|  |  |  |  |
| --- | --- | --- | --- |
| Product Name: | | | |
| Product Supplier Name: | | Approved EMC Test Facility(s):  *Include Lab Manager Name(s)* | |
| Product Design Engineer: | |
| Product Manager: | | Vehicles & Model Year using this product:  *e.g. L660 18MY, X780 19MY* | |
| Product Part Number(s):  *List all JLR product part numbers that this test plan is applicable to. (May be listed on separate page)* | |
| Product Manufacturing Location(s) Where will this product be produced? | | EMC Specification Used:  e.g. JLR-EMC-CS v1.0 amendment 4 | |
| *I certify that the information contained in this test plan is factual including description of the product operation, correct functional classifications, and acceptance criteria. I understand and agree that any subsequent changes to this test plan prior to design verification testing shall be communicated to the JLR EMC department. Any changes or revisions to this test plan after test completion shall require written technical justification and approval by the same EMC department. I understand that failure to follow this process may result in non-acceptance of the product's EMC test data by the JLR EMC department. I also understand and acknowledge that requirements validated via this test plan are relevant only to the specific vehicles that the product is to be fitted to. Use of the product on other vehicle platforms may require additional EMC performance requirements, which will necessitate additional verification testing of the product. I certify that the product samples submitted for EMC testing are of a production representative design. I agree to submit a summary report directly to the JLR EMC department no later than five (5) business days following completion of testing. I also agree to forward a copy of the test laboratory's detailed test report directly to the JLR EMC department within thirty (30) business days following completion of testing.*   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Supplier Product Design Engineer: | | | | |  |  | | | | | |  | | | | |  |  | | | | | | *Sign* |  | *Print* |  | *Date* |  |  |  |  |  |  | |  | | | | |  |  | | | | | |  | | | | |  |  | | | | | | JLR Component Owner Concurrence: | | | | |  | JLR EMC Concurrence | | | | | |  | | | | |  |  | | | | | | *Sign* |  | *Print* |  | *Date* |  | *Sign* |  | *Print* |  | *Date* |   **Test Plan Revision History**   |  |  |  |  | | --- | --- | --- | --- | | **Date** | **Supplier Reference** | **Description** | **Approved**  **Issue No.** | | *dd/mm/yy* | *v0.1* | *First Draft* |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | | | | |
| ***For Internal EMC Department Use*** | | | |
| Test Plan Tracking Number | JLR-EMC-201 - | | Issue No. |

# *Bright blue text in this document is for guidance and should be deleted when completing the plan.*1.0 Introduction

- *Scope and purpose of test plan*

## **1.1 Product Family Description**

* *General Product Family Description*
* *Differences/similarities between HW/SW Versions if any*
* *Max complexity DUT's may be used to represent an entire product family, provide justification/rationale for doing this.*

## **1.2 Theory of Operation**

* *General Theory of Operation inclusive of how it is used in the vehicle*
* *Functions/Features – Customer Interactions*
* *Interaction with other vehicle systems & interfaces*

|  |
| --- |
| *Internal block diagram of the DUT* |

|  |
| --- |
| *Sub-System Interfaces – Configuration*  *(This could be a maximum system complexity configuration)*  *Provide FULL Block Diagram to show how the DUT will be connected in the vehicle* |

## **Physical Construction**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **a) What are the Product Package Material(s):** | | | | | | | |
| Metallic ► |  | Non-Metallic ► |  | Conductive ► |  | Non-Conductive ► |  |
| **Provide further Material description below as necessary:** | | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **b) What is the Product Package Volume:** | | | | | |
| X Dimension (mm) ► |  | Y Dimension (mm) ► |  | Z Dimension (mm) ► |  | |

|  |  |
| --- | --- |
| **c) Provide the Product Mechanical View:** | |
| *Top – Plan View* | *ISO View* |
| *Front View* | *Side* |

|  |  |
| --- | --- |
| **d) How many separate Connectors?** |  |
| *Provide connector diagram and pin out detail for each connector.* | |

## **Connector Diagram**

*Connector Diagram(s)*

## **Connector Pinout Detail**

|  |  |  |
| --- | --- | --- |
| **Pin #** | **Signal Name** | **Wiring Detail**  (SW/TWP/STWP1) |
|  |  |  |
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1Abbreviations:

