SOUTH QUALITY

PROFICIENCY TESTING PROVIDER

REPORT No 11498

Date of issue: *February 4, 2026*

Status: FINAL REPORT

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ASTM D4169

PERFORMANCE TESTING OF SHIPPING CONTAINERS AND SYSTEMS

Program: SQO-4456.V1 - Round 1

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1. FOREWORD

This report summarizes the results of the **SQO-4456.V1 (Round 1)** proficiency testing program on the determination of the ability of shipping units to withstand the distribution environment. This program is carried out under a simultaneous participation format, according to the A.3.1 classification of the ISO 17043 standard ("Model 2 - Figure A.1").

South Quality conducted the testing program from August to November 2025 with the aim of assessing the laboratory's ability to competently perform the designated tests.

2. ORGANIZATION

Program Coordinator:	Lic. Esther Casas
Assistant Technician:	Berenice Ferrel
Statistic:	Lic. Manuel Tozaki
Supervision:	Eng. Emiliano Medina

3. OBJECTIVE

The objective of this proficiency testing program is to determine the ability of shipping units to withstand the distribution environment using the following standard:

Standard
ASTM D4169 - 23e1

To verify this, batches of boxes with different contents have been selected.

Participants in this program have not been previously informed about the expected results of the samples they receive.

4. PARTICIPANTS

In the present round, 7 laboratories participated, as detailed below:

CODE	Country	ISO 17025 Accredited	Results delivered
01	Malaysia	Yes	Yes
02	USA	Yes	Yes
03	Italia	Yes	Yes
04	Canada	Yes	Yes
05	USA	Yes	Yes
06	Netherlands	Yes	Yes
07	USA	Yes	Yes

5. HOMOGENEITY

Several batches were prepared by South Quality personnel in an identical way.

Subsequently, a homogeneity study was conducted with an ISO 17025 accredited laboratory.

The control process followed ISO 33405: 2024, clauses 7.4.1.1 / 7.4.1.2. Stratified random sampling was employed, and samples were chosen using random number generation software.

The results of this test appear below:

Size of each batch: **30 samples** Tested samples from each batch: **8 samples**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE ANALYZED SAMPLES (CONDITIONING, LOOSE LOAD VIBRATION & VEHICLE VIBRATION)		
	BATCH: LPK2845	BATCH: LPK2486	BATCH: LPK2487
Product and package condition (damaged or undamaged)	YES	YES	NO

Samples for this program are taken from the selected batch identified as LPK2845.

Analysis of this testing data indicated that samples were sufficiently homogeneous for the program and, therefore, any participant results identified as outliers cannot be attributed to sample variability.

6. SAMPLE INFORMATION

The following samples were sent for testing (Participant **Code 01**):

Batch:	LPK2845
Sample ID:	01
Characteristics:	Packaged switching power supplies Box dimensions: 20 × 20 × 10 cm - Material: Cardboard Contents: Switching power supply 12 V, 5 A, 60 W - 3 units - 500 g Gross weight of the box: 785 g

7. IMAGES

SAMPLES

SAMPLES


8. ASSIGNED VALUES

The assigned values are obtained from the results reported by all participants (**Consensus values**).

9. STATISTICS

The results must be treated as qualitative.

For qualitative results, the comparison will be made directly against the assigned values, so any difference will be evaluated as **Unsatisfactory**.

10. PARTICIPANT RESULTS

LABORATORY CODE	LPK2845		
	OUTER PACKAGING	INNER PACKAGING	PRODUCT
01	PASS	PASS	PASS
02	PASS	PASS	PASS
03	PASS	PASS	**FAIL** ¤
04	PASS	PASS	PASS
05	PASS	PASS	PASS
06	PASS	PASS	PASS
07	PASS	PASS	PASS
CONSENSUS VALUE	**PASS**	**PASS**	**PASS**

11. EVALUATION OF PERFORMANCE

Laboratory **Code 01**: The laboratory has obtained **SATISFACTORY** results in the evaluation of all results arising from the conducted tests.

Laboratory **Code 02**: The laboratory has obtained **SATISFACTORY** results in the evaluation of all results arising from the conducted tests.

Laboratory **Code 03**: The laboratory has obtained **UNSATISFACTORY** results in the evaluation of functional testing on the units packaged.

Laboratory **Code 04**: The laboratory has obtained **SATISFACTORY** results in the evaluation of all results arising from the conducted tests.

