

T99X171.00 Reliability Test Plan v1.0

Climatic test plan

No.	Item	Test Condition	Pass Criteria	Q'ty	Reference Standard
1	Thermal Measurement Test	Power on, Operation 8 hours at 25°C/50°C and thermal record	1. Tj < Spec. 2. Housing top < Δt15 °C 3. Housing bottom < Δt15 °C 4. Cap's MTBF > 43,800 hrs	1	IEC 60068-2-1 IEC 60068-2-2
2	Cold start	1. Power off, and store at -5°C for 24 hours then power on to check function. 2. Repeat test 15 times	1. No functional failures both during and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	2	IEC 60068-2-1
3	Hot start	1. Power off, and store at 50°C for 24 hours then power on to check function. 2. Repeat test 15 times	1. No functional failures both during and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	2	IEC 60068-2-2
4	Continuation of temperature cycle	1. Operating in high and low temperature environment at 50/-5°C 2. 50°C with 1°C/min, Dwell 3 hrs ; -5°C with 1°C/min, Dwell 3 Hrs, total 72 hrs	1. No functional failures both during and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	2	IEC 60068-2-30
5	Temperature and humidity cycles test	Power off, storage in temperature and humidity environment at 70 / -20°C (Dwell 12 hrs and 90 %R.H. Total: 72 hrs	1. No functional failures both before and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	2	IEC 60068-2-30
6	High Temperature & Humidity Test (Op)	Power on, Operation, Ta = 50°C ,Humi.= 90%R.H. for 72 hours	1. No functional failures both during and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	2	IEC 60068-2-78
7	Operational Temperature Range	Power on 1. 25°C for 1 hr 2. 25°C to -5°C for 2 hrs 3. -5°C for 13 hrs 4. -5°C to 25°C for 2 hrs 5. 25°C/65% for 1 hr 6. 25°C/65% to 50°C/65% for 2 hrs 7. 50°C/90% for 13 hrs 8. 50°C/90% to 25°C for 2 hrs Repeat 1~8 for 2 cycles 9. 25°C/60% for 48 hrs Total for 120 hrs Note: 1. Input condition 1) voltage : 220v 2) Source : SKB's Live channel in their network 2. Test sample quantity : 6ea 1) DUT1, 2 : MultiView 2) DUT3, 4 : VOD 3) DUT5, 6 : LMD (Laser) 	1. No functional failures both before and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	6	Customer's Spec.
8	Thermal Shock	Power off , non-OP, Ta= -20C (30min) ~ 70C (30min) 15 cycles, Transfer time : 5 min	1. No functional failures both before and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	2	MIL-810
9	EDVT test	Verify the hardware design by exposure of the product to wider temperature, voltage and frequency margining. Test Temp. at -5/50 °C	1. No functional failures both during and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	1	Foxconn's Spec.
10	Power on /off Test with Temperature	1.Power on: 50 sec; off 10 sec. (follow product characteristic) 2. Vin: follow customer's spec or MRS, 2,500 cycle, total 5,000 3. Test Temp at -5/50 °C	1. No functional failures both during and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	2	Foxconn's Spec.
11	Quickly Power on/off Test	1.Power on: 120 sec; off 3 sec. (follow product characteristic) 2. Vin: follow customer's spec or MRS, for 100 cycles 3. Test Temp at 25 °C (Room Temp.)	No functional failures both during and after the test	20	Foxconn's Spec.
12	Highly Accelerated Life Test (HALT)	1. Thermal step stress (Cold) 2. Thermal step stress (Hot) 3. Fast thermal transition 4. Vibration step stress 5. Combined thermal cycling	To find the product limit	5	Foxconn's Spec.
13	MTBF Prediction	Based on Telecordia SR-332 Issue-III Prediction software: Relax program	NA	0	Telecordia SR-332 Issue-III
14	MTBF Demonstration	Target: 43,800 hours Test Temperature: 50°C Sample size: 20 units Refer to Mil-Std 781D , LCL 90% RDT Completion Milestone: @ 90% confidence level	1. Life Time> 5 years. No functional failures of the test 2. No performance degradation during the functional test 3. No visual damage to the products during inspection, such as shrinkage, peeling, or discoloration, etc.	20	Mil-Std 781D

Mechanical test plan

No.	Item	Test Condition	Pass Criteria	Q'ty	Reference Standard
1	Vibration Test Random (Op)	1. 0.002G ² /Hz 2. 5 to 500Hz 3. Direction: 3 mutually perpendicular axis 4. Duration:30 min/ axis	1. No functional failures both during and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	2	IEC 60068-2-64
2	Shock test (Op)	1. Shock spectrum: Half sine, Duration: 11 ms, 2. Acceleration: 30 m/s ² , Direction of shocks: 6 3. Test duration: 6 faces x 3 shocks	1. No functional failures both before and after the test 2. No performance degradation before the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	2	IEC 60068-2-27
3	Drop test	1. Height for fall test: 750 mm 2. Steel floor 3. Drop 6 faces	1. No functional failures both before and after the test 2. No performance degradation before the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	2	IEC-60950-01
4	Remote Control Display Angle	The operating range of the IR Remote shall be 10 m at an angle 0deg & +/-30deg from axial. Remote shall be 7 m at an angle of +/-45 degrees from axial when tested in accordance with standard test procedures.	1. No functional failures both during and after the test 2. No performance degradation during the functional test	2	Customer's Spec.
5	Abrasion Resistance of Label Test	1. Storage the label at 50°C for 12 hours . 2. Start the test at 50°C . 3. 95% alcohol. 4. Load: 3N. 5. Total 5 times.	1. Any paints required by this standard shall be durable and legible. 2. No any exposed original surface. 3. After this test, the product should not be deformed or disfigured in any way.	2	Customer's Spec.
6	Logo/Printing Abrasion Test	Alcohol Abrasion Test Alcohol concentration: > 95%, load: 200gf, cycle: 150 cycles (one cycle= forward + backward),	No physical defect and functional failure after this test.	2	Foxconn's Spec.

