



## **cLGA<sup>®</sup> Socket System Comparison of InterCon Testing to EIA-540BOAE Requirements**

**November 26, 2001**

### **Summary:**

**The InterCon cLGA<sup>®</sup> socket has been evaluated through test sequences which satisfy both the EIA-540BOAE and the Bellcore GR-1217 specifications. As such, the InterCon test plan well exceeded the individual requirements of either industry standard plan. This document compares the InterCon test plan to the EIA document, and shows all areas in which InterCon's testing exceeds the EIA-540BOAE requirements.**

**A test flow diagram for the EIA-540BOAE qualification specification is attached. Highlighted in green on the diagram are the additional tests and test conditions used during cLGA<sup>®</sup> socket testing. Also included is a sequence by sequence summary of the EIA test plan, comparing in more detail the EIA requirements with the InterCon tests and test conditions.**

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**Test sequence comparisons**

For each sequence of the EIA-540BOAE qualification plan, the applicable sequence of the InterCon EIA 540BOAE/Bellcore GR-1217 qualification test is compared. The test conditions for all tests of both the EIA and InterCon plans are listed. **Test conditions in which the InterCon EIA/Bellcore test exceeded the EIA-540BOAE requirement are shown in green.**

**EIA-540BOAE Sequence AP:**

**EIA requirement:**

*Thermal Aging* (24 hrs, 85° C)  
*LLCR* (20 mΩ max change/pair)  
*Shock* (50 G, 11 ms, 11.3 ft/sec,  
18 shocks total, 2 ns  
discontinuity)  
*Vibration* (50 to 2000 Hz, 7.3 G'rms,  
45 min/axis, 3 axes, 2 ns  
discontinuity)  
*LLCR*  
*ATC* (0° C to 75° C, 2000 cycles)  
*LLCR* every 168 cycles of ATC

**InterCon EIA 540BOAE/Bellcore  
GR-1217 test sequence (group BP-  
1 from attached InterCon test  
diagram):**

*Thermal Aging* (24 hrs, 85° C)  
*LLCR* (20 mΩ max change/pair)  
*Shock* (50 G, 11 ms, 11.3 ft/sec,  
18 shocks total, 2 ns discontinuity)  
*Vibration* (200 gram simulated  
heat sink, 50 to 2000 Hz,  
7.3 G'rms, 45 min/axis,  
3 axes, 2 ns discontinuity)  
*LLCR*  
*ATC* (0° to **100° C**, 2000 cycles,  
**monitor socket for glitch  
detection during test**)  
*LLCR* every 168 cycles of ATC

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**EIA-540BOAE Sequence BP:**

**EIA requirement:**

*LLCR* (20 mΩ max change/pair)

*Durability* (20 cycles)

*LLCR*

*Thermal Shock* (-40° to 60° C,  
1 hour cycles, 10 cycles)

*LLCR*

*Cyclic Humidity* (1000 hours,  
25° to 85° C)

*LLCR*

**InterCon EIA 540BOAE/Bellcore  
GR-1217 test sequence (group CP  
from attached InterCon test  
diagram):**

*LLCR* (20 mΩ max change/pair)

*Durability* (**25 cycles**)

*LLCR*

**Dust (Composition 1 (benign), 1  
hour, brush clean)**

*LLCR*

*Thermal Shock* (**-55° to 85° C**,  
1 hour cycles, 10 cycles)

*LLCR*

*Cyclic Humidity* (1000 hours,  
25° to 85° C, **glitch monitoring**)

*LLCR*

**EIA-540BOAE Sequence CP:**

**EIA requirement:**

*DWV* (400 VAC)

*IR* (100 VDC, 100 MΩ min)

*Thermal Shock* (-40° to 60° C,  
1 hour cycles, 10 cycles)

*Cyclic Humidity* (1000 hours,  
25° to 85° C)

*DWV* (400 VAC)