Laboratory **Code 05**: The laboratory has obtained **SATISFACTORY** results in the evaluation of all results arising from the conducted tests.

Laboratory **Code 06**: The laboratory has obtained **SATISFACTORY** results in the evaluation of all results arising from the conducted tests.

Laboratory **Code 07**: The laboratory has obtained **SATISFACTORY** results in the evaluation of all results arising from the conducted tests.

12. CONCLUSIONS

The overall performance on this **SQ-4456.V1 (Round 1)** program from the participating laboratories, based on expected results, are the following:

- Participants Codes **01, 02, 04, 05, 06** and **07** have obtained a **SUFFICIENT** performance in accordance with the expected results and do not require any action;

- Participant Code **03** has obtained an **INSUFFICIENT** performance in accordance with the expected results and must take action on the tests where results differed from those expected (See annex B).

The criteria used for the evaluation of the overall performance are as follows:

- **SUFFICIENT** performance: No unsatisfactory results were obtained.

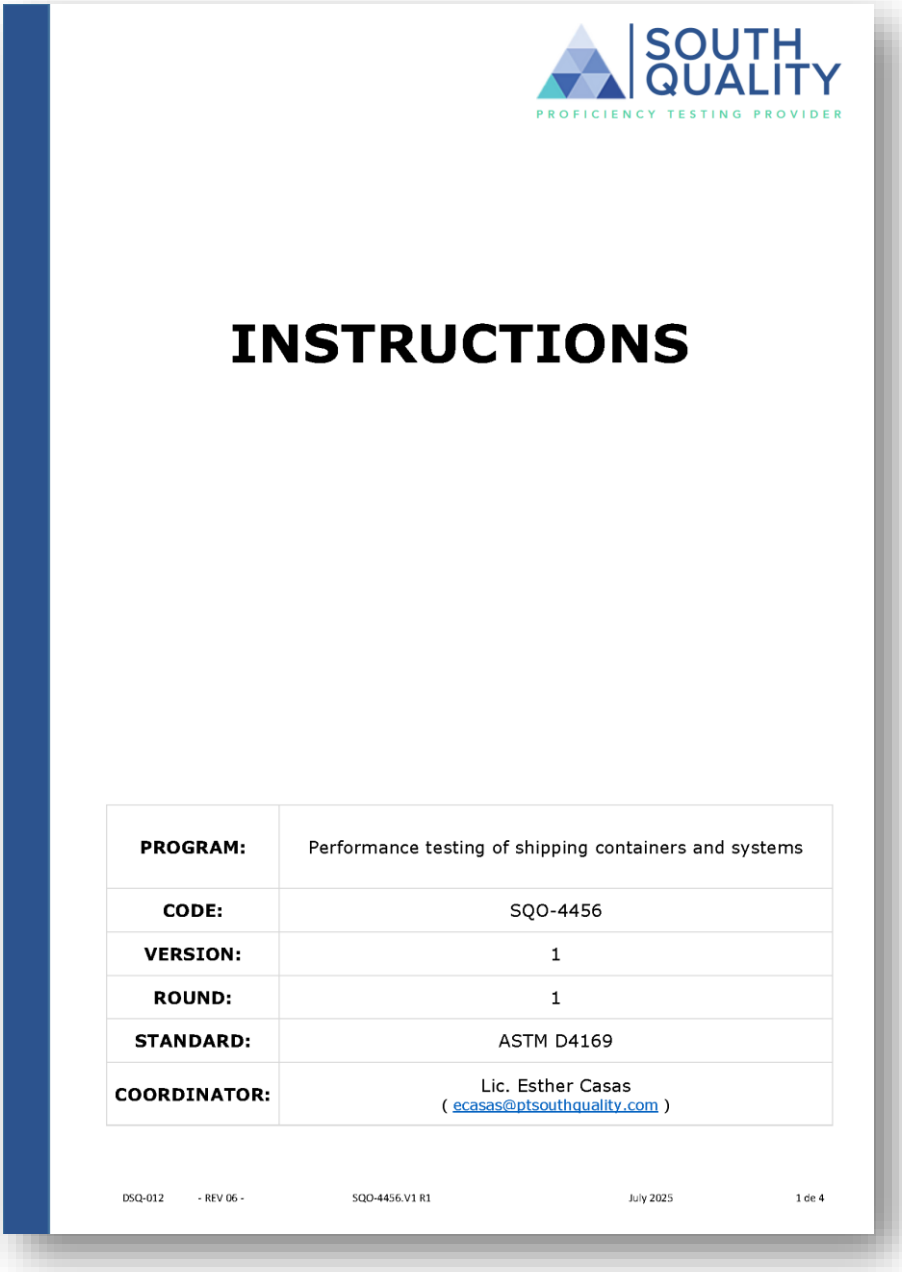
- **INSUFFICIENT** performance: One or more unsatisfactory result were obtained.

