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| --- | --- | --- | --- |
| **Author** | | **Review** | **Approval** |
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|  | |  |  |
| **Distribution** | | | |
| See Project Master Document for the roles and Project Members List for the name of people | | See Project Master Document for the roles and Project Members List for the name of people | See Project Master Document for the roles and Project Members List for the name of people |
|  | |  |  |
| **Executive**  **Summary** | This document presents the quality metrics of the eCS MCC regarding the R1.2 version. | | |

272502 VW VWA VN 41S1\_NAR EL SB:

Software QualiTy METRICS report

ON R2.0 Version

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# General Information

## Revision history

|  |  |  |  |
| --- | --- | --- | --- |
| **Revision** | **Date** | **Author(s)** | **Description/comment** |
| 1.1 | 13.04.2023 | V. Chioveanu | Initial version for R1.2 |
| 1.2 | 18.04.2023 | V. Chioveanu | Corrected name in PTC |
| 1.3 | 26.07.2023 | V. Chioveanu | Update for version R2.0 |

## Purpose and Scope

The purpose of this report is to describe the software code analysis done with QAC on all software components used by the R2.0

Product: eCS Audi MCC

Software Version: **R2.0**

QAC version: **8.2.0.R**

## Referenced documents

|  |  |  |
| --- | --- | --- |
| **Id** | **Document name** | **Location** |
|  | PP4G\_QAC\_Analysis.py | [*S:\Metrics\Static\_Analysis*](file:///S:\Metrics\Static_Analysis) |
|  | QAC\_Warning\_Report.xlsx |
|  | QAC\_Metrics\_Report.xlsx |
|  | MISRA C 2012 | *MISRA C Guidelines* |
|  | SW03OTH003 - SW coding rules user guide | *PLM AEM\_PROCESS\_1.18.00* |

## Terminology and definitions

|  |  |
| --- | --- |
| **Terminology** | **Meaning** |
|  |  |

# Metrics Acceptability Criteria

The metrics acceptability criteria used to obtain a good software quality are defined in [Ref5].