SW = Single Wire

TWP = Twisted Wire Pair

STWP = Shielded Twisted Wire Pair

## **Vehicle Packaging**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **a) Indicate the general package location of this Product in the Vehicle:** | | | | | | | | | |
| Engine bay ► |  | Under body ► |  | Cabin ► |  | Boot ► |  | External Body ► |  |
| **Provide further description below as necessary:** | | | | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **b) Will this Product be PACKAGED or TRANSPORTED in materials of differing Triboelectric Series values (either at tier 1 or tier 2 suppliers)?** | | | | | |
|  |  | Yes ► |  | No ► |  |
| **c) What is the potential CUSTOMER ACCESSIBILITY to the Product:** | | | | | |
| Access from Outside Vehicle Cabin ► |  | Access from Inside Vehicle Cabin ► |  | No Access ► |  |
| **d) What is the nature of that Access:** | | | | | |
| Direct Access (Physical touching) ► |  | Indirect Access (Remote Switch) ► |  |  |  |
| **Provide further description below as necessary:** | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **e) How is the Product connected to Power Return (GND)?** | | | | |
| **Reference (GND):** | Direct to Local Chassis► |  | In Harness (remote GND/Module) ► |  |
| **Which Pin(s)?** |  | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **f) How is the Case connected to a Reference Level (GND)?** | | | | | | |
| In the Vehicle – How is the metallic case connected? | Connect (GND) ► |  | Isolated ► |  | Unknown ► |  |
| In the Product – Is there a power return connection to the Case? | Direct (DC) ► |  | Coupled (AC) ► |  | NO Connect ► |  |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **g) Is the Product connected internally / externally to Magnetically Sensitive / Controlled Devices?**   |  |  |  |  | | --- | --- | --- | --- | | Yes► |  | No► |  | | | | | | | | |
| Internal ► |  | External ► |  | Sensitive ► |  | Controlled ► |  |
| **Provide further description below as necessary:** | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **h) How is the Product connected to Vehicle Power?** | | | | |
| *Please select which Vehicle power source(s) the product is connected to?* |  | *List ALL Connector Pins that have an external connection to Vehicle Power* | Fused? | *Describe Fuse Rating for each connection* |
| Direct Battery Connection ► |  |  |  |  |
| ‡ Switched Power 1 ► |  |  |  |  |
| ‡ Switched Power 2 ► |  |  |  |  |
| ‡ Switched Power 3 ► |  |  |  |  |
| ‡ Switched Power 4 ► |  |  |  |  |
| Regulated Power ► |  |  |  | |
| † Internal Power ► |  | † Battery source internal to the DUT | | |
| ‡ Switched Power – any circuit connected to vehicle battery through a mechanical switch, electro-mechanical relay or electronic switch. Annotate the proper name for each Switched Power signal source (e.g. Run, Run/Start, Ignition, VPWR…). | | | | |

# 2.0 EMC Requirements Analysis

## **2.1 Critical Interface Signals**

*Identify those signals whose EMC immunity is critical (potentially more susceptible, e.g. CAN, Vehicle Speed). For those critical signals, include electrical characteristics (e.g. Voltage/Current Level, Frequency, Duty Cycle).*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Signal Description** | **Voltage/Current Level** | **Frequency** | **% Duty Cycle (range)** | **Other** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
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## **2.2 Potential Sources of Emissions**

*List all DUT internal microprocessor clocks, subclocks, local oscillators etc. in addition to all periodic interface signals that may act as potential sources of radiated or conducted emissions e.g. PWM outputs. Signal characteristics including frequency, duty cycle, and signal voltage/current level should also be included.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Signal Source Description** | **Voltage/Current**  **Level** | **Frequency** | **% Duty Cycle**  **(range)** | **Other** |
|  |  |  |  |  |
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## **2.3 Test Sample / Surrogate Selection**

*Where applicable justify selection of surrogate sample(s) to represent entire DUT family. A minimum of two identical samples shall be used.*

# 3.0 Test Design and Requirements

## **3.1 DUT Operating Modes/Functional Classifications**

*List all DUT operating mode(s) that are active in each of the vehicle operating states (i.e. OFF, ACC, START, RUN). Place an “X” in the appropriate column to indicate the applicable vehicle operating states. For each DUT operating mode, list all major functions under their appropriate functional class. Use the table below for presentation of this information. All mode and function names listed in the table must include a subsequent description.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **DUT Mode** | **DUT Functions** | | | **Vehicle Operating Modes** | | | |
|  | **Class A** | **Class B** | **Class C** | **Off** | **Accessory** | **Start** | **Run** |
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### **Mode Description(s):**

