Apacer Technology Inc. **Qual Report**

CX210-MSD
Reliability & Environment Test Report

Test Start :
2021,9,27

Test End:
2021,10,27

Tested by:

Chain Yang

Approved by:

Danny TC Chen

Ver 1.0

Oct. 27, 2021

1. High Temperature Storage/Operation (Pass)

1.1 Testing Objective

To verify the varied temperature requirements from the different areas because products may be subjected to varied operation temperature condition. The product must be tested to verify its temperature endurance.

1.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Connect the component (DUT) to the motherboard and verify its functionality for baseline.
3. Put the component (DUT) into chamber and the motherboard is outside.
4. Program the test profile and turn on the chamber based on specification.
5. Inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

1.3 Testing Component (DUT)

3pcs CX210-MSD

1.4 Testing Equipment

MMM (Germany) Fcocell-111

1.5 Testing Specification

1.Temperature:85 ºC
2.Duration:500Hours

1.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

1.7 Testing Result

Testing Condition	**Temperature**	**Testing Time**	**Result**	**Remark**
			Sample No. 1,2,3	
Storage/ Operation	85ºC	500 hours	Pass	-

1.8 Testing Photo

2. High Temperature and Humidity Storage/Operation (Pass)

2.1 Testing Objective

To verify the varied temperature requirements from the different areas because products may be subjected to varied operation temperature condition. The product must be tested to verify its temperature endurance.

2.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Connect the component (DUT) to the motherboard and verify its functionality for baseline.
3. Put the component (DUT) into chamber and the motherboard is outside then power on the motherboard.
4. Program the test profile and turn on the chamber based on specification.
5. Inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

2.3 Testing Component (DUT)

3pcs CX210-MSD

2.4 Testing Equipment

MMM (Germany) Fcocell-111

2.5 Testing Specification

1.Temperature:40 ºC
Humidity:93%
2.Time:500hrs

2.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

2.7 Testing Result

Testing Condition	**Temperature/ Humidity**	**Testing Time**	**Result**	**Remark**
			Sample No. 1,2,3	
Operation	40ºC/93%	500 hours	Pass	-

2.8 Testing Photo

3. Low Temperature Storage/Operation (Pass)

3.1 Testing Objective

To verify the varied temperature requirements from the different areas because products may be subjected to varied operation temperature condition. The product must be tested to verify its temperature endurance.

3.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Connect the component (DUT) to the motherboard and verify its functionality for baseline.
3. Put the component (DUT) into chamber and the motherboard is outside.
4. Program the test profile and turn on the chamber based on specification.
5. Inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

3.3 Testing Component (DUT)

3pcs CX210-MSD

3.4 Testing Equipment

Revco Legaci

3.5 Testing Specification

1.Temperature:-40 ºC
2.Duration:168Hours

3.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

3.7 Testing Result

Testing Condition	Temperature	Testing Time	Result	Remark
			Sample No. 1,2,3	
Storage	-40ºC	168 hours	Pass	-

3.8 Testing Photo

4. Altidue Test (Pass)

4.1 Testing Objective

To verify the product ability of impact in air pressure

4.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Connect the component (DUT) to the motherboard and verify its functionality for baseline.
3. Put the component (DUT) into chamber and the motherboard is outside.
4. Program the test profile and turn on the chamber based on specification.
5. Inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

4.3 Testing Component (DUT)

3pcs CX210-MSD

4.4 Testing Equipment

ESPEC/MTZ-21H-H

4.5 Testing Specification

1.Height:80,000feet
2.Duration:4Hours

4.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

4.7 Testing Result

Testing Condition	**Height**	**Testing Time**	**Result**	**Remark**
			Sample No. 1,2,3	
Operation	80,000feet	4 hours	Pass	-

4.8 Testing Photo

5. High Temperature and High Humidity Storage Test (Pass)

5.1 Testing Objective

To verify the varied temperature requirements from the different areas because products may be subjected to varied operation temperature condition. The product must be tested to verify its temperature/humidity endurance.

