

TEST REPORT

REPORT NO.: 2021RE0158-S1

PAGE : 1 OF 29

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Applicant : **DELAB SCIENTIFIC SDN. BHD. (426602-W)**

Manufacturer : **DELAB SCIENTIFIC SDN. BHD. (426602-W)**
No.22, Jalan Tembaga SD5/2D,
Bandar Sri Damansara,
52200 Kuala Lumpur,
MALAYSIA

Product : **DIGITAL POWER FACTOR REGULATOR**

Reference Standards/ : IEC 61000-6-4 : 2018 EMC –Generic Standards – Emission for industrial
Method of test environments
IEC 61000-6-2 : 2016 EMC –Generic Standards – Immunity for industrial
environments
IEC 60255-27 : 2013 : - Clause 10.6.4.2 "Impulse Voltage Withstand"
IEC 60255-27 : 2013 : - Clause 10.6.4.3 "Dielectric Test"

Description of sample : Brand : DELAB
Model : NV-14s
Family Model : NV-5, NV-7, NV-6s and NV-8s
Rating : 100-275 Vac / 415 Vac, 45-65 Hz

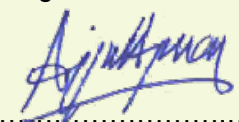
Date received of :
Complete Application : 5 MARCH 2021

Job No. : J20211410092


Description of overall : The test results for submitted test sample as described in this test report
Test Results complied with the requirement of the above Reference Standard

Issue date : 20 AUGUST 2021

Approved Signatories,


.....
(AZIZUL AZMAN JAAFAR)
Group Leader
EMC Laboratory

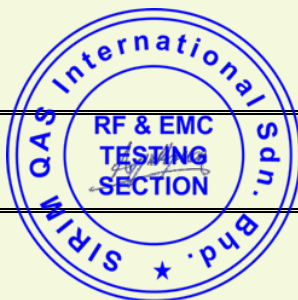



.....
(ZARISMAIL ABD RAHMAN)
Head
RF & EMC Testing Section
Testing Services Department

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1. SUMMARY OF TEST RESULTS

Note: This supplementary report is identical to Report No. 2021RE0158. The amended is to include "Brand : DELAB", "Model" and "Rating" in Page 1.

| Reference Standard | Test Method | Basic Standards | Testing Date | Results |
|----------------------|--|-----------------|----------------------------|---------|
| IEC 61000-6-4 : 2018 | Conducted Emission | CISPR 16-2-1 | 5.3.2021 - 12.3.2021 | PASS |
| | Radiated Emission | CISPR 16-2-3 | | PASS |
| IEC 61000-6-2 : 2016 | Electrostatic Discharge | IEC 61000-4-2 | | PASS |
| | Radio-Frequency Electromagnetic Field Amplitude Modulation | IEC 61000-4-3 | | PASS |
| | Fast Transients | IEC 61000-4-4 | | PASS |
| | Surges | IEC 61000-4-5 | | PASS |
| | Radio Frequency Common Mode | IEC 61000-4-6 | | PASS |
| | Power frequency magnetic field | IEC 61000-4-8 | | PASS |
| | Voltage Dips and Short Interruptions | IEC 61000-4-11 | | PASS |
| | Immunity Against Damped Oscillatory Wave (1 MHz) Test | IEC 61000-4-18 | | PASS |
| IEC 60255-27 : 2013 | Impulse Voltage Withstand | Clause 10.6.4.2 | | PASS |
| IEC 60255-27 : 2013 | Dielectric Test | Clause 10.6.4.3 | | PASS |

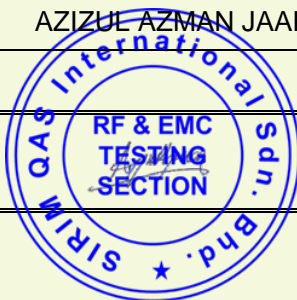
The compliance statement above is based on the tested model NV-14s. The applicant has declared the following model are identical to the tested model, refer to the Declaration letter at the last page of this report :-

1. Model 1 : NV-5
2. Model 2 : NV-7
3. Model 3 : NV-6s
4. Model 4 : NV-8s

ADDITIONAL INFORMATION:

| | |
|---------------|---------------------|
| Tested by : | MAHADI SHARIF |
| Reviewed by : | AZIZUL AZMAN JAAFAR |

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2. OPERATING CONDITION

2.1 EUT (Equipment under test) Descriptions

Table 1: Descriptions of EUT

| No. | Item/Model Name | Remarks |
|-----|---|---------------------------------|
| 1 | Product Name | Digital Power Factor Controller |
| 2 | Model No. | NV-14s |
| 3 | Brand | DELAB |
| 4 | Highest frequency of Internal source of EUT | <1 GHz |
| 5 | Rating | 100-275 Vac, 45-65 Hz |
| 6 | Test Voltage | 240 Vac, 50 Hz |
| 7 | Operating Mode | Normal Operating |

3. TEST METHODOLOGY

3.1 Emission Test

Radio disturbance characteristic measurement was performed in the semi-anechoic chamber and shielded enclosure room for radiated and conducted emission respectively according to the IEC 61000-6-4.

