status of the playback session via Playback_Request equal to Playback Terminated.

4.1.2.5.4 VRP-REQ-409347/A-Failure During Playback

If one of the following conditions is detected during the playback or decryption:
- Storage Device is not Available
- CameraNotavailable
- Connection error
- Decryption error
- Unable to verify file signature

the VRPInterfaceServer shall stop the playback session and send abort status via PublishPlaybackStatus

4.1.2.5.5 VRP-REQ-409444/A-Manage Playback

When **ManagePlayback_Request** is received, the VRPInterfaceServer shall Provide the playback stream jump to with playback time, segment time, segment number:
- Skip_Delta

- goto_time
- goto_segment
- playback of the new camera view with the current position

And send ManagePlayback_Request response with SessionID and one of the following values:
Success if the no error detected
Failure and specify the reason of the failure if any issues detected.
The VRPInterfaceServer shall send playback status via PublishPlaybackStatus

4.1.2.6   VRP-REQ-407569/A-Pause Playback

4.1.2.6.1   VRP-REQ-409348/A-Pause Playback Conditions
When PausePlayback_Request is received, the VRPInterfaceServer shall verify the below Pause Playback condition:
- the specified session ID is in playback process/ playback Pause

4.1.2.6.2   VRP-REQ-409361/A-Pause Playback
If the Pause Playback Condition is true, the VRPInterfaceServer shall:
pause the specified playback PausePlayback_Request and Respond with the status of the Paused Status
Else if the Pause Playback Condition is false send Respond with PausePlayback_Request with failure status and the reason of the Failure.
The VRPInterfaceServer shall send playback status paused via PublishPlaybackStatus

4.1.2.6.3   VRP-REQ-409405/A-Failure During the Pause Playback
In Storage Device is not Available condition the VRPInterfaceServer shall send PausePlayback_Request with a Failure response.

4.1.2.7   VRP-REQ-407570/A-Resume Playback

4.1.2.7.1   VRP-REQ-409441/A-Resume Playback Condition
When ResumePlayback_Request is received, the VRPInterfaceServer shall verify the below Resume Playback condition:
The specified session status is in pause playback process

4.1.2.7.2   VRP-REQ-409442/A-Resume Playback
If the Resume Conditions are true, the VRPInterfaceServer shall resume the specified pause playback (video and metadata) via ResumePlayback_Request and shall respond with the status Else if Resume Playback Condition is false and respond with the failure message via ResumePlayback_Request
The VRPInterfaceServer shall send playback status playback in progress via PublishPlaybackStatus

4.1.2.8   VRP-REQ-407571/A-Stop Playback

4.1.2.8.1   VRP-REQ-409445/A-Stop Playback Conditions
When StopPlayback_Request is received, the VRPInterfceServer shall verify the following Stop Playback conditions:
- the Specified session is in Playback/ Pause Playback State

4.1.2.8.2   VRP-REQ-409446/A-Stop Playback
If the Stop Playback Conditions are true, the VRPInterfaceServer shall:
- stop the specified playback (video and metadata)
- send a success response via StopPlayback_Request

- send stopped status via PublishPlaybackStatus

The playback session is complete and a resume of the session is not possible at this point.