APPENDIX A

A1 - PARTICIPANT DATA

Company:	**SIRIM QAS INTERNATIONAL SDN. BHD.**
Laboratory:	**PACKAGING, UN & ISTA**
Country:	Malaysia
Client ID:	S326
Contact person:	MOHD HAFIZOL BIN SHAARI (Senior Testing Engineer)
	mhafizol@sirim.my

A2 - INSTRUCTIONS



INSTRUCTIONS

PROGRAM:	Performance testing of shipping containers and systems
CODE:	SQO-4456
VERSION:	1
ROUND:	1
STANDARD:	ASTM D4169
COORDINATOR:	Lic. Esther Casas (ecasas@ptsouthquality.com)

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1 - **General**

This document serves as a guide for managing the results of the **SQO-4456.V1 (Round 1)** program.

2 - **Standard**

ASTM D4169 - 23e1

3 - **Participant**

SIRIM QAS INTERNATIONAL SDN. BHD. PACKAGING, UN & ISTA	**CODE 01**

4 - **Tests involved**

TEST
Determination of the ability of shipping units to withstand the distribution environment

5 - **Samples**

CODE	**SAMPLE**	**QUANTITY**
LPK2845-01	Packaged switching power supplies (3 units)	1 unit

6 - **Notes**

a) The deadline for submitting the results is **September 15, 2025.**
b) The participants must submit the results using the usual report employed by their laboratory.
c) The box to be tested bears labels with instructions that must be followed:
- The box contains a polystyrene strip that must be removed **prior** to the test.
- The box must only be opened **after** the test.

d) Samples must be retained until the end of the program, which concludes with the submission of the final report.
e) To review the results, test images would be appreciated. Images can be attached at the end of this document or sent by email.

7 - **Test conditions and verification procedures**

a) The sample must be subjected to the following test plan:

No.	Test plan	Test Parameter
1	Clause 6 Conditioning	Cross Reference Standard: ASTM D4332-22 Temperature: 23±2°C Relative Humidity: 50±5%RH Duration: 24 hours
2	Clause 13 Schedule F Loose Load Vibration	Cross Reference Standard: ASTM D999-08 (2023) Method: A1 Amplitude: 25 mm (peak to peak) Total Duration: 40 minutes (ALII) Test orientation: Face 3 facing down (Duration 50%) Face 2 facing down (Duration 25%) Face 5 facing down (Duration 25%)
3	Clause 12 Schedule E Vehicle Vibration	Cross Reference Standard: ASTM D4728-17 (2022) Mode of Transportation: Truck (Table 2) Test orientation: Face 3 facing down Face 2 facing down Face 5 facing down

b) After completing the test plan, the products and package condition (damaged or undamaged) must be verified.

c) For the switching power supplies, both visual examination and functional testing shall be conducted.

PHOTOGRAPHS

A3 - PARTICIPANT RESULTS

SIRIM QAS International Sdn. Bhd. (410334-X)
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40700 Shah Alam, Selangor Darul Ehsan, Malaysia.
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TEST REPORT

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Applicant	:	**PT SOUTH QUALITY SAS** CUIT 30-71707517-6 Pareja 3981 – Villa Devoto (C1419GVG) Cludad Autonoma de Buenos Aires - ARGENTINA
Manufacturer	:	Not applicable
Product	:	Packaged switching power supplies (3 units)
Reference Standard/ Method of test	:	ASTM D4169-23 - Performance Testing of Shipping Containers and Systems. - Assurance level (AL): II - Distribution cycle (DC) 2: Specifically defined distribution system, user-specified - Test plan: CI.6-F-E
Description of sample/ Description of Test Specimen	:	Program code : SQO-4456 Sample code : LPK2845-01 Type of Packaging : Corrugated Box Carton size : 250(L)X250(W)X100(H) – mm Package gross mass : 0.77 kg Quantity : 1 box
Date Received of Complete Application	:	10 August 2025
Job No.	:	J2025139SQO-4456
Description of Test Results/ Overall Test Result	:	The test result of the submitted test sample is described on pages 2 to 4 of this test report
Issued date	:	11 NOV 2025