5.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Connect the component (DUT) to the motherboard and verify its functionality for baseline.
3. Put the component (DUT) into chamber and the motherboard is outside.
4. Program the test profile and turn on the chamber based on specification.
5. Inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

5.3 Testing Component (DUT)

3pcs CX210-MSD

5.4 Testing Equipment

TAS HTCL 600FS

5.5 Testing Specification

1.Temperature:85 ºC
2.Humidity:85%
3.Duration:1000Hrs

5.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

5.7 Testing Result

Testing Condition	**Temperature**	**Testing Time**	**Result**	**Remark**
			Sample No. 1,2,3	
Operation	85ºC/85%	1000 hours	Pass	-

5.8 Testing Photo

6. Temperature Cycling Test (Pass)

6.1 Testing Objective

To verify the varied temperature requirements from the different areas because products may be subjected to varied operation temperature condition. The product must be tested to verify its temperature endurance.

6.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Connect the component (DUT) to the motherboard and verify its functionality for baseline.
3. Put the component (DUT) into chamber and the motherboard is outside then power on the motherboard.
4. Program the test profile and turn on the chamber based on specification.
5. Inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

6.3 Testing Component (DUT)

3pcs CX210-MSD

6.4 Testing Equipment

Votsch VT 7012 S2

6.5 Testing Specification

1.Temperature:-40~85ºC

2.No. of Cycles:1000

6.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

6.7 Testing Result

Testing Condition	**Temperature**	**Cycles**	**Result**	**Remark**
			Sample No. 1,2,3	
Storage	-40~85ºC	1000	Pass	-

6.8 Testing Photo

7. Bending Test (Pass)

7.1 Testing Objective

To verify the product can withstand any external forces caused by real application.

7.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Connect the component (DUT) to the motherboard and verify its functionality for baseline.
3. Setup the testing environment.
4. Program the test profile and turn on the equipment based on specification.
5. Inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

7.3 Testing Component (DUT)

3pcs CX210-MSD

7.4 Testing Equipment

Universal Load Tester INSTRON 5565

7.5 Testing Specification

1.Applied Force:10N
2.Duration:Hold 60 seconds/cycle

7.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

7.7 Testing Result

Testing Condition	**Force**	**Duration**	**Result**	**Remark**
			Sample No. 1,2,3	
Storage	10N	60 seconds/cycle	Pass	-

7.8 Testing Photo

8. Torque Test (Pass)

8.1 Testing Objective

To verify the product can withstand any external forces caused by real application.

8.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Connect the component (DUT) to the motherboard and verify its functionality for baseline.
3. Setup the testing environment.
4. Program the test profile and turn on the equipment based on specification.
5. Inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

8.3 Testing Component (DUT)

3pcs CX210-MSD

8.4 Testing Equipment

SE Torgue Tester Model:2205S

8.5 Testing Specification

1.Applied Force:0.1N-m or ±2.5deg
2.Duration:Hold 30 seconds/cycle

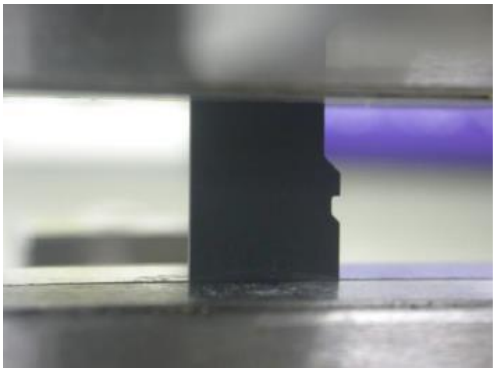
8.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

8.7 Testing Result

Testing Condition	**Force**	**Duration**	**Result**	**Remark**
			Sample No. 1,2,3	
Storage	0.1N-m or ±2.5deg	30 seconds/cycle	Pass	-

8.8 Testing Photo



9. Drop Test (Pass)

9.1 Testing Objective

To verify the product can withstand any external forces caused by real application.

