TRS

GWM V2MH AVM & MOD

## 

**Document release**

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| --- | --- |
| Delivery via PC network / e-mail. | **Version: 1.0**  Date: 2017-06-22 |
| **Release of the document:**  Name:  Date:  Signature: | PM: Sun, Vicki    Phone: 021-23065623  E-mail: Vicki.Sun@harman.com |
| Origin Harman, Department:  Name:  Date: Signature: | **Release of the document at <GWM>:**  Name:  Date: Signature: |

**Preamble:**

This document is an addition to the concluded development- and delivery contract with < GWM>.

The System Specification is the department’s basis for their development and was worked out in close coordination with < GWM >.

This System Specification is the result of the previous work on the project by different groups consisting of people from both companies and replaces all former conventions in the sector of product specification. It is obligatory the product’s entire term for both parties – especially for customer service and quality departments – until its written and bilateral accepted change.

Should this specification or direct or indirect referenced sub-specifications contain any inconsistency or outstanding points, both parties will endeavour to isolate and correct them in bilateral agreement and bilateral profit.

**Change documentation**

|  |  |  |  |
| --- | --- | --- | --- |
| Version | ***Description*** | Who | When |
| template | Template created from *TFS\_xx\_Tuner\_Scalable Platform\_english.doc* | Chen,chen | 20111231 |
| 1.0 | Draft version for review | Lu, Guofeng | Jun 22, 2017 |

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# Technical Requirements Specification for AVM & MOD

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# References to Documents

## 2.1 Customer Requirements Specification

产品定义书-V2多媒体播放器总成中高配-1.21.pdf

GWM\_Platform\_Feature-Functionlist\_infotainment\_V1\_0.xlsx

## 2.2 System Architectural Technical Requirements Specification

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## 2.3 System Architectural Design

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# Analysis

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## 3.2 Short Description / Customer Motivation

The documentation is guidance for requirement analysis for AVM & MOD feature. The content should be discussed from customer requirement engineer, software design team including CoC and CPM.

## 3.3 Features

Around view system provides stitched images in many different views such as Bird’s eye or any other 3D or distortion-corrected view. Driver can switch the view around the car by touch screen or by hard key, or the view switching can be triggered by angle of the steering wheel.

MOD (moving object detection) can detect moving object in front (or behind) of the car with wide range and high resolution camera, driver in the car can get warning in the car when this feature is enabled.

### 3.3.1 Around View Camera

### 3.3.1.1 Activate around camera view by touch screen

Around camera view can be manually activated by HMI software touch button.

#### <HMI heading>

### 3.3.1.2 Activate around camera view by hard key

Around camera view can be manually activated by hard key button.

### 3.3.1.2 Activate around camera view by engaging rear gear

Around camera view can be automatically activated when rear gear engaged.

### 3.3.1.3 Deactivate around camera view by touch screen

Around camera view can be manually deactivated by HMI software touch button.

#### <HMI heading>

### 3.3.1.4 Deactivate around camera view by hard key

Around camera view can be manually deactivated by hard key button manually.

### 3.3.1.5 Deactivate around camera view by disengaging rear gear

Around camera view can be automatically deactivated when rear gear disengaged.

### 3.3.1.6 Deactivate around camera view by speed

When vehicle speed is over 15km/h (activated by touch screen), system automatically turns off AVM screen and goes back to previous application. Once application is switched, system shall not be back to AVM even vehicle speed is lower than 15km/h.

#### <HMI heading>

### 3.3.1.7 Switching around camera view manually by touch screen

Around camera view can be switched manually by HMI software touch button manually.

System change AVM view mode as following:

- Top View (360 Degrees View): composite view from the top to down.

- Front View: display front camera only.

- Rear View: display rear camera only.

- Right View: display right camera only.

- Left View: display left camera only.

#### <HMI heading>

### 3.3.1.8 Switching around camera view automatically by steer wheel/radar/MOD

Around camera view can be switched automatically by steer wheel and radar sensor automatically

System change AVM view mode as following:

- Front View: when car is driving close to object in front of the car

- Rear View: right turn or angle of steer wheel

- Right View: when car is driving close to object behind of the car

- Left View: left turn or angle of steer wheel

-cross road view (front and rear): when detected cross traffic (based on MOD)

### 3.3.1.9 Mute Audio when around camera view is activated

When around view camera is activated, audio of entertainment(tuner) shall be mute.

### 3.3.1.10 Resume Audio when around camera view is deactivated

When around view camera is deactivated, audio of entertainment(tuner) shall be resumed if it is previously enabled.