Approved Signatory

(MOHD HAFIZOL BIN SHAARI)
Senior Testing Engineer

SIRIM QAS INTERNATIONAL SDN BHD
Mechanical & Automotive Section

(Ir. KAMARULZAMAN BIN MAT ZIN)
Head
Mechanical & Automotive Section (MAST)
Testing Services Department

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SAMPLE INFORMATION AND TEST RESULT

Package-product Information :

Sample gross mass	:	0.77kg
Sample dimension	:	250(L)X250(W)X100(H) – mm (outer packaging)
Program code	:	SQO-4456
Sample code	:	LPK2845-01
Type	:	Combination packaging - Outer packaging : 1 box - Inner packaging : 3 boxes/outer packaging
No. of product	:	3 units

Notes:
1. Refer appendix I for pictures of the sample (package-product) and face identification.
2. Refer appendix III for pictures of the sample (package-product) after test.
3. Sample was sampling and provided by PT SOUTH QUALITY SAS.
4. Sample were received in good condition.
5. The inner packaging and product will be inspected and evaluated after the completion of the entire test sequence.
6. Simple Acceptance Rule is used for the conformity statement. The level of risk regarding the Probability of False Accept is up to 50% according to ILAC G8:09.
8. Date of receive sample: 10 August 2025.
9. Date of test: 22 October 2025 – 24 October 2025.
10. Participant name: Sirim QAS International Sdn. Bhd. (Packaging, UN & ISTA) (Code 01)
11. Location of test: Building 13, SIRIM Berhad, Shah Alam, Selangor, Malaysia.

Test Item	:	Temperature conditioning		
Test Standard	:	ASTM D4169-23 – Clause 6 (cross-reference ASTM D4332-22) - Temperature conditioning – controlled temperature & humidity		
Test Equipment	:	Equipment name	:	Temperature & Humidity Walk-in Chamber
		Brand/Maker	:	Weiss
		Model	:	WWH512/70/3/WC/RUM/X
		Calibration date	:	28/1/2025
Test Description	:	Conditioning profile	:	23±2°C; 50±5%RH
		Conditioning duration	:	24 hours
Test Result (Outer Packaging)	:	No evaluation or observation is required.		

Notes:
1. Refer appendix II for the picture of temperature conditioning test setup.
2. Refer appendix IV for graph of temperature & humidity profile.
3. The next test sequence (Loose load vibration – vibration test) was performed on the same packages-product.

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SAMPLE INFORMATION AND TEST RESULT

Test Item : Vibration test

Test Standard : ASTM D4169-23 – Clause 13 (cross-reference ASTM D999-08 (2015))
- Schedule F – Loose load vibration

Test Equipment :

Equipment name	:	Vibration Test System
Brand/Maker	:	IIMV
Model	:	I240
Calibration date	:	09/09/2025

Test Description :

Type/method	:	A1 (Repetitive shock test – vertical motion)
Frequency	:	4.5 Hz
Displacement	:	25 mm (peak to peak)
Test orientation and duration	:	Face 3 (base) facing down – 20 minutes Face 2 (side) facing down – 10 minutes Face 5 (end) facing down – 10 minutes

Test Result (Outer Packaging) : No noticeable damage or dents were observed on the sample. The carton box remained intact and in good condition.

Notes:
1. Refer appendix II for the picture of vibration (loose load) test setup.
2. Refer appendix IV for the graph of Loose load vibration.
2. The last test sequence (Vehicle vibration – vibration test (truck)) was performed on the same packages-product.

Test Item : Vibration test

Test Standard : ASTM D4169-23 – Clause 12 (cross-reference ASTM D4728-17 (2022))
- Schedule E – Vehicle vibration

Test Equipment :

Equipment name	:	Vibration Test System
Brand/Maker	:	IIMV
Model	:	I240
Calibration date	:	09/09/2025

Test Description :

Type	:	Random
Mode of transportation	:	Truck
Grms & duration	:	High level – 0.70 (5 minutes) Medium level – 0.54 (15 minutes) Low – 0.40 (40 minutes)
Test orientation	:	Face 3 (base) facing down Face 2 (side) facing down Face 5 (end) facing down

Test Result (Outer Packaging) : No noticeable damage or dents were observed on the sample. The carton box remained intact and in good condition.

