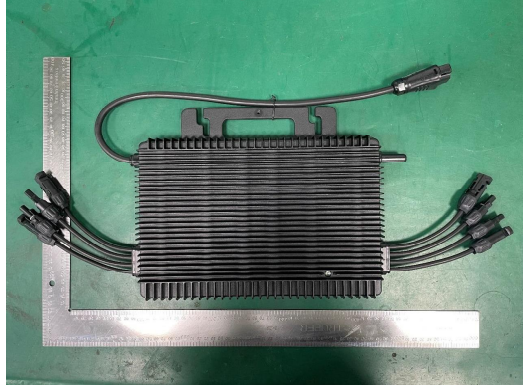


TEST REPORT N°: BMH-ESH-P21080064B-1-A1
Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

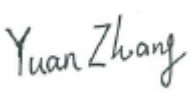

EMC TEST REPORT

| | | | |
|-----------------------------------|--|-------------|------------------------|
| To : | Hoymiles Power Electronics Inc. | Fax : | -- |
| Attn : | -- | Email : | -- |
| Address : | No.18 Kangjing Road, HangZhou, Zhejiang Province, P.R. China | | |
| Cc : | -- | Fax/Email : | -- |
| Attn : | -- | | |
| This document includes : 46 pages | | Test date : | Jan.18 to Jan.24, 2024 |

| | | |
|----------------------|--|---|
| MANUFACTURER NAME : | Hoymiles Power Electronics Inc. |  |
| ADDRESS : | No.18 Kangjing Road, HangZhou, Zhejiang Province, P.R. China | |
| PRODUCT : | PV Microinverter | |
| TYPE REFERENCE : | HMS-2000-4T, HMS-1800-4T, HMS-1600-4T | |
| RATED VOLTAGE : | Refer to section 3.1 | |
| RATED OUTPUT POWER : | Refer to section 3.1 | |
| PROTECTION CLASS : | I | |
| TESTS REALISED : | On one sample of HMS-2000-4T | |

| | |
|------------------------|---|
| STANDARDS USED(DATE) : | EN 62920:2017+A11:2020+A1:2021/ IEC 62920:2017+A1:2021 EN IEC 61000-6-3:2021/ IEC 61000-6-3:2020 EN IEC 61000-6-4:2019/ IEC 61000-6-4:2018 EN IEC 61000-6-1:2019/ IEC 61000-6-1:2016 EN IEC 61000-6-2:2019/ IEC 61000-6-2:2016 EN IEC 61000-3-2:2019+A1:2021/ IEC 61000-3-2:2018+A1:2020 EN 61000-3-3:2013+A1:2019+A2:2021/IEC 61000-3-3:2013+A1:2017+A2:2021 EN 301 489-1 V2.2.3 (2019-11), EN 301 489-3 V2.3.2 (2023-01) |
| CLAUSES EXAMINED : | All Clauses Relevant |

Harmonic current and flicker tests in this report are subcontracted to Shanghai Testing & Inspection Institute For Electrical Equipment Co., Ltd.(STIEE).
Other test items in test Location: Building C, No. 829, Xin Zhuan Road, Shanghai, CHINA

| | | |
|--|---|---|
| CONCLUSION : | | The sample does satisfy the clauses examined . |
| Test done by,  Name: Yuan ZHANG Title: Projector Engineer Date: Jan.25, 2024 | Approved by,  Name: Sean YU Title: RF Supervisor Date: Jan.25, 2024 | |

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.



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Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

1 TESTING PROGRAM

The tests have been carried out according to the requirements of the following standards:

Emission standard EN 62920:2017+A11:2020+A1:2021

- Measurement of the disturbance voltage levels.
- Measurement of the radiated disturbance levels.
- Measurement of the harmonic currents.
- Measurement of the voltage fluctuations and flickers.

Immunity standard EN 62920:2017+A11:2020+A1:2021

- Immunity to electrostatic discharges - publication EN 61000-4-2.
- Immunity to fast transients/bursts - publication EN 61000-4-4.
- Immunity to conducted disturbances induced by radio-frequency fields - publication EN 61000-4-6.
- Immunity to radiated radio-frequency electromagnetic field with amplitude modulation - publication EN 61000-4-3.
- Immunity to surges - publication EN 61000-4-5.
- Immunity to voltage dips -publication EN 61000-4-11.
- Immunity to voltage interruptions - publication EN 61000-4-11.

Emission standard EN IEC 61000-6-3:2021/ IEC 61000-6-3:2020

- Measurement of the radiated emission.
- Measurement of the conducted emission.
- Measurement of the discontinuous interference.
- Measurement of the harmonic currents.
- Measurement of the voltage fluctuations.

Emission standard EN IEC 61000-6-4:2019/ IEC 61000-6-4:2018

- Measurement of the radiated emission.
- Measurement of the conducted emission.
- Measurement of the discontinuous interference.

Immunity standard EN IEC 61000-6-1:2019/ IEC 61000-6-1:2016

- Immunity to electrostatic discharges - publication IEC 61000-4-2.
- Immunity to fast transients/bursts - publication IEC 61000-4-4.
- Immunity to conducted disturbances induced by radio-frequency fields - publication IEC 61000-4-6.
- Immunity to power frequency magnetic field- publication IEC 61000-4-8.
- Immunity to radiated radio-frequency electromagnetic field with amplitude modulation - publication IEC 61000-4-3.
- Immunity to surges - publication IEC 61000-4-5.
- Immunity to voltage dips -publication IEC 61000-4-11.
- Immunity to voltage interruptions - publication IEC 61000-4-11.

| | | |
|--|---|---|
| Bureau Veritas ADT (ShangHai) Corporation 必维诚硕科技(上海)有限公司 | No.829,Xin Zhuan Road,Song Jiang District,Shanghai,China | Tel: +86 21 6195 7000 Fax: +86 21 6195 7001 Email: contact@cn.bureauveritas.com |
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Immunity standard EN IEC 61000-6-2:2019/ IEC 61000-6-2:2016

- Immunity to electrostatic discharges - publication IEC 61000-4-2.
- Immunity to fast transients/bursts - publication IEC 61000-4-4.
- Immunity to conducted disturbances induced by radio-frequency fields - publication IEC 61000-4-6.
- Immunity to power frequency magnetic field- publication IEC 61000-4-8.
- Immunity to radiated radio-frequency electromagnetic field with amplitude modulation - publication IEC 61000-4-3.
- Immunity to surges - publication IEC 61000-4-5.
- Immunity to voltage dips -publication IEC 61000-4-11.
- Immunity to voltage interruptions - publication IEC 61000-4-11.

Emission standard EN IEC 61000-3-2:2019+A1:2021/ IEC 61000-3-2:2018+A1:2020

- Measurement of the harmonic currents.

Emission standard EN 61000-3-3:2013+A1:2019+A2:2021/ IEC 61000-3-3:2013+A1:2017+A2:2021

- Measurement of the voltage fluctuations and flickers.

Emission standard EN 301 489-1 V2.2.3 (2019-11), EN 301 489-3 V2.3.2 (2023-01)

- Measurement of the conducted emission levels.
- Measurement of the radiated emission levels.
- Measurement of the harmonic currents.
- Measurement of the voltage fluctuations and flickers.
-

Immunity standard EN 301 489-1 V2.2.3 (2019-11), EN 301 489-3 V2.3.2 (2023-01)

- Immunity to electrostatic discharges - publication IEC 61000-4-2.
- Immunity to fast transients/bursts - publication IEC 61000-4-4.
- Immunity to conducted disturbances induced by radio-frequency fields - publication IEC 61000-4-6.
- Immunity to radiated radio-frequency electromagnetic field with amplitude modulation - publication IEC 61000-4-3.
- Immunity to surges - publication IEC 61000-4-5.
- Immunity to voltage dips -publication IEC 61000-4-11.
- Immunity to voltage interruptions - publication IEC 61000-4-11.
- Immunity to transients and surges- publication ISO 7637-2

Special comments: This report is based on history report BMH-ESH-P21080064B-1 for updating and adding standard, delete BM series models. After evaluation, We choose model HMS-2000-4T to apply CE, RE, Harmonic , Flicker, EFT and CS tests, the test result is applicable to all models.

2 HISTORY OF FAILURE

None.



| | | |
|--|---|---|
| Bureau Veritas ADT (ShangHai) Corporation 必维诚硕科技(上海)有限公司 | No.829,Xin Zhuan Road,Song Jiang District,Shanghai,China | Tel: +86 21 6195 7000 Fax: +86 21 6195 7001 Email: contact@cn.bureauveritas.com |
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3 EQUIPMENT CHARACTERISTICS

3.1 Technical characteristics

| | | | | | |
|---|----------------|---|------------------|---|--|
|  | | PV Microinverter Model: HMS-1600-4T | | Hoymiles Power Electronics Inc. hoymiles.com Made in China | |
| Max. Input Voltage | 65V d.c. | Nominal Output Voltage | 230/240V a.c. | | |
| MPPT Voltage Range | 16-60V d.c. | Nominal Output Frequency | 50/60Hz | | |
| Start-up Voltage | 22V d.c. | Peak Conversion Efficiency | 96.7% | | |
| Max. Continuous Input Current | 4 × 14A d.c. | Enclosure | IP67 | | |
| Max. Input Short Circuit Current | 4 × 25A d.c. | Over Voltage Category | PV:II, Mains:III | | |
| Max. Continuous Output Power | 1600VA | Protective Class | I | | |
| Max. Continuous Output Current | 6.96A a.c. | Pollution Degree | PD3 | | |
| Output Power Factor | >0.99(Default) | Ambient Temperature Range | -40°C to +65°C | | |
|  | | | | | |

| | | | | | |
|---|----------------|---|------------------|---|--|
|  | | PV Microinverter Model: HMS-1800-4T | | Hoymiles Power Electronics Inc. hoymiles.com Made in China | |
| Max. Input Voltage | 65V d.c. | Nominal Output Voltage | 230/240V a.c. | | |
| MPPT Voltage Range | 16-60V d.c. | Nominal Output Frequency | 50/60Hz | | |
| Start-up Voltage | 22V d.c. | Peak Conversion Efficiency | 96.5% | | |
| Max. Continuous Input Current | 4 × 15A d.c. | Enclosure | IP67 | | |
| Max. Input Short Circuit Current | 4 × 25A d.c. | Over Voltage Category | PV:II, Mains:III | | |
| Max. Continuous Output Power | 1800VA | Protective Class | I | | |
| Max. Continuous Output Current | 7.83A a.c. | Pollution Degree | PD3 | | |
| Output Power Factor | >0.99(Default) | Ambient Temperature Range | -40°C to +65°C | | |
|  | | | | | |



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PV Microinverter
Model: HMS-2000-4T

Hoymiles Power Electronics Inc.
hoymiles.com Made in China

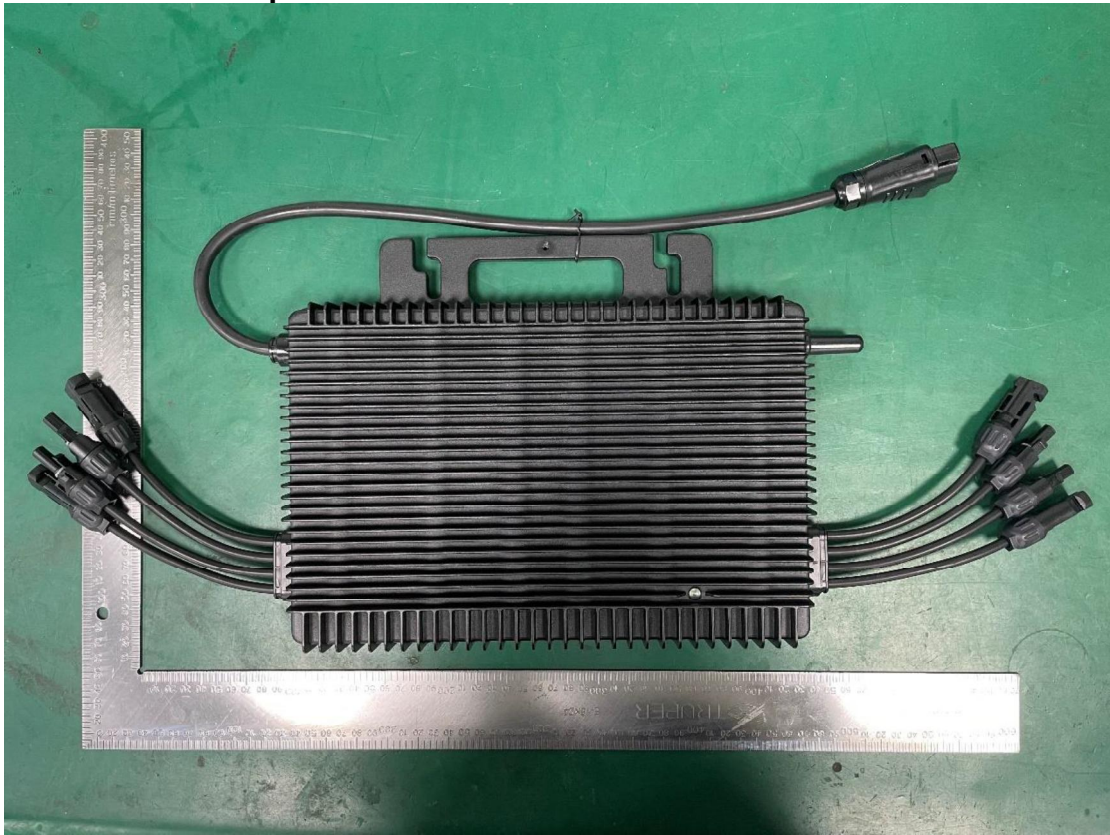
| | | | |
|----------------------------------|----------------|----------------------------|------------------|
| Max. Input Voltage | 65V d.c. | Nominal Output Voltage | 230/240V a.c. |
| MPPT Voltage Range | 16-60V d.c. | Nominal Output Frequency | 50/60Hz |
| Start-up Voltage | 22V d.c. | Peak Conversion Efficiency | 96.5% |
| Max. Continuous Input Current | 4 × 16A d.c. | Enclosure | IP67 |
| Max. Input Short Circuit Current | 4 × 25A d.c. | Over Voltage Category | PV:II, Mains:III |
| Max. Continuous Output Power | 2000VA | Protective Class | I |
| Max. Continuous Output Current | 8.70A a.c. | Pollution Degree | PD3 |
| Output Power Factor | >0.99(Default) | Ambient Temperature Range | -40°C to + 65°C |