### **Function Description(s):**

## **Test Requirements**

The DUT component / sub-system category is assessed as being:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Passive** | | | | **Active** | | | | | |
| P | R | BM | EM | A | AS | AM | AX | AY | AW |
|  |  |  |  |  |  |  |  |  |  |

*It is possible for multiple categories to be applicable.*

## **Common Test Requirements**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Description** | **Test applies (Y/N)** | **Functional Class &**  **Functional Status** | | | **Interface to be tested** | **S/C1** | **Operating Mode(s) to be used for indicated test** |
| **A** | **B** | **C** |
| **Radiated Immunity – RF** | | | | | | | |
| **RI 112** Level 2  BCI |  | II | II | I | All circuits | C |  |
| **RI 112** Level 1  BCI |  | I | I | I | All circuits | C |  |
| **RI 114** Level 2  ALSE/Reverb |  | II | II | I | DUT and all circuits | C |  |
| **RI 114** Level 1  ALSE/Reverb |  | I | I | I | DUT and all circuits | C |  |
| **RI 115** Level 2  Portable Transmitter |  | II | II | I | All DUT surfaces and circuits | C |  |
| **RI 115** Level 1  Portable Transmitter |  | I | I | I | All DUT surfaces and circuits | C |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Coupled Immunity - RF** | | | | | | | |
| **RI 130**  Inductive Transients |  | I | I | I | All circuits | S |  |
| **RI 140**  Magnetic Field |  | I | I | I | All DUT surfaces | C |  |
| **RI 150**  Charging System |  | I | I | I | All circuits | S |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Conducted Immunity – Continuous** | | | | | | | |
| **CI 210**  Continuous Disturbance |  | I | I | I | *Power supply inputs 2* | C |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Description** | **Test applies (Y/N)** | **Functional Class &**  **Functional Status** | | | **Interface to be tested** | **S/C1** | **Operating Mode(s) to be used for indicated test** |
| **A** | **B** | **C** |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Conducted Immunity - Transients** | | | | | | | | | |
| **CI 220** Pulse A1 | | Switched Power < 5A |  | II | II | II | *Power supply inputs 2* | S |  |
| Control Circuits |  | II | II | II | *Power supply inputs 2* | S |  |
| **CI 220** Pulse A2-1 | Switched Power < 5A | |  | II | II | II | *Power supply inputs 2* | S |  |
| **CI 220**  Pulse A2-1Pulse A2-2 | Control Circuits | |  | II | II | II | *Power supply inputs 2* | S |  |
| **CI 220** Pulse C-1 | | |  | I | I | I | *Power supply inputs 2* | S |  |
| **CI 220** Pulse C-2 | | |  | I | I | I | *Power supply inputs 2* | S |  |
| **CI 220** Pulse E | | Switched Power ≥ 5A |  | II | II | II | *Power supply inputs 2* | S |  |
| Control Circuits |  | II | II | II | *Power supply inputs 2* | S |  |
| **CI 220** Pulse F1 | | |  | I | I | I | *Power supply inputs 2* | S |  |
| **CI 220** Pulse F2 | | |  | II | II | II | *Power supply inputs 2* | S |  |
| **CI 220** Pulse G1 (Normal Load Dump) | | |  | III | III | II | *Power supply inputs 2* | C |  |
| **CI 220** Pulse G2(Central Load Dump) | | |  | III | III | II | *Power supply inputs 2* | C |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Conducted Immunity - Power Cycle** | | | | | | | |
| **CI 230** Waveform A |  | II | II | II | *Power supply inputs not active during start 2* | C |  |
| **CI 230** Waveform B |  | II | II | II | *Ignition power supply inputs 2* | C |  |
| **CI 230** Waveform C |  | II | II | II | *Power supply inputs only active during start 2* | C |  |
| **CI 230** Waveform D |  | II | II | II | *Direct battery power supply inputs 2* | C |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Conducted Immunity - Voltage Offset** | | | | | | | |
| **CI 250 (setup a)** |  | I | I | I | *All DUT ground inputs 2* | S |  |
| **CI 250 (setup b)** |  | I | I | I | *All external load/sensor grounds 2* | S |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Conducted Immunity - Voltage Dropout** | | | | | | | |
| **CI 265** Waveform A |  | II | II | II | *Power supply inputs 2* | C |  |
| **CI 265** Waveform B |  | II | II | II | *Power supply inputs 2* | C |  |
| **CI 265** Waveform C |  | II | II | II | *Power supply inputs 2* | C |  |
| **CI 265** Waveform D |  | I | I | I | *Power supply inputs 2* | S |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Conducted Emissions** | | | | | | | |
| **CE 410** - Transient |  | I | I | I | *Power supply inputs 2* | S |  |
| **CE 420** - RF |  | I | I | I | *Power supply inputs and grounds 2* | S |  |