9.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Connect the component (DUT) to the motherboard and verify its functionality for baseline.
3. Setup the testing environment.
4. Program the test profile and turn on the equipment based on specification.
5. Inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

9.3 Testing Component (DUT)

3pcs CX210-MSD

9.4 Testing Equipment

Manual

9.5 Testing Specification

1. Height:1.5m
2. Drop Surface:6 surfaces

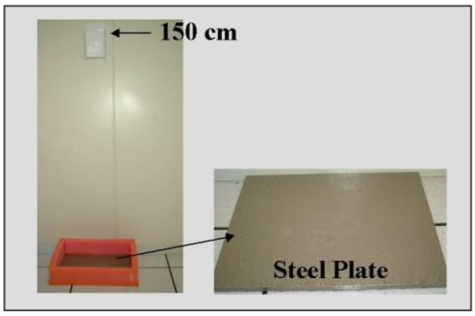
9.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

9.7 Testing Result

Testing Condition	Height	Drop Surface	Result	Remark
			Sample No. 1,2,3	
Storage	1.5m	6 surfaces	Pass	

9.8 Testing Photo



10. *Vibration Test (Pass)*

10.1 Testing Objective

The purpose of the vibration test is to determine mechanical weakness or performance degradation of a component(DUT) when subjected to vibration. Based on this information, to decide whether the component(DUT) is acceptable or not. It may be used in some cases to determine the structural integrity of specimens and study their dynamic behavior. Vibration testing may be performed anytime during the course of the test program. The accumulated effects of vibration induced stress may affect component(DUT) performance under other environmental conditions, such as temperature, altitude, humidity.

10.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Verify the component (DUT) functionality.
3. Fix component (DUT) on vibration table properly by adequate fixture
4. Expose the component (DUT) to the test level and duration as determined from the specifications.
5. After the test, inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.
6. Repeat step 3~5 for each axis.

10.3 Testing Component (DUT)

3pcs CX210-MSD

10.4 Testing Equipment

IMV / i240

10.5 Testing Specification

1.Frequency:10Hz~2KHz

2.30G peak

3.Axis:X/Y/Z
4.Duration:1hour/Axis

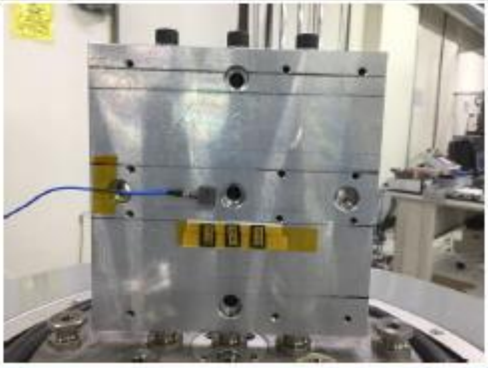
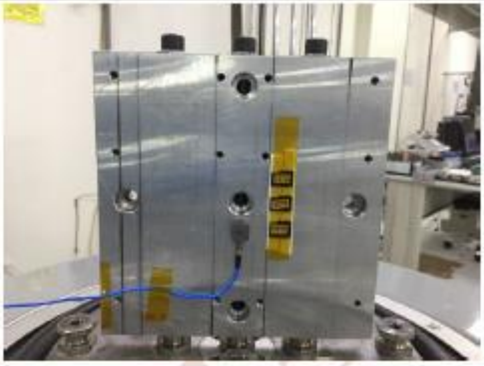
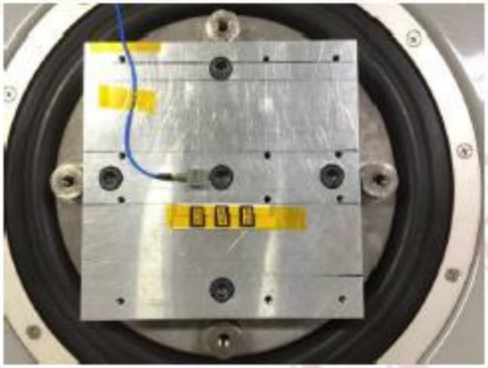
10.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