3.2 Description of Supporting Equipment Used During Test NIL

3.3 Modification on EUT NIL

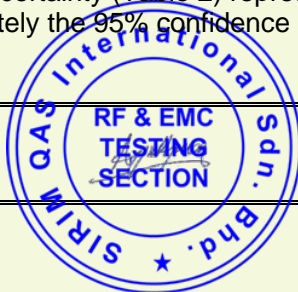
3.4 Any deviations from the Basic EMC standards NIL

3.5 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels has been estimated for tests performed on the EUT as specified in CISPR-16-4-2:

This measurement uncertainty (Table 2) represents an expanded uncertainty expressed approximately the 95% confidence level using a coverage factor of k=2

| | | |
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Table 2 : Measurement Uncertainty

| Measurement | Frequency | CISPR Uncertainty, U_{CISPR} (dB) | Lab Uncertainty, U_{lab} (dB) |
|--------------------|----------------|---|---|
| Conducted Emission | 150kHz – 30MHz | ± 3.4 | ± 2.34 |
| Radiated Emission | 30MHz – 1GHz | ± 6.3 | ± 3.91 |

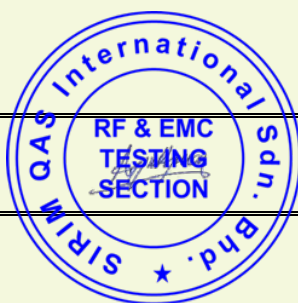
The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the measurement uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results in condition of U_{lab} is smaller than U_{CISPR} given in CISPR 16-4-2 (IEC 61000-6-4 : Clause 7).

3.6 Performance criteria for immunity tests

Criteria A – The apparatus shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the apparatus if used as intended.

Criteria B – The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Criteria C – Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls



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2. CONDUCTED EMISSION

2.1 Test Specifications

The evaluations of Conducted Emission were performed according to CISPR 16-2-1 and shall meet the minimum performance of IEC 61000-6-4.

Table 1: Limit of Conducted Emission

| Frequency range (MHz) | Limits (dB μ V) | |
|-----------------------|---------------------|---------|
| | Quasi-peak | Average |
| 0.15 to 0.5 | 79 | 66 |
| 0.5 to 30 | 73 | 60 |

2.2 Test Setup

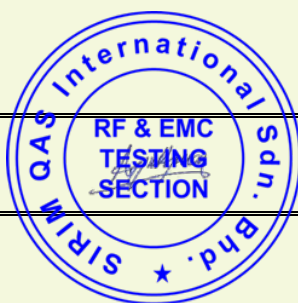
- 2.2.1 The measurement of Conducted Emission was performed in accordance to the procedure set forth in the CISPR 16-2-1.
- 2.2.2 The test was performed in the shielded enclosure room measuring and properly grounded to a single point in the grounding system.
- 2.2.3 The power supply for the EUT was tapped from a 50 Ω /50 μ H LISN, grounded to the shielded room via grounding straps. Main supply to the LISN was filtered by power line filters bonded to the external wall of the shielded room to reduce the ambient RF voltage.
- 2.2.4 The measurement was performed in EUT normal operating mode with external EMI filter has been installed at EUT power input terminal.

2.3 Test Results

The measurements of conducted emission for both terminal lines (neutral and live) were complied with the test specification as shown in Table 2.

Table 2: Result of Conducted Emission

| No. | Mode | Phase | Result | Remarks |
|-----|------------------|---------|--------|------------|
| 1. | Normal operating | LIVE | Pass | Appendix I |
| 2. | Normal operating | NEUTRAL | Pass | Appendix I |



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3. RADIATED EMISSION

3.1 Test Specifications

The evaluations of Radiated Emission were performed according to CISPR 16-2-3 and shall meet the minimum performance of IEC 61000-6-4.

Table 3 : Limit of Radiated RF Disturbances

| Limit of Radiated RF Disturbances 30 MHz to 1000 MHz at 3m distance | | |
|---|----------------------------|---------|
| Frequency range (MHz) | Quasi-peak Limits (dBμV/m) | |
| 30-230 | 50 | |
| 230-1000 | 57 | |
| Limit of Radiated RF Disturbances 1 GHz to 6 GHz at 3m distance | | |
| Frequency range (GHz) | Limits (dBμV/m) | |
| | Quasi-peak | Average |
| 1 - 3 | 70 | 50 |
| 3 - 6 | 74 | 54 |

3.2 Test Setup

- 3.2.1 The Radiated Emission measurement was performed according to the procedure set forth in the CISPR 16-2-3 at 3 m antenna distance.
- 3.2.2 The measurements were performed in 3m semi anechoic chamber.
- 3.2.3 The measurements were performed in EUT normal operating mode.

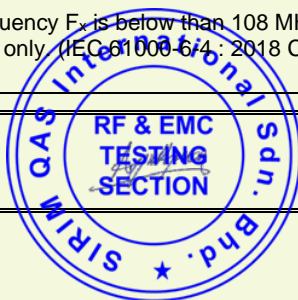
3.3 Test Results

The measurements of Radiated Emission were complied with the test specification as shown in Table 4.

