


TEST REPORT N°: BMH-ESH-P21080066B-1-A3
Supplement "A1" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28


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 : 52 pages		Test date :	Oct.23 to Oct.26, 2023

MANUFACTURER NAME :	Hoymiles Power Electronics Inc.	
ADDRESS :	No.18 Kangjing Road, HangZhou, Zhejiang Province, P.R. China	
PRODUCT :	PV Microinverter	
TYPE REFERENCE :	HMS-500-1T, HMS-450-1T, HMS-400-1T, HMS-350-1T, HMS-300-1T, HMS-500-1A, HMS-450-1A, HMS-400-1A, HMS-350-1A, HMS-300-1A, HMS-500BM, HMS-450BM, HMS-400BM, HMS-350BM, HMS-300BM	
RATED VOLTAGE :	Refer to section 3.1	
RATED OUTPUT POWER :	Refer to section 3.1	
PROTECTION CLASS :	I	
TESTS REALISED :	--	

STANDARDS USED (DATE) :	EN 62920:2017+A11:2020+A1:2020/ IEC 62920:2017+A1:2020 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,		Approved by,
Name: Yuan ZHANG		Name: Sean YU
Title: Projector Engineer		Title: RF Supervisor
Date: Oct.26, 2023		Date: Oct.26, 2023

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1 TESTING PROGRAM

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

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

- 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+A1:2020

- 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.

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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 V2.1.1 (2019-03)

- Measurement of the conducted emission levels.
- Measurement of the radiated emission levels.
- Measurement of the harmonic currents.
- Measurement of the voltage fluctuations and flickers.
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Immunity standard EN 301 489-1 V2.2.3 (2019-11), EN 301 489-3 V2.1.1 (2019-03)

- 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-P21080066B-2-A2 for adding standard and changing PCB layout. After evaluation, We choose model HMS-500-1T to apply CE, RE, Harmonic , Flicker, EFT and CS tests, the test result is applicable to all models.

2 HISTORY OF FAILURE

None.



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3 EQUIPMENT CHARACTERISTICS

3.1 Technical characteristics

		PV Microinverter Model: HMS-300-1A		Hoymiles Power Electronics Inc. hoymiles.com Made in China	
Max. Input Voltage	60V 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	12A d.c.	Enclosure	IP67		
Max. Input Short Circuit Current	20A d.c.	Overvoltage Category	PV:II, Mains:III		
Max. Continuous Output Power	300VA	Protective Class	I		
Max. Continuous Output Current	1.30A a.c.	Pollution Degree	PD3		
Output Power Factor	>0.99(Default)	Ambient Temperature Range	-40°C to +65°C		
					

		PV Microinverter Model: HMS-300-1T		Hoymiles Power Electronics Inc. hoymiles.com Made in China	
Max. Input Voltage	60V 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	12A d.c.	Enclosure	IP67		
Max. Input Short Circuit Current	20A d.c.	Overvoltage Category	PV:II, Mains:III		
Max. Continuous Output Power	300VA	Protective Class	I		
Max. Continuous Output Current	1.30A 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-350-1A

Hoymiles Power Electronics Inc.
hoymiles.com Made in China

Max. Input Voltage	60V 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	13A d.c.	Enclosure	IP67
Max. Input Short Circuit Current	20A d.c.	Overvoltage Category	PV:II, Mains:III
Max. Continuous Output Power	350VA	Protective Class	I
Max. Continuous Output Current	1.52A a.c.	Pollution Degree	PD3
Output Power Factor	>0.99(Default)	Ambient Temperature Range	-40°C to +65°C



PV Microinverter
Model: HMS-350-1T


Hoymiles Power Electronics Inc.
hoymiles.com Made in China

Max. Input Voltage	60V 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	13A d.c.	Enclosure	IP67
Max. Input Short Circuit Current	20A d.c.	Overvoltage Category	PV:II, Mains:III
Max. Continuous Output Power	350VA	Protective Class	I
Max. Continuous Output Current	1.52A a.c.	Pollution Degree	PD3
Output Power Factor	>0.99(Default)	Ambient Temperature Range	-40°C to +65°C