Notes:
1. Refer appendix II for the picture of vibration (vehicle) test setup.
2. Refer appendix IV for the graph of Vehicle vibration.

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Mechanical & Automotive Section

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SUMMARY OF TEST RESULT

After completing all test sequences according to Test Plan F&E based on ASTM D4169-23, including temperature conditioning as specified in Clause 6, a visual inspection and evaluation were conducted on the tested sample.

Overall evaluation on packages-product (outer packaging)

No visible damage or deterioration were observed that could affect the condition or structure of the outer packaging, or the performance and quality of the product. The carton box remain intact and in good condition.

Overall evaluation on packages-product (inner packaging)

No visible damage or deterioration were observed that could affect the condition or structure of the outer packaging, or the performance and quality of the product. The carton boxes (3 boxes) remain intact and in good condition.

Overall evaluation on packages-product (product)

No visible defects or damages were found on any of the three units of switching power supplies. Functional testing was carried out, and all units operated properly.

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Mechanical & Automotive Section

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APPENDIX I
FACES IDENTIFICATION

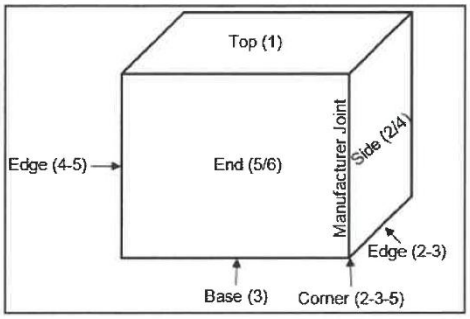

Figure 1: Faces identification for package-product

PICTURES OF SAMPLE

Figure 1: Packaged switching power supplies (outer packaging)

Figure 2: Packaged switching power supplies (outer packaging)

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APPENDIX II
PICTURES OF TEST SETUP

Figure 3: Temperature conditioning – controlled temperature & humidity

Figure 4: Loose load and vehicle vibration - Face 3 (base) facing down

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APPENDIX II
PICTURES OF TEST SETUP