Table 4 : Results of radiated emission

| Frequency | Polarization | Result | Remark |
|---|-----------------------|--------|-------------|
| 30 MHz – 1 GHz | Vertical & Horizontal | Pass | Appendix II |
| Note: Highest internal frequency F_x is below than 108 MHz. Thus, the highest measured frequency range is up to 1GHz only. (IEC 61000-6-4 : 2018 Clause 9 – Table 2) | | | |

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4. ELECTROSTATIC DISCHARGE (ESD)

4.1 Test Specifications

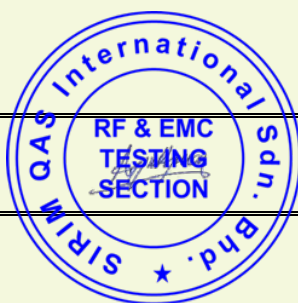
The evaluations of electrostatic discharge were performed according to IEC 61000-4-2 and shall meet the performance of IEC 61000-6-2.

Table 5 : ESD Specification

| Type of discharge | Standard specifications | Requirement |
|-------------------|-------------------------|-------------|
| Contact discharge | ± 6 kV | Criteria B |
| Air discharge | ± 8 kV | Criteria B |

4.2 Test Setup

- 4.2.1 Electrostatic Discharges measurements were performed in the shielded enclosure according to IEC 61000-4-2.
- 4.2.2 The ESD gun was loaded with 150pF-storage capacitor and 330ohm-discharge resistor and connected to the ESD simulator.
- 4.2.3 The contact discharges were applied to all metal part and chassis and air discharges were applied to all insulation part, metal part and chassis. See Figure 1.
- 4.2.4 The EUT was operated in its normal operating mode and the performance was evaluated based on functionality of the product.



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4.3 Test Results

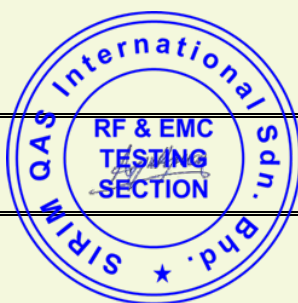
The measurements of Electrostatic Discharge were found to comply with the minimum performance requirements of IEC 61000-6-2 as shown in Table 6 and Table 7 below.

Table 6: Results of contact discharge ESD test.

| Test Level | Position | Test point | Results | Performance criteria |
|------------|---|------------|--------------------------------------|----------------------|
| ±6 kV | Top, Front, Left, Right, Rear | C1 | No malfunction during and after test | Criteria A |
| | | C2 | No malfunction during and after test | Criteria A |
| | | C3 | No malfunction during and after test | Criteria A |
| | | C4 | No malfunction during and after test | Criteria A |

Table 7: Results of air discharge ESD test.

| Test Level | Position | Test point | Results | Performance criteria |
|------------|---|------------|--------------------------------------|----------------------|
| ±8 kV | Top, Front, Left, Right, Rear | A1 | No malfunction during and after test | Criteria A |
| | | A2 | No malfunction during and after test | Criteria A |
| | | A3 | No malfunction during and after test | Criteria A |
| | | A4 | No malfunction during and after test | Criteria A |
| | | A5 | No malfunction during and after test | Criteria A |
| | | A6 | No malfunction during and after test | Criteria A |
| | | A7 | No malfunction during and after test | Criteria A |
| | | A8 | No malfunction during and after test | Criteria A |
| | | A8 | No malfunction during and after test | Criteria A |
| | | A9 | No malfunction during and after test | Criteria A |



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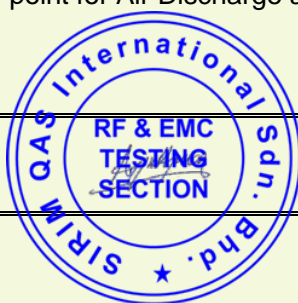


Front View



Rear View

Figure 1 : ESD point for Air Discharge and Contact Discharge



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5. RADIO-FREQUENCY ELECTROMAGNETIC FIELD. AMPLITUDE MODULATION

5.1 Test Specifications

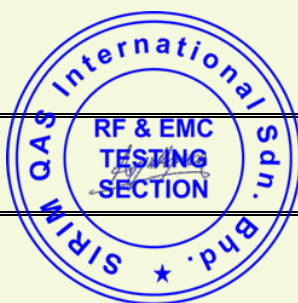
The evaluations of radio-frequency electromagnetic field. Amplitude Modulation test were performed according to IEC 61000-4-3 and shall meet the minimum performance of IEC 61000-6-2.

Table 8: RF Electromagnetic Field test specification

| Type of modulations | Level | Minimum performance criteria |
|--------------------------------|--------|------------------------------|
| 80 to 1000 MHz 1kHz 80%AM | 10 V/m | A |
| 1400 to 6000 MHz 1kHz 80%AM | 3 V/m | A |

5.2 Test Setup

- 5.2.1. Radio-frequency electromagnetic field, Amplitude modulation test was performed in the 3m fully anechoic chamber in accordance to the procedure set forth in the IEC 61000-4-3.
- 5.2.2. The antenna was mounted on an antenna tripod and set at a distance 3m away from the EUT and the supporting equipment. The tests were done for both antenna polarities.
- 5.2.3. The EUT was operated in its normal operating mode and the performance was evaluated based on functionality of the product.



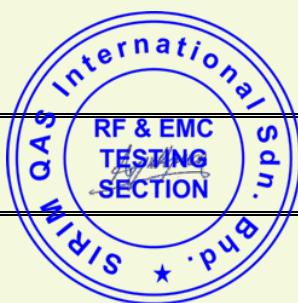
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5.3 Test Results

The evaluations of Radio-frequency electromagnetic field, Amplitude modulation test were found to comply with the minimum performance requirements of IEC 61000-6-2 as shown in Table 9 below.