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	<p>PV Microinverter Model: HMS-400-1A</p>	<p>Hoymiles Power Electronics Inc. hoymiles.com Made in China</p>
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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	14A d.c.	Enclosure	IP67
Max. Input Short Circuit Current	25A d.c.	Overvoltage Category	PV:II, Mains:III
Max. Continuous Output Power	400VA	Protective Class	I
Max. Continuous Output Current	1.74A a.c.	Pollution Degree	PD3
Output Power Factor	>0.99(Default)	Ambient Temperature Range	-40°C to +65°C

	<p>PV Microinverter Model: HMS-400-1T</p>	<p>Hoymiles Power Electronics Inc. hoymiles.com Made in China</p>
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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	14A d.c.	Enclosure	IP67
Max. Input Short Circuit Current	25A d.c.	Overvoltage Category	PV:II, Mains:III
Max. Continuous Output Power	400VA	Protective Class	I
Max. Continuous Output Current	1.74A 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-450-1A

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	15A d.c.	Enclosure	IP67
Max. Input Short Circuit Current	25A d.c.	Overvoltage Category	PV:II, Mains:III
Max. Continuous Output Power	450VA	Protective Class	I
Max. Continuous Output Current	1.96A a.c.	Pollution Degree	PD3
Output Power Factor	>0.99(Default)	Ambient Temperature Range	-40°C to +65°C



PV Microinverter
Model: HMS-450-1T

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	15A d.c.	Enclosure	IP67
Max. Input Short Circuit Current	25A d.c.	Overvoltage Category	PV:II, Mains:III
Max. Continuous Output Power	450VA	Protective Class	I
Max. Continuous Output Current	1.96A 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-500-1A

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	16A d.c.	Enclosure	IP67
Max. Input Short Circuit Current	25A d.c.	Overvoltage Category	PV:II, Mains:III
Max. Continuous Output Power	500VA	Protective Class	I
Max. Continuous Output Current	2.17A a.c.	Pollution Degree	PD3
Output Power Factor	>0.99(Default)	Ambient Temperature Range	-40°C to +65°C



PV Microinverter
Model: HMS-500-1T

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	16A d.c.	Enclosure	IP67
Max. Input Short Circuit Current	25A d.c.	Overvoltage Category	PV:II, Mains:III
Max. Continuous Output Power	500VA	Protective Class	I
Max. Continuous Output Current	2.17A 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-300BM

Hoymiles Power Electronics Inc.
hoymiles.com Made in China

Max. Input Voltage	60V 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	12A d.c.	Enclosure	IP67
Max. Input Short Circuit Current	20A d.c.	Overvoltage Category	PV:II, Mains:III
Max. Continuous Output Power	300VA	Protective Class	I
Max. Continuous Output Current	1.30A a.c.	Pollution Degree	PD3
Output Power Factor	>0.99(Default)	Ambient Temperature Range	-40°C to +65°C



PV Microinverter
Model: HMS-350BM

Hoymiles Power Electronics Inc.
hoymiles.com Made in China

Max. Input Voltage	60V 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	13A d.c.	Enclosure	IP67
Max. Input Short Circuit Current	20A d.c.	Overvoltage Category	PV:II, Mains:III
Max. Continuous Output Power	350VA	Protective Class	I
Max. Continuous Output Current	1.52A 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-400BM

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	14A d.c.	Enclosure	IP67
Max. Input Short Circuit Current	25A d.c.	Overvoltage Category	PV:II, Mains:III
Max. Continuous Output Power	400VA	Protective Class	I
Max. Continuous Output Current	1.74A a.c.	Pollution Degree	PD3
Output Power Factor	>0.99(Default)	Ambient Temperature Range	-40°C to +65°C



PV Microinverter
Model: HMS-450BM

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	15A d.c.	Enclosure	IP67
Max. Input Short Circuit Current	25A d.c.	Overvoltage Category	PV:II, Mains:III
Max. Continuous Output Power	450VA	Protective Class	I
Max. Continuous Output Current	1.96A 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-500BM

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	16A d.c.	Enclosure	IP67
Max. Input Short Circuit Current	25A d.c.	Overvoltage Category	PV:II, Mains:III
Max. Continuous Output Power	500VA	Protective Class	I
Max. Continuous Output Current	2.17A a.c.	Pollution Degree	PD3
Output Power Factor	>0.99(Default)	Ambient Temperature Range	-40°C to +65°C