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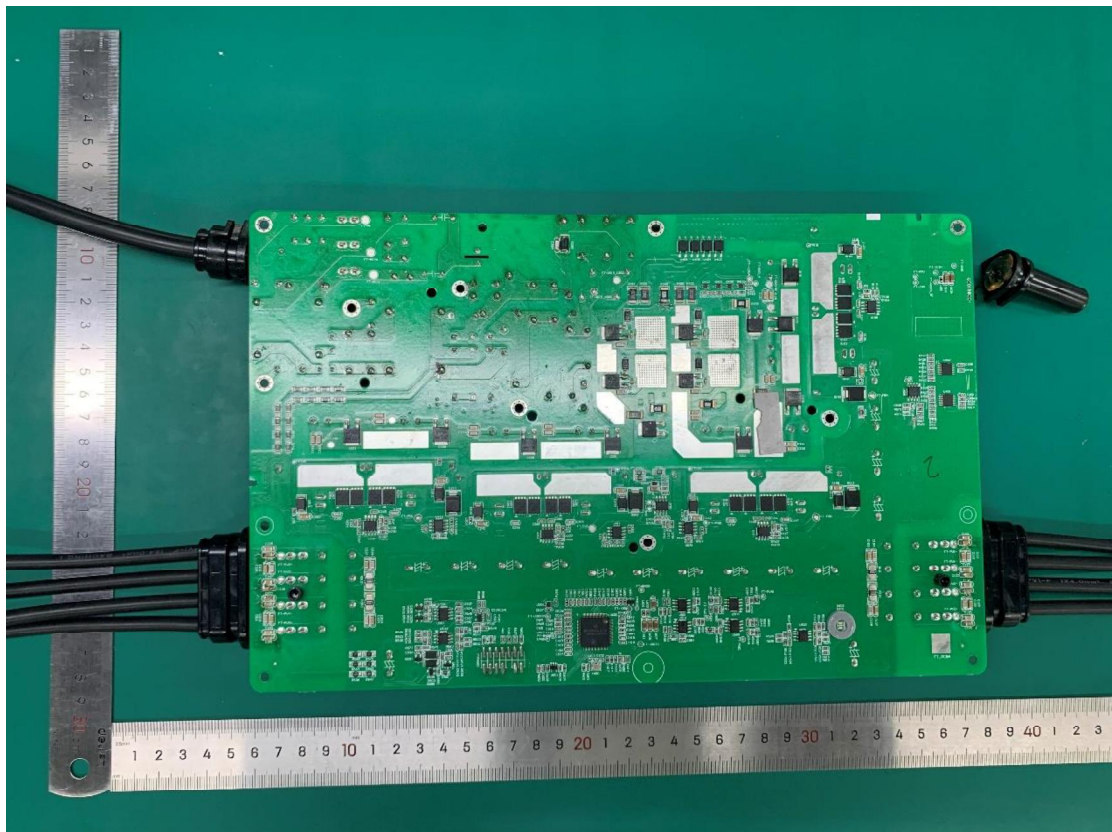
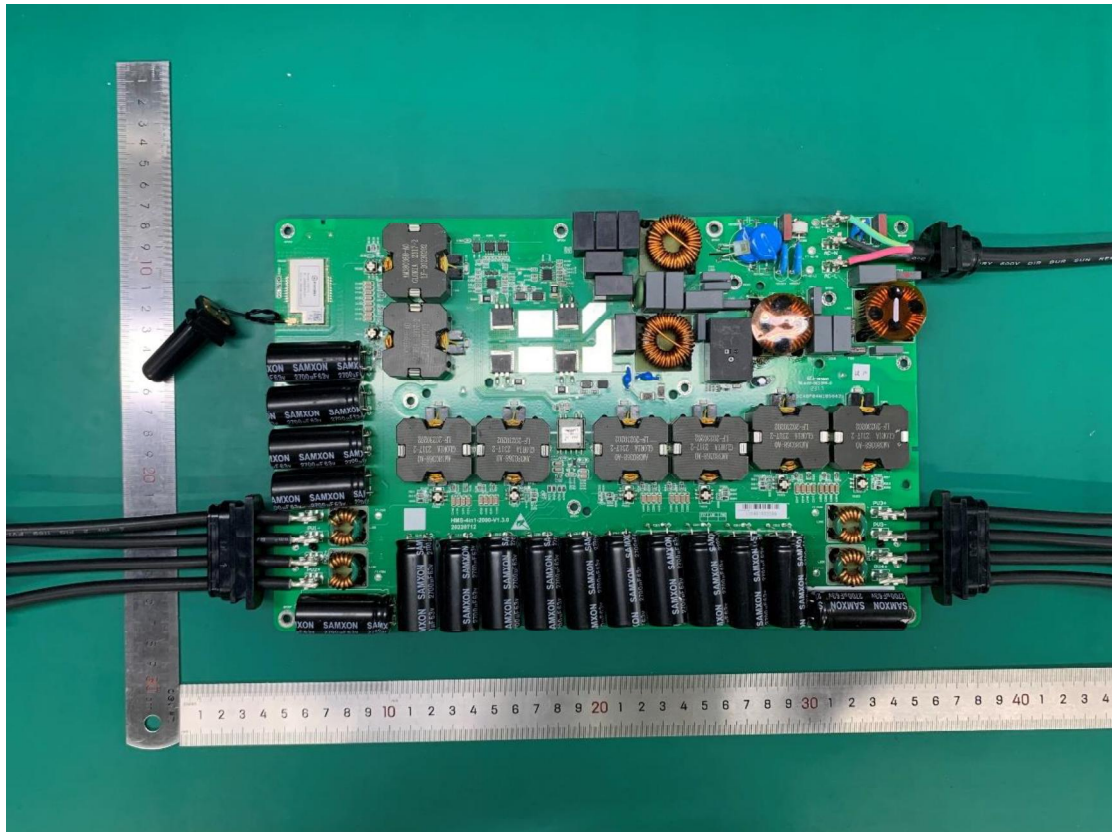
Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

3.2 Pictures of sample



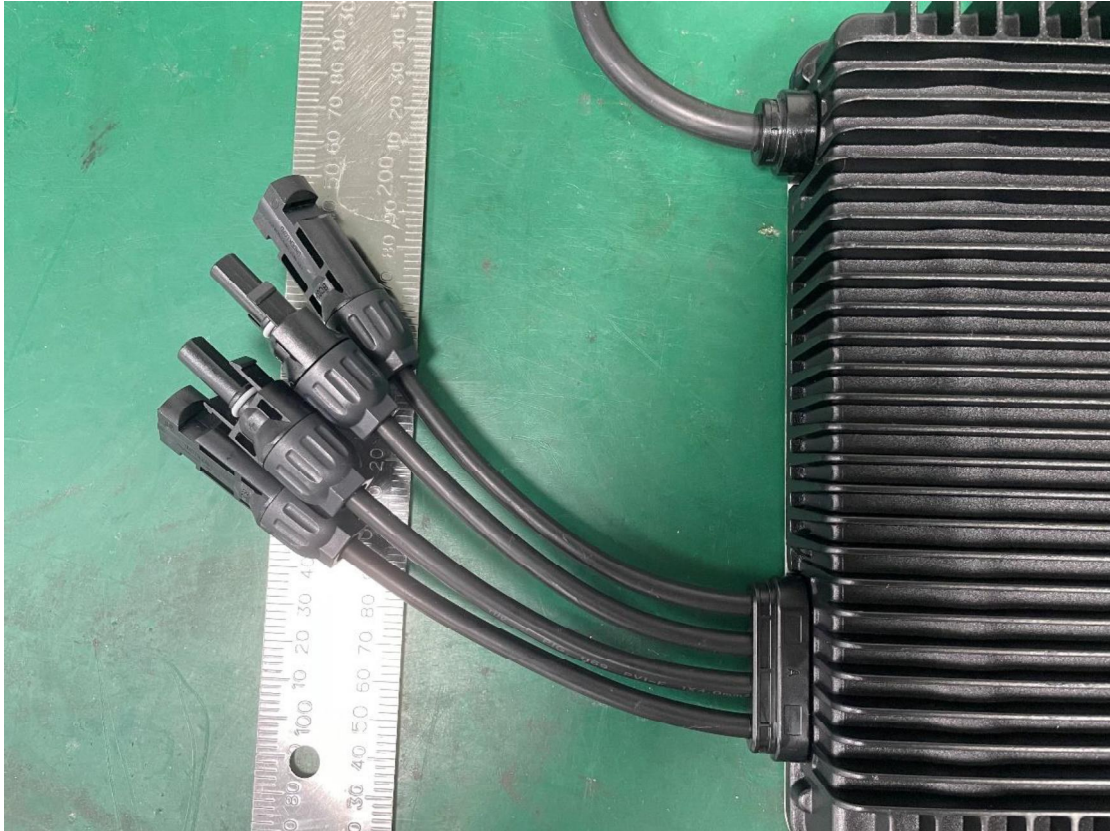
TEST REPORT N°: BMH-ESH-P21080064B-1-A1

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TEST REPORT N°: BMH-ESH-P21080064B-1-A1

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4 Test Configuration of Equipment under Test

4.1 DESCRIPTION OF TEST MODES

| MODE | CONFIGURATION |
|------|-----------------------------------|
| 1 | DC input: dc 48V, AC output: 230V |
| 2 | DC input: dc 42V, AC output: 230V |
| 3 | DC input: dc 34V, AC output: 230V |

4.2 Description of test modes

| Test Item | Test Mode |
|---|-----------|
| Conducted Emission | 1,2,3 |
| Radiated Emission(Below 1GHz) | 1,2,3 |
| Radiated Emission(Above 1GHz) | 1 |
| Harmonics | 1(Note) |
| Voltage Fluctuations | 1(Note) |
| Electrostatic Discharge Immunity Test (ESD) | 1 |
| Radio electromagnetic field immunity test (RS) | 1 |
| Electrical Fast Transient/ Burst Immunity Test (EFT) | 1 |
| Surge Immunity Test | 1 |
| Conduction Disturbances induced by Radio-Frequency Fields | 1 |
| Voltage Dips and Voltage Interruptions Immunity Test | 1 |

Note: Testing was conducted at 25 %, 50 % and 100 % of nominal power.



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5 OPERATING CONDITIONS

The apparatus was placed in a shielded room, full or semi anechoic chamber, and was powered with an alternative current source through filters mounted on the shielded room wall. The apparatus was worked continuously.

Climatic conditions :

| | | |
|----------------------|---|----------|
| Temperature | : | 19-22 °C |
| Relative humidity | : | 48-53 % |
| Atmospheric pressure | : | 101 kPa |

6 Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2 Ed 1.0.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

This lab's measurement uncertainty U_{Lab}, is low than U_{Cispr} , Table 1 – Values of U_{Cispr} of CISPR 16-4-2 Ed. 1.0, therefore compliance is deemed to occur if no measured disturbance exceeds the disturbance limit.

| Measurement | | Value |
|-------------------------------------|---------------|---------|
| Conducted emissions | | 2.55 dB |
| Conducted emissions at telecom port | | 2.60 dB |
| Radiated emissions | 30 MHz ~ 1GHz | 3.22 dB |
| | Above 1GHz | 2.89 dB |



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7 PERFORMANCE CRITERIA

EN 61000-6-2

- Criterion A : The apparatus operate as intended during the test. No degradation of performance or loss of function is allowed below the performance level.
- Criterion B : The apparatus operate as intended after the test. No change of operating state and the stored data are allowed. During the test, degradation of performance is allowed.
- Criterion C : Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

For 301 489-3

- performance criterion A applies for immunity tests with phenomena of a continuous nature;
- performance criterion B applies for immunity tests with phenomena of a transient nature.

NOTE: Whether a phenomenon is considered transient, continuous or otherwise is indicated in the test procedures for the phenomenon in ETSI EN 301 489-1 [1], clause 9.

Table 2: Performance Requirements

| Criterion | During test | After test |
|-----------|--|---|
| A | Operate as intended No loss of function No unintentional responses | Operate as intended No loss of function No degradation of performance No loss of stored data or user programmable functions |
| B | May show loss of function No unintentional responses | Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions |



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8 TEST RESULTS

8.1 EMISSION STANDARD EN IEC 61000-6-3:2021/ IEC 61000-6-3:2020

| Article | TEST | TEST SPECIFICATION | RESULTS | | | |
|---------|---|--|------------|------------|------------|------------|
| | | | P | F | NA | Rem |
| 9 | <u>Radiated disturbance</u> Frequency range: 30 – 1000 MHz Table 1: Emission Enclosure | Operating conditions : according to the article 9 Measuring Distance: 10 m Antenna : - horizontal position - vertical position Diagram(s) No. <1> | [X] [X] | [] [] | [] [] | [] [] |
| 9 | <u>Conducted disturbance</u> Frequency range: 0,15 – 30 MHz Table 4: Emission AC mains | Operating conditions : according to the article 9 Port(s) : • AC mains port Diagram(s) No. <3> | [X] | [] | [] | [] |
| 9 | <u>Discontinuous interference</u> Frequency range: 0,15 – 30 MHz Table 1: Emission AC mains Basic standard: EN 55014-1 | Operating conditions : according to the article 9 Port(s) : • AC mains port Table(s) No. < > | [] | [] | [X] | [] |
| 9 | <u>Limits for harmonic currents emission</u> Basic standard: EN 61000-3-2 | Frequency range: 0 to 2 kHz Class of the apparatus : A Table(s) No. <1> | [X] | [] | [] | [] |
| 9 | <u>Limitation of voltage fluctuations and flicker in low-voltage supply systems</u> Basic standard: EN 61000-3-3 | Frequency range: 0 to 2 kHz Table(s) No. <2> | [X] | [] | [] | [] |

P : pass – F : Fail – NA : not applicable – Rem : remark



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8.2 IMMUNITY STANDARD EN IEC 61000-6-2:2019

| Article | TEST | TEST SPECIFICATION | RESULTS | | | |
|---------|---|---|---------|-----|-----|-----|
| | | | P | F | NA | Rem |
| 9 | <u>Electrostatic discharges</u> Table 1 Enclosure Performance criteria B | Contact discharges Level : ± 4 kV Application points : • horizontal coupling plane • vertical coupling plane • metal part | [X] | [] | [] | [1] |
| | | | [X] | [] | [] | [1] |
| | | | [X] | [] | [] | [1] |
| | Performance criteria B | Air discharges Level : ± 8 kV Application points : • enclosure | [X] | [] | [] | [1] |
| 9 | <u>Radio-frequency electromagnetic fields 80 to 1000 MHz</u> Table 1 Enclosure Performance criteria A | Test field strength : 10 V/m (unmodulated signal) Modulation frequency : 1 kHz Modulation depth : 80 % Frequency Step : 1% Dwell Time : 2 s Logperiodic antenna : - horizontal position - vertical position | [X] | [] | [] | [1] |
| | | | [X] | [] | [] | [1] |
| 9 | <u>Radio-frequency electromagnetic fields 1400 to 6000 MHz</u> Performance criteria A | Test field strength : 3 V/m (unmodulated signal) Modulation frequency : 1 kHz Modulation depth : 80 % Frequency Step : 1% Dwell Time : 2 s Horn antenna : - horizontal position - vertical position | [X] | [] | [] | [1] |
| | | | [X] | [] | [] | [1] |
| | <u>Radio-frequency electromagnetic fields 1000 to 6000 MHz</u> <u>Performance criteria A</u> | Test field strength : 3 V/m (unmodulated signal) Modulation frequency : 1 kHz Modulation depth : 80 % Frequency Step : 1% Dwell Time : 2 s Horn antenna : - horizontal position - vertical position | [X] | [] | [] | [1] |
| | | | [X] | [] | [] | [1] |
| 9 | <u>Power Frequency Magnetic Field</u> Table 1 Enclosure Performance criteria A | Field frequency : 50/60 Hz Level : 30 A/m | [] | [] | [X] | [2] |
| | | | | | | |

P : pass – F : Fail – NA : not applicable – Rem : remark



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| Article | TEST | TEST SPECIFICATION | RESULTS | | | |
|---------|---|---|---------|-----|-----|-----|
| | | | P | F | NA | Rem |
| 9 | <u>Fast transients/bursts</u> Table 4 Alternative current power input and output ports Performance criteria B | Level : ± 2 kV Rise time/hold time : 5/50 ns Repetition rate : 5 kHz Testing time : 2 min Port(s) : • AC mains | [X] | [] | [] | [1] |
| 9 | <u>Injected current 0.15 to 80 MHz</u> Table 4 Alternative current power input and output ports Performance criterion A | Voltage level : 10 V (unmodulated signal) Modulation frequency : 1 kHz Frequency Step : 1% Dwell Time: 2 s Modulation depth : 80 % Application with Port(s) : • AC mains | [X] | [] | [] | [1] |
| 9 | <u>Surges</u> Table 4 Alternative current power input and output ports Performance criterion B | Tr/Th(μ s) : 1.2/50 (8/20) Number of surges : 5 positive and 5 negative Phase angles : 0°, 90°, 180° and 270° Level : ± 1 kV Port(s) : • power input, between lines and neutral | [X] | [] | [] | [1] |
| | Performance criterion B | Level : ± 2 kV Port(s) : • power input, between lines and earth • power input, between neutral and earth | [X] | [] | [] | [1] |
| | | | [X] | [] | [] | [1] |
| 9 | <u>Voltage dips and voltage interruptions</u> Table 4 Alternative current power input port(s) Performance criterion C | <u>Voltage interruptions</u> Test level : 0 % $U_t \rightarrow 0$ V Duration : 5 s Phase angles : 0° Port(s) : • AC mains | [X] | [] | [] | [1] |
| | Table 4 Alternative current power input port(s) Performance criterion C | <u>Voltage dips</u> Test level : 40 % $U_t \rightarrow 92$ V Duration : 100 ms Phase angles : 0° Port(s) : • AC mains | [X] | [] | [] | [1] |
| | Table 4 Alternative current power input port(s) Performance criterion B | <u>Voltage dips</u> Test level : 70 % $U_t \rightarrow 161$ V Duration : 10 ms Phase angles : 0° and 180° Port(s) : • AC mains | [X] | [] | [] | [1] |