Table 9: Results of air discharge Radio-frequency electromagnetic field test.

| Test Description | Antenna Polarization | Level | Performance evaluation | Remark |
|--------------------------------|----------------------|--------|--|------------|
| 80 to 1000 MHz 1kHz 80%AM | Horizontal | 10 V/m | No malfunction during and after the test | Criteria A |
| | Vertical | 10 V/m | No malfunction during and after the test | Criteria A |
| 1400 to 6000 MHz 1kHz 80%AM | Horizontal | 3 V/m | No malfunction during and after the test | Criteria A |
| | Vertical | 3 V/m | No malfunction during and after the test | Criteria A |



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6. FAST TRANSIENTS / BURST

6.1 Test specifications

The evaluations of fast transients were performed according to IEC 61000-4-4 and shall meet the minimum performance of IEC 61000-6-2.

Table 10: Fast Transients test specification

| Terminal | Test level | Test duration | Requirement |
|---------------|---------------------------|---------------|-------------|
| Input Voltage | ± 2 kV 5 or 100kHz | 2 minutes | Criteria A |

6.2 Test setup

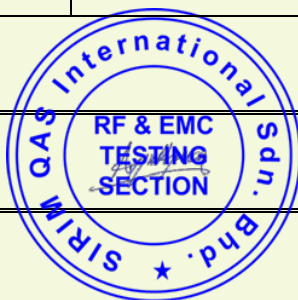
- 6.2.1 Fast transients measurements were performed in the shielded enclosure according to the procedure set forth in the IEC 61000-4-4.
- 6.2.2 The transient was introduced to the supply line of the EUT
- 6.2.3 The interference impulses (positive and negative) were coupled into the supply line for the time duration of 2 minutes.
- 6.2.4 The interference impulses (positive and negative) were coupled into the capacitive clamp for communication lines with test duration of 2 minutes.
- 6.2.5 The EUT was operated in its normal operating mode and the performance was evaluated based on functionality of the product.

6.3 Test results

The evaluations of the EUT against fast transients were found to comply with the minimum performance requirements of IEC 61000-6-2 as shown in Table 11 below.

Table 11: Result of Fast Transients /Burst test.

| Test level | AC Port | Result | Performance criteria |
|-------------------------|---------|--|----------------------|
| ± 2 kV 2 minutes | L1 | No malfunction during and after the test | Criteria A |
| | N | No malfunction during and after the test | Criteria A |
| | L1+N | No malfunction during and after the test | Criteria A |



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7. SURGES

7.1 Test Specifications

The evaluations of Surge test were performed according to IEC 61000-4-5 and shall meet the minimum performance of IEC 61000-6-2 requirement.

Table 12: Surge test specification

| Port | Test Level | Test port | Requirement |
|-------|------------|---------------------------------|-------------|
| Mains | ± 2 kV | Differential mode (Line – Line) | Criteria B |
| Mains | ± 4 kV | Common mode (Line – Earth) | Criteria B |

7.2 Test Setup

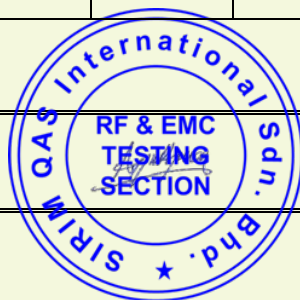
- 7.2.1 The Surge test was performed in the shielded enclosure according to the procedure set forth in the IEC 61000-4-5.
- 7.2.2 The EUT and its supporting equipment were setup its normal operating mode with a power supply tapped from couple decouple network of Surge generator for AC and DC mains supply port.
- 7.2.3 The surge was introduced to the supply line of the EUT and signal lines respectively.
- 7.2.4 The EUT was operated in its normal operating mode and the performance was evaluated based on functionality of the product.

7.3 Test Results

The evaluations of Surge test were found to comply with the minimum performance requirements of IEC 61000-6-2 as shown in Table 13 below.

Table 13: Result of Surge test.

| Mode | Test Level | Surge Terminal | Result | Performance criteria |
|-----------|------------|----------------|---|----------------------|
| Line-Line | ± 1 kV | L1-N | No malfunction during and after the test. | Criteria A |
| | ± 2 kV | L1-N | No malfunction during and after the test. | Criteria A |



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8. RADIO-FREQUENCY COMMON MODE

8.1 Test Specifications

The evaluations of Radio-frequency common mode were performed according to IEC 61000-4-6 and shall meet the minimum performance of IEC 61000-6-2 requirement.

Table 14: Radio-frequency common mode test specification

| Test Level | Test port | Requirement |
|---|-----------------|-------------|
| 150kHz to 80MHz 80% AM 1kHz 10 V r.m.s. | AC supply input | Criteria A |

8.2 Test Setup

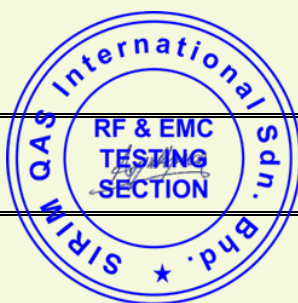
- 8.2.1 Radio-frequency common mode was performed in the shielded enclosure room in accordance to the procedure set forth in the IEC 61000-4-6.
- 8.2.2 The filtered power supply for the CDN was tapped from the appropriate power socket.
- 8.2.3 10V field strength of the unmodulated signal was applied to the EUT through CDN module for AC power port.
- 8.2.4 10V field strength of the unmodulated signal was applied to the inductive clamp for signal lines interference.
- 8.2.5 The EUT was operated in its normal operating mode and the performance was evaluated based on functionality of the product.

