LVDS MINI-B CABLE ASSEMBLIES

1.0 SCOPE

B3 This Product Specification covers the LVDS 111041, 100301, and 100314 cable assembly series specifically designed for automotive applications.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER(S)

2.1.1 PRODUCT NAME: LVDS MINI-B CABLE ASSEMBLY

B3 2.1.2 SERIES NUMBER: 111041, 100301 (LVDS), & 100314.

2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

REFER TO RESPECTIVE ENGINEERING & SALES DRAWINGS

2.3 SAFETY AGENCY APPROVALS

NOT APPLICABLE

3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

B3 **3.1 SALES DRAWINGS:** SD-111041-***, RSD-111041-***, RSD-100301-***, & RSD-100314-***.

3.2 ENGINEERING DRAWINGS: E-111041-***, E-100301-***, & E-100314-***.

3.3 PACKAGING SPECIFICATIONS: PK-68800-***

3.4 SPECIFICATIONS

3.4.1 SAE/USCAR-2 Performance Specification for Automotive Electrical Connector Systems.

3.4.2 SAE/USCAR-30 Performance Specification for Automotive Universal Serial Bus. (USB) Connection System as applicable.

3.4.3 USB 2.0 Universal Serial Bus Specification as applicable.

3.4.4 USB 2.0 Specification Engineering Change Notice #1: Mini-B Connector, Date: 10/20/2000.

3.4.5 Universal Serial Bus Cables and Connectors Class Document 2.0.

4.0 RATINGS

4.1 VOLTAGE

60 Volts AC (RMS)/60 Volts DC

4.2 CURRENT

1.0 Amps

4.3 TEMPERATURE CLASS: 2

- 40°C to + 105°C

5.0 PERFORMANCE

5.1 ELECTRICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Contact Resistance (Low Level) - USB Std A	Mate connectors: apply a maximum voltage of 20 mV and a current of 100 mA per SAE/USCAR-30 5.3.1	30 milliohms Maximum
2	Contact Resistance (Low Level) – USB Min B	Mate connectors: apply a maximum voltage of 20 mV and a current of 100 mA per SAE/USCAR-30 5.3.1	50 milliohms Maximum
3	Isolation Resistance	Mate connectors: apply a voltage of 500 VAC for 1 minute minimum between adjacent terminals and between terminals to ground, encompassing all possible combinations per SAE/USCAR-30 5.3.2	100 Megaohms Minimum Post Test
4	Impedance	Measure the conductors of the cable assembly per SAE/USCAR-30 5.4.1	Interconnect Impedance Nominal: 90 Ohm Differential Tolerance: +/-15% Rise time: 100ps at the test fixture Bulk cable impedance Nominal: 100 Ohm Differential Tolerance: +/-7% Rise time: 100ps at the test fixture
5	Propagation Delay	Measure the end-to-end propagation of the cable assembly per SAE/USCAR-30 5.4.2	5.2ns/meter Maximum
6	Propagation Delay Skew	Measure to ensure signal on both the +ve and -ve lines arrive at the receiver simultaneously of the cable assembly per SAE/USCAR-30 5.4.3	20 ps/meter Maximum

<table>
<tr><td rowspan="11">7</td><td rowspan="11">Attenuation</td><td rowspan="11">Measure to ensure adequate signal strength to the receiver in order to maintain a low error rate of the cable assembly per SAE/USCAR-30 5.4.4</td><td>Frequency(GHz)</td><td>Loss dB/4m</td></tr>
<tr><td>0.1</td><td>-2.4</td></tr>
<tr><td>0.5</td><td>-4.3</td></tr>
<tr><td>0.9</td><td>-5.7</td></tr>
<tr><td>1.1</td><td>-6.3</td></tr>
<tr><td>1.5</td><td>-7.5</td></tr>
<tr><td>1.7</td><td>-8.2</td></tr>
<tr><td>2.1</td><td>-9.1</td></tr>
<tr><td>2.5</td><td>-9.9</td></tr>
<tr><td>2.9</td><td>-10.7</td></tr>
<tr><td>3.1</td><td>-11</td></tr>
<tr><td>8</td><td>EMI / EMC Shielding Effectiveness</td><td>Test conducted in accordance with IEC CISPR-25 : Radio disturbance characteristics for the protection of receivers used on board vehicles, boats, and on devices -</td><td colspan="2">Limits set per CISPR-25 specification or applicable customer specification - between 30 MHz and 2 GHz using 1.7 m reference cable length</td></tr>
<tr><td>9</td><td>Differential to Common Mode Conversion (SCD21)</td><td>Differential Pair</td><td colspan="2">Limit:
10MHz to 500MHz : < 30dB
500MHZ to 1.5GHz : < 25dB</td></tr>
</table>