7	USB Plug Test	Test Cycles: 5,000 Cycles Test Speed: 10 times/min Functional check every 1,000 cycles.	No physical defect and functional failure after this test.	2	Foxconn's Spec.
8	HDMI Plug Test	Test Cycles: 5,000 Cycles Test Speed: 10 times/min Functional check every 1,000 cycles.		2	Foxconn's Spec.
9	RJ-45 Plug Test	Test Cycles: 5,000 Cycles Test Speed: 10 times/min Functional check every 1,000 cycles.		2	Foxconn's Spec.
10	Power Jack Plug Test	Test Cycles: 5,000 Cycles Test Speed: 10 times/min Functional check every 1,000 cycles.		2	Foxconn's Spec.
11	Salt Fog	1. Salt: 5% , Temp. : 35C and Humidity: 85% 2. Test duration: 8 hours salt fog exposure then 8 hours drying conditions 3. Total test time: 16 hours	No physical defect and functional failure after this test.	2	MIL-810F section 509.4

Packaged test plan																																																																							
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1	Temperature and Humidity Test	Power off, Storage, Ta =38°C, Humi.= 85%R.H. for 72 hrs	No obvious visible damage on boxes after temperature and humidity test.	1 carton	ISTA-2A																																																																		
2	Static Compression Test	1. Apply a static load "Wt x (S - 1) x F" for 1 hour. 2. Wt: Total weight of the packaged-product. 3. S: Total number of packaged-products in a stack. 4. F: Compensating factor=5	No obvious visible damage on boxes after drop test	1 carton	ISTA-2A																																																																		
3	Random Vibration Test	1. Face 3 rests on the platform for 30 mins 2. Face 1 rests on the platform for 10 mins 3. Face 2 or 4 rests on the platform for 10 mins 4. Face 5 or 6 rests on the platform for 10 mins 5. Frequency : 1...4...100...200 6. PSD : 0.0001...0.01...0.01...0.0001	No obvious visible damage on boxes after vibration test.	1 carton	ISTA-2A																																																																		
4	Package drop test	< 10 Kg, drop 97 cm, 10 ~ 19 Kg, drop 81 cm, 19 ~ 28 Kg, drop 66 cm, one corner, three edge, six faces, total ten drop. <table border="1"> <thead> <tr> <th colspan="3">Package Product Weight</th> <th colspan="3">Drop Height</th> </tr> <tr> <th>Box 1 (kg)</th> <th>Box 2 (kg)</th> <th>Box 3 (kg)</th> <th>Box 4 (kg)</th> <th>Box 5 (kg)</th> <th>Box 6 (kg)</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> </tr> <tr> <td>15</td> <td>15</td> <td>15</td> <td>15</td> <td>15</td> <td>15</td> </tr> <tr> <td>20</td> <td>20</td> <td>20</td> <td>20</td> <td>20</td> <td>20</td> </tr> <tr> <td>25</td> <td>25</td> <td>25</td> <td>25</td> <td>25</td> <td>25</td> </tr> <tr> <td>30</td> <td>30</td> <td>30</td> <td>30</td> <td>30</td> <td>30</td> </tr> <tr> <td>35</td> <td>35</td> <td>35</td> <td>35</td> <td>35</td> <td>35</td> </tr> <tr> <td>40</td> <td>40</td> <td>40</td> <td>40</td> <td>40</td> <td>40</td> </tr> <tr> <td>45</td> <td>45</td> <td>45</td> <td>45</td> <td>45</td> <td>45</td> </tr> <tr> <td>50</td> <td>50</td> <td>50</td> <td>50</td> <td>50</td> <td>50</td> </tr> </tbody> </table>	Package Product Weight			Drop Height			Box 1 (kg)	Box 2 (kg)	Box 3 (kg)	Box 4 (kg)	Box 5 (kg)	Box 6 (kg)	10	10	10	10	10	10	15	15	15	15	15	15	20	20	20	20	20	20	25	25	25	25	25	25	30	30	30	30	30	30	35	35	35	35	35	35	40	40	40	40	40	40	45	45	45	45	45	45	50	50	50	50	50	50	No obvious visible damage on boxes after vibration test.	1 carton	ISTA-2A
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5	Fix displacement Test	Displacement: 25 mm Duration: 14200 times	No obvious visible damage on boxes after drop test.	1 carton	ISTA-2A																																																																		