Else if Stop Playback Condition is false the server shall respond with the failure message via StopPlayback_Request with the reason of the failure.
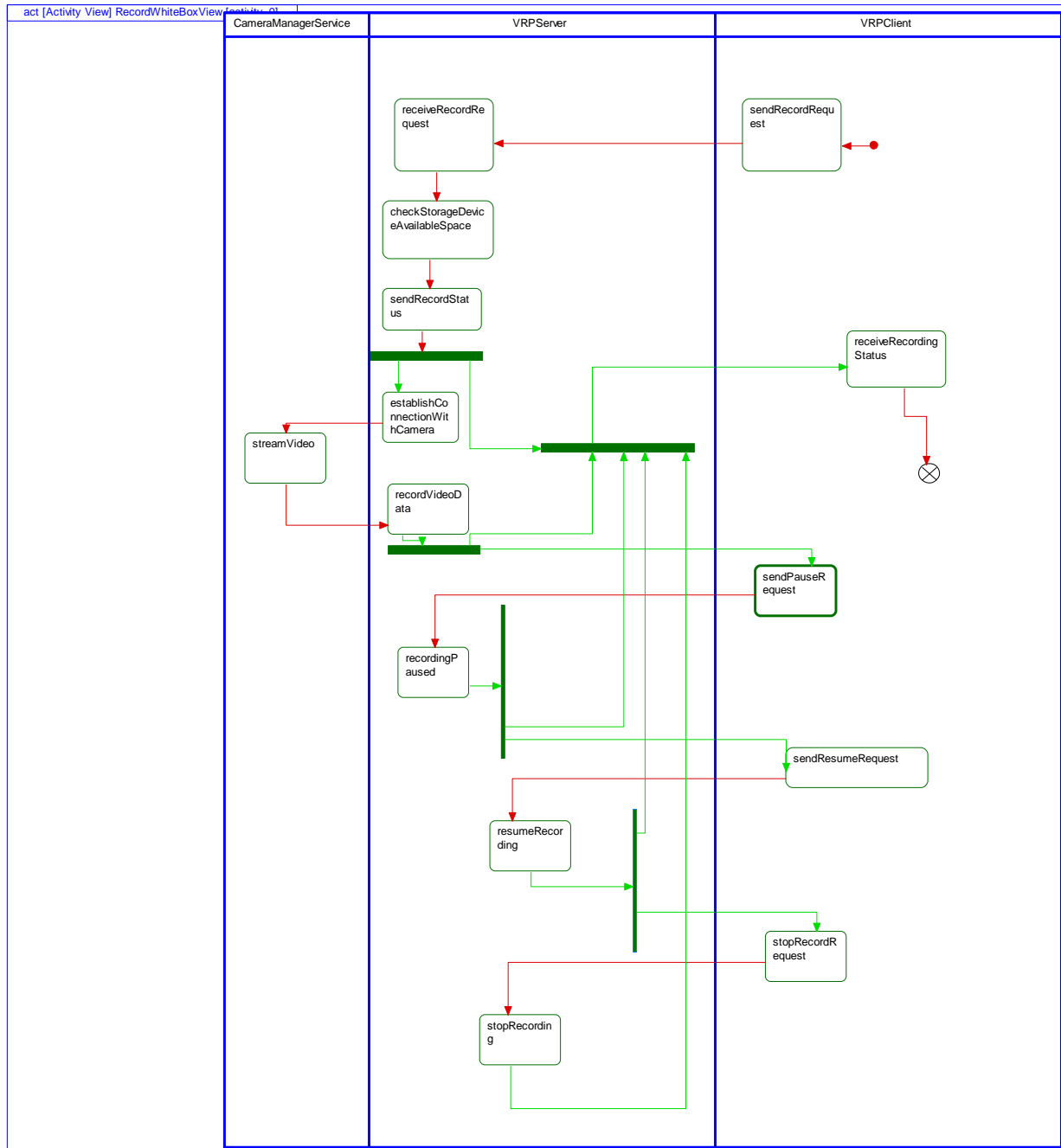
4.1.3   White Box View