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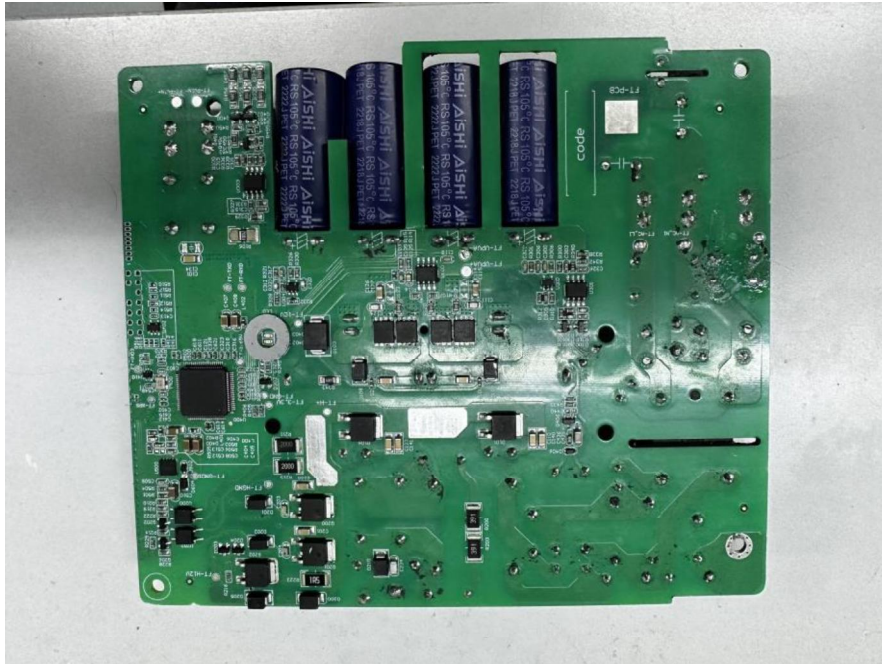
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3.2 Pictures of sample



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BM Series





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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 UC_{Cispr}, Table 1 – Values of UC_{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] [X]	[] []	[] []	[1] [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

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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]



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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



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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



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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



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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 • vertical coupling plane • enclosure • screw	[X] [X] [X] [X]	[] [] [] []	[] [] [] []	[1] [1] [1] [1]
		Air discharges Level : ± 8 kV Application points : • enclosure • panel • ports	[X]	[]	[]	[1]
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 • DC power input port • Signal/control port	[X] [X] []	[] [] []	[] [] [X]	[1] [1] [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 • DC power input port • Signal/control port	[X] [X] []	[] [] []	[] [] [X]	[1] [1] [5]

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



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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(μ s) : 1.2/50 (8/20) Number of surges : 5 positive and 5 negative Phase angles : 0°, 90°, 180° and 270° Level : \pm 1 kV for AC power port \pm 0.5 kV for DC power port Port(s) : • power input, between positive and negative • DC power input port	[X] []	[] []	[] [X]	[1] [4]
		Level : \pm 2 kV for AC power port \pm 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 30 m.
- 5 : The EUT have no related port.

9 CONCLUSION

The apparatus PV Microinverter and models HMS-500-1T, HMS-450-1T, HMS-400-1T, HMS-350-1T, HMS-300-1T, HMS-500-1A, HMS-450-1A, HMS-400-1A, HMS-350-1A, HMS-300-1A, HMS-500BM, HMS-450BM, HMS-400BM, HMS-350BM, HMS-300BM are in compliance with the requirements of the standards EN 62920:2017+A11:2020+A1:2020, IEC 62920:2017+A1:2020, 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).