5.2 MECHANICAL REQUIREMENTS

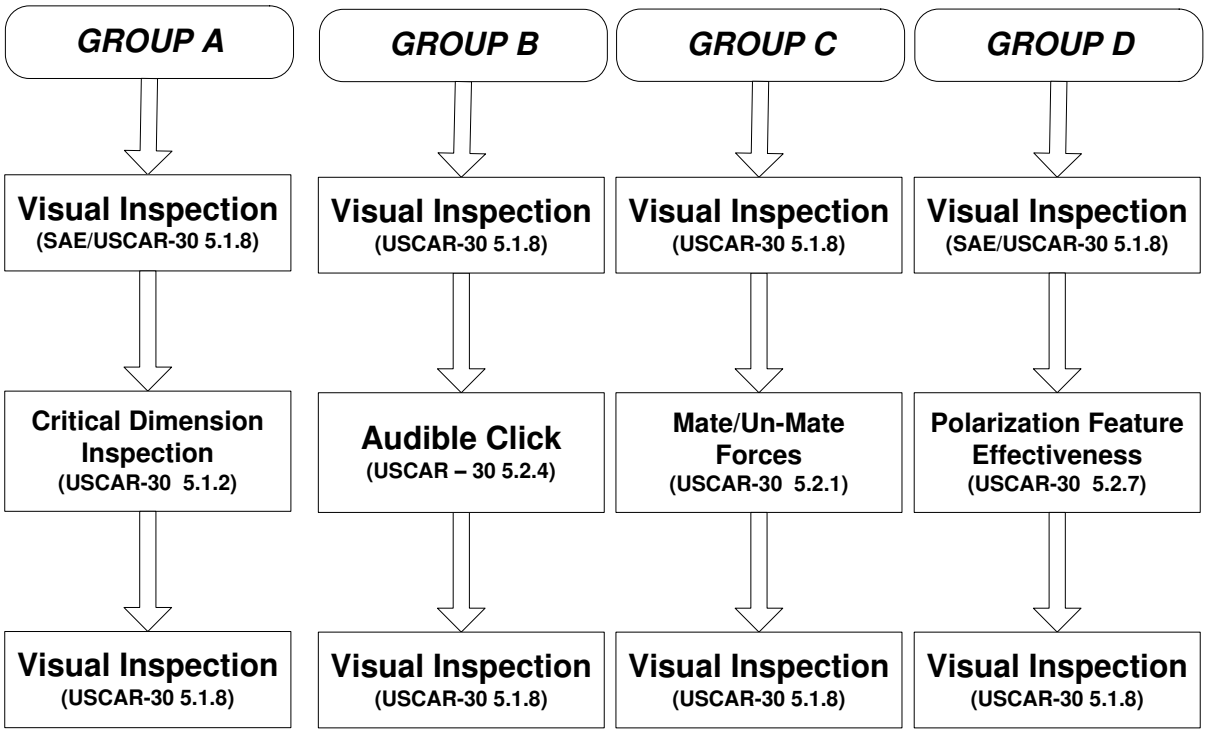
ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Audible Click	Mate / un-mate connector to receiving connector and measure dB level change from ambient level.	7dB above ambient – unconditioned 5dB above ambient - conditioned
2	Drop Test	Drop 3X onto a horizontal concrete surface from a height of 1m orienting the sample in various directions each time per SAE/USCAR -30 5.2.5 and SAE/USCAR-2 5.4.8	No evidence of deterioration, cracks, deformities, etc. that could affect functionality or distort appearance. Connector locking mechanism must function without breakage.
3	Connector Mate and Unmate Forces	Mate and unmate connector at a rate not to exceed 50mm per minute per SAE/USCAR-30 5.2.1	45 N maximum mating force & 45 N maximum un-mating forces w/ lock disengaged. 110 N minimum un-mating force w/ lock engaged
4	Connector Cycling – Standard “A”	Mate connectors 5000 cycles per SAE/USCAR-30 5.1.7	30 milliohms Maximum LLCR
5	Connector Cycling – Mini “B”	Mate connectors 10 cycles per SAE/USCAR-30 5.1.7	50 milliohms Maximum LLCR
6	Cable Pull-out (Retention)	Apply an axial pullout force of 40N on the cable for one minute minimum per SAE/USCAR -30 5.2.6 (EIA-364-38 Condition A)	40 N Minimum pullout force and no discontinuities on any circuit for more than one microsecond
7	Over-Mold Adhesion (bond Integrity)	Apply force to connector over-mold per EIA-364, TP-Cable Pull-Out, Rev. B, Method A	220 N Minimum force
8	Polarization Feature Effectiveness	Engage connector halves to attempt insertion. Connector must withstand minimum Force to deter mating.	90 N minimum