*IR* (100 VDC, 100 MΩ min)

**InterCon EIA 540BOAE/Bellcore  
GR-1217 test sequence (group DP  
from attached InterCon test  
diagram):**

*DWV* (**500 VAC**)

*IR* (**500 VDC**, 100 MΩ min)

*Thermal Shock* (**-55° to 85° C**,  
1 hour cycles, 10 cycles)

*Cyclic Humidity* (1000 hours,  
25° to 85° C, **glitch  
monitoring**)

*DWV* (**500 VAC**)

*IR* (**500 VDC**, 100 MΩ min)

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**EIA-540BOAE Sequence DP:**

**EIA requirement:**

*Thermal Aging (24 hrs, 85° C)*  
*LLCR (20 mΩ max change/pair)*  
*Temperature Life (85° C, 500 hours)*  
*LLCR*  
*Mixed Flowing Gas (Class IIA,*  
*7 days, mated)*  
*LLCR*

**InterCon EIA 540BOAE/Bellcore  
GR-1217 test sequence (group  
EP-1 from attached InterCon test  
diagram):**

*Thermal Aging (24 hrs, 85° C)*  
*LLCR (20 mΩ max change/pair)*  
*Temperature Life (90° C, 2000  
hours)*  
*LLCR*  
*Mixed Flowing Gas (Class IIA,*  
*7 days, mated)*  
*LLCR*  
*ATC (0° to 100° C, 24 hours)*  
*LLCR*

**EIA-540BOAE Sequence EP:**

**EIA requirement:**

*Resistance to Soldering Heat*  
*Solvent Resistance*

**InterCon EIA 540BOAE/Bellcore  
GR-1217 test sequence:**

Neither test applicable to solderless  
InterCon product.

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**EIA-540BOAE Sequence FP:**

**EIA requirement:**

*LLCR* (20 mΩ max change/pair)  
*Shock* (50 G, 11 ms, 11.3 ft/sec,  
18 shocks total, 2 ns  
discontinuity)  
*Vibration* (50 to 2000 Hz, 7.3 G'rms,  
45 min/axis, 3 axes, 2 ns  
discontinuity)  
*LLCR*  
*Power Cycling* (2000 cycles,  
20° to 95° C)  
*LLCR*

**InterCon EIA 540BOAE/Belcore  
GR-1217 test sequence (group  
GP from attached InterCon test  
diagram):**

*LLCR* (20 mΩ max change/pair)  
*Shock* (50 G, 11 ms, 11.3 ft/sec,  
18 shocks total, 2 ns discontinuity)  
*Vibration* (200 gram simulated  
heat sink, 50 to 2000 Hz,  
7.3 G'rms, 45 min/axis,  
3 axes, 2 ns discontinuity)  
*LLCR*  
*Power Cycling* (2000 cycles,  
20° to 95° C)  
*LLCR*