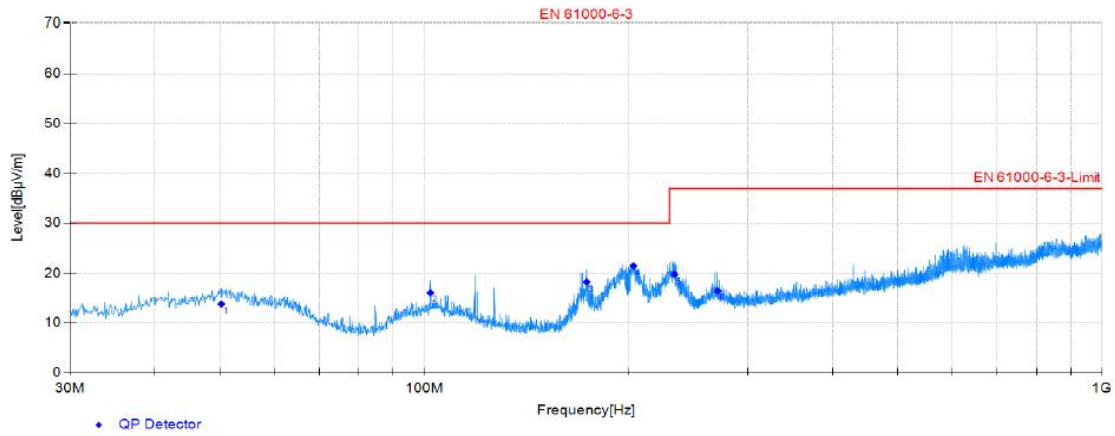


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Diagram No. 1
Mode 1

H



Final Data List

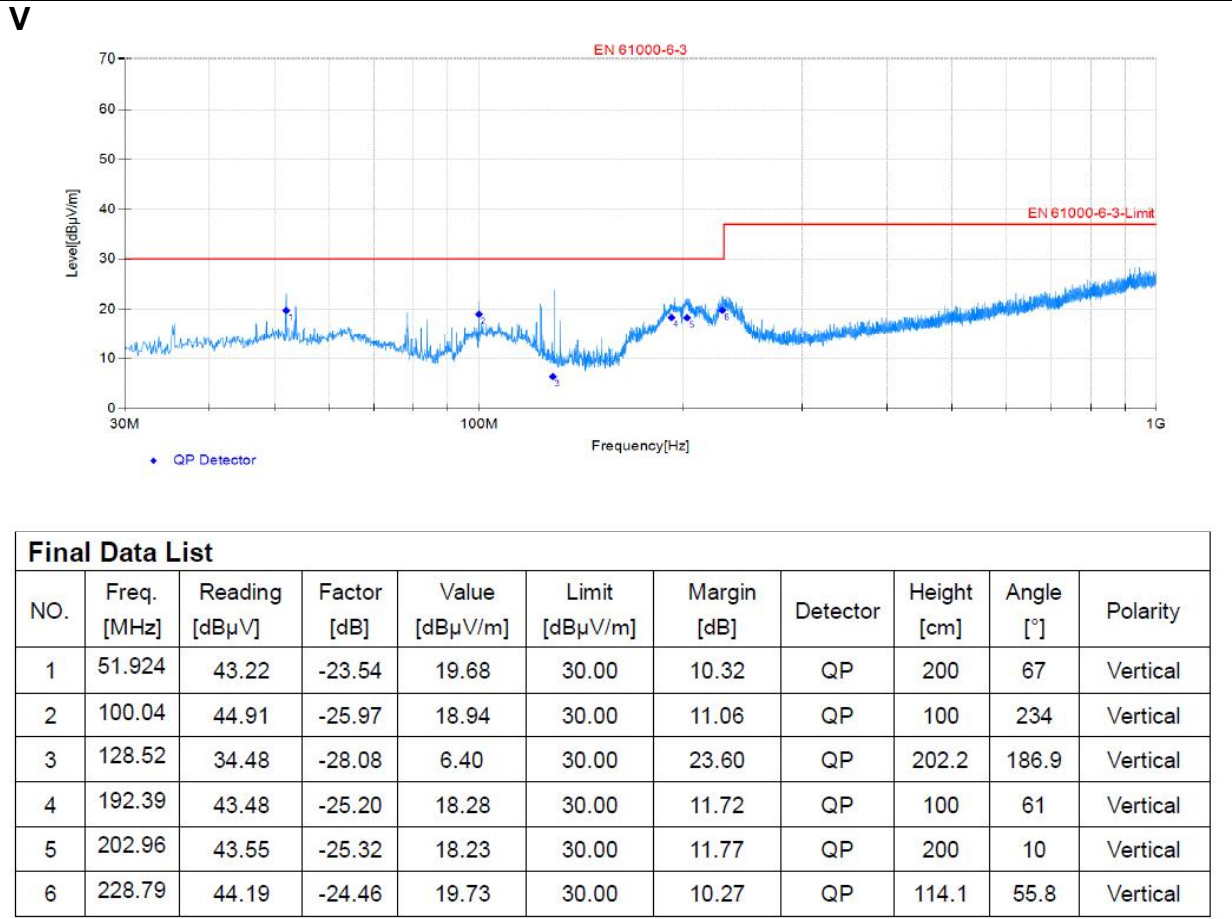
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1	50.178	24.61	-10.94	13.67	30.00	16.33	QP	200	344	Horizontal
2	102.07	29.1	-13.02	16.08	30.00	13.92	QP	300	159	Horizontal
3	173.47	33.92	-15.68	18.24	30.00	11.76	QP	400	288	Horizontal
4	203.47	35.21	-13.76	21.45	30.00	8.55	QP	394	89.9	Horizontal
5	233.81	32.38	-12.62	19.76	37.00	17.24	QP	400	78	Horizontal
6	270.77	28.52	-12.07	16.45	37.00	20.55	QP	400	50	Horizontal