8.3 Test Results

The evaluations of Radio-frequency common mode were found to comply with the minimum performance requirements of IEC 61000-6-2 as shown in Table 15 below.

Table 15: Result of Radio-frequency common mode test.

| Test Level | Terminal | Result | Performance criteria |
|---|---------------|--|----------------------|
| 150kHz to 80MHz 80% AM 1kHz 10 V r.m.s. | Input Voltage | No malfunction during and after the test | Criteria A |



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9. POWER FREQUENCY MAGNETIC FIELDS

9.1 Test Specifications

The evaluations of Power frequency magnetic fields were performed according to IEC 61000-4-8 and shall meet the minimum performance of IEC 61000-6-2 requirement.

Table 16: Power frequency magnetic fields specification

| Frequency | Test Specification | Manufacturer's Specification | Minimum Performance criteria |
|-----------|--------------------|------------------------------|------------------------------|
| 50 Hz | 30 A/m | 300 A/m | A |

9.2 Test Setup

- 9.2.1 Power frequency magnetic fields were performed in accordance to the procedure set forth in the IEC 61000-4-8.
- 9.2.2 The EUT has been placed in the center of the induction coil.
- 9.2.3 The coil must be at least 1m away from any wall and from magnetic material.
- 9.2.4 The measurement has been performed with the EUT connected to the generator with the shortest power supply cable. The test duration is at least 10s.
- 9.2.5 The EUT was operated in its normal operating mode and the performance was evaluated based on functionality of the product.

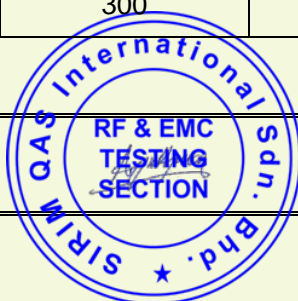
9.3 Test Results

The evaluations of the EUT against Power frequency magnetic fields were found to comply with the minimum performance requirements of IEC 61000-6-2 as shown in Table 17 below.

Table 17: Results of Power frequency magnetic fields test.

| Frequency (Hz) | Field strength (A/m) | Result | Performance criteria |
|----------------|----------------------|--|----------------------|
| 50 | 30 | No malfunction during and after the test | A |
| 50 | 300 | No malfunction during and after the test | A |

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10. VOLTAGE DIPS AND SHORT INTERRUPTIONS

10.1 Test Specifications

The evaluation of immunity against the voltage dips and interruptions immunity test were performed according to IEC 61000-4-11 and shall meet the minimum performance of IEC 61000-6-2.

Table 18: Minimum requirement of Voltage dips and interruptions immunity

| Test Specification | Cycles (50/60 Hz) | Minimum Performance criteria |
|--------------------|-------------------|------------------------------|
| 0 % | 1 | B |
| 40 % | 10 / 12 | C |
| 70 % | 25 / 30 | C |
| 0 % | 250 / 300 | C |

10.2 Test Setup

- 10.1 Voltage dips, short interruptions and voltage variation measurement was performed according to the procedure set forth in the IEC 61000-4-11.
- 10.2 The EUT was operated in its normal operating mode with display were used for observation and evaluation.

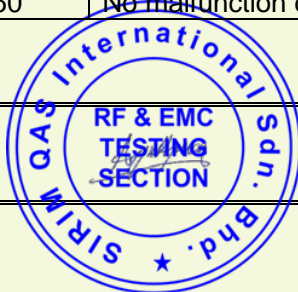
10.3 Test Results

The evaluations of the EUT against voltage dips and interruptions were found to comply with the minimum performance requirement of IEC 61000-6-2 as shown in Table 19 below.

Table 19: Results of voltage dips and interruptions test.

| Voltage reduction | Duration (cycles of 50 Hz) | Performance evaluation | Performance Criteria |
|-------------------|----------------------------|--|----------------------|
| 0 % | 1 | No malfunction during and after the test | A |
| 40 % | 10 | No malfunction during and after the test | A |
| 70% | 25 | No malfunction during and after the test | A |
| 0 % | 250 | No malfunction during and after the test | B |

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11. IMMUNITY AGAINST DAMPED OSCILLATORY WAVE (1 MHz) TEST

11.1 Test Specifications

The evaluations of immunity against damped oscillatory wave (1 MHz) test were performed according to IEC 61000-4-18 and shall meet the minimum performance of IEC 61000-6-2 requirement.

Table 20: Immunity against damped oscillatory wave (1 MHz) test requirement

| Port | Test Level | Requirement |
|-------------|----------------------------------|-------------|
| Supply Line | ± 1.0 kV @ differential mode | Criteria B |
| | ± 2.5 kV @ common mode | Criteria B |

11.2 Test Setup

11.2.1 Immunity against damped oscillatory wave (1 MHz) test was performed in the shielded enclosure room in accordance to the procedure set forth in the IEC 61000-4-18.

11.2.2 The 1 MHz burst was induced to the input power terminals of the EUT.

11.2.3 The test was performed in a shielded enclosure, using a surge generator network coupler/decoupler compliant with IEC 61000-4-18.