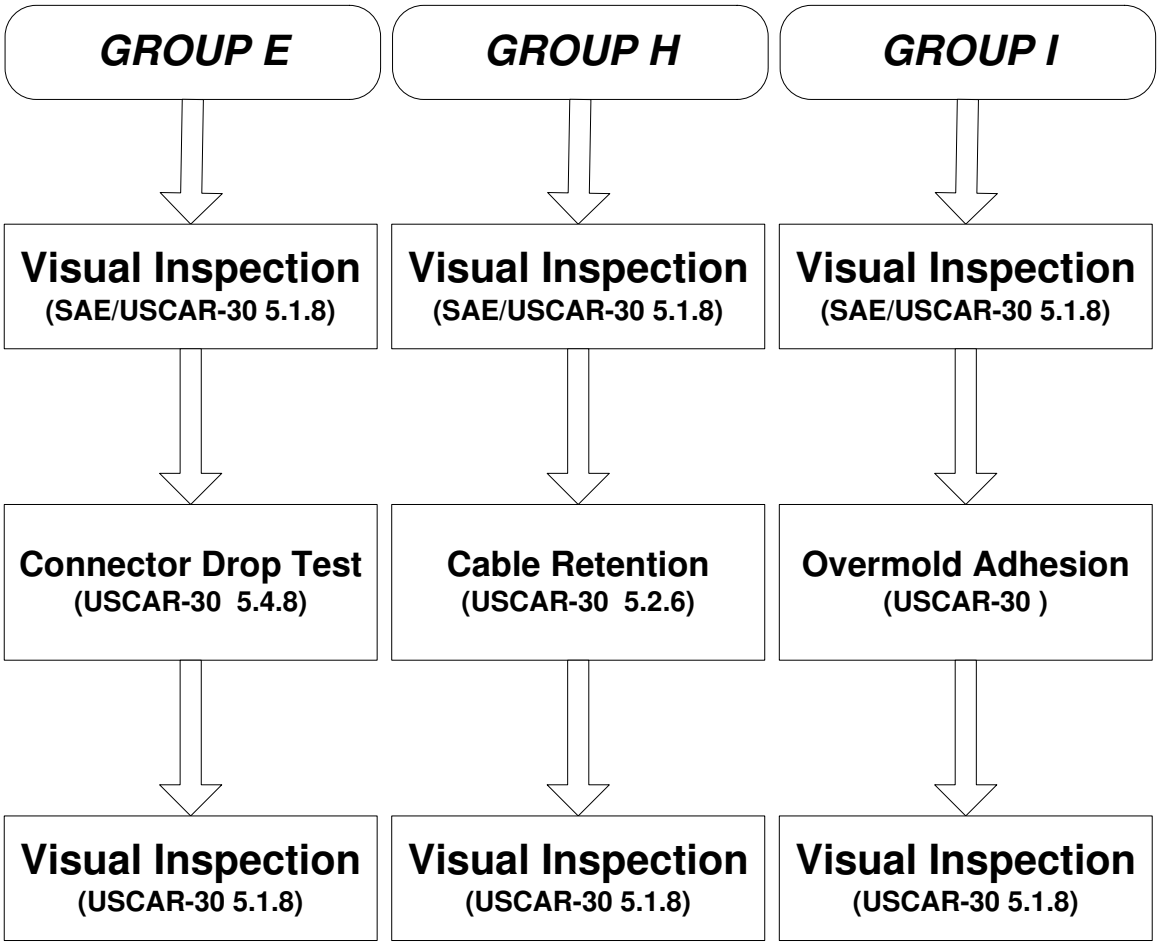
5.3 ENVIRONMENTAL REQUIREMENTS

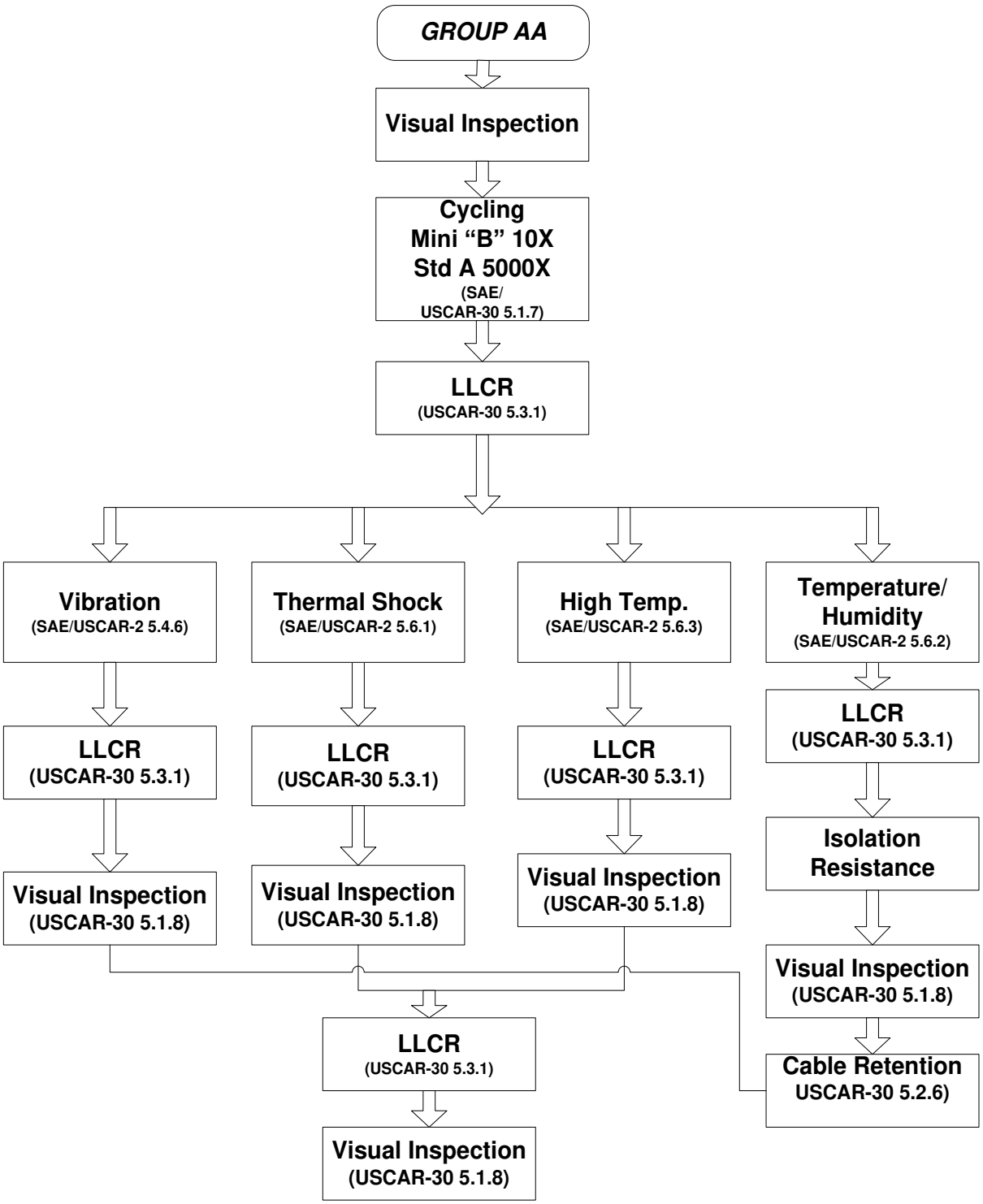
ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Vibration (Random)	Random vibration, non-engine coupled per SAU/USCAR-2 5.4.6 & SAE/USCAR-30 5.1.9	30 milliohms Max. LLCR – Standard "A", 50 milliohms Max. LLCR – Mini "B" & Discontinuity < 1 microsecond
2	Shock (Thermal)	Mate connectors; expose to 100 cycles of: Temperature °C — Duration (Minutes) -40 +0/-3 — 30 +25 ±10 — 0.5 MAXIMUM +105 +3/-0 — 30 +25 ±10 — 0.5 MAXIMUM per SAE/USCAR-2 5.6.1 & SAE/USCAR-30 5.1.9.4	30 milliohms Max. LLCR – Standard "A", 50 milliohms Max. LLCR – Mini "B" & Discontinuity < 1 microsecond
3	High Temperature Exposure	Mate connectors; expose to: 1008 hours at 105°C ± 2°C per SAE/USCAR-2 5.6.3	30 milliohms Max. LLCR – Standard "A", 50 milliohms Max. LLCR – Mini "B" & Visual: No Damage
4	Temperature/ Humidity (Cyclic)	Mate connectors: subject to 40 cycles of below Time — Temperature — Relative Humidity 0.5 hrs — -40°C ± 3°C — uncontrolled 0.5 hrs — -40°C ramp to +105°C — uncontrolled 6.0 hrs — +105°C ± 3°C — 80-90% 1.0 hrs — +105°C ramp to -40°C — uncontrolled per SAE/USCAR-2 5.6.2	30 milliohms Max. LLCR – Standard "A", 50 milliohms Max. LLCR – Mini "B" & Visual: No Damage
5	Flammability	FMVSS 302	Meets Requirements