4.1.3.1   Activity Diagrams

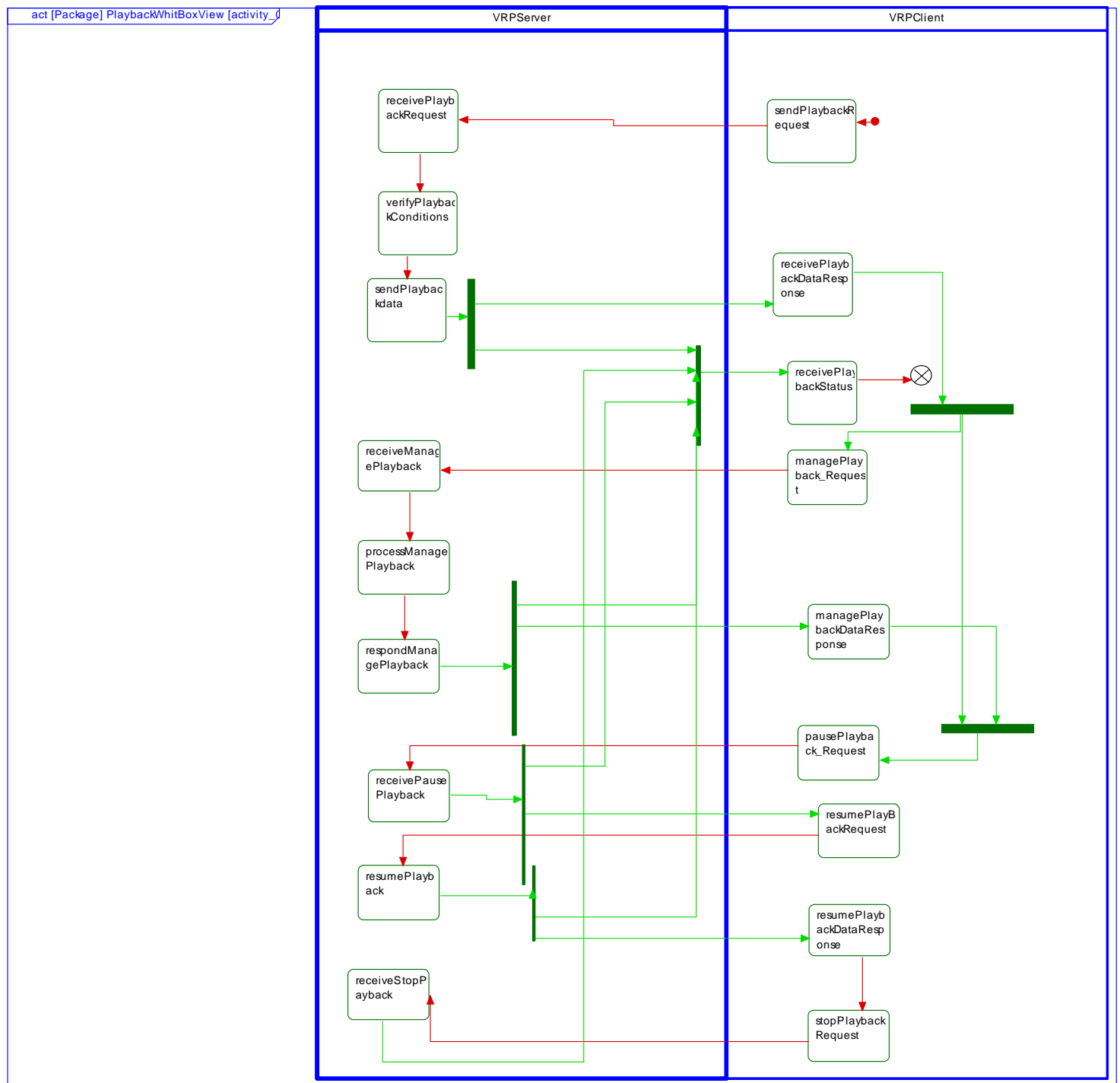