11.2.4 The 1 MHz burst generator network was on the top of ground plane and connected to the positive earth.

11.2.5 The EUT was operated in its normal operating mode and the performance was evaluated based on functionality of the product.

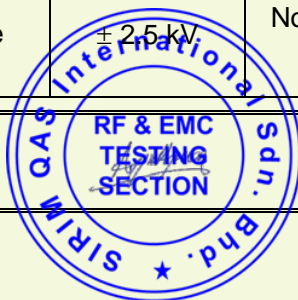
11.3 Test Results

The evaluations of Immunity against damped oscillatory wave (1 MHz) test were found to comply with the minimum performance requirements of IEC 61000-6-2 as shown in Table 21 below.

Table 21: Result of Immunity against damped oscillatory wave (1 MHz) test

| Phase | Level | Performance evaluation | Performance criteria |
|-------------------|--------------|--|----------------------|
| Differential Mode | ± 1.0 kV | No malfunction during and after the test | Criteria A |
| Common Mode | ± 2.5 kV | No malfunction during and after the test | Criteria A |

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12. IMPULSE VOLTAGE WITHSTAND TEST

(Test is subcontracted to Domestic III Lab –EEST1)

12.1 Test Specifications

The evaluations of immunity against impulse voltage withstand were performed according to IEC 60255-27 Clause 10.6.4.2, as shown in Table 22.

Table 22: Impulse voltage withstand test requirement

| Test Level | Performance Requirement |
|------------|--|
| ± 5 kV | No disruptive discharge during test and after the test, EUT shall comply with all relevant performance requirements. |

12.2 Test Setup

12.2.1 Impulse voltage withstand measurement was performed in the shielded enclosure in accordance to the procedure set forth in the IEC 60255-27 Clause 10.6.4.2.

12.2.2 The EUT was set into off operation mode and evaluations were done during and after the test.

12.2.3 The impulse voltages were induced between each circuit and between independent circuits.

12.3 Test Results

The evaluations of the EUT against impulse voltage withstand were found to comply with the performance criteria A, as shown in Table 23.

Table 23: Results of Impulse voltage withstand for all models.

| Test Terminal | Test Level | Test evaluation |
|-----------------------------|------------|--|
| between each circuit | ± 5 kV | No disruptive discharge during test and meet the relevant performance after the test |
| between independent circuit | ± 5 kV | |



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13. DIELECTRIC TEST

(Test is subcontracted to Domestic III Lab –EEST1)

13.1 Test Specifications

The evaluations of immunity against impulse voltage withstand were performed according to IEC 60255-27 Clause 10.6.4.3, as shown in Table 24.

Table 24: Dielectric test requirement

| Test Level | Performance Requirement |
|--------------------|---------------------------------------|
| $\pm 2 \text{ kV}$ | No breakdown or flashover shall occur |

13.2 Test Setup

13.2.1 Dielectric measurement was performed in the shielded enclosure in accordance to the procedure set forth in the IEC 60255-27 Clause 10.6.4.3.

13.2.2 The EUT was set into off operation mode and evaluations were done during the test.

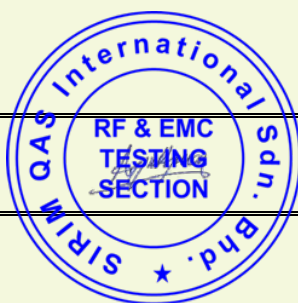
13.2.3 The impulse voltages were induced between each circuit and between independent circuits.

13.3 Test Results

The evaluations of the EUT against impulse voltage withstand were found to comply with the performance criteria A, as shown in Table 25.

Table 25: Results of Dielectric Test

| Test Terminal | Test Level | Test evaluation |
|-----------------------------|------------------|---|
| between each circuit | $\pm 2\text{kV}$ | No breakdown or flashover was occurred. |
| between independent circuit | $\pm 2\text{kV}$ | |



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14. TEST INSTRUMENTS

| No. | Equipment | Manufacturer | Model | Serial No. |
|-----|---|-----------------|-------------|----------------|
| 1 | EMI Receiver | Rohde & Schwarz | ESCI | 100823 |
| 2 | Line Impedance Stabilization Network (LISN) | Schwarzbeck | NSLK 8127 | 8127-916 |
| 3 | Trilog Broadband Antenna | Schwarzbeck | VULB 9163 | 9163-567 |
| 4 | ESD Generator | 3C TEST | EDS30V | ES031000420016 |
| 5 | EMC Compact Tester | Haefely | Axos8 | 181176 |
| 6 | Signal Generator | Rohde & Schwarz | SMT 06 | 827424/005 |
| 7 | Power Amplifier | Schaffner | CBA 9413B | 4029 |
| 8 | Logarithmic Periodic Dipole Antenna | Schwarzbeck | STLP 9128E | 9128 E 043 |
| 9 | RF Power Meter | Boonton | 4232A | 62901 |
| 10 | Signal Generator | IFR | 2032 | 203002/046 |
| 11 | Power Amplifier | Schaffner | CBA 9425 | 1008 |
| 12 | Coupling Decoupling Network | Schaffner | CDN M016 | 35844 |
| 13 | Magnetic Field Coil | TESEQ | INA 702 | 289 |
| 14 | Magnetic Field Generator | TESEQ | MFO 6501 | 205 |
| 15 | Main Frame | Schaffner | NSG 2050 | 200130-589AR |
| 16 | Main Frame | Schaffner | NSG 2050 | 200130-589AR |
| 17 | Surge generator | Schaffner | PNW 2050 | 200116-023SC |
| 18 | Coupling and decoupling network | Schaffner | CDN 131/133 | 118 |