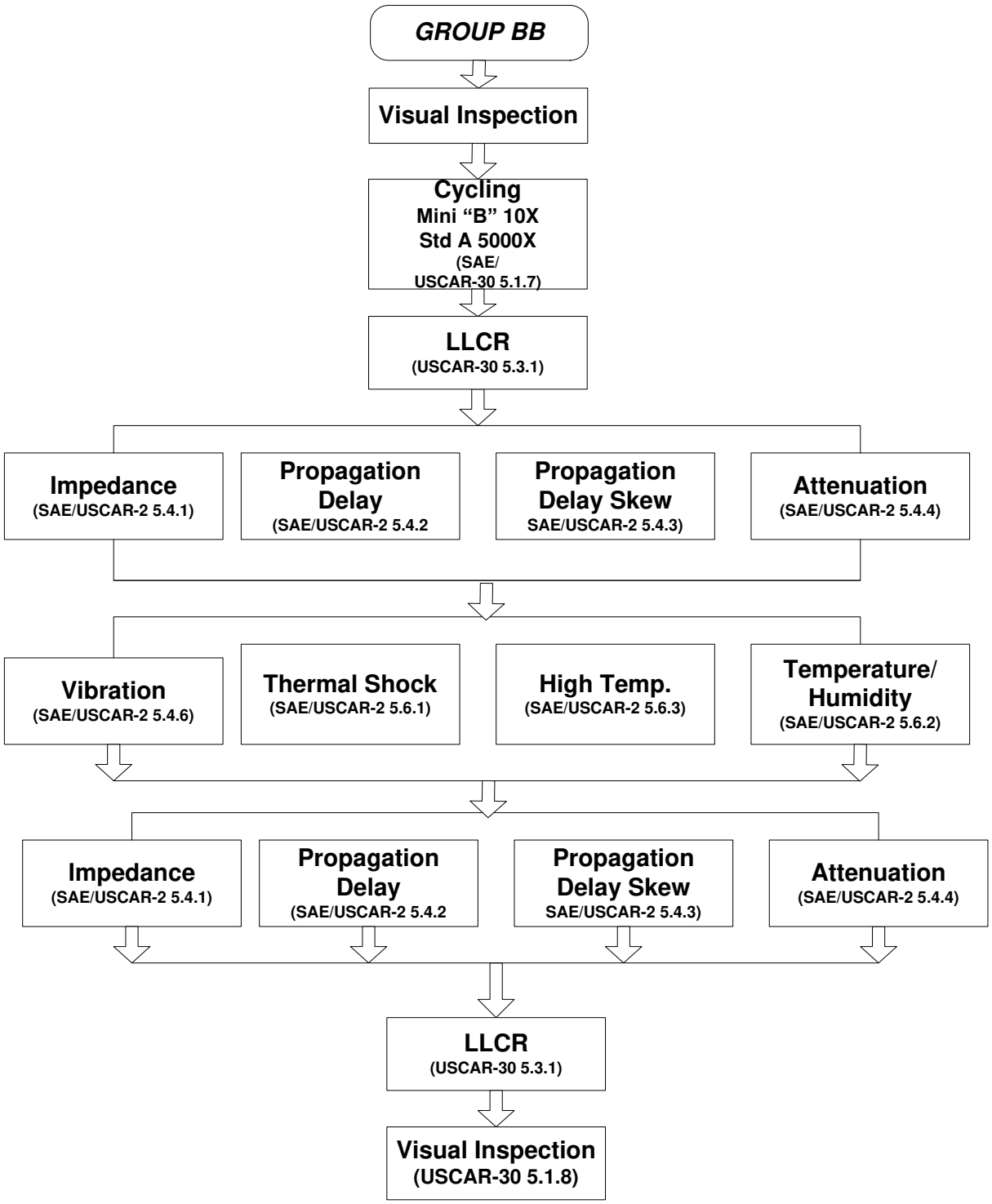
6.0 TEST SEQUENCING

Cable assemblies were tested in the following sequences.




GROUP E
GROUP H
GROUP I
Visual Inspection (SAE/USCAR-30 5.1.8)
Visual Inspection (SAE/USCAR-30 5.1.8)
Visual Inspection (SAE/USCAR-30 5.1.8)
Connector Drop Test (USCAR-30 5.4.8)
Cable Retention (USCAR-30 5.2.6)
Overmold Adhesion (USCAR-30)
Visual Inspection (USCAR-30 5.1.8)
Visual Inspection (USCAR-30 5.1.8)
Visual Inspection (USCAR-30 5.1.8)


GROUP AA
Visual Inspection
Cycling
Mini "B" 10X
Std A 5000X
(SAE/
USCAR-30 5.1.7)
LLCR
(USCAR-30 5.3.1)
Vibration
(SAE/USCAR-2 5.4.6)
Thermal Shock
(SAE/USCAR-2 5.6.1)
High Temp.
(SAE/USCAR-2 5.6.3)
Temperature/
Humidity
(SAE/USCAR-2 5.6.2)
LLCR
(USCAR-30 5.3.1)
LLCR
(USCAR-30 5.3.1)
LLCR
(USCAR-30 5.3.1)
LLCR
(USCAR-30 5.3.1)
Isolation
Resistance
Visual Inspection
(USCAR-30 5.1.8)
Visual Inspection
