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Package Test Report for T99X171.00

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Revision Change History

Revision	Description of Change	Date
1.0	Initial Release	2019/05/30

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Purpose

1. Provide a formal functional demonstration of the product design reliability.
2. Identify any design discrepancies.
3. Reliability assurance of trial samples which are designed and fabricated in accordance with the customer's product specifications.
4. Conduct robustness testing on early production samples in accordance to ISTA 2A specification.

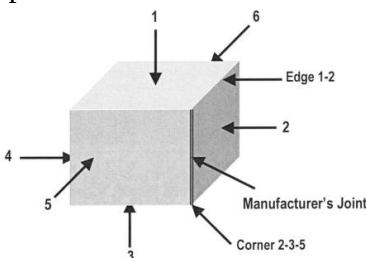
Scope

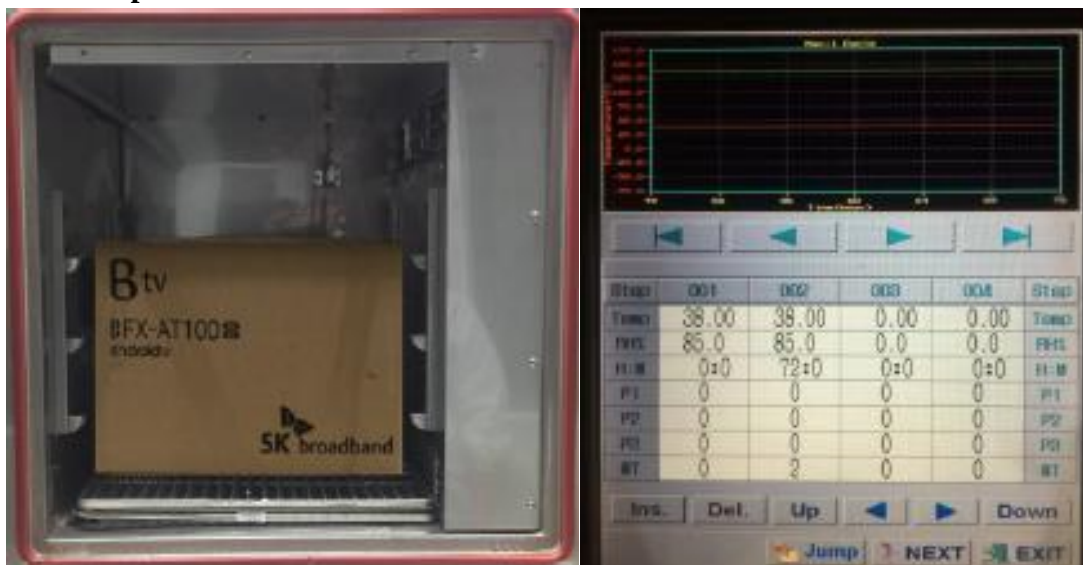
Based on T99X171.00 package test plan to describe the performance requirements, validation criteria, and the validation tests which focus on T99X171.00 product.

Sample information



Summary of Test Items:

No.	Item	Test Condition	Unit	Test Period	Pass Criteria	Test result
1	Temperature and Humidity Test	Power off, Storage. Ta =38°C, Humi = 85%R.H. for 72hrs	1 carton	3 Day	No obvious visible damage on boxes after temperature and humidity test .	OK
2	Static Compression Test	Apply a static load "Wt x (S-1) x F" for 1 hour. Wt: Total weight of the packaged-product. S: Total number of packaged-products in a stack. F: Compensating factor =5	1 carton	1 Day	No obvious visible damage on boxes after static compression test.	OK
3	Random Vibration Test	Face 3 rests on the platform for 30 mins Face 1 rests on the platform for 10 mins Face 2 or 4 rests on the platform for 10 mins Face 5 or 6 rests on the platform for 10 mins Frequency: 1...4...100...200 PSD: 0.0001...0.01...0.01...0.0001	1 carton	1 Day	No obvious visible damage on boxes after vibration test.	OK
4	Packaged 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. 	1 carton	1 Day	No obvious visible damage on sample after test.	OK
5	Vibration Fixed Displacement Test	Input amplitude: 25 mm (peak to peak) Dwell at 4.9 Hz for 14200 times Direction: Z axis	1 carton	1 Day	No obvious visible damage on sample after test.	OK



Test Procedure:

1. Before to do the test, need to do the visually inspection.
2. Take the sample to temperature humidity chamber.
3. Follow above thermal curve to do the test.
4. After test, check the package following below criteria.