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15. PHOTOGRAPHS

15.1 Photographs of test sample



Front View of NV-14s



Rear View of NV-14s



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Label NV-14s

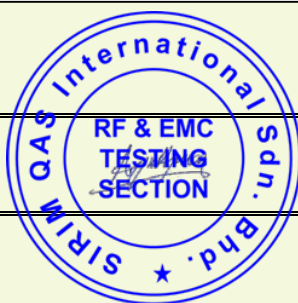


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15.2 Photograph of Conducted Emission measurement



15.3 Photograph Radiated Emission for 30MHz – 1 GHz

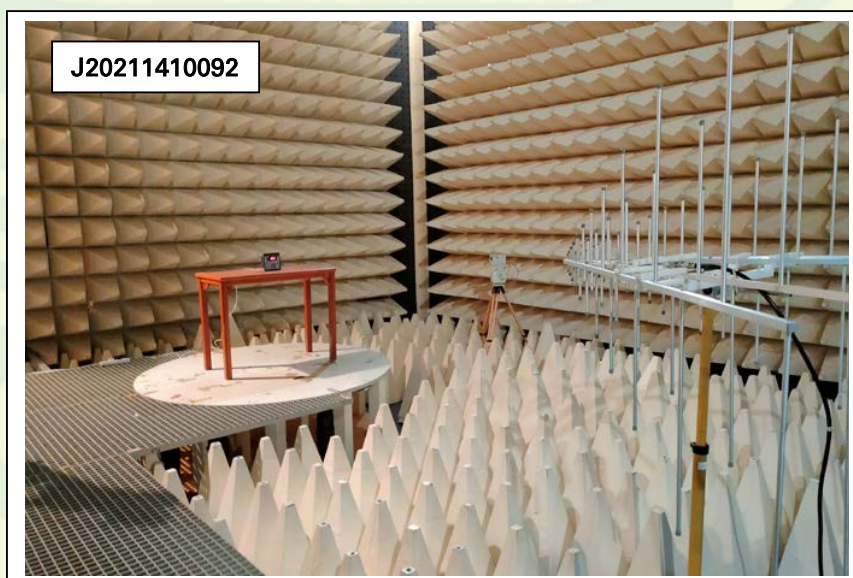


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15.4 Photograph of Electrostatic Discharge - ESD