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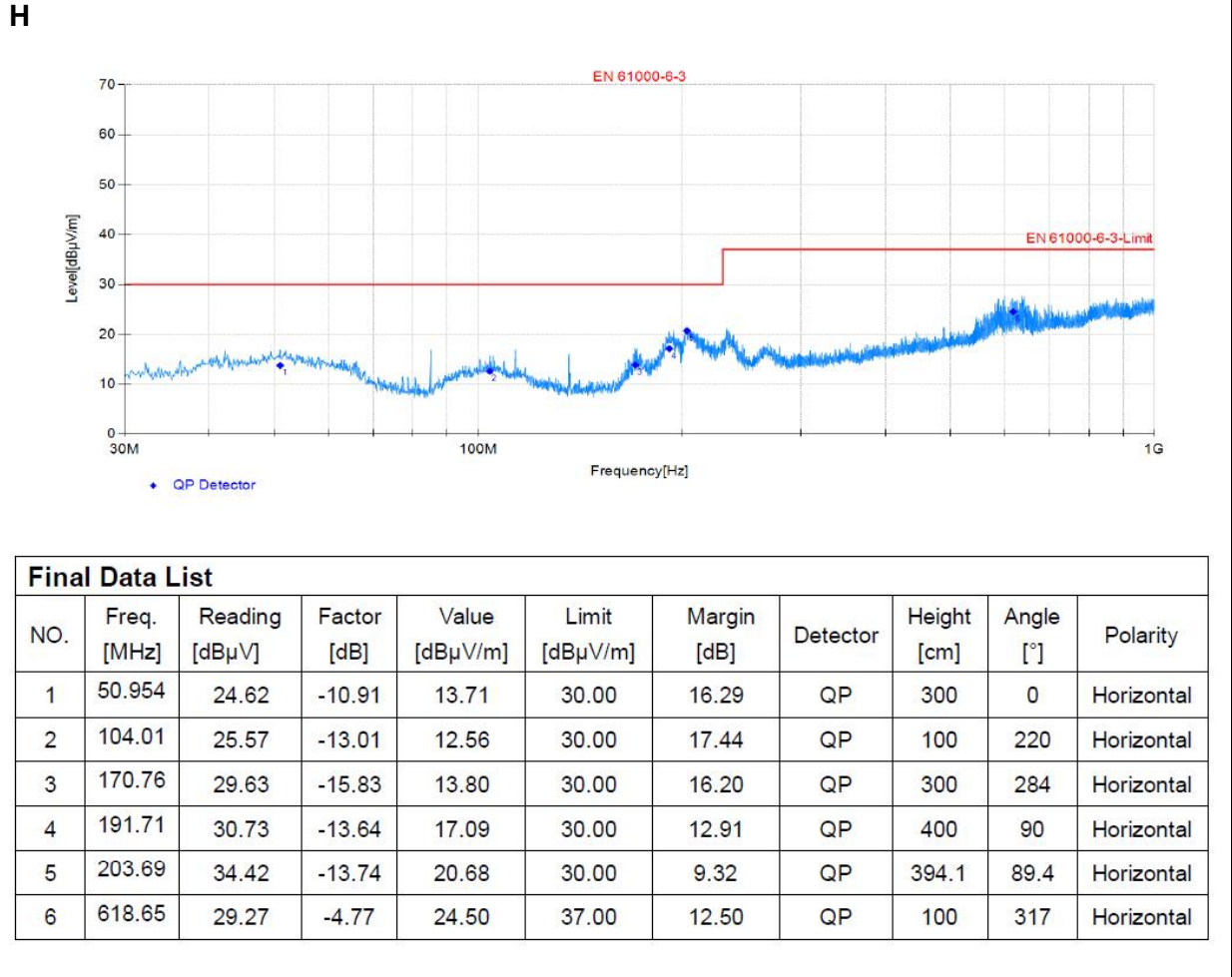