P : pass – F : Fail – NA : not applicable – Rem : remark

| | | |
|---|--|---|
| Bureau Veritas ADT (ShangHai) Corporation 必维诚硕科技(上海)有限公司 | No.829,Xin Zhuan Road,Song Jiang District,Shanghai,China | Tel: +86 21 6195 7000 |
| | | Fax: +86 21 6195 7001 |
| | | Email: contact@cn.bureauveritas.com |
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| TEST REPORT EN 61000-6-3 VER.1.2 | | |



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Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

8.3 EMISSION STANDARD EN 301 489-1 V2.2.3 (2019-11), EN 301 489-3 V2.1.1 (2019-03)

| Article | TEST | TEST SPECIFICATION | RESULTS | | | |
|--------------|--|--|------------|------------|------------|------------|
| | | | P | F | NA | Rem |
| 8.4 8.4.3 | <u>Conducted emission Limit</u> Frequency range: 0.15 to 30 MHz | Operating conditions : according to the standard EN 301 489-1 V2.2.3 clause 8.4.2 Port(s) : • AC mains port Diagram No. <3> | [X] | [] | [] | [] |
| 8.2 8.2.3 | <u>Radiated disturbance limits</u> Frequency range: 30 to 6000 MHz | Operating conditions : according to the standard EN 301 489-1 V2.2.3 clause 8.2.2 Enclosure of ancillary equipment measured on a stand alone basis Measuring Distance: 3 m Antenna : - horizontal position - vertical position Diagram(s) No. <1> to <2> | [X] [X] | [] [] | [] [] | [] [] |
| 8.5 | <u>Limits for harmonic currents emission</u> | Frequency range: 0 to 2 kHz Class of the apparatus : A Table(s) No. < > | [] | [] | [X] | [2] |
| 8.6 | <u>Limits of voltage fluctuations and flicker in low-voltage supply systems</u> | Frequency range: 0 to 2 kHz Table(s) No. < > | [] | [] | [X] | [2] |



TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

8.4 IMMUNITY STANDARD EN 301 489-1 V2.2.3 (2019-11), EN 301 489-3 V2.3.2 (2023-01)

| Article | TEST | TEST SPECIFICATION | RESULTS | | | |
|---------|--|---|---------|-----|-----|-----|
| | | | P | F | NA | Rem |
| 9.3 | <u>Electrostatic discharges</u> <u>Table 2</u> Enclosure Performance criteria B | Contact discharges Level : ± 4 kV Application points : • horizontal coupling plane | [X] | [] | [] | [1] |
| | | • vertical coupling plane | [X] | [] | [] | [1] |
| | | • metal part | [X] | [] | [] | [1] |
| | Performance criteria B | Air discharges Level : ± 8 kV Application points : • enclosure | [X] | [] | [] | [1] |
| 9.2 | <u>Radio-frequency electromagnetic fields 80 to 6000 MHz</u> <u>Table 2</u> Enclosure Performance criteria A | Test field strength : 3 V/m (unmodulated signal) Modulation frequency : 1 kHz Modulation depth : 80 % Frequency Step : 1% Dwell Time : 3 s Logperiodic/Gtem antenna : - horizontal position | [X] | [] | [] | [1] |
| | | - vertical position | [X] | [] | [] | [1] |
| 9.4 | <u>Fast transients/bursts</u> <u>Table 2</u> Alternative current power input and output ports Performance criteria B | Level : ± 1 kV Rise time/hold time : 5/50 ns Repetition rate : 5 kHz Testing time : 2 min Port(s) : • AC mains | [] | [] | [X] | [2] |

P : pass - F : Fail - NA : not applicable - Rem : remark



TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

| Article | TEST | TEST SPECIFICATION | RESULTS | | | |
|---------|---|---|---------|-----|-----|-----|
| | | | P | F | NA | Rem |
| 9.5 | <u>RF common mode 0,15 MHz to 80 MHz</u> <u>Table 2</u> Alternative current power input and output ports Performance criterion A | Voltage level : 3 V (unmodulated signal) Modulation frequency : 1 kHz Modulation depth : 80 % Frequency Step : 1% Dwell Time: 3 s Application with CND-M3 Port(s) : • AC mains | [] | [] | [X] | [2] |
| 9.8 | <u>Surges</u> <u>Table 2</u> Alternative current power input and output ports Performance criterion B | Tr/Th(μs) : 1.2/50 (8/20) Number of surges : 5 positive and 5 negative Phase angles : 0°,90°,180° and 270° Level : ± 1 kV Port(s) : • power input, between lines and neutral | [] | [] | [X] | [2] |
| | Performance criterion B | Level : ± 2 kV Port(s) : • power input, between lines and earth • power input, between neutral and earth | [] | [] | [X] | [2] |
| | | | [] | [] | [X] | [2] |
| 9.7 | <u>Voltage dips and voltage interruptions</u> <u>Table 2</u> Alternative current power input and output port(s) Performance criterion C | <u>Voltage interruptions</u> Test level : 0 % Ut-> 0 V Duration : 250 cycles (at 50Hz) Port(s) : • AC mains | [] | [] | [X] | [2] |
| | <u>Table 2</u> Alternative current power input and output port (s) Performance criterion B | <u>Voltage dips</u> Test level : 70 % residual voltage Duration : 25 cycles (at 50Hz) Test level : 0% residual voltage Duration : 0.5 cycle Test level : 0% residual voltage | [] | [] | [X] | [2] |
| | | | [] | [] | [X] | [2] |
| 9.6 | <u>Transients and surges</u> for 12V and 24V DC powered equipment | According to ISO 7637-2 Test level III: 1, 2a, 2b and 4, 10 times each Test level III : 3a and 3b for 20 minutes each | [] | [] | [X] | [3] |
| | | | [] | [] | [X] | [3] |

P : pass - F : Fail - NA : not applicable - Rem : remark

| | | |
|---|--|---|
| Bureau Veritas ADT (ShangHai) Corporation 必维诚硕科技(上海)有限公司 | No.829,Xin Zhuan Road,Song Jiang District,Shanghai,China | Tel: +86 21 6195 7000 Fax: +86 21 6195 7001 Email: contact@cn.bureauveritas.com |
| Page 17 of 46 | | TEST REPORT EN 61000-6-3 VER.1.2 |



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8.5 EMISSION STANDARD EN 62920:2017+A11:2020+A1:2021

Class: Class A
 Class B

| Article | TEST | TEST SPECIFICATION | RESULTS | | | |
|---------|---|--|-----------------|----------------|------------------|------------------|
| | | | P | F | NA | Rem |
| 8.2 | <u>Disturbance voltage limits</u> Frequency range: 0.15 to 30 MHz Table 7 & 9 & 11 | Port(s) : • auxiliary AC power input ports • DC power input port • Wired network port and signal/control port Diagram(s) No. <2> | [X] [] [] | [] [] [] | [] [X] [X] | [] [4] [5] |
| 8.2 | <u>Radiated disturbance limits</u> Frequency range: 30 to 1000 MHz Table 13 | Measuring Distance: 10 m Port(s) : • Enclosure port Diagram(s) No. <1> | [X] | [] | [] | [] |
| 8.1 | <u>Limits for harmonic currents emission</u> | Frequency range: 0 to 2 kHz Class of the apparatus : A Table(s) No. <1> | [X] | [] | [] | [] |
| 8.1 | <u>Limitation of voltage fluctuations and flicker in low-voltage supply systems</u> | Frequency range: 0 to 2 kHz Table(s) No. <2> | [X] | [] | [] | [] |

P : pass – F : Fail – NA : not applicable – Rem : remark



TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

8.6 IMMUNITY STANDARD EN 62920:2017+A11:2020+A1:2021

Class: Class A
 Class B

| Article | TEST | TEST SPECIFICATION | RESULTS | | | |
|---------|---|---|---------|-----|-----|-----|
| | | | P | F | NA | Rem |
| 7.1 | <u>Electrostatic discharges</u> <u>Table 1</u> Enclosure Performance Criterion B | Contact discharges Level : ± 4kV Application points : | | | | |
| | | • horizontal coupling plane | [X] | [] | [] | [1] |
| | | • vertical coupling plane | [X] | [] | [] | [1] |
| | | • enclosure | [X] | [] | [] | [1] |
| | | • screw | [X] | [] | [] | [1] |
| | | Air discharges Level : ± 8 kV Application points : | | | | |
| | | • enclosure | [X] | [] | [] | [1] |
| | | • panel | | | | |
| | | • ports | | | | |
| 7.1 | <u>Fast transients/bursts</u> <u>Table 1</u> AC power port, DC power port and signal/control port Performance Criterion B | Level : ± 1 kV for AC power port ± 0.5 kV for DC power port and signal/control port Repetition rate : 5 kHz Testing time : 2 min Port(s) : | | | | |
| | | • AC power output port | [X] | [] | [] | [1] |
| | | • DC power input port | [X] | [] | [] | [1] |
| | | • Signal/control port | [] | [] | [X] | [5] |
| 7.1 | <u>Injected current 0.15 to 80 MHz</u> <u>Table 1</u> AC power port, DC power port and signal/control port Performance Criterion A | Voltage level : 3V Modulation frequency : 1 kHz Modulation depth : 80 % Frequency Step : 1% Dwell Time: 3 s Application with CDN Port(s) : | | | | |
| | | • AC power output port | [X] | [] | [] | [1] |
| | | • DC power input port | [X] | [] | [] | [1] |
| | | • Signal/control port | [] | [] | [X] | [5] |

P : pass - F : Fail - NA : not applicable - Rem : remark



TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

| Article | TEST | TEST SPECIFICATION | RESULTS | | | |
|---------|--|--|-------------------|-------------------|-------------------|-------------------|
| | | | P | F | NA | Rem |
| 7.1 | <u>Radio-frequency electromagnetic fields 80 to 1000 MHz</u> Table 1 Enclosure Performance Criterion A | Test field strength : 3 V/m (unmodulated signal) Modulation frequency : 1 kHz Modulation depth : 80 % Frequency Step : 1% Dwell Time : 3 s <input checked="" type="checkbox"/> Logperiodic antenna - horizontal position - vertical position | [X] [X] | [] [] | [] [] | [1] [1] |
| 7.1 | <u>Radio-frequency electromagnetic fields 1400 to 6000 MHz</u> Performance criteria A | Test field strength : 3 V/m (unmodulated signal) Modulation frequency : 1 kHz Modulation depth : 80 % Frequency Step : 1% Dwell Time :3 s Horn antenna : - horizontal position - vertical position | [X] [X] | [] [] | [] [] | [1] [1] |
| 7.1 | <u>Surges</u> Table 1 AC power port, DC power port and signal/control port Performance Criterion B | Tr/Th(μs) : 1.2/50 (8/20) Number of surges : 5 positive and 5 negative Phase angles : 0°, 90°, 180° and 270° Level : ± 1 kV for AC power port ± 0.5 kV for DC power port Port(s) : • power input, between positive and negative • DC power input port | [X] [] | [] [] | [] [X] | [1] [4] |
| | | Level : ± 2 kV for AC power port ± 1 kV for DC power port Port(s) : • power input, between lines and earth • power input, between neutral and earth • DC power input port | [X] [X] [] | [] [] [] | [] [] [X] | [1] [1] [4] |



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| Article | TEST | TEST SPECIFICATION | RESULTS | | | |
|---------|---|---|---------|-----|-----|-----|
| | | | P | F | NA | Rem |
| 7.1 | <u>Voltage dips and voltage interruptions</u> Table 3 AC power port Performance criterion B | <u>Voltage dips</u> Test level : 0 % Ut-> 0 V Duration : 10 ms Phase angles : 0° and 180° Port(s) : • AC output port | [X] | [] | [] | [1] |
| | | <u>Voltage dips</u> Test level : 0 % Ut-> 0 V Duration : 20 ms Phase angles : 0° and 180° Port(s) : • AC output port | [X] | [] | [] | [1] |
| | | <u>Voltage dips</u> Test level : 70 % Ut-> 161 V Duration : 500 ms Phase angles : 0° and 180° Port(s) : • AC output port | [X] | [] | [] | [1] |
| | Table 3 AC power port Performance criterion C | <u>Voltage interruptions</u> Test level : 0 % Ut-> 0 V Duration : 5000 ms Phase angles : 0° Port(s) : • AC output port | [X] | [] | [] | [1] |

Remark(s) :

- 1 : During and after the test, there are no loss of function and no change of power consumption and operating state.
- 2 : As there are no components in the EUT susceptible to magnetic fields, so it is not needed to perform this test.
- 3 : The EUT does not work in in the vehicular environment.
- 4 : The cable length of DC power port is less than 3m.
- 5 : The EUT have no related port.

9 CONCLUSION

The apparatus PV Microinverter and models HMS-2000-4T, HMS-1800-4T, HMS-1600-4T are in compliance with the requirements of the standards EN 62920:2017+A11:2020+A1:2021, IEC 62920:2017+A1:2021, EN IEC 61000-6-3:2021, IEC 61000-6-3:2020, EN IEC 61000-6-4:2019, IEC 61000-6-4:2018, EN IEC 61000-6-1:2019, IEC 61000-6-1:2016, EN IEC 61000-6-2:2019, IEC 61000-6-2:2016, EN IEC 61000-3-2:2019+A1:2021 , IEC 61000-3-2:2018+A1:2020, EN 61000-3-3:2013+A1:2019+A2:2021 and IEC 61000-3-3:2013+A1:2017+A2:2021 and EN 301 489-1 V2.2.3 (2019-11), EN 301 489-3 V2.3.2 (2023-01).



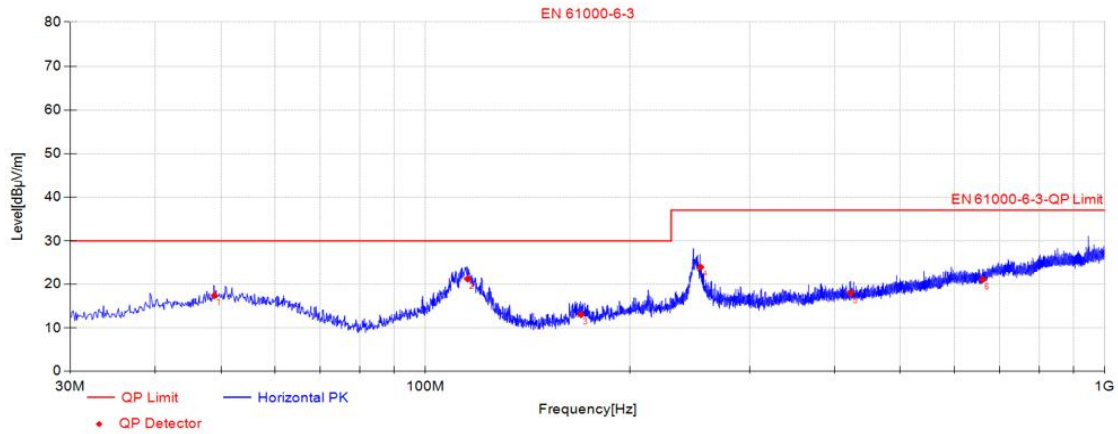
TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