# List of the improvable functions

This table is extracted from **Improvable** Excel sheet in ***QAC\_Metrics\_Report.xlsx*** *[Ref3].* This shows which functions do not meet the metrics acceptability criteria defined in Chapter 2. For more details please see [Ref3].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| File Name | The following functions must be improved on next release | Justification | Action | Status |
| ACC.c 1.39 | acc\_Init | no functional impact | NONE | JUSTIFIED |
| ACC.c 1.39 | acc\_ReadData | no functional impact | NONE | JUSTIFIED |
| ACC.c 1.39 | acc\_ReadAlarmRegisters | no functional impact | NONE | JUSTIFIED |
| AdcIf.c 1.19.1.5.1.2.1.13 | AdcIf\_runGetChannelValue | no functional impact | NONE | JUSTIFIED |
| ATM.c 1.3.8.28 | atm\_SetDemEvent | no functional impact | NONE | JUSTIFIED |
| ATM.c 1.3.8.28 | atm\_PlayOneShotTests | no functional impact | NONE | JUSTIFIED |
| BswM\_Callouts.c 1.58.1.48 | bswm\_CheckNvmIntegrity | no functional impact | NONE | JUSTIFIED |
| BswM\_Callouts.c 1.58.1.48 | BswM\_Cyclic\_10msTimer | no functional impact | NONE | JUSTIFIED |
| BswM\_Callouts.c 1.58.1.48 | BswM\_OnStartupTwoA | no functional impact | NONE | JUSTIFIED |
| BswM\_Callouts.c 1.58.1.48 | BswM\_CB\_NfyNvMJobEnd | no functional impact | NONE | JUSTIFIED |
| BswM\_Callouts.c 1.58.1.48 | BswM\_OnStartupTwoB | no functional impact | NONE | JUSTIFIED |
| BswM\_Callouts.c 1.58.1.48 | BswM\_OnStartComEffective | no functional impact | NONE | JUSTIFIED |
| BswM\_Callouts.c 1.58.1.48 | BswM\_OnPostRunFromRun | no functional impact | NONE | JUSTIFIED |
| BswM\_Callouts.c 1.58.1.48 | BswM\_On\_Prep\_Shutdown | no functional impact | NONE | JUSTIFIED |
| BswM\_Callouts.c 1.58.1.48 | OS\_TASK\_OsTask\_Bsw\_ReadWrite\_AllProcess | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_Manage\_eCS\_Status\_Verr\_Reihe1\_BFS\_1 | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_Manage\_eCS\_Status\_Verr\_Reihe1\_BFS\_2 | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_Manage\_eCS\_Status\_Verr\_Reihe1\_FS\_1 | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_Manage\_eCS\_Status\_Verr\_Reihe1\_FS\_2 | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_Manage\_eCS\_Status\_Verr\_Reihe2\_BFS | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_Manage\_eCS\_Status\_Verr\_Reihe2\_FS | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_Manage\_eCS\_Error\_Reihe1\_BFS\_1 | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_Manage\_eCS\_Error\_Reihe1\_BFS\_2 | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_Manage\_eCS\_Error\_Reihe1\_FS\_1 | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_Manage\_eCS\_Error\_Reihe1\_FS\_2 | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_Manage\_eCS\_Error\_Reihe2\_BFS | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_Manage\_eCS\_Error\_Reihe2\_FS | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_Manage\_eCS\_Gurtschloss\_Status | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_ManagePeriodicData\_TimeSlot01 | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_ManagePeriodicData\_TimeSlot02 | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | cil\_ManagePeriodicData\_TimeSlot04 | no functional impact | NONE | JUSTIFIED |
| CIL\_AppliToCAN.c 1.5.3.46 | CIL\_runCANToSafetyAppli | no functional impact | NONE | JUSTIFIED |
| CIL\_CANToAppli.c 1.6.3.24 | cil\_Update\_07Cx\_Block01\_InfosToSend | no functional impact | NONE | JUSTIFIED |
| CIL\_CANToAppli.c 1.6.3.24 | cil\_Update\_07Cx\_Block03\_InfosToSend | no functional impact | NONE | JUSTIFIED |
| CIL\_Init.c 1.3.1.8 | CIL\_runManageMF | no functional impact | NONE | JUSTIFIED |
| Dcm\_Callouts.c 1.26 | Dcm\_WriteMemory | no functional impact | NONE | JUSTIFIED |
| Dcm\_Callouts.c 1.26 | Dcm\_ReadMemory | no functional impact | NONE | JUSTIFIED |
| DIA.c 1.1.12.24 | DIA\_runServiceRequestIndication | no functional impact | NONE | JUSTIFIED |
| DIA.c 1.1.12.24 | DIA\_runDidF15B\_FingerprintAndProgrammingDateOfLogicalSoftwareBlocksRead | no functional impact | NONE | JUSTIFIED |