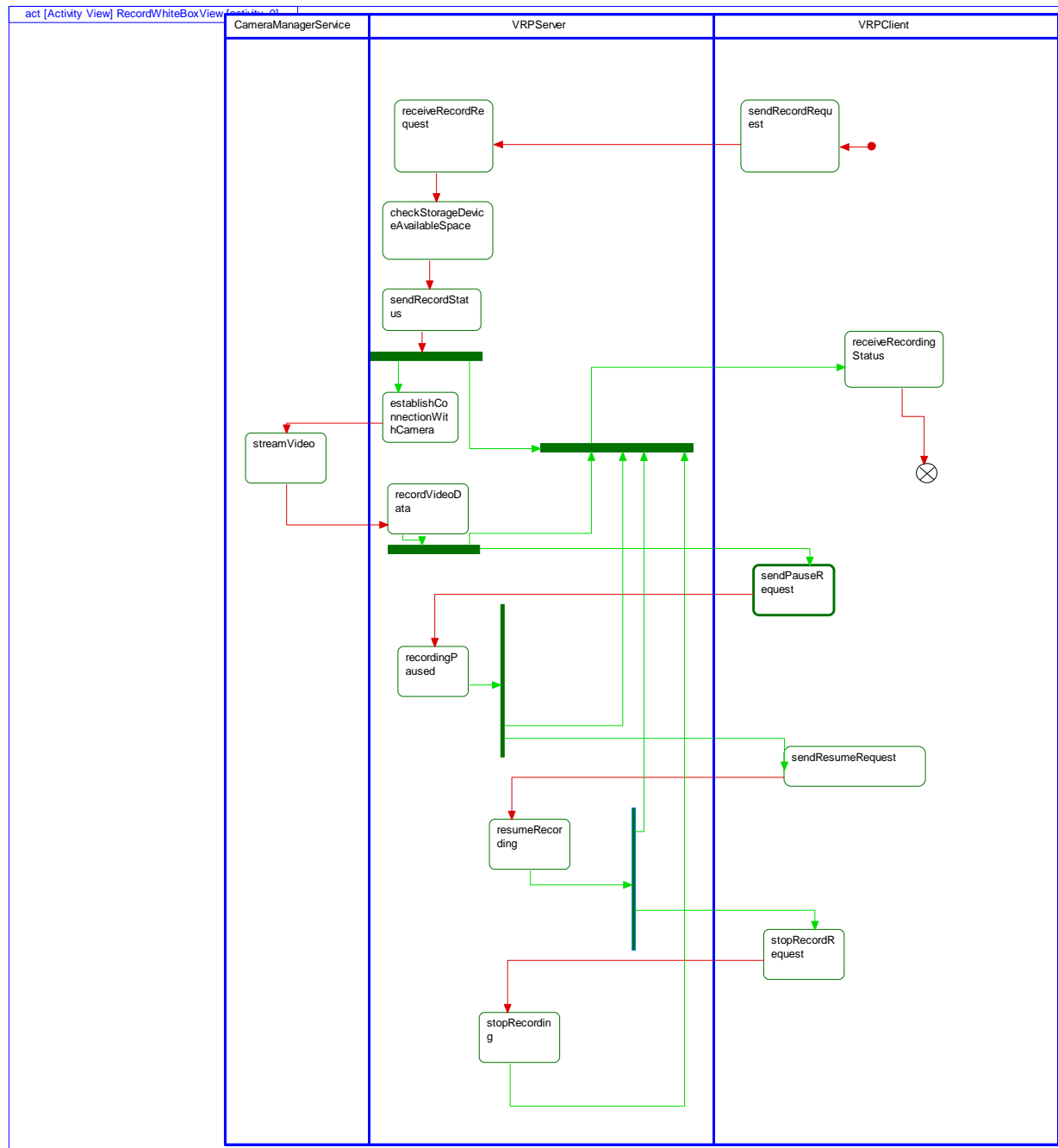#### 4.1.3.1.1   VRP-ACT-REQ-407066/B-Record