Diagram No. 1

Mode 1

H



Final Data List

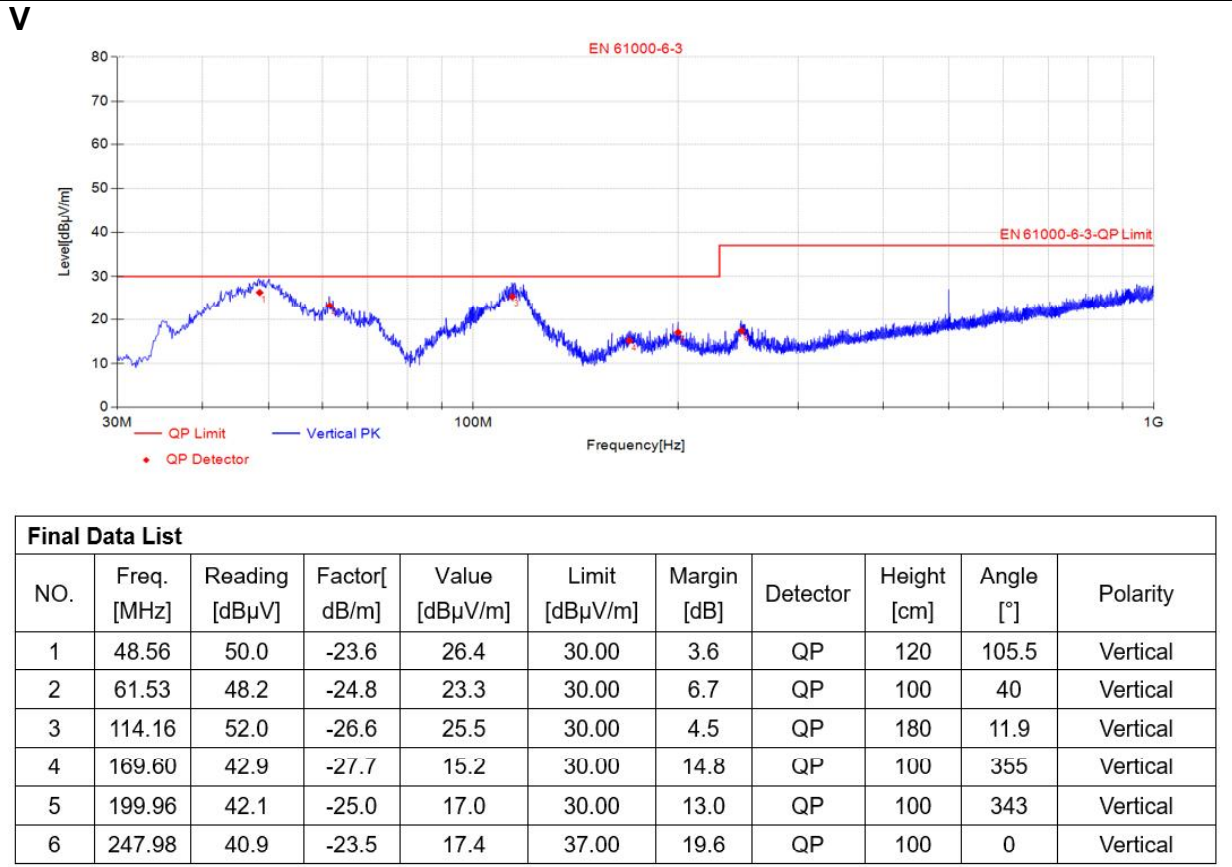
| NO. | Freq. [MHz] | Reading [dBµV] | Factor [dB/m] | Value [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Detector | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|-----------|------------|
| 1 | 48.92 | 28.4 | -11.0 | 17.4 | 30.00 | 12.6 | QP | 200 | 272 | Horizontal |
| 2 | 115.37 | 35.4 | -14.3 | 21.2 | 30.00 | 8.8 | QP | 300 | 269 | Horizontal |
| 3 | 169.40 | 28.9 | -15.8 | 13.1 | 30.00 | 17.0 | QP | 300 | 69 | Horizontal |
| 4 | 254.00 | 36.1 | -12.0 | 24.0 | 37.00 | 13.0 | QP | 300 | 79 | Horizontal |
| 5 | 422.40 | 26.5 | -8.6 | 18.0 | 37.00 | 19.1 | QP | 300 | 230 | Horizontal |
| 6 | 661.34 | 25.8 | -4.8 | 21.0 | 37.00 | 16.0 | QP | 100 | 355 | Horizontal |



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Continued



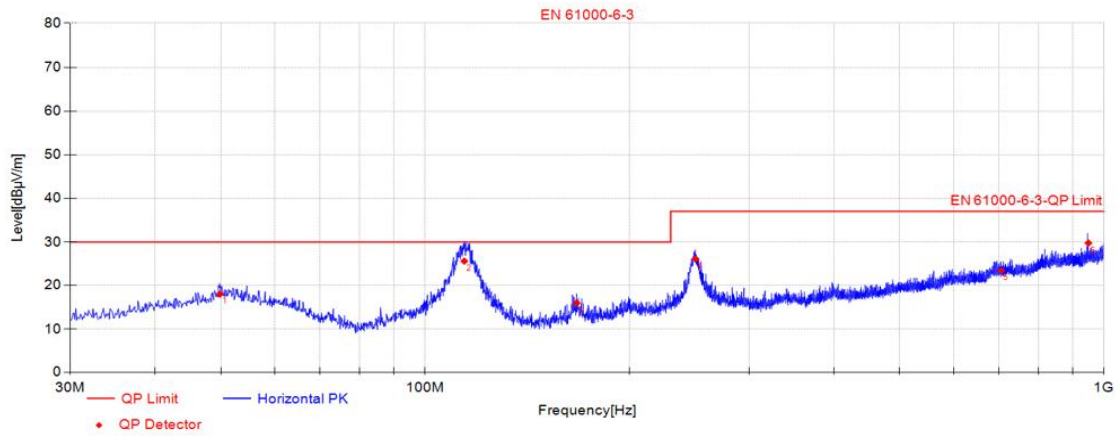


TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

**Continued
Mode 2**

H



Final Data List

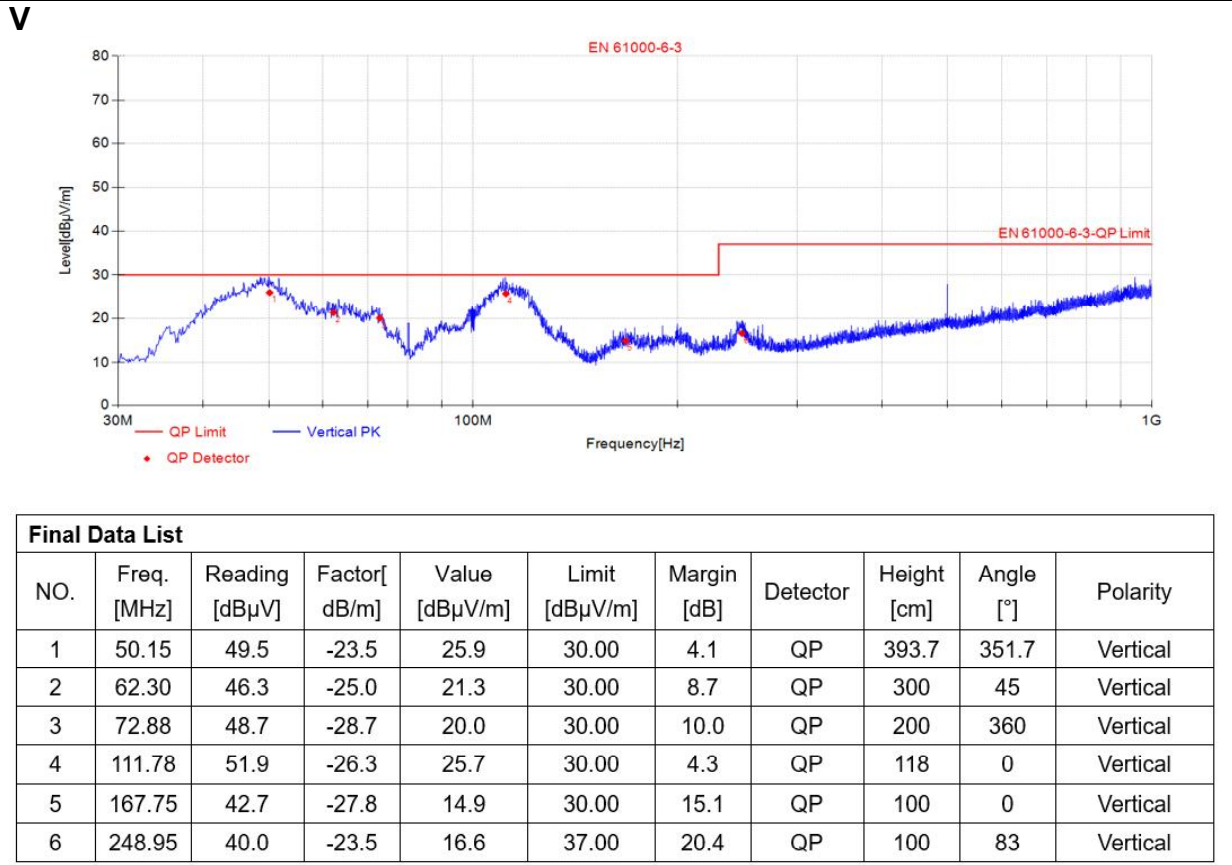
| NO. | Freq. [MHz] | Reading [dBµV] | Factor [dB/m] | Value [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Detector | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|-----------|------------|
| 1 | 49.89 | 28.9 | -11.0 | 18.0 | 30.00 | 12.0 | QP | 400 | 211 | Horizontal |
| 2 | 114.22 | 39.7 | -14.1 | 25.7 | 30.00 | 4.3 | QP | 384.1 | 49.9 | Horizontal |
| 3 | 167.17 | 31.8 | -15.9 | 15.9 | 30.00 | 14.1 | QP | 400 | 78 | Horizontal |
| 4 | 250.21 | 38.3 | -12.1 | 26.2 | 37.00 | 10.8 | QP | 400 | 69 | Horizontal |
| 5 | 705.48 | 26.7 | -3.3 | 23.4 | 37.00 | 13.6 | QP | 300 | 243 | Horizontal |
| 6 | 948.49 | 30.0 | -0.2 | 29.8 | 37.00 | 7.2 | QP | 400 | 60 | Horizontal |



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Continued

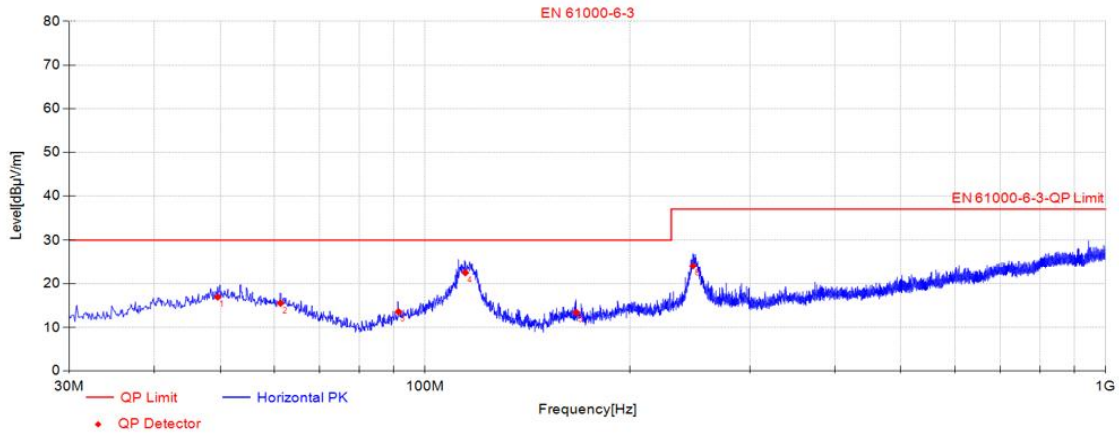


TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

**Continued
Mode 3**

H



Final Data List

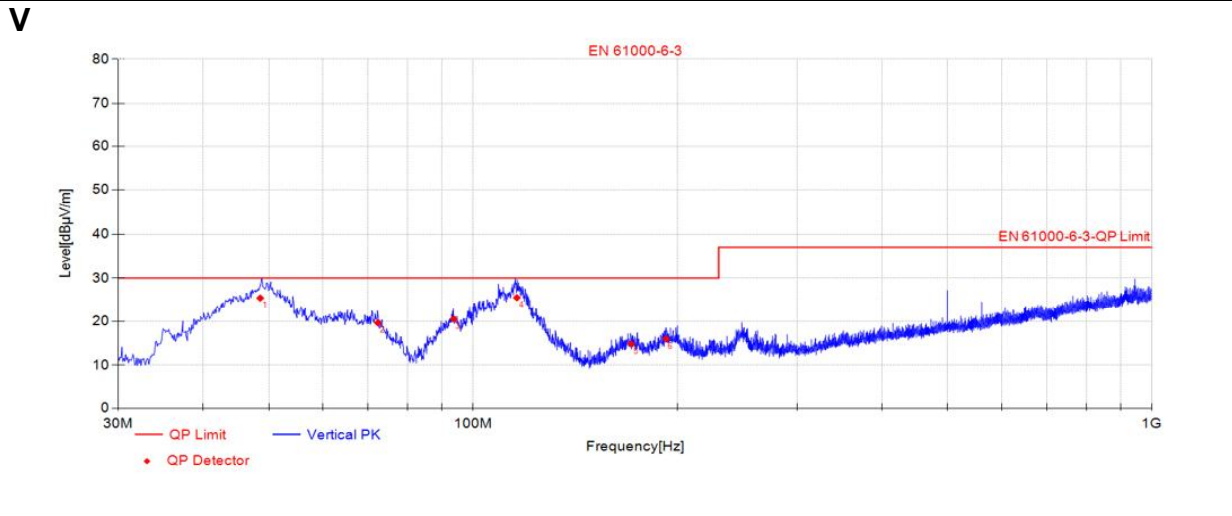
| NO. | Freq. [MHz] | Reading [dBµV] | Factor [dB/m] | Value [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Detector | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|-----------|------------|
| 1 | 49.60 | 27.9 | -11.0 | 16.9 | 30.00 | 13.1 | QP | 100 | 0 | Horizontal |
| 2 | 61.33 | 27.8 | -12.3 | 15.5 | 30.00 | 14.5 | QP | 300 | 211 | Horizontal |
| 3 | 91.41 | 28.5 | -14.9 | 13.6 | 30.00 | 16.4 | QP | 300 | 172 | Horizontal |
| 4 | 114.59 | 36.6 | -14.1 | 22.5 | 30.00 | 7.5 | QP | 300 | 32 | Horizontal |
| 5 | 166.78 | 29.3 | -15.9 | 13.4 | 30.00 | 16.6 | QP | 300 | 69 | Horizontal |
| 6 | 247.59 | 36.3 | -12.2 | 24.1 | 37.00 | 12.9 | QP | 300 | 88 | Horizontal |