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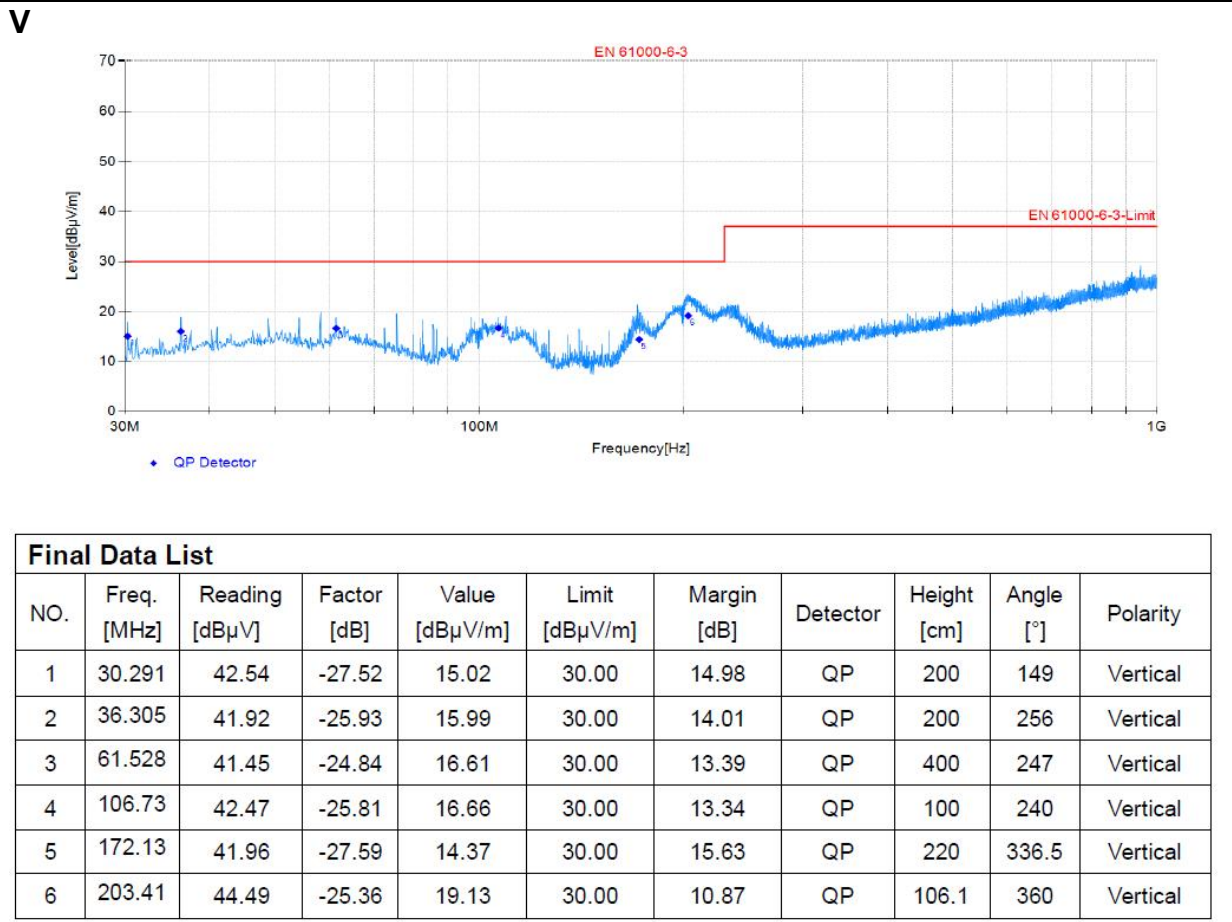
**Continued
Mode 2**