Activity Diagram
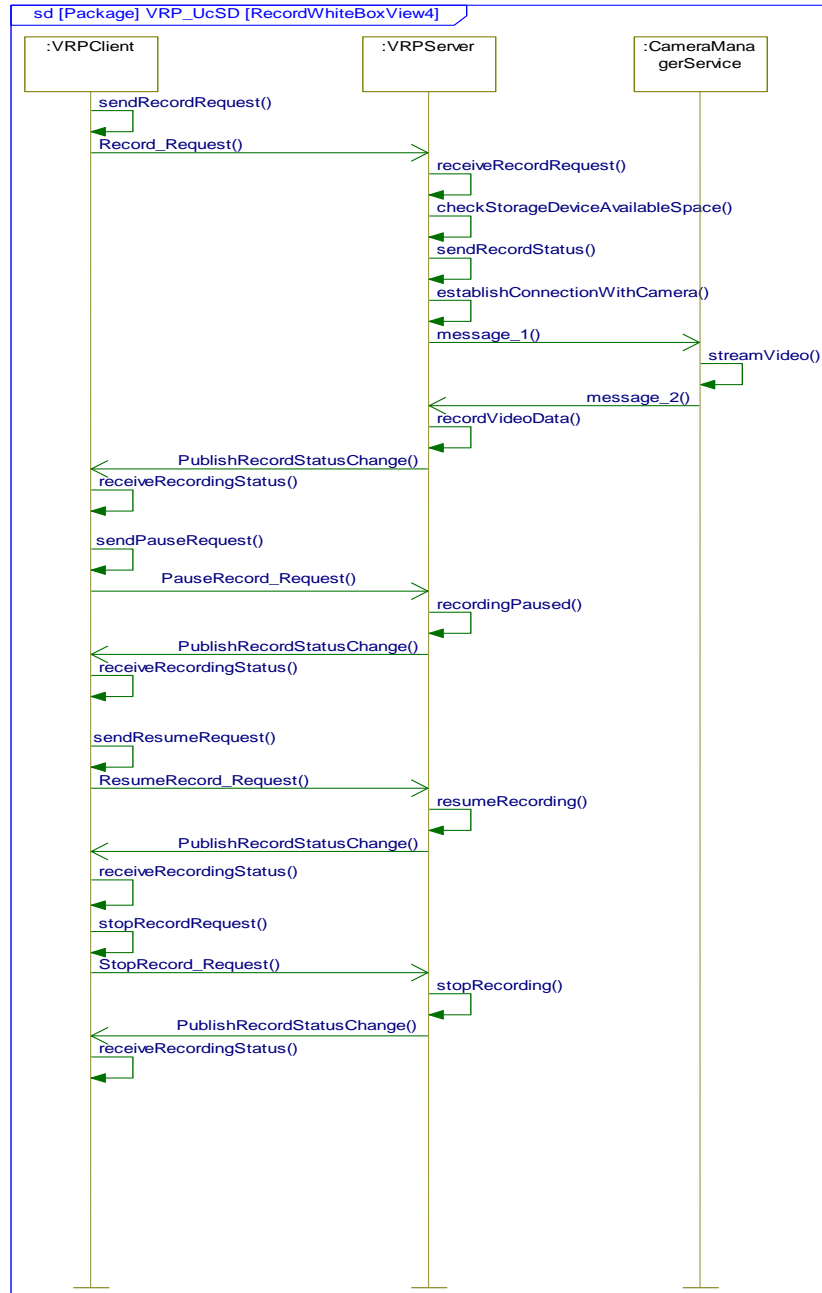
Record

4.1.3.1.2   VRP-ACT-REQ-462718/A-Playback

Activity Diagram

4.1.3.2 Sequence Diagrams

4.1.3.2.1 VRP-SD-REQ-461617/A-Record

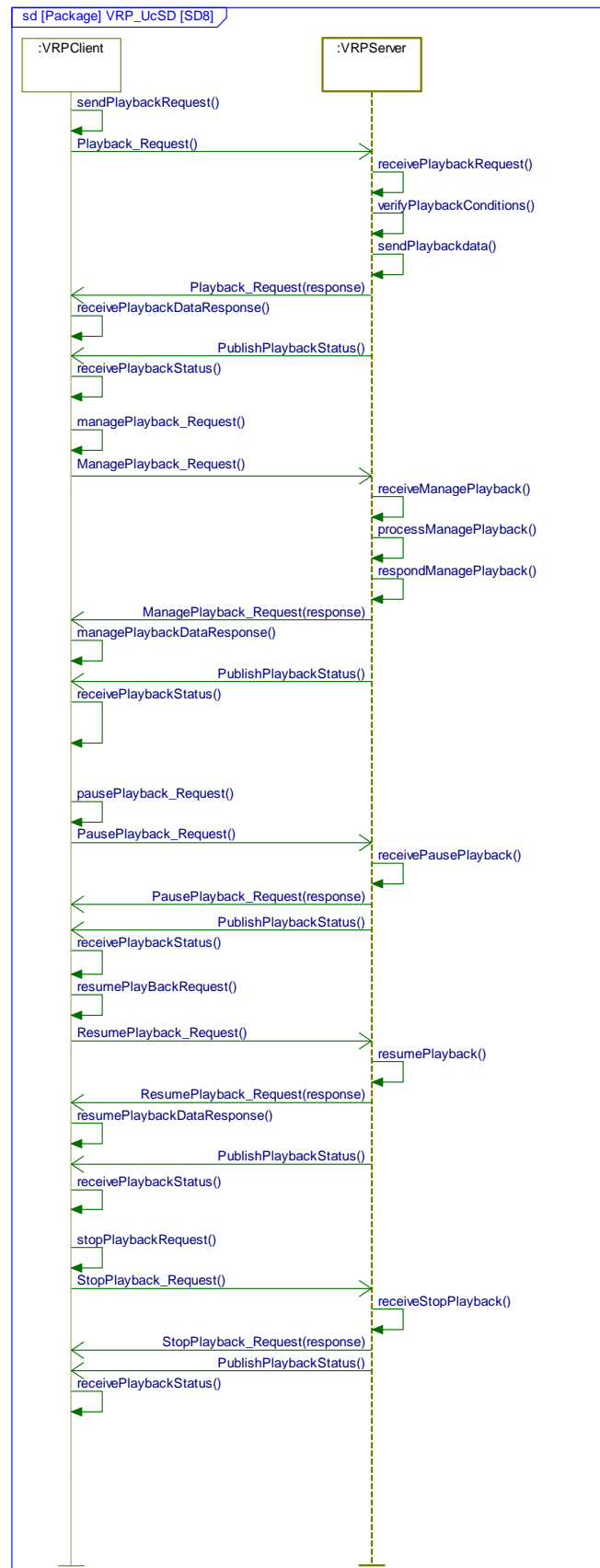**Sequence Diagram**

Record

sd [Package] VRP_UcSD [RecordWhiteBoxView4]

:VRPClient   :VRPServer   :CameraManagerService

sendRecordRequest()

Record_Request()

receiveRecordRequest()

checkStorageDeviceAvailableSpace()

sendRecordStatus()

establishConnectionWithCamera()

message_1()

streamVideo()

message_2()

recordVideoData()