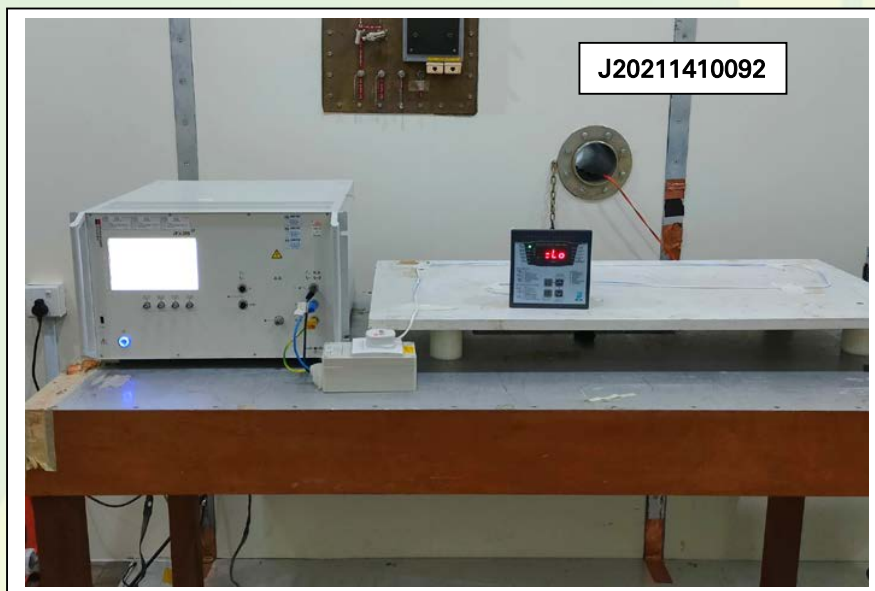


15.5 Photograph of Radio-frequency electromagnetic field (Amplitude modulation)

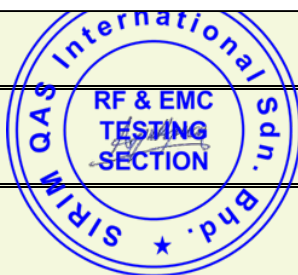
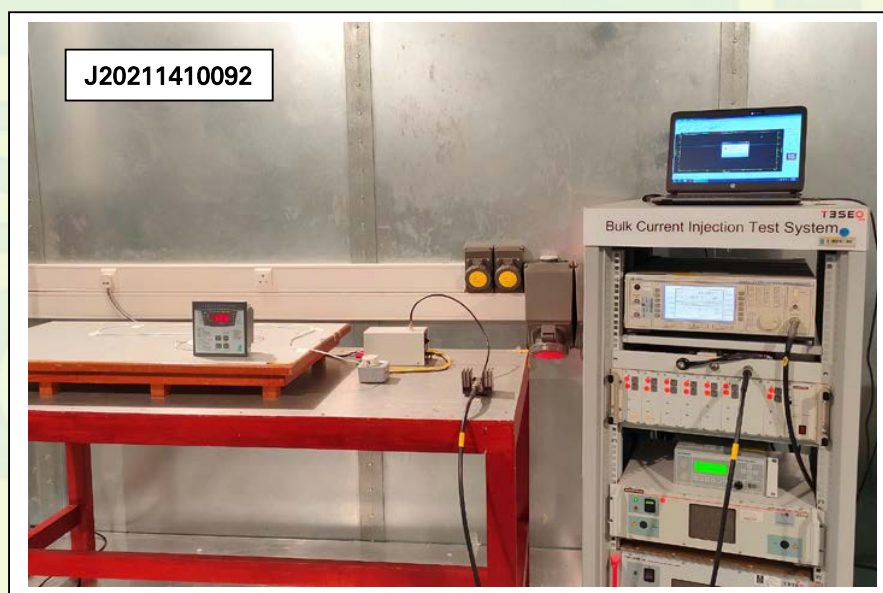


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15.6 Photograph of Voltage Dips and Short Interruption, Fast Transients and Surges



15.7 Photograph of Radio-frequency common mode



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15.8 Photograph of Power Frequency Magnetic Field



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2. The Test Report shall not be misused, amended, changed, varied or modified in any manner whatsoever by the Applicant or otherwise.
3. If the Test Report is to be furnished to any third party or to the public, each such Test Report shall be furnished in full, legible and in its entirety.
4. The Test Report shall not be reproduced and shall not in any event be used for any advertising purposes or whatsoever without written approval from the Head of Quality, Occupational Safety and Health & Environment (QOSHE) of SIRIM QAS International of No 1, Persiaran Dato' Menteri, Building 8, Section 2, P.O. Box 7035, 40700 Shah Alam, Selangor Darul Ehsan.
5. Customer (Applicant/Manufacture/Factory, etc.) is not permitted to use any SIRIM QAS International, SIRIM or other SIRIM's subsidiaries logo or words on packaging, sample's manual, technical specification, items and products.
6. Subject to consent and written approval from the Head of Quality, Occupational Safety and Health & Environment (QOSHE) of SIRIM QAS International, the customer (Applicant/Manufacture/Factory, etc.) may use SIRIM QAS International logo or word on the promotional materials and the Applicant shall only include the phrase, "A sample of this product has been tested by SIRIM QAS International ...(Test Report No) ...(dated) ...(for what test) ...(to which standard)" or such similar words which stress that only the sample was actually tested. This phrase shall only be used for the purpose of product advertisement or product promotion (eg; brochures/flyers/official website). For avoidance of doubt, the statement shall not be used on the sample, packaging of the sample, items and products.
7. In the event there is an investigation from a Government Regulatory Agency concerning the Applicant's Test Report, SIRIM QAS International may disclose the information pertaining to the Test Report for purposes of such investigation.
8. Further or in the alternative, it is strictly forbidden unless with prior written approval from the Chief Executive Officer of SIRIM QAS International, to represent in any manner whatsoever that SIRIM QAS International, SIRIM and/or other SIRIM's subsidiaries has endorsed, approved or validated the Product of the Applicant in any manner whatsoever.
9. In the event the Applicant is found in breach of this provision, SIRIM QAS International, SIRIM and/or other SIRIM's subsidiaries without prejudice to any other rights and remedies may take whatever action necessary including but not limited to:
 - a) Informing and placing a notice in the media;
 - b) Obtaining an injunction from Court (cost on a solicitor-client basis to be borne by the Applicant);
 - c) Refusing to accept any further Product for Testing Services from the Applicant or whosoever related to the Applicant, whether subsidiary or otherwise;
 - d) Instructing the Applicant to withdraw and recall the advertisement, statement or document in question and advertise a clarification and apology to SIRIM QAS International, SIRIM and/or other SIRIM's subsidiaries twice in a national publication of SIRIM QAS International's choice at the Applicant's sole cost; and
 - e) Informing or lodging a report pertaining the Applicant's Test Report with the relevant authorities.
10. SIRIM QAS International is committed in supporting an environmentally-friendly business practices by reducing paper consumption, therefore we do not issue any hard copy of Test Report to the Applicant. However, additional certified true copy(ies) or softcopy of the Test Report may be issued upon request by the Applicant upon payment of the relevant fee. The certified true copy(ies) or softcopy of test report shall only be given for test report issued not more than three (3) years from the date of issuance.
11. Issuance of Amendment Report due to the following reasons are chargeable to the Applicant :
 - a) Changes in details of the Applicant name and/or address;
 - b) Changes in details of the Manufacturer's name and/or address;
 - c) Changes in details of the Factory location name and/or address;
 - d) Changes in details of the model and/or type designation
12. However, issuance of Supplementary Report due to the following reasons are FOC :
 - a) Misprints and typo errors;
 - b) Missing technical information as agreed in PP1 form;
 - c) Test data not reported;
 - d) Mistake in reporting of test data
13. Corrections to report shall only be allowed if the date of issuance of the original report has not exceeded 6 months and shall be limited to a maximum 3 times, after either case whichever occurs earlier, an Amendment or a Supplementary Report shall not be issued.