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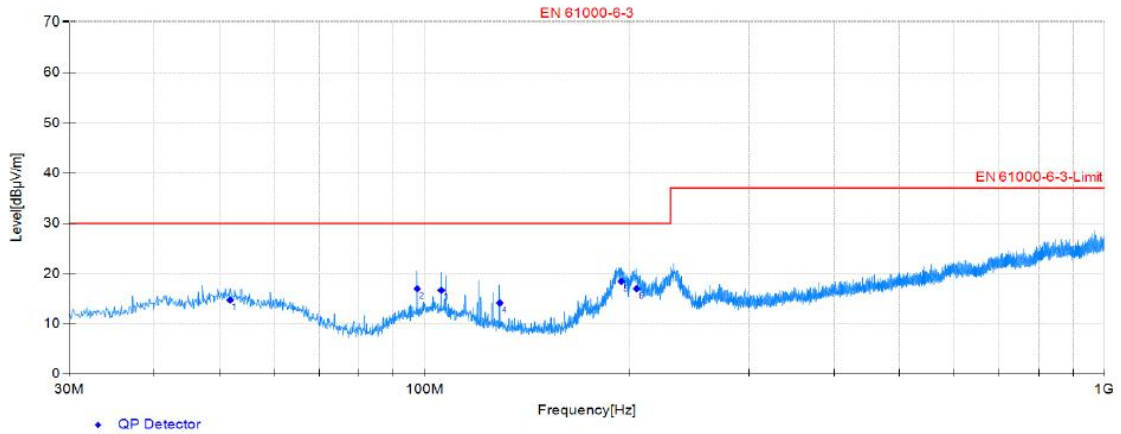