PublishRecordStatusChange()

receiveRecordingStatus()

sendPauseRequest()

PauseRecord_Request()

recordingPaused()

PublishRecordStatusChange()

receiveRecordingStatus()

sendResumeRequest()

ResumeRecord_Request()

resumeRecording()

PublishRecordStatusChange()

receiveRecordingStatus()

stopRecordRequest()

StopRecord_Request()

stopRecording()

PublishRecordStatusChange()

receiveRecordingStatus()

4.1.3.2.2 VRP-SD-REQ-462741/A-Playback

Sequence Diagram

4.2 VRP-FUN-REQ-407079/B-Management of Recordings

4.2.1 Use Cases

4.2.1.1 VRP-UC-REQ-407080/A-Delete Specified and/or Unprotected

Actors	VRPInterfaceClient , VRPInterfaceServer,USB
Pre-conditions	Powermode Conditions are met VRPInterfaceClient is ON VRPInterfaceServer is ON Cameras are ON Storage Device Available File and their information available
Scenario Description	If the Delete conditions are true after/ during the delete data process, the VRPInterfaceServer shall delete the specified recording, segments and send response with the Status via Delete_Specified. Else send Delete_Specified with the reason of the failure. If the Delete conditions are true after/ during the delete data process, the VRPInterfaceServer shall delete the all necessary unprotected files to reach desired state(all unprotected or to specified percent of total space) and send response with the Status via Delete_Unprotected. Else send Delete_Unprotected with the reason of the failure.
Post-conditions	File or folder gets deleted.
List of Exception Use Cases	Storage Device not available Folder/File not available
Interfaces	CAN,USB

4.2.1.2 VRP-UC-REQ-407081/A-Protect Recording Property Conditions

Actors	VRPInterfaceClient , VRPInterfaceServer,USB
Pre-conditions	Powermode Conditions are met VRPInterfaceClient is ON VRPInterfaceServer is ON Cameras are ON Storage Device Available File and their information available
Scenario Description	If the Protect Recording Properties Conditions are true before / during the recording protection process, the VRPInterfaceServer shall: • send ProtectRecordingProperty_Request to change the specified recording property us following: o NotReadOnly if the recording is set to Write only o ReadOnly if the recording is set to read only. • send status via ProtectRecordingProperty_Request

	Else send ProtectRecordingProperty_Request with the reason of the failure.
Post-conditions	Change in File Property for file
List of Exception Use Cases	Storage Device not available Folder/File not available
Interfaces	CAN,USB

4.2.1.3 VRP-UC-REQ-407573/A-List Recording Information

Actors	USB,SYNC(VRP), ECG
Pre-conditions	Powermode Conditions are met VRPInterfaceClient is ON VRPServer is On USB storage Device Connectd
Scenario Description	When the VRPInterfaceServer receives a request to list the list of Recordings via ListRecordinginfo_Request the server shall respond with the following. A list of devices available (Storage Device IDs) Per device, includes a list of records - recording_session_id - MetadataToRecord - segment_number - Storage_Id - date_time_created - total_size - Total Duration_time - Recording session Name - Protection Info - Total_Segments - Camera Views - EncryptVideo - EncryptMetadata When the VRPInterfaceServer receives a request to list the list of Recording Session Segments via ListRecordingsessionsegments_Request the server shall respond with the following: - segment_number - date_time_created - Total Duration_time - Protected - Camera Views
Post-conditions	File details and list of files are responded.
List of Exception Use Cases	
Interfaces	USB, Ethernet

4.2.2   Requirements

4.2.2.1   *VRP-REQ-407082/A-Delete Condition for Specified*

When Delete_Specified is received, the VRPInterfaceServer shall verify all the following Delete Data Conditions
- Specified storage device is available
- Specified RecordingId is available

4.2.2.2   *VRP-REQ-447597/A-Delete Condition for unprotected*

When Delete_Unprotected is received, the VRPInterfaceServer shall verify all the following Delete Data Conditions
- storage device is available
- Feature has unprotected files on the device.

4.2.2.3   *VRP-REQ-407083/A-Delete specified*

If the Delete conditions are true after/ during the delete data process,
the VRPInterfaceServer shall delete the specified recording, segments and send response with the Status via Delete_Specified.
Else send Delete_Specified with the reason of the failure.

4.2.2.4   *VRP-REQ-447598/A-Delete Unprotected*

If the Delete conditions are true after/ during the delete data process,
the VRPInterfaceServer shall delete the all necessary unprotected files to reach desired state(all unprotected or to specified percent of total space) and send response with the Status via Delete_Unprotected.
Else send Delete_Unprotected with the reason of the failure.