### 3.3.1.11 Pause media when around camera view is activated

When around view camera is activated, media shall be pause if it is playing that time.

### 3.3.1.12 Resume media when around camera view is activated

When around view camera is deactivated, media shall be resumed if it is previously enabled.

### 3.3.1.13 Keep playing BT phone when around camera view is activated

BT phone hands-free is an exception, keep voice output while AVM is activated.

#### <HMI heading>

### 3.3.1.14 Show previous application when rear gear not engaged (exit from AVM)

System switches back to previous application when gear shifted to other level besides of 'R'.

### 3.3.1.15 Setting guide line displayed on around camera view

User can set guidelines for parking display and not display on around camera view.

#### <HMI heading>

### 3.3.1.16 Displaying static guide line on around camera view

Static guidelines shall be displayed on around camera view at same time.

### 3.3.1.17 Displaying dynamic guide line on around camera view

Dynamic guidelines shall be displayed on around camera view at same time.

### 3.3.1.18 Displaying distance block view (fusion with radar sensors) on around camera view

System shall display the vehicle with radar sensors in front and back. When any obstacle is detected, system shall blink detected radar sensor and distance to obstacle

### 3.3.1.19 Displaying waring message on around camera view

System shall display warning message while AVM is displayed. "Please watch out your surrounding while you're driving"

#### <HMI heading>

### 3.3.1.20 Displaying system fault message on around camera view

When AVM is fault, the corresponding warning message display on screen.

#### <HMI heading>

### 3.3.1.21 Blocking Popup & Notification when around camera view is activated

System doesn't allow any popup or notification to block AVM video screen. These shall be displayed after AVM is deactivated.

### 3.3.1.22 Blocking Application switching when around camera view is activated

System doesn't allow to switch to other screen while AVM is activated.

### 3.3.1.23 Displaying Door open state when around camera view is activated

When AVM is activated, the corresponding image of door state shall be displayed on screen. example: one of four doors is open.

### 3.3.1.24 Displaying trunk open state when around camera view is activated

When trunk open, the corresponding reminder will display on screen.

### 3.3.1.25 Displaying outside mirror open state when around camera view is activated

When AVM is activated, the corresponding image of outside mirror state shall be displayed on screen.

### 3.3.1.26 Auto calibration of around view system

Camera of around view system can be auto calibrated with the white land on the road. It shall have the quality target of <7cm deviation at 1m distance.

### 3.3.1.27 Diagnosis of around view system

Around view system shall notify its state to diagnosis service when system fault happened.

### 3.3.2 Moving Object Detection

### 3.3.2.1 Moving object detection by front view

The front camera shall able to detect cross traffic in front of the car.

### 3.3.2.2 Moving object detection by rear view

The rear camera shall able to detect cross traffic behind of the car.

### 3.3.2.3 Detection range of MOD

The detection range shall be 20 meter in horizontal and 8 meter in vertical.

### 3.3.2.4 Detection type of MOD

MOD shall detect all type of the object moving close to the car, including the car, bicycles or pedestrian, but it will not identify what the object it is.

### 3.3.2.5 Detection size of MOD

MOD shall detect the object which higher than 0.5 meter and width (in the image view) more than 10 pixels.

### 3.3.2.6 Detection warning rate of MOD

MOD shall detect the object with correctly report warning rate above 95%.

### 3.3.2.7 Detection false positive rate of MOD

MOD shall correctly detect the object with false positive report rate less than 5%.

### 3.3.2.6 Detection speed of MOD

MOD shall detect the object under low speed.

### 3.3.3 KPI of around view camera system

### 3.3.3.1 latency of displaying around camera view when camera system is ready

Latency of AVM video screen shall not exceed 500 milliseconds when camera system is ready.

### 3.3.3.2 latency of displaying around camera view from a system cold start

Latency of AVM video screen shall not exceed 5500ms milliseconds from a system cold start state.

### 3.3.2.3 stability of camera view

No camera flickering shall be seen after camera is activated.

## 3.4 Non-Functional Requirements

### 3.4.1 Requirement Analysis



### 3.4.2 AVM&MOD specified hardware requirement

### 

### 3.4.3 Other requirements need to be point out

|  |  |  |
| --- | --- | --- |
| **Requirement** | **Description** | **Project capability** |
|  |  |  |
|  |  |  |

# Terms

|  |  |
| --- | --- |
| **Terms** | **Description** |
| Bird’s Eye View | A perspective generated from an image or group of stitched images to provide a top down view directly overhead at a vantage point. In Surround View this is directly over the vehicle centroid. |
| AVM | Around view camera |
| MOD | Moving object detection |
|  |  |