Figure 5: Loose load and vehicle vibration - Face 2 (side) facing down

Figure 6: Loose load and vehicle vibration - Face 5 (end) facing down

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APPENDIX III
PICTURES OF SAMPLE AFTER TEST

Figure 7: Sample condition after test – Outer packaging

Figure 8: Sample condition after test – Outer packaging

Figure 9: Placement of inner packaging within outer packaging

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APPENDIX III
PICTURES OF SAMPLE AFTER TEST

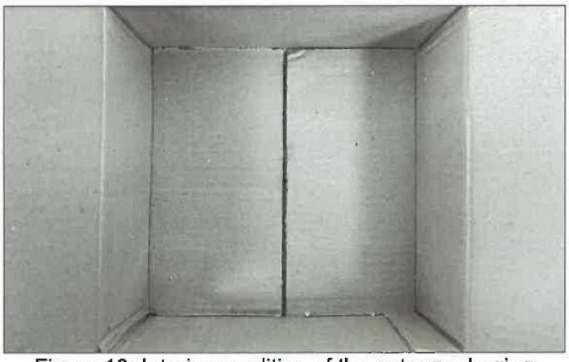

Figure 10: Interior condition of the outer packaging

Figure 11: Inner packaging condition

Figure 12: Product condition – Box #1

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APPENDIX III
PICTURES OF SAMPLE AFTER TEST

Figure 13: Product condition – Box #2

Figure 14: Product condition – Box #3

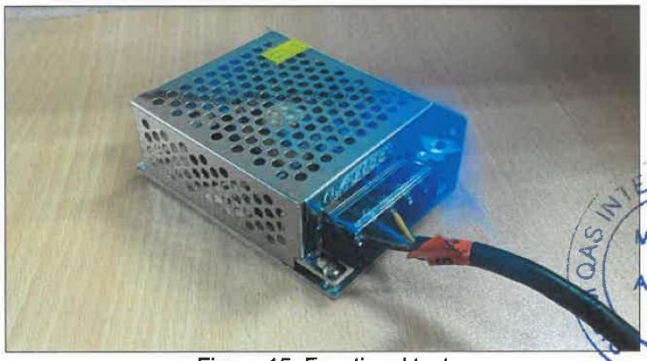

Figure 15: Functional test

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APPENDIX III
PICTURES OF SAMPLE AFTER TEST

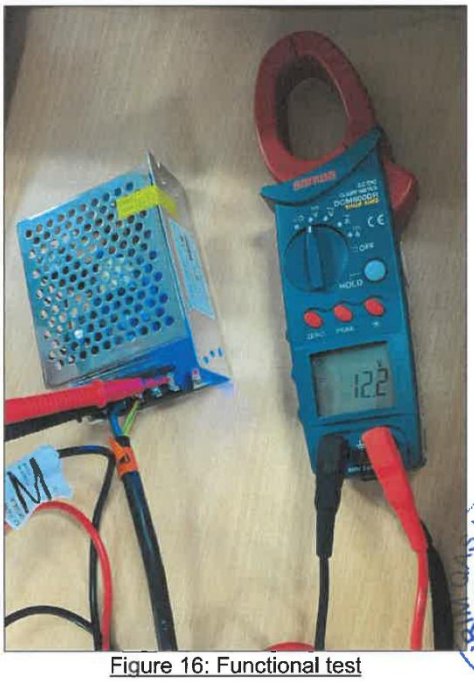

Figure 16: Functional test

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APPENDIX IV
GRAPHS

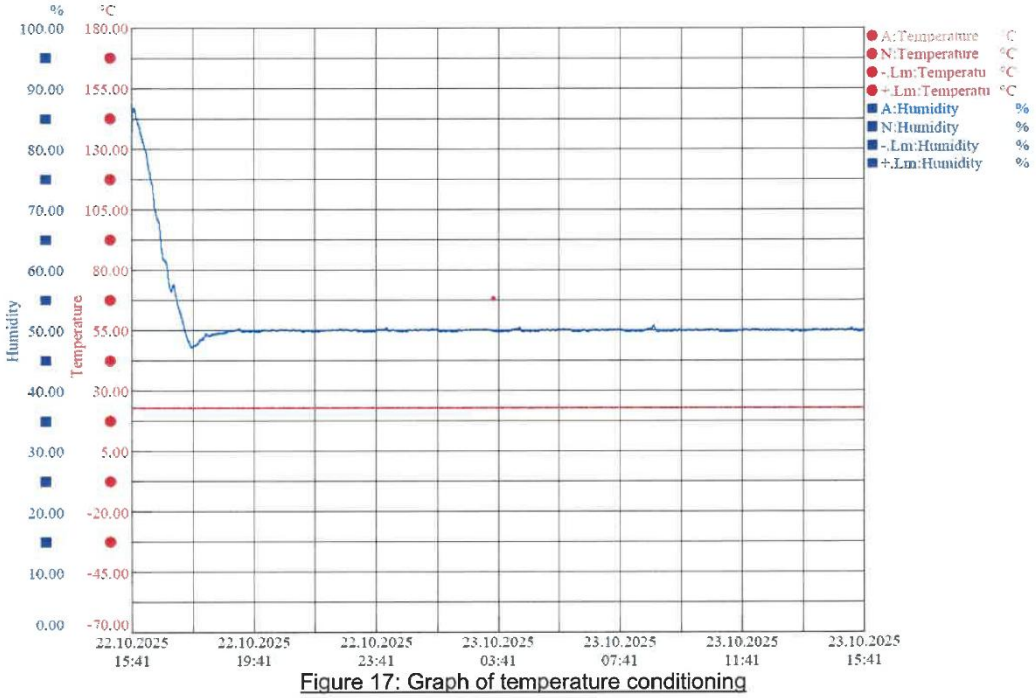

Figure 17: Graph of temperature conditioning

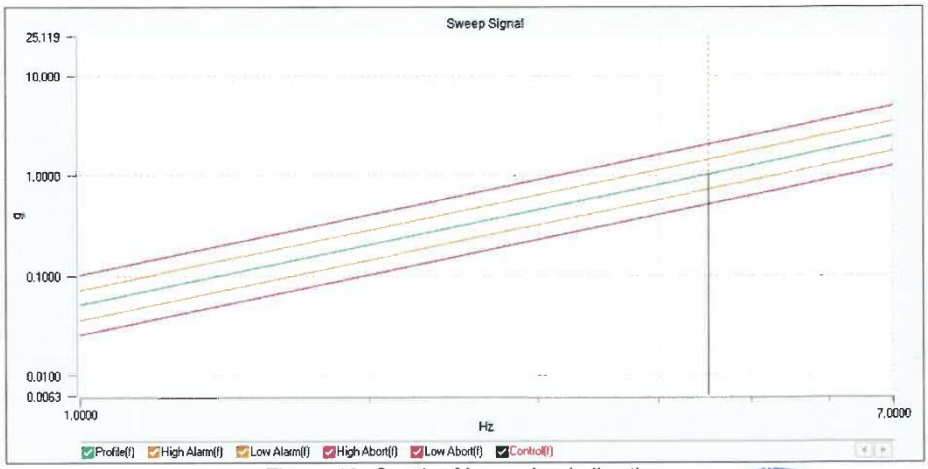

Figure 18: Graph of Loose load vibration