## **Test Standard Specific Requirements**

Complete **EITHER** the **RED** section or the **BLUE** section depending on the specification being applied:-

**RED – EMC-CS-2010JLR v1.2**

**BLUE – JLR-EMC-CS v1.0**

And then delete the section **NOT** being applied.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Description** | **Test applies (Y/N)** | **Functional Class &**  **Functional Status** | | | **Interface to be tested** | **S/C1** | **Operating Mode(s) to be used for indicated test** |
| **A** | **B** | **C** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Conducted Immunity - Voltage Overstress** | | | | | | | | |
| **CI 270- A -14 Volt**  Reverse Battery | |  | III | III | III | *Power supply inputs 2* | C |  |
| **CI 270- B +19 Volt**  Over voltage – Failed Regulator | |  | III | II | II | *Power supply inputs 2* | C |  |
| **CI 270- C + 24 volt**  Over voltage – Jump Start | BATT / IGN  ≥ 60 secs |  | III | I/II | I/II | *Power supply inputs 2* | C |  |
| START  ≥ 15 secs |  | III | I/II | I/II | *Power supply inputs 2* | C |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Conducted Immunity – Electrostatic Discharge** | | | | | | | |
| **CI 280** Handling  (DUT not powered) |  | IV | IV | IV | *All DUT surfaces and circuits* | S |  |
| **CI 280** Powered  Sequence 1 to 3 |  | I | I | I | *All DUT surfaces and connectors* | S |  |
| **CI 280** Powered  Sequence 4 to 6 |  | II | II | II | *All DUT surfaces and connectors* | S |  |
| **CI 280** Powered  Sequence 7 (15 kV) |  | II | II | II | *All DUT surfaces and connectors accessible from vehicle interior* | S |  |
| **CI 280** Powered  Sequence 8 (25 kV) |  | II | II | II | *All DUT surfaces and connectors accessible from vehicle exterior* | S |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Radiated Emissions** | | | | | | | **FFT Method** | |  |
| **RE 310**  (0.15 - 2500 MHz) |  | I | I | I | *DUT and all circuits* | C | |  | |
| **MQ-7012**  (1.7 - 5825 MHz) |  | I | I | I | *DUT and all circuits* | C | |  | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Description** | **Test applies (Y/N)** | **Functional Class &**  **Functional Status** | | | **Interface to be tested** | **S/C1** | **Operating Mode(s) to be used for indicated test** |
| **A** | **B** | **C** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Conducted Immunity - Voltage Overstress** | | | | | | | | |
| **CI 270- A -14 Volt**  Reverse Battery | |  | III | III | III | *Power supply inputs 2* | C |  |
| **CI 270- B +19 Volt**  Over voltage – Failed Regulator | |  | III | II | II | *Power supply inputs 2* | C |  |
| **CI 270- C + 28 volt**  Over voltage – Jump Start | BATT / IGN  ≥ 60 secs |  | III | I/II | I/II | *Power supply inputs 2* | C |  |
| START  ≥ 15 secs |  | III | I/II | I/II | *Power supply inputs 2* | C |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Conducted Immunity – Electrostatic Discharge** | | | | | | | |
| **CI 280** Handling  (DUT not powered) |  | IV | IV | IV | *All DUT surfaces and circuits* | S |  |
| **CI 280** Powered  Seq. DP-01 to DP-04 |  | I | I | I | *All DUT surfaces and connectors* | S |  |
| **CI 280** Powered  Sequence DP-05 (15 kV) |  | II | II | II | *All DUT surfaces and connectors accessible from vehicle interior* | S |  |
| **CI 280** Powered  Sequence DP-06 (25 kV) |  | II | II | II | *All DUT surfaces and connectors accessible from vehicle exterior* | S |  |
| **CI 280** Powered  Seq. IP-01 to IP-03 |  | I | I | I | *Discharge Islands* | C |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Radiated Emissions** | | | | | | | |
| **RE 310**  (0.15 - 5905 MHz) |  | I | I | I | *DUT and all circuits* | C |  |
| **RE 320**  (20 Hz – 150 kHz) |  | I | I | I | *DUT and all circuits* | C |  |