Pass Criteria:

No obvious visible damage on sample after test.

Test Result: OK

2. Static Compression Test

Purpose:

The purpose of this test is to ensure the packaged product can withstand compressive forces that occur during normal transportation and warehousing operations.

Quantity: 1carton

Equipment:

Compression machine No. DL313C-10

Test Objective:

$$P = [W_t \times (S - 1) \times F] = 283.5 \text{ [N]}$$

W_t = Total weight of package (8,1Kg)

S = Number of packages in stack (8)

F = Safety factor (5)

Compression rate: 0.21mm/s

Time: 1hr

Test Setup:



Test Procedure:

1. Calculate the test load: $P = [W_t \times (S-1) \times F]$

W_t = Total weight of packaged-product (full MC)

S = Total number of packaged-products in a stack

F = Compensating factor

2. Place the test unit on the compression tester table as below photo.
3. Start the test machine and bring the platens together at the rate of one-half inch per minute.
4. Start to press the unit gradually as calculation parameter.
5. Maintain the force for one hour, and then release the force.
6. Check the package following below criteria.

Pass Criteria:

No obvious visible damage on sample after test.

Test Result: **OK**

3. Random Vibration Test

Purpose:

To determine the mechanical weakness and/or degradation in specified performance of specimens and use this information, in conjunction with the relevant specification, to decide the acceptability of the specimens.

Quantity: 1 carton

Equipment:

Vibration machine: ACT2000-R0100S

Laboratory Environment:

- The temperature: $22 \pm 3^\circ\text{C}$
- The relative humidity: $50 \pm 20\% \text{RH}$

Test Objective:

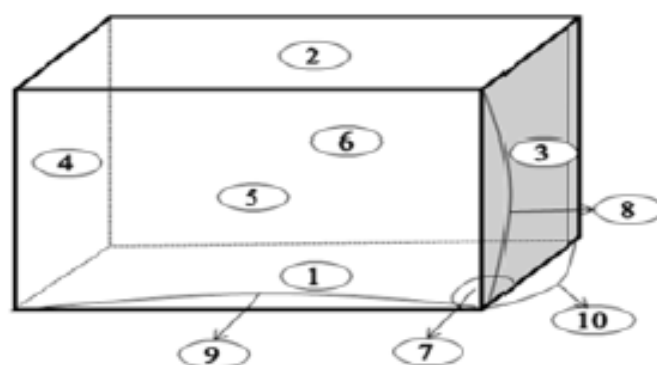
Power-off, non-operation

Four sides of the container should be tested: bottom 30min, top 10min, left 10min, front 10min

Input acceleration=1.15Grms

Frequency(Hz)	PSD(g^2/Hz)
1.0	0.0001
4.0	0.01
100.0	0.01
200.0	0.001

1. Top
2. Bottom
3. Right
4. Left
5. Front
6. Back
7. Corner 5-3-1
8. Edge 5-3



9. Edge
5-1
10. Edge
3-1

Test Setup:



Face 1



Face 3

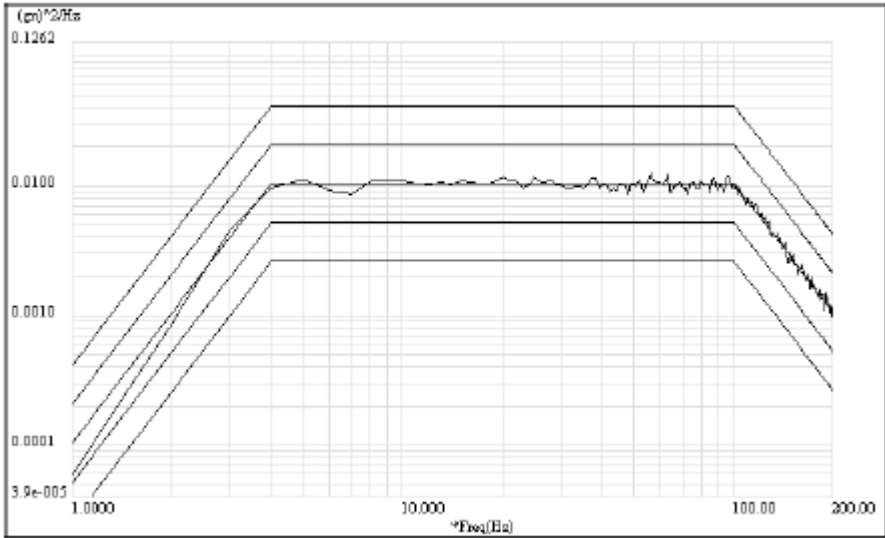


Face 4



Face 6

Test Spectrum



Test Procedure:

1. Put the packaged-product on the vibration table so that bottom face rests on the platform.
2. Start the vibration system to produce the random vibration spectrum indicated in the test objective.
3. Stop the vibration system after the completion of 30min. Invert the packaged-product so that top face rests on the platform.
4. Begin the vibration duration for this orientation.
5. Stop the vibration system after the completion of 10min. Place the packaged-product so that either left face or rear face rests on the platform.
6. Begin the vibration duration for this orientation.
7. Stop the vibration system after the completion of 10min. Place the packaged-product so that either front face or right face rests on the platform.
8. Begin the vibration duration for this orientation.
9. Stop the vibration testing at the end of 10min.
10. Check the module & package following below criteria.

Pass Criteria:

No obvious visible damage on sample after vibration test.

Test Result: OK

4. Packaged Drop Test:

Purpose:

This test is to determine if the packaging system will protect the product during a sudden shock that may occur in the distribution environments.

Quantity: 1carton

Test equipment:

- Controlled number : FH-NSBG-001046
- Drop test system: GP-2003

Laboratory Environment:

- The temperature: (20~28)°C
- The relative humidity: (30~60) %

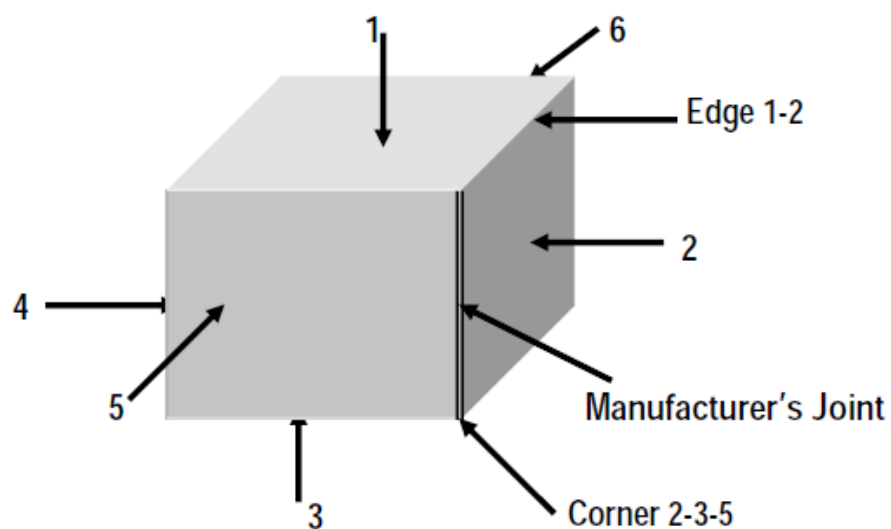
Test Objective:

0Kg<Carton =8.1Kg<10Kg, Carton Drop Height: 970mm

Total Drops: 10 drops (1 corner, 3 edges and 6 faces)

Test Diagram:

Identify faces according to the diagram below.



Sequence #	Orientation	Specific face, edge or corner
1	Corner	most fragile face-3 corner, if not known, test 2-3-5
2	Edge	shortest edge radiating from the corner tested
3	Edge	next longest edge radiating from the corner tested
4	Edge	longest edge radiating from the corner tested
5	Face	one of the smallest faces
6	Face	opposite small face
7	Face	one of the medium faces
8	Face	opposite medium face
9	Face	one of the largest faces
10	Face	opposite large face

		
Corner 2-3-5	Edge 2-5	Edge 3-5



Edge 2-3



Face 5



Face 6



Face 2



Face 4



Face 1



Face 3



Drop height

Test Procedures:

1. Put the product on drop mechanism.
2. Drop for one corner, three edges, and six faces.
3. Check the mechanical and function after the test.

Pass Criteria:

1. No obvious visible damage on sample after test 3.
2. Any different between before and after must be noted.

Test Result: OK**5. Vibration fixed displacement****Purpose:**

To determine the mechanical weakness and/or degradation in specified performance of specimens and use this information, in conjunction with the relevant specification, to decide the acceptability of the specimens.

Test Speciation:

Power-off, non-operation

Test Duration in Minutes = $\frac{14,200 \text{ Vibratory Impacts}}{\text{Cycles Per Minute (CPM) or [Cycles Per Second (Hz) x 60]}}$

NOTE:

The test duration for the Second Vibration Test Block may be different from that calculated for the First Vibration Test Block because the frequency required to bounce the packaged-product in the Second Vibration Test Block may be different.