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Continued



Final Data List

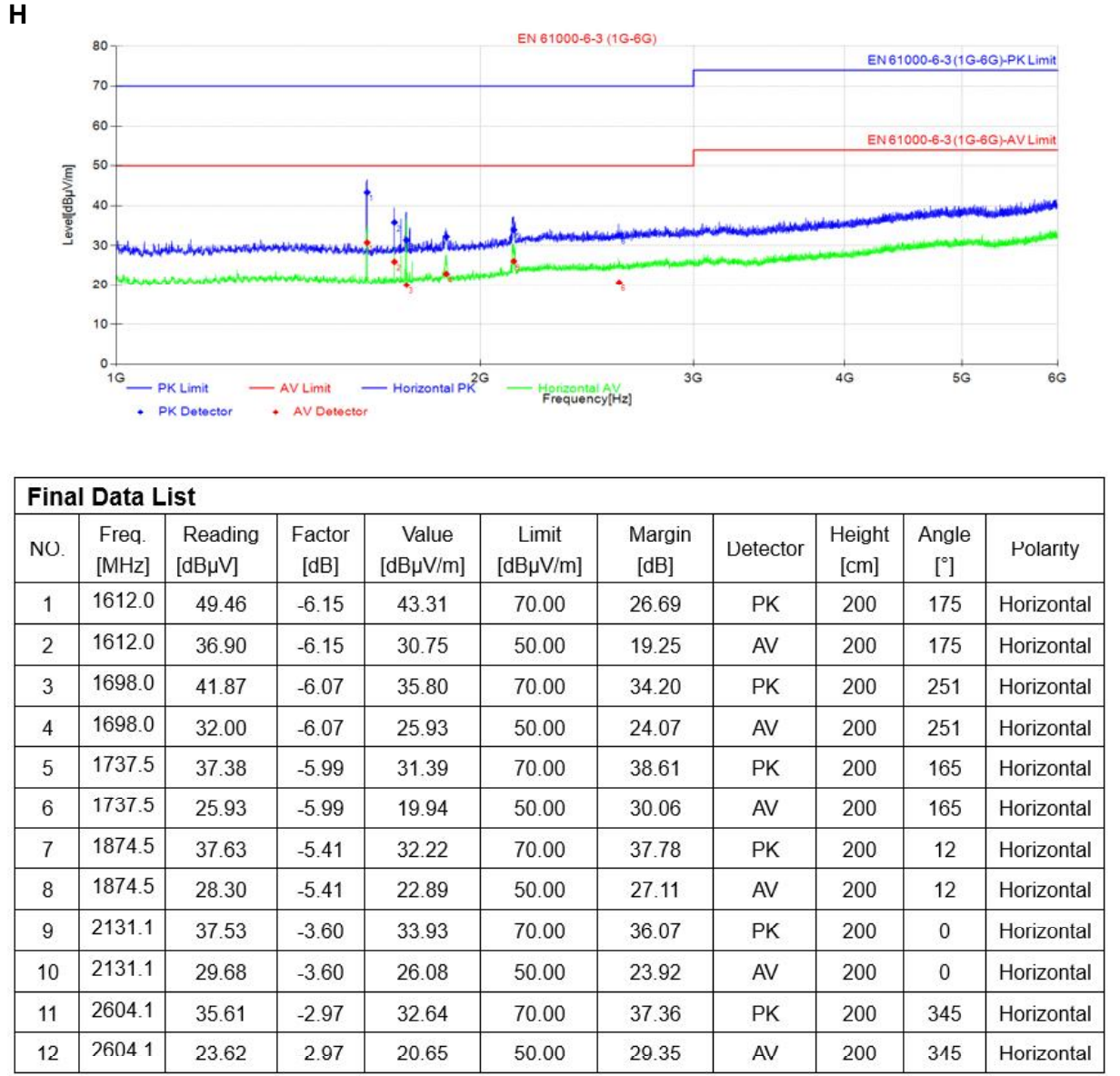
| NO. | Freq. [MHz] | Reading [dBµV] | Factor [dB/m] | Value [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Detector | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|-----------|----------|
| 1 | 48.58 | 49.0 | -23.6 | 25.4 | 30.00 | 4.6 | QP | 119.7 | 111.7 | Vertical |
| 2 | 72.39 | 48.1 | -28.5 | 19.6 | 30.00 | 10.4 | QP | 200 | 34 | Vertical |
| 3 | 93.64 | 47.3 | -26.8 | 20.5 | 30.00 | 9.5 | QP | 100 | 7 | Vertical |
| 4 | 116.01 | 52.2 | -26.7 | 25.5 | 30.00 | 4.5 | QP | 185.7 | 17.6 | Vertical |
| 5 | 170.96 | 42.5 | -27.6 | 14.8 | 30.00 | 15.2 | QP | 100 | 360 | Vertical |
| 6 | 192.39 | 41.1 | -25.2 | 15.9 | 30.00 | 14.1 | QP | 100 | 79 | Vertical |



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**Diagram No. 2
Mode 1**

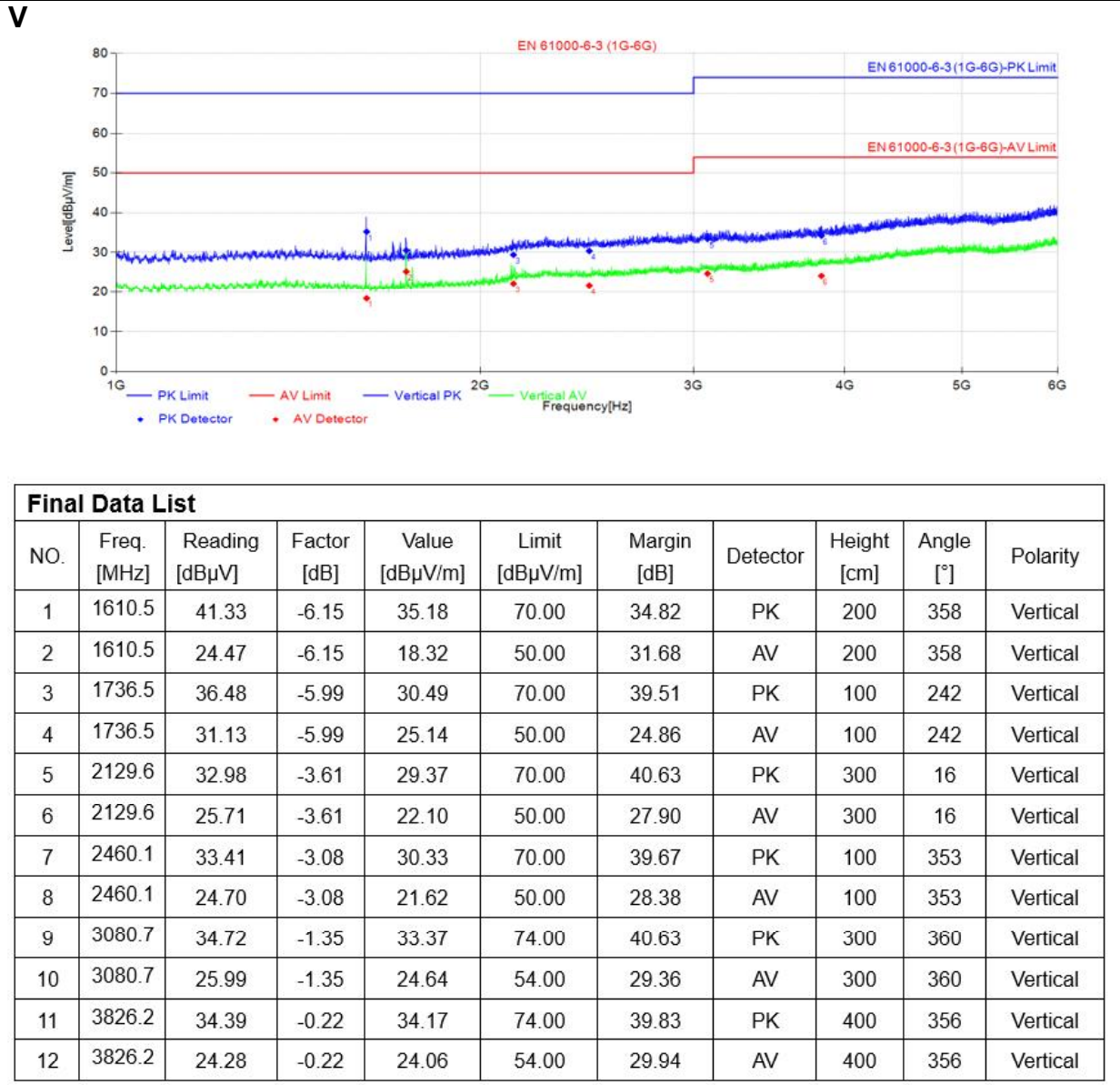




TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

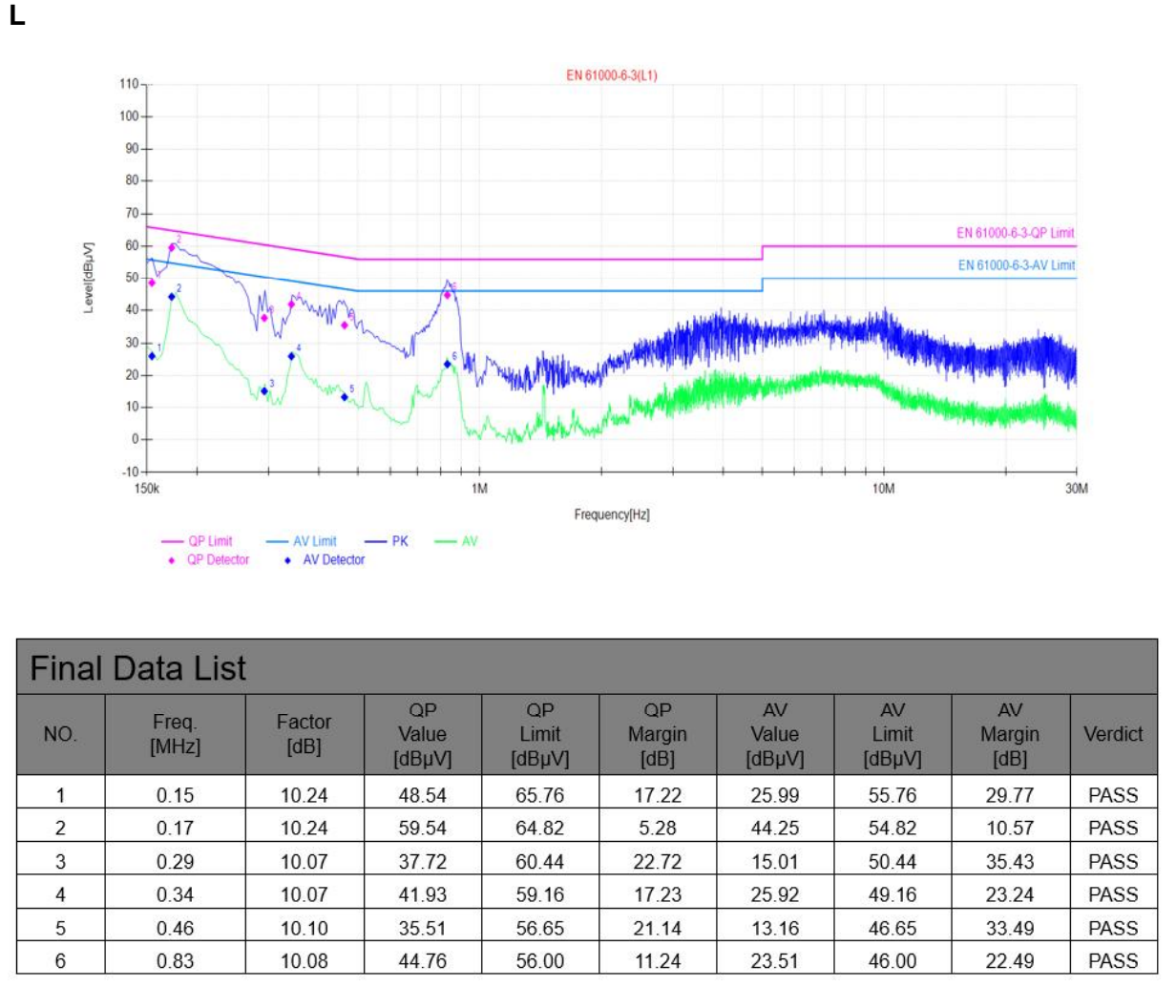
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Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

**Diagram No. 3
Mode 1**

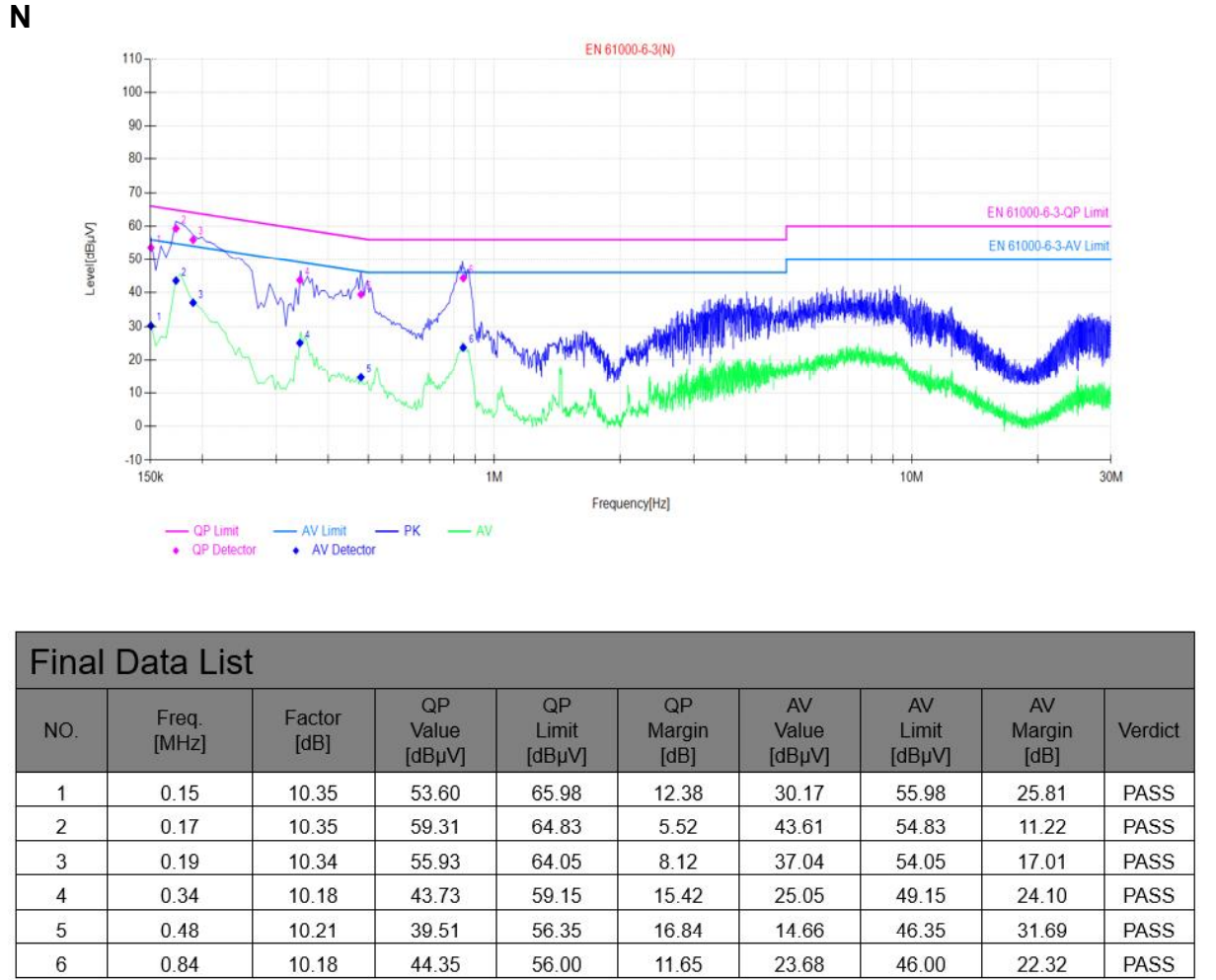




TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

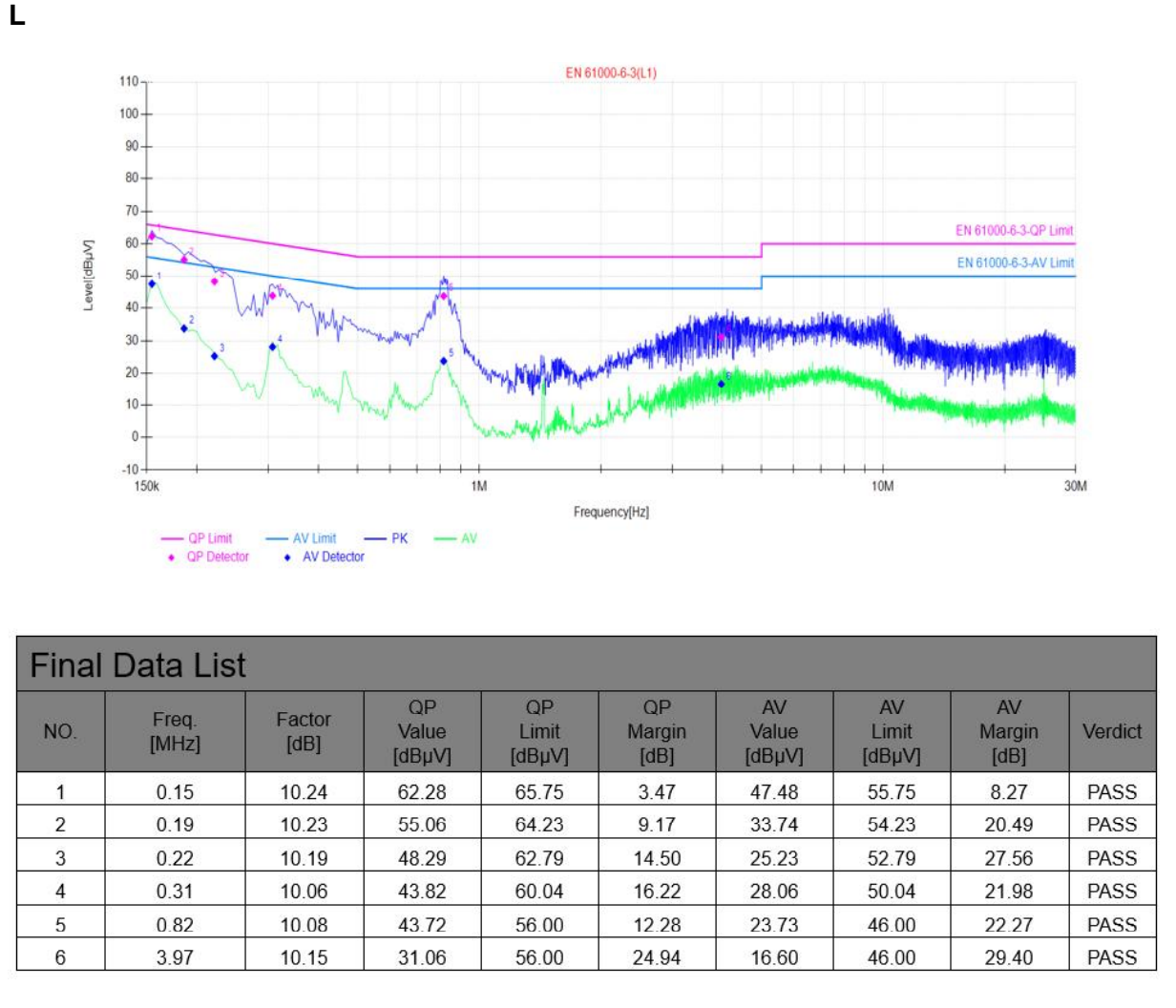
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TEST REPORT N°: BMH-ESH-P21080064B-1-A1