(USCAR-30 5.1.8)
Visual Inspection
(USCAR-30 5.1.8)
Visual Inspection
(USCAR-30 5.1.8)
Cable Retention
USCAR-30 5.2.6)
LLCR
(USCAR-30 5.3.1)
Visual Inspection
(USCAR-30 5.1.8)


GROUP BB
Visual Inspection
Cycling
Mini "B" 10X
Std A 5000X
(SAE/
USCAR-30 5.1.7)
LLCR
(USCAR-30 5.3.1)
Impedance
(SAE/USCAR-2 5.4.1)
Propagation
Delay
(SAE/USCAR-2 5.4.2
Propagation
Delay Skew
SAE/USCAR-2 5.4.3)
Attenuation
(SAE/USCAR-2 5.4.4)
Vibration
(SAE/USCAR-2 5.4.6)
Thermal Shock
(SAE/USCAR-2 5.6.1)
High Temp.
(SAE/USCAR-2 5.6.3)
Temperature/
Humidity
(SAE/USCAR-2 5.6.2)
Impedance
(SAE/USCAR-2 5.4.1)
Propagation
Delay
(SAE/USCAR-2 5.4.2
Propagation
Delay Skew
SAE/USCAR-2 5.4.3)
Attenuation
(SAE/USCAR-2 5.4.4)
LLCR
(USCAR-30 5.3.1)
Visual Inspection
(USCAR-30 5.1.8)

7.0 PACKAGING

Parts shall be packaged to protect against damage during handling, transit, and storage.

8.0 OTHER INFORMATION