The chart below shows **example** Test Duration's calculated for several frequencies:

CPM	Hz	Test Duration in Minutes
150	2.5	95
180	3.0	79
210	3.5	68
240	4.0	60
270	4.5	53
300	5.0	48

Test equipment:

- Controlled number : FN-CNSG-000431
- Vibration test system: Vibration Machine HV-1000F

Laboratory Environment:

- The temperature: $(25 \pm 5)^{\circ}\text{C}$
- The relative humidity: $(25 \sim 75) \%$

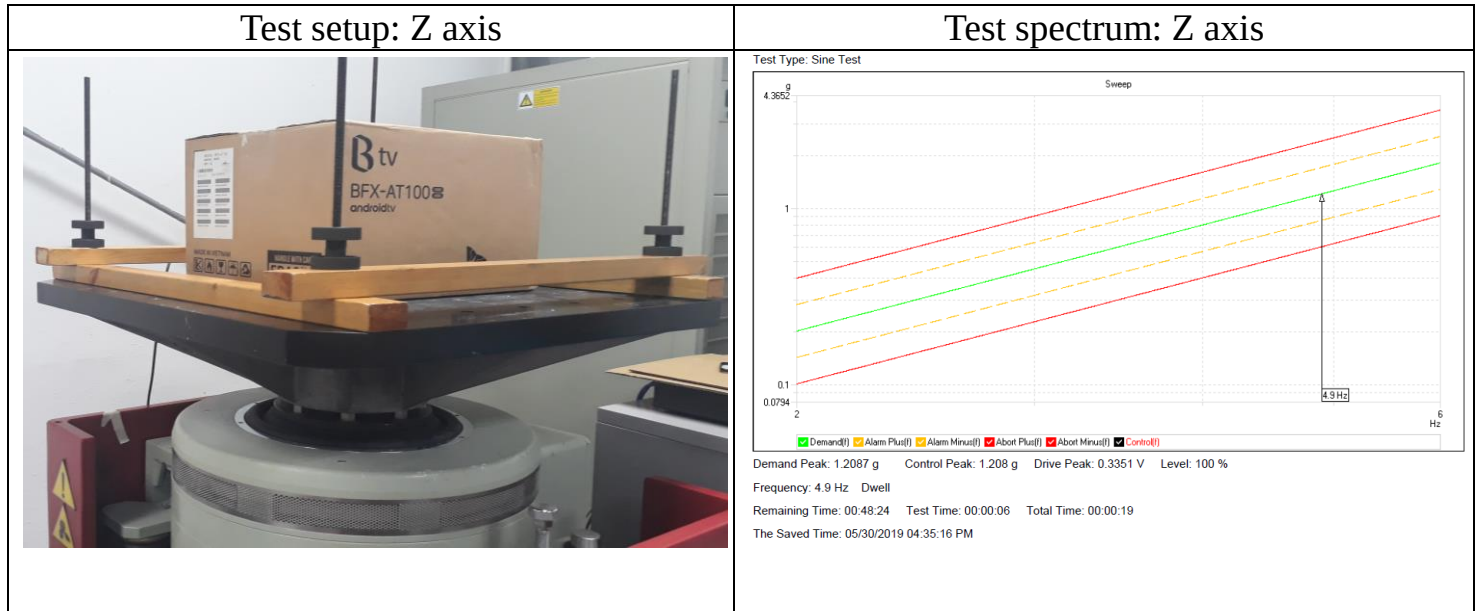
Test Procedures:

1. Before doing the test, need to do visual inspection.
2. Put the sample vibration table so that face 3 rests on the platform.
3. Start the vibration system to vibrate at 1.0 inches (25mm) total displacement at the machine's lowest frequency
4. Maintain a fixed displacement at 1 in (25 mm) and slowly increase the frequency (speed) of the vibration table until the packaged-product begins to momentarily leave the surface of the platform.
5. Hold the vibration frequency
6. A metal shim can be intermittently moved between the bottom of the longest dimension of the packaged product and the surface of the platform is 4.9 Hz
7. Begin vibration duration for 14200 times.

8. Complete vibration duration.

9. Inspection of the package-product for visible damage is allowed.

The photos and spectrums of samples are shown as below:



Pass Criteria:

No obvious visible damage on sample after test.

Test Result: OK

—————End of Report—————