10.7 Testing Result

Testing Condition	**Frequency**	**Duration**	**Result**	**Remark**
			Sample No. 1,2,3	
Storage	10Hz~ 2KHz	1hour/Axis	Pass	-

10.8 Testing Photo/Profile

	
X Axis	Y Axis
	N/A
Z Axis	N/A

11. Durability Test (Pass)

11.1 Testing Objective

To verify the product can withstand a certain number of mating caused by real application.

11.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Verify the component (DUT) functionality.
3. Fix component (DUT) on equipment properly by adequate fixture
4. Expose the component (DUT) to the test level and duration as determined from the specifications.
5. After the test, inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

11.3 Testing Component (DUT)

3pcs CX210-MSD

11.4 Testing Equipment

UNIVERSAL Load Tester

11.5 Testing Specification

No. of Trials:10,000

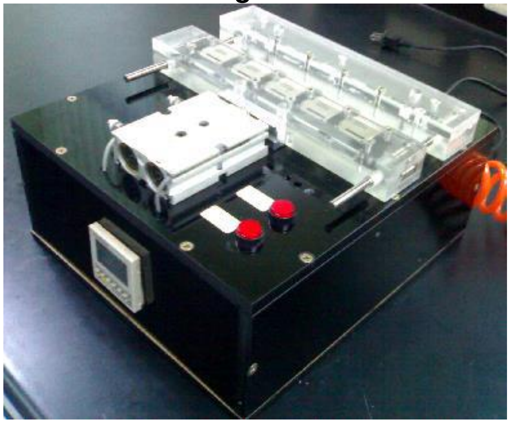
11.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

11.7 Testing Result

Testing Condition	**No. of Trials**	**Result**	**Remark**
		Sample No. 1,2,3	
Storage	10,000	Pass	-

11.8 Testing Photo/Profile



12. Salt Spray Test (Pass)

12.1 Testing Objective

To verify the product can withstand any corrosion caused by real application.

12.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Verify the component (DUT) functionality.
3. Fix component (DUT) on equipment properly by adequate fixture
4. Expose the component (DUT) to the test level and duration as determined from the specifications.
5. After the test, inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

12.3 Testing Component (DUT)

5pcs CX210-MSD

12.4 Testing Equipment

Salt Water Spray Tester(SH-60)

12.5 Testing Specification

1. Temperature:35 ºC
2. Concentration:3%NaCl
3. Duration:24Hours

12.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

12.7 Testing Result

Testing Condition	**Concentration**	**Duration**	**Result**	**Remark**
			Sample No. 1,2,3,4,5	
Storage	3%NaCl	24hours	Pass	-

12.8 Testing Photo/Profile

13. *Mechanical Shock Test (Pass)*

13.1 Testing Objective

The purpose of the vibration test is to determine mechanical weakness or performance degradation of a component(DUT) when subjected to vibration. Based on this information, to decide whether the component(DUT) is acceptable or not. It may be used in some cases to determine the structural integrity of specimens and study their dynamic behavior. Vibration testing may be performed anytime during the course of the test program. The accumulated effects of vibration induced stress may affect component(DUT) performance under other environmental conditions, such as temperature, altitude, humidity.

13.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Verify the component (DUT) functionality.
3. Fix component (DUT) on Shock table properly by adequate fixture
4. Expose the component (DUT) to the test level and duration as determined from the specifications.
5. After the test, inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.
6. Repeat step 3~5 for each axis.