| DIA\_ReadDataByIdentifier.c 1.4.2.47 | DIA\_runRidF797\_AccAngleOffsetCalibrationStart | no functional impact | NONE | JUSTIFIED |
| DIA\_ReadDataByIdentifier.c 1.4.2.47 | dia\_IsAsciiCharAllowedAUDI | no functional impact | NONE | JUSTIFIED |
| DIA\_RoutineControl.c 1.10.2.33 | DIA\_run\_Did0236\_ProgrammingDataElockEcuWrite | no functional impact | NONE | JUSTIFIED |
| eCS.c Unknown | ComputeBallPosition | model based | NONE | JUSTIFIED |
| eCS.c Unknown | CrashDetectionMtrPerSecSqd | model based | NONE | JUSTIFIED |
| eCS.c Unknown | Tab1DS0I2T521\_d | model based | NONE | JUSTIFIED |
| EIM.c 1.5 | EIM\_ManageAecStatus | no functional impact | NONE | JUSTIFIED |
| Fsm.c 1.50 | fsm\_ManageSolenoidErrors | no functional impact | NONE | JUSTIFIED |
| Fsm.c 1.50 | fsm\_RunSolenoidStateManagement | no functional impact | NONE | JUSTIFIED |
| Fsm.c 1.50 | FSM\_runMainFunction | no functional impact | NONE | JUSTIFIED |
| Fsm.c 1.50 | fsm\_UpdateModeStatus\_SolenoidAbortionErrorPresentConditions | no functional impact | NONE | JUSTIFIED |
| FSM\_modes.c 1.39 | fsm\_UpdateModeStatus\_SolenoidInhibitionErrorPresentConditions | no functional impact | NONE | JUSTIFIED |
| FSM\_modes.c 1.39 | FSM\_manageSolenoidCounters | no functional impact | NONE | JUSTIFIED |
| IoHwAb\_AdcIf.c 1.8.1.1.1.12.1.45 | iohwab\_DetectVoltageFluctuationOnSolenoid | no functional impact | NONE | JUSTIFIED |
| IoHwAb\_AdcIf.c 1.8.1.1.1.12.1.45 | iohwab\_SearchState | no functional impact | NONE | JUSTIFIED |
| IoHwAb\_AdcIf.c 1.8.1.1.1.12.1.45 | IoHwAb\_runGetMeasure | no functional impact | NONE | JUSTIFIED |
| IoHwAb\_AdcIf.c 1.8.1.1.1.12.1.45 | IoHwAb\_GetSolenoidTemperature | no functional impact | NONE | JUSTIFIED |
| LPM.c 1.26 | LPM\_sleepInit | no functional impact | NONE | JUSTIFIED |
| LPM.c 1.26 | LPM\_sleepMainLoop | no functional impact | NONE | JUSTIFIED |
| LPM.c 1.26 | LPM\_sleepRestore | no functional impact | NONE | JUSTIFIED |
| MIC.c 1.1.9.15 | MIC\_Init | no functional impact | NONE | JUSTIFIED |
| NvmIf.c 1.14.1.11 | NvmIf\_Autotest\_RunEepromMemoryNotProgrammed | no functional impact | NONE | JUSTIFIED |
| SAD.c 1.58 | sad\_ControlSolenoidsCircuitry | no functional impact | NONE | JUSTIFIED |
| SAD.c 1.58 | sad\_runSolenoidControl | no functional impact | NONE | JUSTIFIED |
| SAD.c 1.58 | sad\_ControlStepExecution | no functional impact | NONE | JUSTIFIED |
| SAD.c 1.58 | SAD\_runMainFunction | no functional impact | NONE | JUSTIFIED |
| SAD.c 1.58 | sad\_ExecuteOpenCircuitCheck | no functional impact | NONE | JUSTIFIED |
| SAD\_autotests.c 1.54 | sad\_ExecutePinStateCheck | no functional impact | NONE | JUSTIFIED |
| SAD\_autotests.c 1.54 | sad\_ExecuteOvervoltageCheck | no functional impact | NONE | JUSTIFIED |
| SAD\_autotests.c 1.54 | SAD\_CheckSolenoidOpenCircuitAutotest | no functional impact | NONE | JUSTIFIED |
| SAD\_autotests.c 1.54 | SAD\_CheckSolenoidShortToGNDAutotest | no functional impact | NONE | JUSTIFIED |
| SAD\_autotests.c 1.54 | SAD\_CheckSolenoidShortToVBATAutotest | no functional impact | NONE | JUSTIFIED |
| SAD\_autotests.c 1.54 | SAD\_CheckSolenoidOvervoltage | no functional impact | NONE | JUSTIFIED |
| SBC.c 1.2.4.29 | sbc\_ClearStateAndReport | no functional impact | NONE | JUSTIFIED |
| App\_startup.c 1.2.1.10 | RAM\_InitData | no functional impact | NONE | JUSTIFIED |
| App\_startup.c 1.2.1.10 | MyMcuArchClock\_Init | no functional impact | NONE | JUSTIFIED |

# Warnings report

Following table is extracted from **Warnings\_metrics** Excel sheet in ***QAC\_Warning\_Report.xlsx*** [Ref2]. The warning are reported according to Ref[4].

|  |  |
| --- | --- |
| **Component** | **To be corrected** |
| ACC | 0 |
| **AdcIf** | 0 |
| ATM | 0 |
| **BswMIf** | 0 |
| CIL | 0 |
| **CompilerIf** | 0 |
| DcmIf | 0 |
| **DemIf** | 0 |
| DIA | 0 |
| **DioIf** | 0 |
| eCS | 0 |
| **EcuMIf** | 0 |
| EFX | 0 |
| **FSM** | 0 |
| IoHwAb | 0 |
| **LPM** | 0 |
| MIC | 0 |
| **NmIf** | 0 |
| NvmIf | 0 |
| **NVP** | 0 |
| OsIf | 0 |
| **PlatformsIf** | 0 |
| PwmIf | 0 |
| **RCM** | 0 |
| RTE | 0 |
| **RteIf** | 0 |
| SAD | 0 |
| **SBC** | 0 |
| SpiIf | 0 |
| **Startup** | 0 |
| STM | 0 |
| **TL\_Lib** | 0 |