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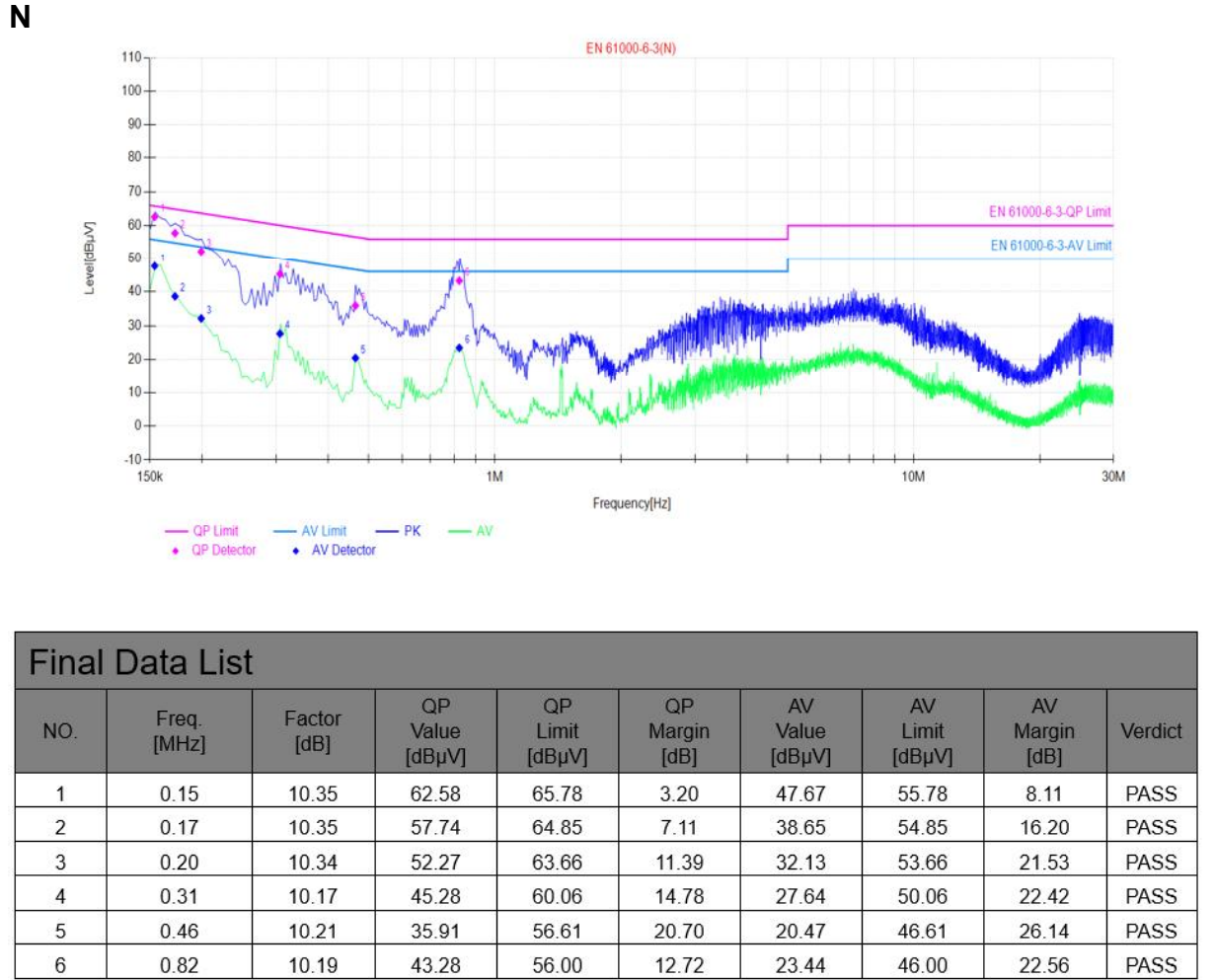
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Mode 2**



TEST REPORT N°: BMH-ESH-P21080064B-1-A1

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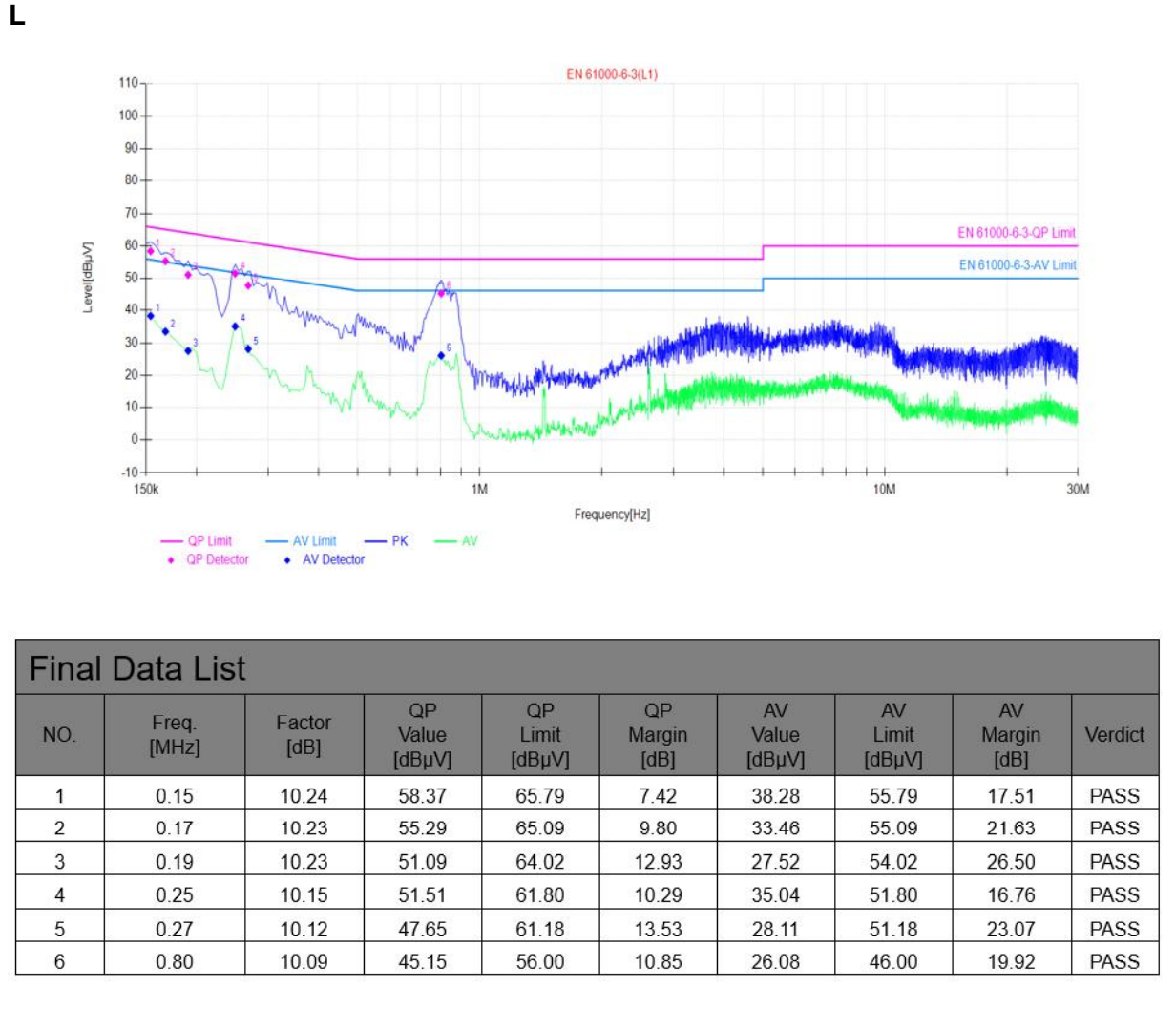
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Final Data List

| NO. | Freq. [MHz] | Factor [dB] | QP Value [dBµV] | QP Limit [dBµV] | QP Margin [dB] | AV Value [dBµV] | AV Limit [dBµV] | AV Margin [dB] | Verdict |
|-----|-------------|-------------|-----------------|-----------------|----------------|-----------------|-----------------|----------------|---------|
| 1 | 0.15 | 10.35 | 62.58 | 65.78 | 3.20 | 47.67 | 55.78 | 8.11 | PASS |
| 2 | 0.17 | 10.35 | 57.74 | 64.85 | 7.11 | 38.65 | 54.85 | 16.20 | PASS |
| 3 | 0.20 | 10.34 | 52.27 | 63.66 | 11.39 | 32.13 | 53.66 | 21.53 | PASS |
| 4 | 0.31 | 10.17 | 45.28 | 60.06 | 14.78 | 27.64 | 50.06 | 22.42 | PASS |
| 5 | 0.46 | 10.21 | 35.91 | 56.61 | 20.70 | 20.47 | 46.61 | 26.14 | PASS |
| 6 | 0.82 | 10.19 | 43.28 | 56.00 | 12.72 | 23.44 | 46.00 | 22.56 | PASS |

**Continued
Mode 3**

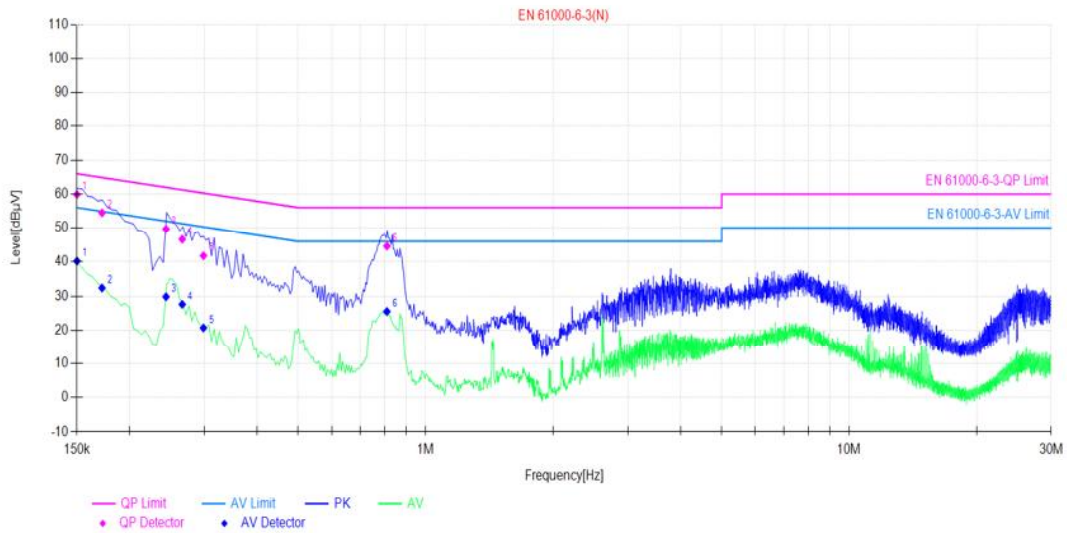


TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

Continued

N



Final Data List

| NO. | Freq. [MHz] | Factor [dB] | QP Value [dBµV] | QP Limit [dBµV] | QP Margin [dB] | AV Value [dBµV] | AV Limit [dBµV] | AV Margin [dB] | Verdict |
|-----|-------------|-------------|-----------------|-----------------|----------------|-----------------|-----------------|----------------|---------|
| 1 | 0.15 | 10.35 | 59.89 | 65.99 | 6.10 | 40.22 | 55.99 | 15.77 | PASS |
| 2 | 0.17 | 10.35 | 54.47 | 64.86 | 10.39 | 32.38 | 54.86 | 22.48 | PASS |
| 3 | 0.24 | 10.26 | 49.65 | 61.97 | 12.32 | 29.81 | 51.97 | 22.16 | PASS |
| 4 | 0.27 | 10.23 | 46.62 | 61.24 | 14.62 | 27.60 | 51.24 | 23.64 | PASS |
| 5 | 0.30 | 10.17 | 41.80 | 60.28 | 18.48 | 20.72 | 50.28 | 29.56 | PASS |
| 6 | 0.81 | 10.20 | 44.60 | 56.00 | 11.40 | 25.52 | 46.00 | 20.48 | PASS |



TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

Table No. 1
100% Load

| Average harmonic current results | | | | |
|---|----------------------|------------|-----------|--------|
| Hn | I _{eff} [A] | % of Limit | Limit [A] | Result |
| 1 | 2.173 | | | |
| 2 | 835.878E-6 | | | PASS |
| 3 | 25.942E-3 | 1.253 | 2.30 | PASS |
| 4 | 948.256E-6 | | | PASS |
| 5 | 14.821E-3 | 1.445 | 1.14 | PASS |
| 6 | 1.191E-3 | | | PASS |
| 7 | 9.792E-3 | 1.413 | 700.00E-3 | PASS |
| 8 | 1.068E-3 | | | PASS |
| 9 | 7.901E-3 | 2.195 | 400.00E-3 | PASS |
| 10 | 977.786E-6 | | | PASS |
| 11 | 6.468E-3 | 2.178 | 330.00E-3 | PASS |
| 12 | 1.014E-3 | | | PASS |
| 13 | 5.469E-3 | 2.894 | 210.00E-3 | PASS |
| 14 | 1.034E-3 | | | PASS |
| 15 | 5.317E-3 | 3.939 | 150.00E-3 | PASS |
| 16 | 922.267E-6 | | | PASS |
| 17 | 4.609E-3 | | | PASS |
| 18 | 977.739E-6 | | | PASS |
| 19 | 3.725E-3 | | | PASS |
| 20 | 1.018E-3 | | | PASS |
| 21 | 3.546E-3 | | | PASS |
| 22 | 977.368E-6 | | | PASS |
| 23 | 3.527E-3 | | | PASS |
| 24 | 1.008E-3 | | | PASS |
| 25 | 3.322E-3 | | | PASS |
| 26 | 1.024E-3 | | | PASS |
| 27 | 3.235E-3 | | | PASS |
| 28 | 1.080E-3 | | | PASS |
| 29 | 3.292E-3 | | | PASS |
| 30 | 1.133E-3 | | | PASS |
| 31 | 2.957E-3 | | | PASS |
| 32 | 1.129E-3 | | | PASS |
| 33 | 2.715E-3 | | | PASS |
| 34 | 1.130E-3 | | | PASS |
| 35 | 2.750E-3 | | | PASS |
| 36 | 1.181E-3 | | | PASS |
| 37 | 2.645E-3 | | | PASS |
| 38 | 1.209E-3 | | | PASS |
| 39 | 2.706E-3 | | | PASS |
| 40 | 1.229E-3 | | | PASS |



TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

50% Load

| Average and Maximum harmonic current results | | | | | | | | | |
|--|----------|--------------|-----------|--------|----------|--------------|-----------|--------|-----------------|
| Hn | Average | | | | Maximum | | | | Harmonic Result |
| | Ieff [A] | of Limit [%] | Limit [A] | Result | Ieff [A] | of Limit [%] | Limit [A] | Result | |
| 1 | 4.163 | | | | 4.164 | | | | |
| 2 | 0.002 | 0.177 | 1.080 | n/a | 0.002 | 0.129 | 1.620 | n/a | PASS |
| 3 | 0.012 | 0.525 | 2.300 | n/a | 0.012 | 0.360 | 3.450 | n/a | PASS |
| 4 | 0.002 | 0.395 | 0.430 | n/a | 0.002 | 0.287 | 0.645 | n/a | PASS |
| 5 | 0.012 | 1.018 | 1.140 | n/a | 0.012 | 0.693 | 1.710 | n/a | PASS |
| 6 | 0.002 | 0.611 | 0.300 | n/a | 0.002 | 0.455 | 0.450 | n/a | PASS |
| 7 | 0.013 | 1.683 | 0.770 | n/a | 0.013 | 1.147 | 1.155 | n/a | PASS |
| 8 | 0.002 | 0.792 | 0.230 | n/a | 0.002 | 0.576 | 0.345 | n/a | PASS |
| 9 | 0.010 | 2.504 | 0.400 | n/a | 0.010 | 1.721 | 0.600 | n/a | PASS |
| 10 | 0.002 | 0.981 | 0.184 | n/a | 0.002 | 0.719 | 0.276 | n/a | PASS |
| 11 | 0.011 | 3.275 | 0.330 | n/a | 0.011 | 2.235 | 0.495 | n/a | PASS |
| 12 | 0.002 | 1.393 | 0.153 | n/a | 0.003 | 1.188 | 0.230 | n/a | PASS |
| 13 | 0.009 | 4.352 | 0.210 | n/a | 0.009 | 2.987 | 0.315 | n/a | PASS |
| 14 | 0.002 | 1.314 | 0.131 | n/a | 0.002 | 0.978 | 0.197 | n/a | PASS |
| 15 | 0.010 | 6.433 | 0.150 | n/a | 0.010 | 4.433 | 0.225 | n/a | PASS |
| 16 | 0.002 | 1.558 | 0.115 | n/a | 0.002 | 1.125 | 0.173 | n/a | PASS |
| 17 | 0.012 | 9.417 | 0.132 | n/a | 0.013 | 6.399 | 0.199 | n/a | PASS |
| 18 | 0.002 | 1.774 | 0.102 | n/a | 0.002 | 1.287 | 0.153 | n/a | PASS |
| 19 | 0.010 | 8.758 | 0.118 | n/a | 0.011 | 6.006 | 0.178 | n/a | PASS |
| 20 | 0.002 | 1.914 | 0.092 | n/a | 0.002 | 1.583 | 0.138 | n/a | PASS |
| 21 | 0.011 | 9.960 | 0.107 | n/a | 0.011 | 6.782 | 0.161 | n/a | PASS |
| 22 | 0.002 | 1.918 | 0.084 | n/a | 0.002 | 1.388 | 0.125 | n/a | PASS |
| 23 | 0.016 | 16.676 | 0.098 | n/a | 0.017 | 11.254 | 0.147 | n/a | PASS |
| 24 | 0.002 | 2.401 | 0.077 | n/a | 0.002 | 1.746 | 0.115 | n/a | PASS |
| 25 | 0.016 | 17.252 | 0.090 | n/a | 0.016 | 11.692 | 0.135 | n/a | PASS |
| 26 | 0.002 | 2.414 | 0.071 | n/a | 0.002 | 1.760 | 0.106 | n/a | PASS |
| 27 | 0.013 | 15.416 | 0.083 | n/a | 0.013 | 10.433 | 0.125 | n/a | PASS |
| 28 | 0.001 | 2.230 | 0.066 | n/a | 0.002 | 1.659 | 0.099 | n/a | PASS |
| 29 | 0.017 | 21.451 | 0.078 | n/a | 0.017 | 14.495 | 0.116 | n/a | PASS |
| 30 | 0.001 | 2.290 | 0.061 | n/a | 0.002 | 1.717 | 0.092 | n/a | PASS |
| 31 | 0.019 | 25.995 | 0.073 | n/a | 0.019 | 17.474 | 0.109 | n/a | PASS |
| 32 | 0.001 | 2.396 | 0.058 | n/a | 0.002 | 1.746 | 0.086 | n/a | PASS |
| 33 | 0.018 | 26.024 | 0.068 | n/a | 0.018 | 17.533 | 0.102 | n/a | PASS |
| 34 | 0.002 | 2.787 | 0.054 | n/a | 0.002 | 2.085 | 0.081 | n/a | PASS |
| 35 | 0.018 | 27.248 | 0.064 | n/a | 0.018 | 18.366 | 0.096 | n/a | PASS |
| 36 | 0.002 | 3.142 | 0.051 | n/a | 0.002 | 2.336 | 0.077 | n/a | PASS |
| 37 | 0.017 | 28.487 | 0.061 | n/a | 0.017 | 19.180 | 0.091 | n/a | PASS |
| 38 | 0.001 | 3.060 | 0.048 | n/a | 0.002 | 2.295 | 0.073 | n/a | PASS |
| 39 | 0.016 | 27.055 | 0.058 | n/a | 0.016 | 18.300 | 0.087 | n/a | PASS |
| 40 | 0.002 | 3.267 | 0.046 | n/a | 0.002 | 2.383 | 0.069 | n/a | PASS |



TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

25% Load

| Average and Maximum harmonic current results | | | | | | | | | |
|--|----------------------|--------------|-----------|--------|----------------------|--------------|-----------|--------|-----------------|
| Hn | Average | | | | Maximum | | | | Harmonic Result |
| | I _{eff} [A] | of Limit [%] | Limit [A] | Result | I _{eff} [A] | of Limit [%] | Limit [A] | Result | |
| 1 | 2.033 | | | | 2.062 | | | | |
| 2 | 0.002 | 0.139 | 1.080 | n/a | 0.002 | 0.108 | 1.620 | n/a | PASS |
| 3 | 0.012 | 0.516 | 2.300 | n/a | 0.013 | 0.367 | 3.450 | PASS | PASS |
| 4 | 0.001 | 0.297 | 0.430 | n/a | 0.001 | 0.224 | 0.645 | n/a | PASS |
| 5 | 0.012 | 1.080 | 1.140 | n/a | 0.013 | 0.763 | 1.710 | PASS | PASS |
| 6 | 0.001 | 0.462 | 0.300 | n/a | 0.002 | 0.345 | 0.450 | n/a | PASS |
| 7 | 0.012 | 1.622 | 0.770 | PASS | 0.013 | 1.128 | 1.155 | PASS | PASS |
| 8 | 0.001 | 0.561 | 0.230 | n/a | 0.001 | 0.427 | 0.345 | n/a | PASS |
| 9 | 0.013 | 3.335 | 0.400 | PASS | 0.014 | 2.286 | 0.600 | PASS | PASS |
| 10 | 0.002 | 1.050 | 0.184 | n/a | 0.003 | 0.969 | 0.276 | n/a | PASS |
| 11 | 0.012 | 3.620 | 0.330 | n/a | 0.012 | 2.496 | 0.495 | n/a | PASS |
| 12 | 0.001 | 0.879 | 0.153 | n/a | 0.001 | 0.651 | 0.230 | n/a | PASS |
| 13 | 0.010 | 4.966 | 0.210 | n/a | 0.011 | 3.443 | 0.315 | n/a | PASS |
| 14 | 0.001 | 0.971 | 0.131 | n/a | 0.001 | 0.715 | 0.197 | n/a | PASS |
| 15 | 0.009 | 6.020 | 0.150 | n/a | 0.010 | 4.239 | 0.225 | n/a | PASS |
| 16 | 0.001 | 1.218 | 0.115 | n/a | 0.002 | 1.106 | 0.173 | n/a | PASS |
| 17 | 0.008 | 6.041 | 0.132 | n/a | 0.008 | 4.267 | 0.199 | n/a | PASS |
| 18 | 0.002 | 1.613 | 0.102 | n/a | 0.002 | 1.186 | 0.153 | n/a | PASS |
| 19 | 0.007 | 6.043 | 0.118 | n/a | 0.008 | 4.293 | 0.178 | n/a | PASS |
| 20 | 0.001 | 1.376 | 0.092 | n/a | 0.001 | 1.026 | 0.138 | n/a | PASS |
| 21 | 0.008 | 7.035 | 0.107 | n/a | 0.008 | 4.938 | 0.161 | n/a | PASS |
| 22 | 0.001 | 1.403 | 0.084 | n/a | 0.001 | 1.044 | 0.125 | n/a | PASS |
| 23 | 0.008 | 7.859 | 0.098 | n/a | 0.008 | 5.619 | 0.147 | n/a | PASS |
| 24 | 0.002 | 2.044 | 0.077 | n/a | 0.002 | 1.565 | 0.115 | n/a | PASS |
| 25 | 0.008 | 9.332 | 0.090 | n/a | 0.009 | 6.762 | 0.135 | n/a | PASS |
| 26 | 0.001 | 2.099 | 0.071 | n/a | 0.002 | 1.560 | 0.106 | n/a | PASS |
| 27 | 0.009 | 10.743 | 0.083 | n/a | 0.010 | 8.025 | 0.125 | n/a | PASS |
| 28 | 0.001 | 1.851 | 0.066 | n/a | 0.001 | 1.467 | 0.099 | n/a | PASS |
| 29 | 0.010 | 12.490 | 0.078 | n/a | 0.011 | 9.376 | 0.116 | n/a | PASS |
| 30 | 0.001 | 1.879 | 0.061 | n/a | 0.001 | 1.450 | 0.092 | n/a | PASS |
| 31 | 0.010 | 13.608 | 0.073 | n/a | 0.011 | 10.386 | 0.109 | n/a | PASS |
| 32 | 0.001 | 1.938 | 0.058 | n/a | 0.001 | 1.532 | 0.086 | n/a | PASS |
| 33 | 0.010 | 14.300 | 0.068 | n/a | 0.011 | 11.162 | 0.102 | n/a | PASS |
| 34 | 0.001 | 2.260 | 0.054 | n/a | 0.001 | 1.773 | 0.081 | n/a | PASS |
| 35 | 0.010 | 14.953 | 0.064 | n/a | 0.012 | 12.225 | 0.096 | n/a | PASS |
| 36 | 0.001 | 2.644 | 0.051 | n/a | 0.002 | 2.118 | 0.077 | n/a | PASS |
| 37 | 0.010 | 17.216 | 0.061 | n/a | 0.013 | 14.171 | 0.091 | PASS | PASS |
| 38 | 0.001 | 2.504 | 0.048 | n/a | 0.001 | 1.985 | 0.073 | n/a | PASS |
| 39 | 0.011 | 18.517 | 0.058 | n/a | 0.013 | 15.577 | 0.087 | PASS | PASS |
| 40 | 0.001 | 2.484 | 0.046 | n/a | 0.001 | 2.094 | 0.069 | n/a | PASS |



TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

Table No. 2

100% Load

| | EUT values | Limit | Result |
|----------|-------------------|--------------|---------------|
| Pst | 0.707 | 1.00 | PASS |
| Plt | 0.309 | 0.65 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.198 | 4.00 | PASS |
| Tmax [s] | 0.000 | 0.50 | PASS |

50% Load

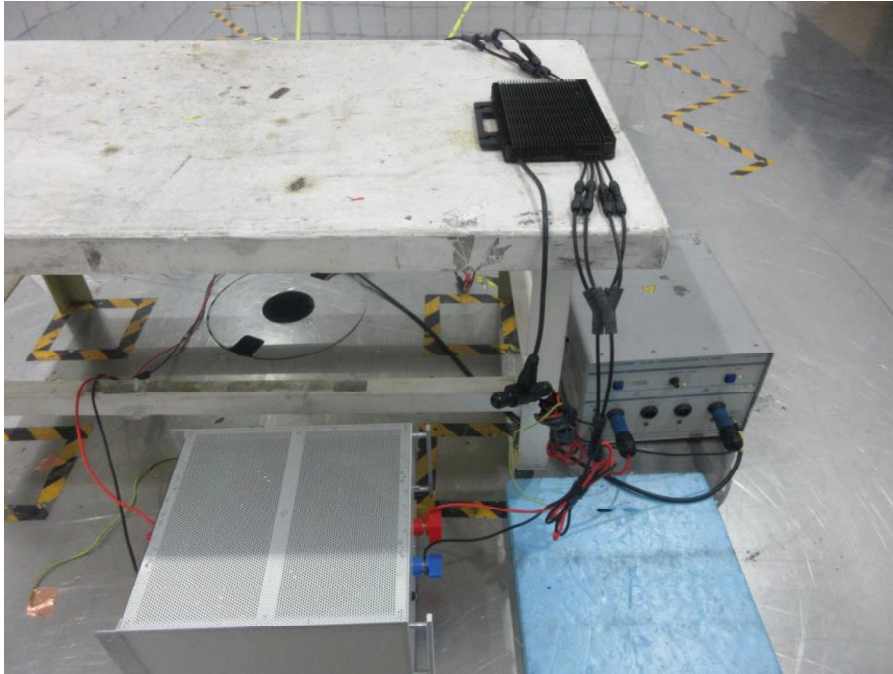
| | EUT values | Limit | Result |
|----------|-------------------|--------------|---------------|
| Pst | 0.036 | 1.00 | PASS |
| Plt | 0.070 | 0.65 | PASS |
| dc [%] | 0.731 | 3.30 | PASS |
| dmax [%] | 0.800 | 4.00 | PASS |
| Tmax [s] | 0.000 | 0.50 | PASS |

25% Load

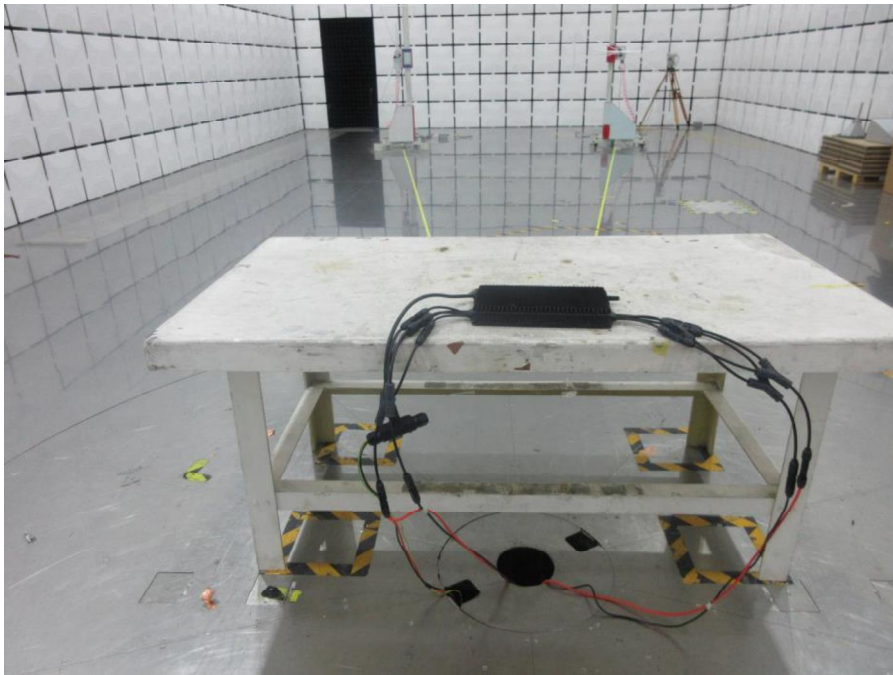
| | EUT values | Limit | Result |
|----------|-------------------|--------------|---------------|
| Pst | 0.037 | 1.00 | PASS |
| Plt | 0.072 | 0.65 | PASS |
| dc [%] | 0.336 | 3.30 | PASS |
| dmax [%] | 0.680 | 4.00 | PASS |
| Tmax [s] | 0.000 | 0.50 | PASS |