NOTES

**1** Indicate specific DUT circuit interface(s) to be subjected to test.

“C” (Combined): Indicates circuits are to be tested simultaneously.

“S” (Separate): Indicates circuits are to be tested separately.

**2** List specific power supply and/or ground inputs to be subjected to testing (including the connector pin number). Where a test is not applicable (i.e. Test applies = N) please clear the text in that row.

## **3.3 Input Requirements**

*Select input conditions that will place the DUT in the desired operating mode(s) required for each test listed in section 3.2. List all modes required and the signal names used in them. Duplicate entries for signal names may exist but under different modes. Include any additional information that is needed to support operation of the DUT during testing including data bus messages, special test software, and/or any non-electrical interfaces. The format below should be used to provide this information.*

**Electrical Input Signals/Characteristics to Operate DUT in the specified test Mode**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **DUT Mode** | **Signal Name** | **Test** | **Pin #** | **Waveform** | **Amplitude** | **Freq/PW/DC%** | **Other** |
|  |  |  |  |  |  |  |  |
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### **Non-electrical input signals/characteristics to make DUT functional:**

## **3.4 Output Requirements**

*Select output signals or non-electrical indicators that will be monitored to verify the required functionality of the DUT for each operating Mode(s) selected in section 3.2. List signals or non-electrical indicators using the table format below. The acceptance criteria chosen shall equal the upper limit of deviation where the degradation in functionality becomes perceivable to the customer. The nominal and acceptable deviation values provided here defines Function Performance Status I for this product.*

**Electrical output(s) to monitor and acceptance criteria**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mode** | **Signal Name** | **Test** | **Pin #** | **Waveform** | **Note 2** | **Amplitude** | **Freq/PW/DC%** | **Other** |
| Sensor On\* | Pressure Signal | All | 12 | PWM | N | 0.5V - 4.5V | DC=50% |  |
|  |  |  |  |  | A | 0V - 5V | DC=40%-60% |  |
|  |  |  |  |  | N |  |  |  |
|  |  |  |  |  | A |  |  |  |
|  |  |  |  |  | N |  |  |  |
|  |  |  |  |  | A |  |  |  |
|  |  |  |  |  | N |  |  |  |
|  |  |  |  |  | A |  |  |  |
|  |  |  |  |  | N |  |  |  |
|  |  |  |  |  | A |  |  |  |

\*Example for guidance - please delete.

**CI 280 ESD Parametric Value Requirements**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter**  **Name** | **Nominal**  **Value** | **Tolerance** | **Reason for change within tolerance band** | **Reason for change out of tolerance band** | **Notes** |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

### **Non-electrical output(s) to monitor and acceptance criteria**

*(e.g. instrument cluster visual display or LED illumination intensity)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mode** | **Function Description** | **Test** | **Note 2** | **Acceptance criterion for function** |
| Solenoid Active\* | Shaft movement | All | N | Shaft shall extend 7mm when driven |
|  |  |  | A | Status I – verify shaft extends 7mm +/- 2mm.  Status II – for tests where performance status II is permissible shaft movement may exceed the limits of performance Status I but must not exceed 10mm. Recovery must be automatically restored following the test. |

\*Example for guidance – please delete.