4.2.2.5   *VRP-REQ-407084/A-Protect Recording Property Conditions*

When **ProtectRecordingProperty_Request** is received, the VRPInterfaceServer shall verify all the following **protect Recording Properties Conditions**:
- Specified Folder and Feature folder are available
- Specified storage device is available

4.2.2.6   *VRP-REQ-407085/A-Protect Recording Properties*

If the **Protect Recording Properties Conditions** are true before / during the recording protection process, the VRPInterfaceServer shall:
- send **ProtectRecordingProperty_Request** to change the specified recording property us following:
  - o   NotReadOnly if the recording is set to Write only
  - o   ReadOnly if the recording is set to read only.
- send status via **ProtectRecordingProperty_Request**

Else send **ProtectRecordingProperty_Request** with the reason of the failure.

4.2.2.7   *VRP-REQ-406923/A-List Recording Information*

When the VRPInterfaceServer receives a request to list the list of Recordings via ListRecordinginfo_Request the server shall respond with the following.
A list of devices available (Storage Device IDs)
- o   Per device, includes a list of records
  - recording_session_id
  - MetadataToRecord
  - segment_number
  - Storage_Id

- date_time_created
- total_size
- Total Duration_time
- Recording session Name
- Protection Info
- Total_Segments
- Camera Views
- EncryptVideo
- EncryptMetadata

When the VRPInterfaceServer receives a request to list the list of Recording Session Segments via ListRecordingsessionsegments_Request the server shall respond with the following:
- segment_number
- date_time_created
- Total Duration_time
- Protected
- Camera Views

4.3 VRP-FUN-REQ-406917/B-Memory and Storage

4.3.1 Use Cases

4.3.1.1 VRP-UC-REQ-406918/A-Storage device selection

Actors	USB, SYNC(VRP), ECG
Pre-conditions	Powermode Conditions are met VRPInterfaceClient is ON VRPServer is On File saved on the storage device is not Read only
Scenario Description	When one of the following conditions is met: - Specified storage device is unavailable - The specified storage device is available and available space is equal to less than Expected Recording Space, the VRPInterfaceServer shall select the Storage device when: Case 1: Device to Consider is Include Pretested - Verify and select the pretested storage device with the most recent recording for the feature which meets the following storage device condition: Available Space is equal to or greater than Expected Recording Space Or - verify and Select the pretested storage device with the most available space, if no pretested storage device with the most recent recording for the feature which meets the condition Available Space is equal to or greater than Expected Recording Space Case 2: Device to Consider is Include Any - Verify and select the pretested storage device with the most recent recording for the feature which meets the following storage condition: Available Space is equal to or greater than Expected Recording Space Or - verify and select the pretested storage device with the most available space meets the following storage condition: : Available Space is equal to or greater than Expected Recording Space , if no pretested storage with most recent recording which meets the storage condition Available Space is equal to or greater than Expected Recording Space Or

	- Select the any storage device with the most available space, if no pretested storage device with the most available space which meets the storage condition Available Space is equal to or greater than Expected Recording Space
Post-conditions	Respond with the memory status and delete oldest file if memory runs out.
List of Exception Use Cases	
Interfaces	Ethernet,USB

4.3.1.2 VRP-UC-REQ-407089/A-Memory Status and Available space

Actors	VRPInterfaceClient, VRPInterfaceServer, USB
Pre-conditions	Powermode Conditions are met VRPInterfaceClient is ON VRPServer is On File saved on the storage device is not Read only

Scenario Description	Available Space
	If Record_Request is received with limited duration, the VRPInterfaceServer shall calculate Minimum Available Space Reached When Available Space is equal or less than minimum Available Space (refer to the F-REQ-435545/A-Determine Available_Space on a Storage Device in VideoRecoderService),then the VRPInterfaceServer shall terminate the recording and send Record_Request with out of storage parameter.
	Storage Memory Status Request When ListStorageDeviceInfo is received, the VRPInterfaceserver shall respond the following memory status of all the connected storage device via ListStorageDeviceInfo.
	Storage Device (s) ID
	Total memory
	Used Memory: used memory
	Protected Feature memory: all the non-read-only files under the folder of the requesting feature
	Not Protected Feature memory: all the read-only files under the folder of the requesting feature
	Other Space: used space related to other features:
	   - files of other features
	   - None of VRP Files
	Free Memory: free memory

Post-conditions	Estimated Memory is calculated per the Recording duration.