**EIA-540BOAE Sequence GP:**

**EIA requirement:**

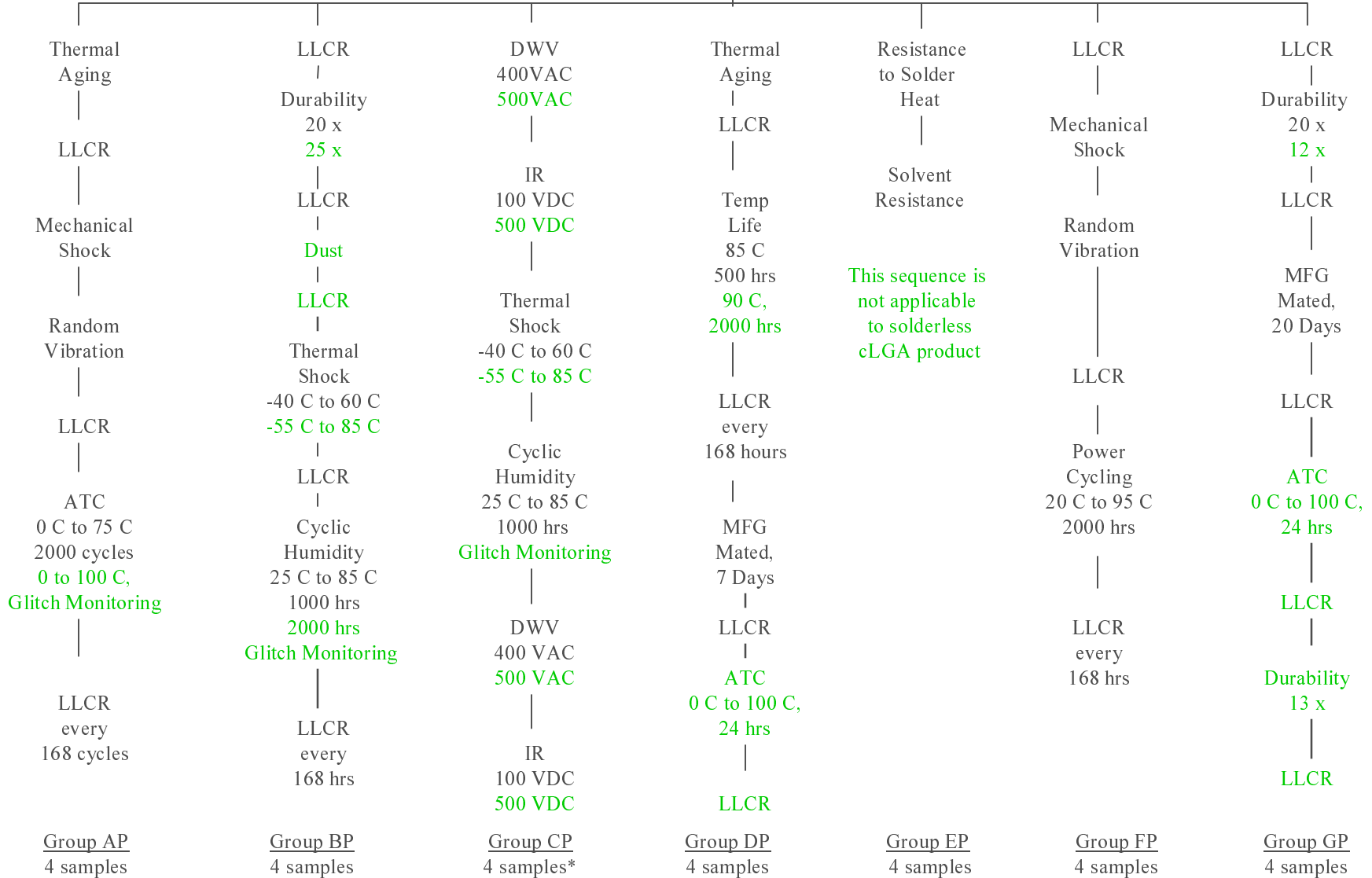
*LLCR* (20 mΩ max change/pair)  
*Durability* (20x)  
*LLCR*  
*Mixed Flowing Gas* (Class IIA,  
20 days, mated)  
*LLCR*

**InterCon EIA 540BOAE/Belcore  
GR-1217 test sequence (group  
HP from attached InterCon test  
diagram):**

*LLCR* (20 mΩ max change/pair)  
*Durability* (12x)  
*LLCR*  
*Mixed Flowing Gas* (Class IIA,  
20 days, mated)  
*LLCR*  
***ATC (0° to 100° C, 24 hours)***  
*LLCR*  
***Durability (13x)***  
*LLCR*



Sample Preparation



EIA-540BOAE Specification

cLGA Socket Qualification

Black font shows EIA-540BOAE requirements

Green font shows InterCon tests and conditions which exceed EIA requirements

\* - Indicates samples are exposed unmated / unmounted