Note2:

**N** = Nominal Value

**A** = Acceptable Value

## **3.5 Load Box/Test Support Requirements**

*List all test fixture information. For each DUT circuit include the pin number, its name and description. Indicate by placing an “X” under the appropriate column whether it is an input or output and if loaded, is it connected to a real or simulated termination. Also include information on additional support hardware/software requirements. Include detailed block diagrams of the load box and/or support equipment. Specify how any support equipment used will be configured so as not to influence the test results.*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Pin #** | **Load**  **Value** | **Input** | **Output** | **Simulated** | **Actual** | **Reference** |
|  |  |  |  |  |  |  |  |  |
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**Load Simulator Diagram**

|  |
| --- |
| *Load Simulator Schematic/Diagram* |

**4.0 DUT Test Set-up’s**

|  |
| --- |
| *Generic test set-up diagram/picture*  *The Generic set-up diagram shall include the following details*   * *Interconnections between DUT, load simulator, artificial network and battery/power supply.* * *DUT, artificial network and load simulator bonding to ground plane* * *DUT support equipment* * *DUT monitoring equipment* * *Fibre optic media used for monitoring DUT inputs and outputs* |

**Detailed Test Setup – Informative**

It is recognised that approved test facilities are capable of component/sub-system setup within the test environments shown in the EMC specification JLR-EMC-CS.

The approved test facility shall provide details of the setup as part of the formal test report.

Specific test exceptions / differences to these test requirements shall be documented in the table below.

ESD test points shall be included even if there is no deviation from the specified test method.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Test ID | Requirement / Description | Deviation from specified test method. (Y/N) | Comments |
|  | CI 280 (U) | Electrostatic Discharge (Un-Powered / Handling) |  | *Include to show ESD test points* |
|  | CI 280 (P) | Electrostatic Discharge (Powered) |  | *Include to show ESD test points* |
|  | RI 112 | RF Immunity - BCI |  |  |
|  | RI 114 | RF Immunity – ALSE/Reverberation |  |  |
|  | RI 115 | RF Immunity – Hand Portable Transmitter |  | *Include details of DUT dimensions, test positions and proximity to intentional storage locations* |
|  | RI 130 | Coupled Immunity – Inductive Transients |  |  |
|  | RI 140 | Magnetic Field Immunity |  |  |
|  | RI 150 | Coupled Immunity – Charging |  |  |
|  | CI 210 | Conducted Immunity – Continuous Disturbances |  |  |
|  | CI 220 | Conducted Immunity – Transient Disturbances |  |  |
|  | CI 230 | Conducted Immunity – Power Cycling |  |  |
|  | CI 250 | Conducted Immunity – Voltage Offset |  |  |
|  | CI 265 | Conducted Immunity – Voltage Dropout |  |  |
|  | CI 270 | Conducted Immunity – Voltage Overstress |  |  |
|  | RE 310 | Radiated RF Emissions |  |  |
|  | RE 320 | Radiated Magnetic Emissions |  |  |
|  | CE 410 | Conducted Transient Emissions |  |  |
|  | CE 420 | Conducted RF Emissions |  |  |

**4.1 Electrostatic Discharge (CI 280:unpowered)**

*Indicate ESD discharge points (required)*

*Test set-up diagram (as needed)*

**CI 280 (unpowered) Test Set-up**

|  |  |
| --- | --- |
| Test Details | Comments |
| Specified Test Method |  |
| Deviations from Specified Test Method |  |
| Harness Configuration |  |
| DUT Orientation |  |
| DUT Grounding (case or harness) |  |
| Additional Test Specific Information |  |
| DUT Monitoring Information |  |

**4.2 Electrostatic Discharge (CI 280: powered)**

*Indicate ESD discharge points (required)*

*Test set-up diagram (as needed)*

**CI 280 (powered) Test Set-up**

|  |  |
| --- | --- |
| Test Details | Comments |
| Specified Test Method |  |
| Deviations from Specified Test Method |  |
| Harness Configuration |  |
| DUT Orientation |  |
| DUT Grounding (case or harness) |  |
| Additional Test Specific Information |  |
| DUT Monitoring Information |  |

**4.3 RF Immunity – Hand Portable Transmitter (RI115)**

*Indicate component dimensions and test positions.*

*Consideration of component proximity to Intentional storage locations shall be given*

*(appropriate cell size and DUT test faces shall be detailed).*

*Test set-up diagram (as needed)*

**RI 115 Test Set-up**

|  |  |
| --- | --- |
| Test Details | Comments |
| Specified Test Method |  |
| Deviations from Specified Test Method |  |
| Harness Configuration |  |
| DUT Orientation |  |
| DUT Grounding (case or harness) |  |
| Additional Test Specific Information |  |
| DUT Monitoring Information |  |