13.3 Testing Component (DUT)

3pcs CX210-MSD

13.4 Testing Equipment

Lansmont /P30

13.5 Testing Specification

1. Acceleration:490m/sec2(50G) with Half Sine Wave
2. Durations:11ms
3. 3axes,6faces

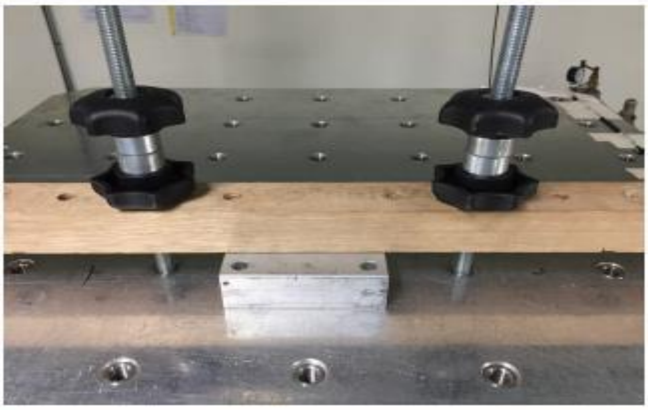
13.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

13.7 Testing Result

Testing Condition	Acceleration	Result	Remark
		Sample No. 1,2,3	
Storage	50G	Pass	-

13.8 Testing Photo/Profile

	
X+ Axis	X- Axis
	
Y+ axis	Y- Axis
	
Z+ Axis	Z- Axis

14. *Waterproof Test (Pass)*

14.1 Testing Objective

To verify the product can withstand the water caused by read application.

14.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Verify the component (DUT) functionality.
3. Fix component (DUT) on equipment properly by adequate fixture
4. Expose the component (DUT) to the test level and duration as determined from the specifications.
5. After the test, inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

14.3 Testing Component (DUT)

3pcs CX210-MSD

14.4 Testing Equipment

Water leakage test chamber

14.5 Testing Specification

1. Water Depth: 1.5m below the surface of water
2. Water Temperature: 25 °C
3. Duration: 30minutes

14.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

14.7 Testing Result

Testing Condition	**Height**	**Result**	**Remark**
		Sample No. 1,2,3	
Storage	1.5m	Pass	-

14.8 Testing Photo/Profile

15. UV Light Exposure Test (Pass)

15.1 Testing Objective

To verify the product can withstand the UV Light exposure caused by read application.

15.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Verify the component (DUT) functionality.
3. Fix component (DUT) on equipment properly by adequate fixture
4. Expose the component (DUT) to the test level and duration as determined from the specifications.
5. After the test, inspect the component (DUT) and compare it to pretest data and physical condition.
   If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

15.3 Testing Component (DUT)

5pcs CX210-MSD

15.4 Testing Equipment

UV Tester

15.5 Testing Specification

254nm,15Ws/cm2

15.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

15.7 Testing Result

Testing Condition	**Energy**	**Result**	**Remark**
		Sample No. 1,2,3,4,5	
Storage	254nm,15Ws/cm2	Pass	-

15.8 Testing Photo/Profile

16 *X-Ray Exposure Test (Pass)*

16.1 Testing Objective

To verify the product can withstand the X-Ray exposure caused by read application.

16.2 Testing Procedure

1. Inspect the component (DUT) to establish operation pretest criteria and physical condition.
2. Verify the component (DUT) functionality.
3. Fix component (DUT) on equipment properly by adequate fixture
4. Expose the component (DUT) to the test level and duration as determined from the specifications.
5. After the test, inspect the component (DUT) and compare it to pretest data and physical condition.
6. If any physical issue or malfunction happened during the testing ,this should be recorded and reported.

16.3 Testing Component (DUT)

3pcs CX210-MSD

16.4 Testing Equipment

Dage XD7600

16.5 Testing Specification

0.1Gy of medium-energy radiation (70 keV to 140 keV cumulative dose per year) to both sides of the card

16.6 Testing Criteria

1. No crack.
2. Card is functional.
3. No transfigure,deformity.
4. No warp or rust for metal parts.

16.7 Testing Result

Testing Condition	Energy	Result	Remark
		Sample No. 1,2,3	
Storage	0.1Gy	Pass	-

16.8 Testing Photo/Profile