	Oldest file is deleted if Estimated memory is more than the storage device capacity Terminate the Recording session if the Storage capacity is reached.
List of Exception Use Cases	
Interfaces	Ethernet,USB

4.3.2 Requirements

4.3.2.1 *VRP-REQ-406920/A-Storage Device Conditions ,Format, Selection and Failure*

The following requirements shall specify the Storage Device Conditions, Selection, Formatting and Failure requirements.

4.3.2.1.1 VRP-REQ-439777/A-Storage Device Conditions

When Record_Request is received with the storage device id and:
  Case 1:
  Device to Consider is "Specified only" then the VRPInterfaceServer shall check if:
  - The specified storage device ID is available
  - Available Space is greater than min Available space(refer to F-REQ-435545/A-Determine Available_Space on a Storage Device)

  Case 2:
  Device to Consider is "Include Pretested" or "Include Any" the VRPInterfaceServer shall check if:
  - The specified storage device ID is available
  - Available Space is equal to or greater than Expected Recording Space. (refer F-REQ-435544/A-Determine Expected_Recording_Space)

4.3.2.1.2 VRP-REQ-406922/A-Storage Device Selection

When one of the following conditions is met:
- Specified storage device is unavailable
- The specified storage device is available and available space is equal to less than Expected Recording Space,
the VRPInterfaceServer shall select the Storage device when:
Case 1:
 Device to Consider is Include Pretested
- Verify and select the pretested storage device with the most recent recording for the feature which meets the following storage device condition: Available Space is equal to or greater than Expected Recording Space
Or
- verify and Select the pretested storage device with the most available space, if no pretested storage device with the most recent recording for the feature which meets the condition Available Space is equal to or greater than Expected Recording Space

Case 2:
Device to Consider is Include Any
- Verify and select the pretested storage device with the most recent recording for the feature which meets the following storage condition: Available Space is equal to or greater than Expected Recording Space
Or
- verify and select the pretested storage device with the most available space meets the following storage condition: : Available Space is equal to or greater than Expected Recording Space
, if no pretested storage with most recent recording which meets the storage condition Available Space is equal to or greater than Expected Recording Space
Or

- Select the any storage device with the most available space, if no pretested storage device with the most available space which meets the storage condition Available Space is equal to or greater than Expected Recording Space

Note:
•   For available space refer to F-REQ-435545/A-Determine Available_Space on a Storage Device
•   For Expected recording space refer F-REQ-435544/A-Determine Expected_Recording_Space in the ENG-768637B-VideoRecorderService

4.3.2.1.3   VRP-REQ-439778/A-Failure when Storage Device conditions are not met, in case of Device to Consider is Specified Only

If one of the following conditions are true:
- the specified storage device ID is unavailable or
-the specified storage device is available and Available Space is equal to or less than minimum available space (using the F-REQ-435545/A-Determine Available_Space on a Storage Device as refered in VideoRecoderService)

then the VRPInterfaceServer send response via Record_Request with Failure and one of the following reasons:
- Storage Device ID unavailable
- No available space

4.3.2.1.4   VRP-REQ-446677/A-Format Storage Device

The VRPInterfaceServer shall be able to Format the Storage Device via the FormatStorageDevice API.
The VRPInterfaceServer shall respond with Success and Storage Space information

4.3.2.2   VRP-REQ-406921/A-Memory Status and Available Space

Available Space
If **Record_Request** is received with limited duration, the VRPInterfaceServer shall calculate Minimum Available Space Reached When Available Space is equal or less than minimum Available Space (refer to the F-REQ-435545/A-Determine Available_Space on a Storage Device in VideoRecoderService),then the VRPInterfaceServer shall terminate the recording and send Record_Request with out of storage parameter.
Storage Memory Status Request
When ListStorageDeviceInfo is received, the VRPInterfaceserver shall respond the following memory status of all the connected storage device via ListStorageDeviceInfo.
Storage Device (s) ID
Total memory
Used Memory: used memory
Protected Feature memory: all the non-read-only files under the folder of the requesting feature
Not Protected Feature memory: all the read-only files under the folder of the requesting feature
Other Space: used space related to other features:
      - files of other features
      - None of VRP Files
Free Memory: free memory

5   Appendix: Reference Documents

Reference #	Document Title
1	ENG-768637B-VideoRecorderService
2	ENG-768744A-VideoPlaybackService
3	Video Recorder and Playback Security Requirements Version 1.4 spec.
4	
5	
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6   Future requirements

- Loop Recording