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Unless otherwise stated, the results shown in this Test Report shall be valid exclusively for the specific sample either provided by the Applicant or sampled by the qualified officer and tested by SIRIM QAS International Sdn. Bhd. In deriving the results of this Test Report, SIRIM QAS International Sdn. Bhd. has relied solely on the sample and data information provided by the Applicant, in accordance with the applicable standards requested by the Applicant in the Application Form. This Test Report shall not be reproduced, except in full, without written approval from the Head of Quality, Occupational Safety and Health & Environment (QOSHE) of SIRIM QAS International Sdn. Bhd. Kindly refer to the last page of this Test Report for the 'Conditions Relating to the Use of SIRIM QAS International Test Report'.

APPENDIX IV
GRAPHS

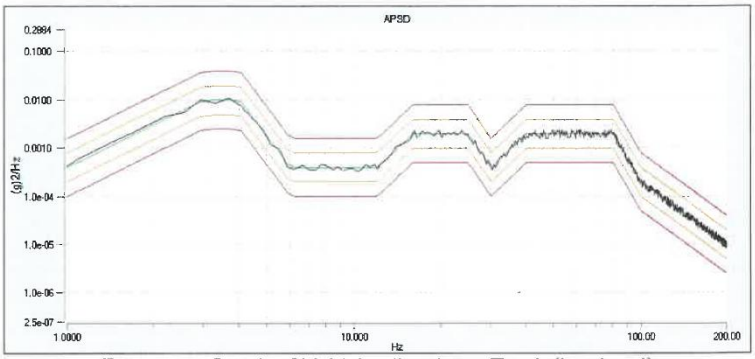

Figure 19: Graph of Vehicle vibration – Truck (low level)

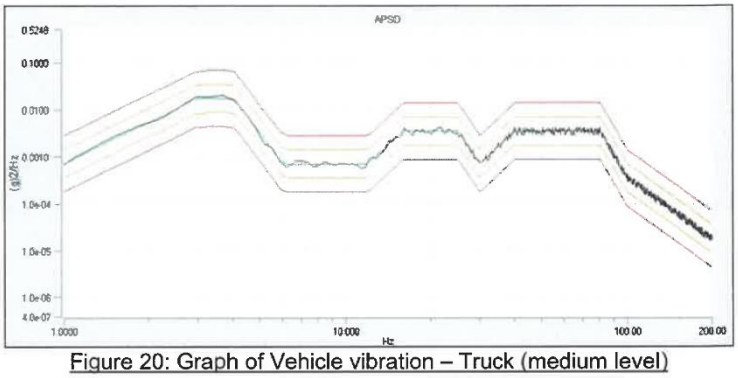

Figure 20: Graph of Vehicle vibration – Truck (medium level)

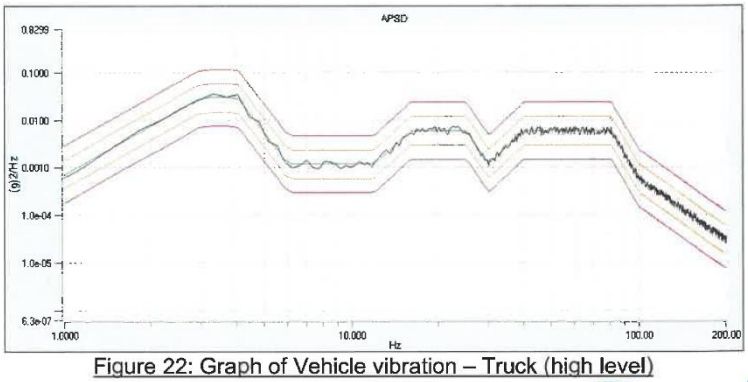

Figure 22: Graph of Vehicle vibration – Truck (high level)

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APPENDIX B

VOID

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