10 TEST PHOTO

Conducted emission test

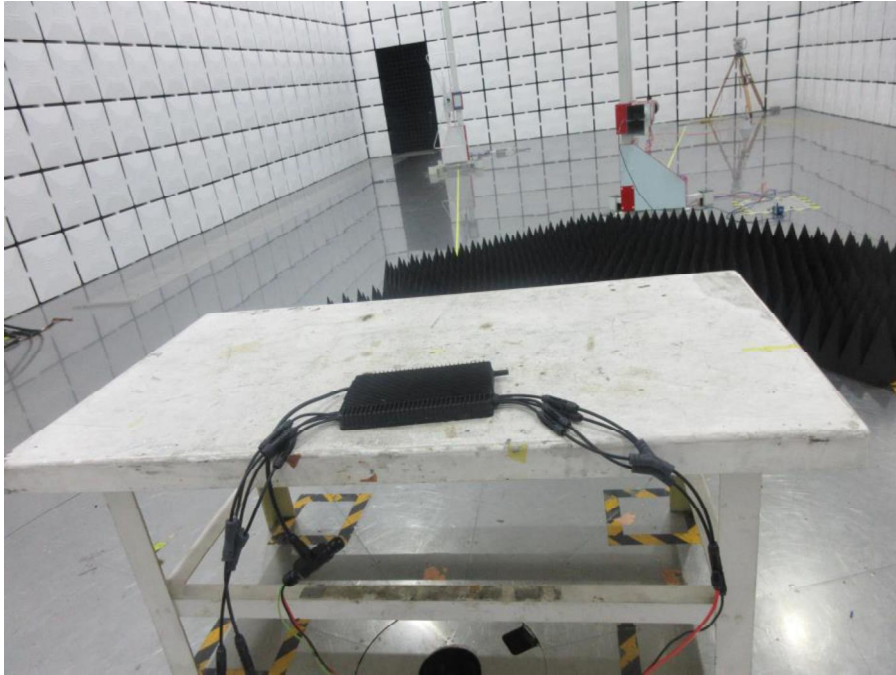


Radiated emission test

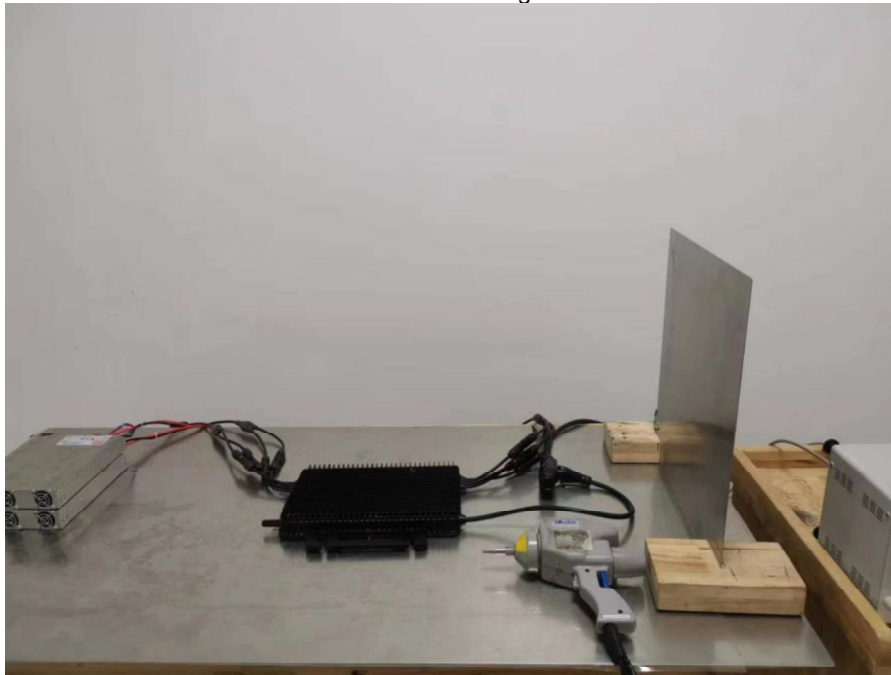


TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

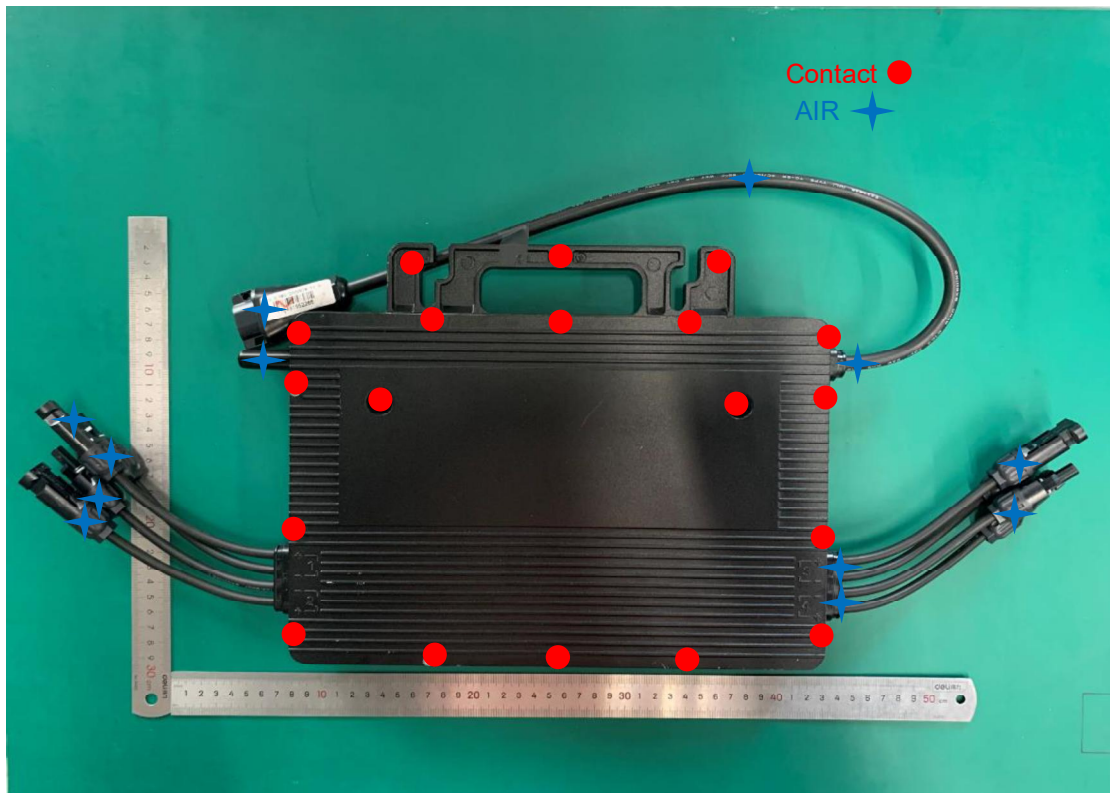
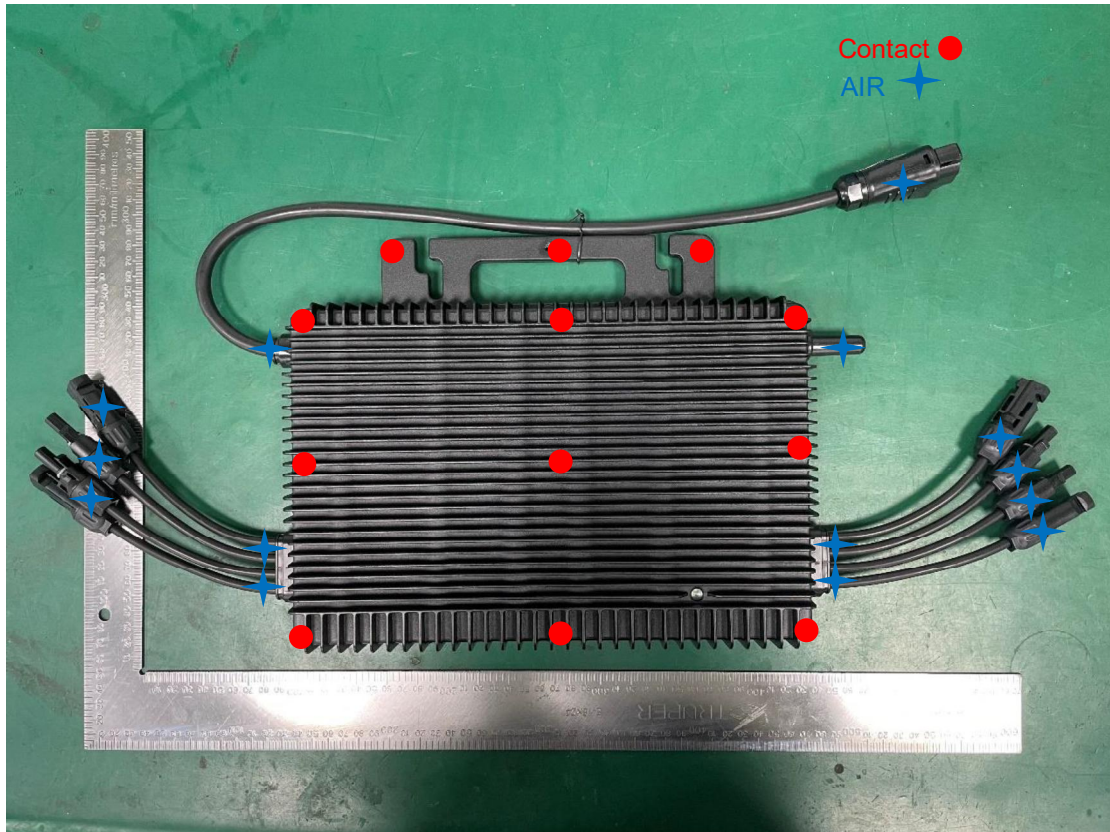


Electrostatic discharges test



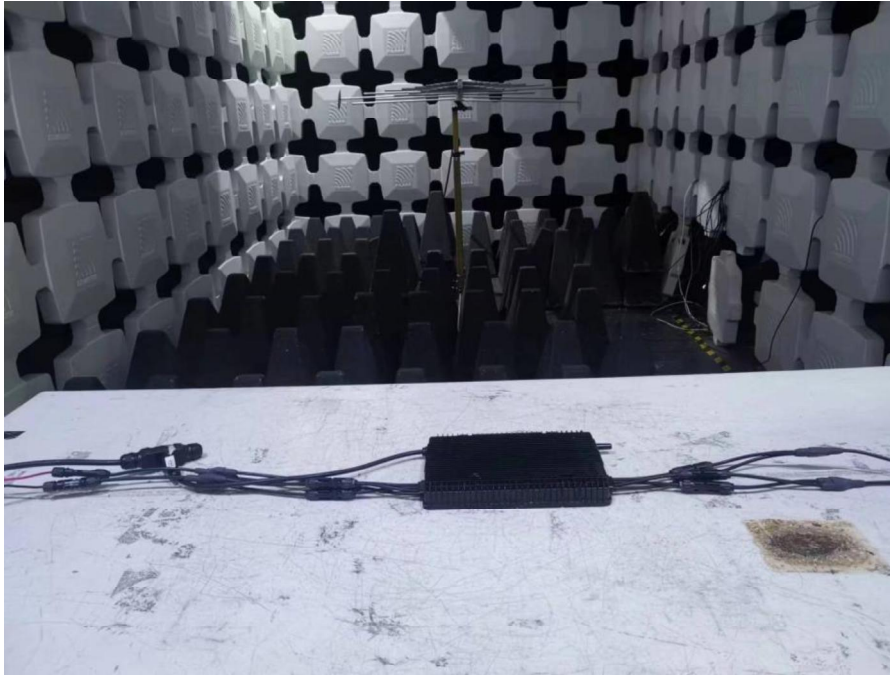
TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

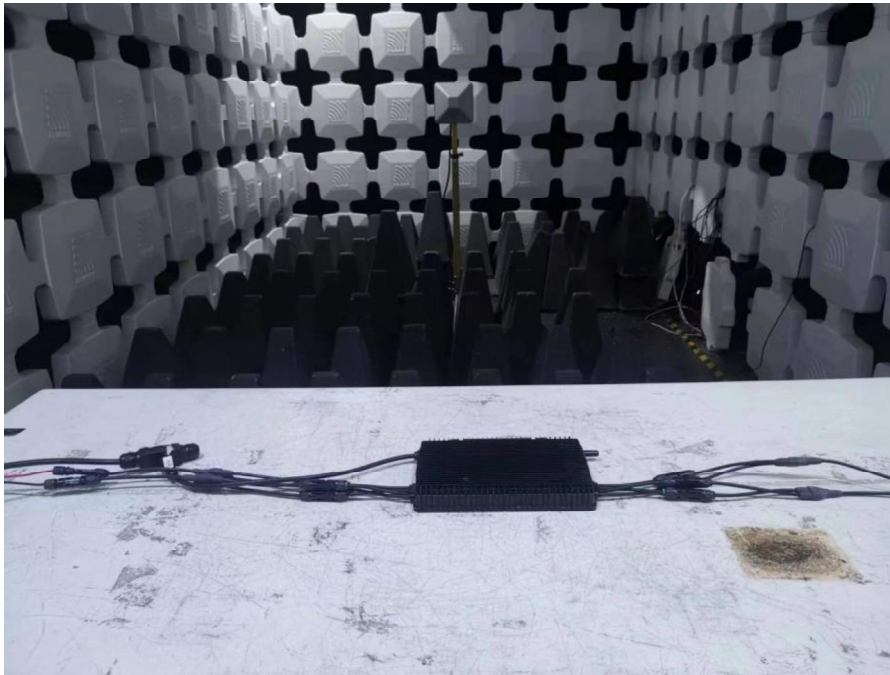


TEST REPORT N°: BMH-ESH-P21080064B-1-A1
Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06
Radiated radio-frequency electromagnetic field test

Below 1GHz



Above 1GHz

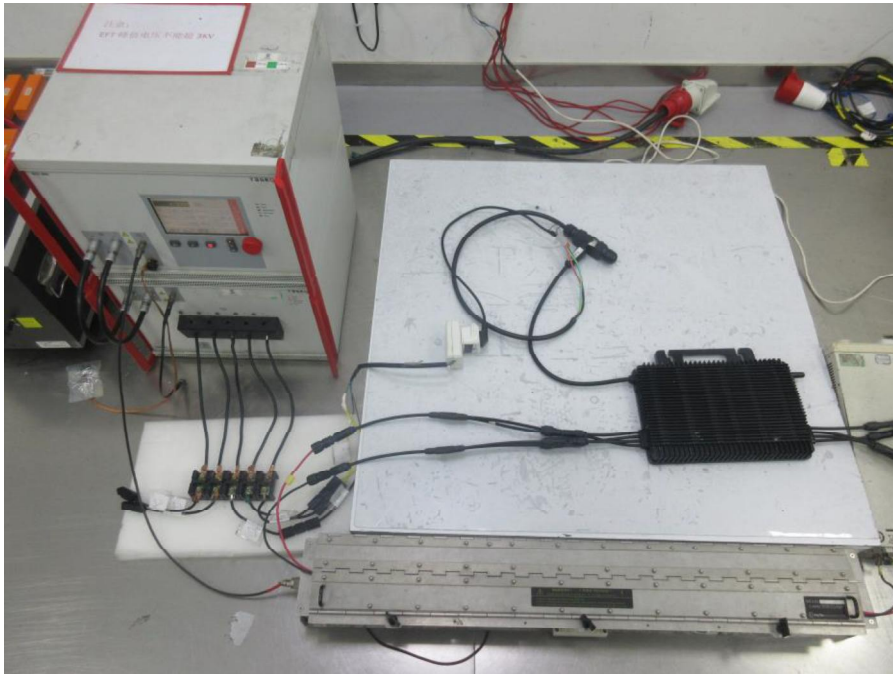


TEST REPORT N°: BMH-ESH-P21080064B-1-A1
 Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

Fast transients/bursts test and surge test
 AC Port



Fast transients/bursts test
 DC Port



TEST REPORT N°: BMH-ESH-P21080064B-1-A1

Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

Conducted disturbances induced by radio-frequency fields test
AC Port



DC Port



TEST REPORT N°: BMH-ESH-P21080064B-1-A1
Supplement "A1" to test report No.: BMH-ESH-P21080064B-1 dated on 2021-09-06

Harmonic, Voltage dips and voltage interruptions test