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**Continued
Mode 3**

H



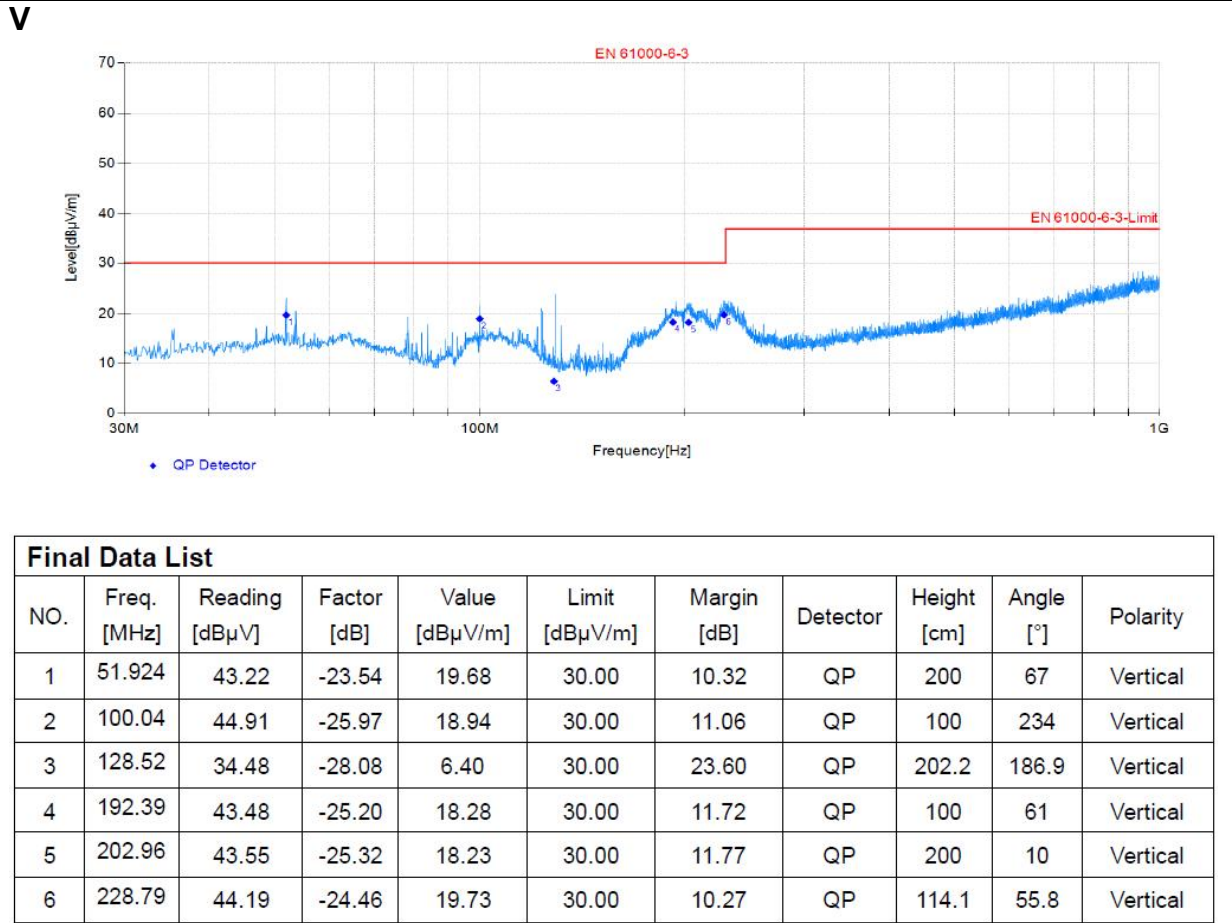
Final Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB]	Value [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	51.730	25.6	-10.91	14.69	30.00	15.31	QP	100	3	Horizontal
2	97.518	30.42	-13.47	16.95	30.00	13.05	QP	400	222	Horizontal
3	105.76	29.71	-13.08	16.63	30.00	13.37	QP	400	146	Horizontal
4	128.94	30.1	-15.99	14.11	30.00	15.89	QP	300	64	Horizontal
5	194.58	31.66	-13.25	18.41	30.00	11.59	QP	394.5	112.3	Horizontal
6	205.10	30.76	-13.80	16.96	30.00	13.04	QP	400	106	Horizontal

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Continued

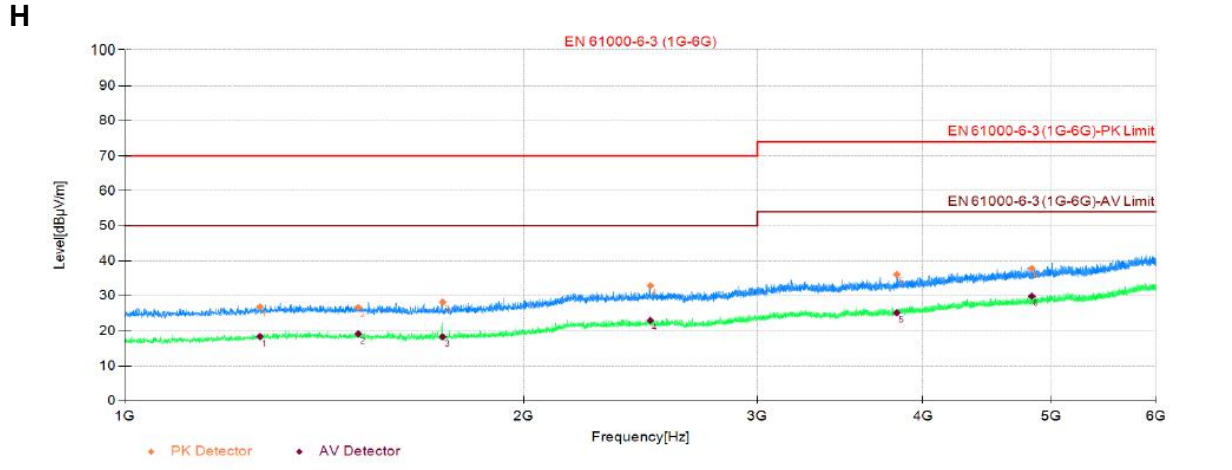




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**Diagram No. 2
Mode 1**



Final Data List

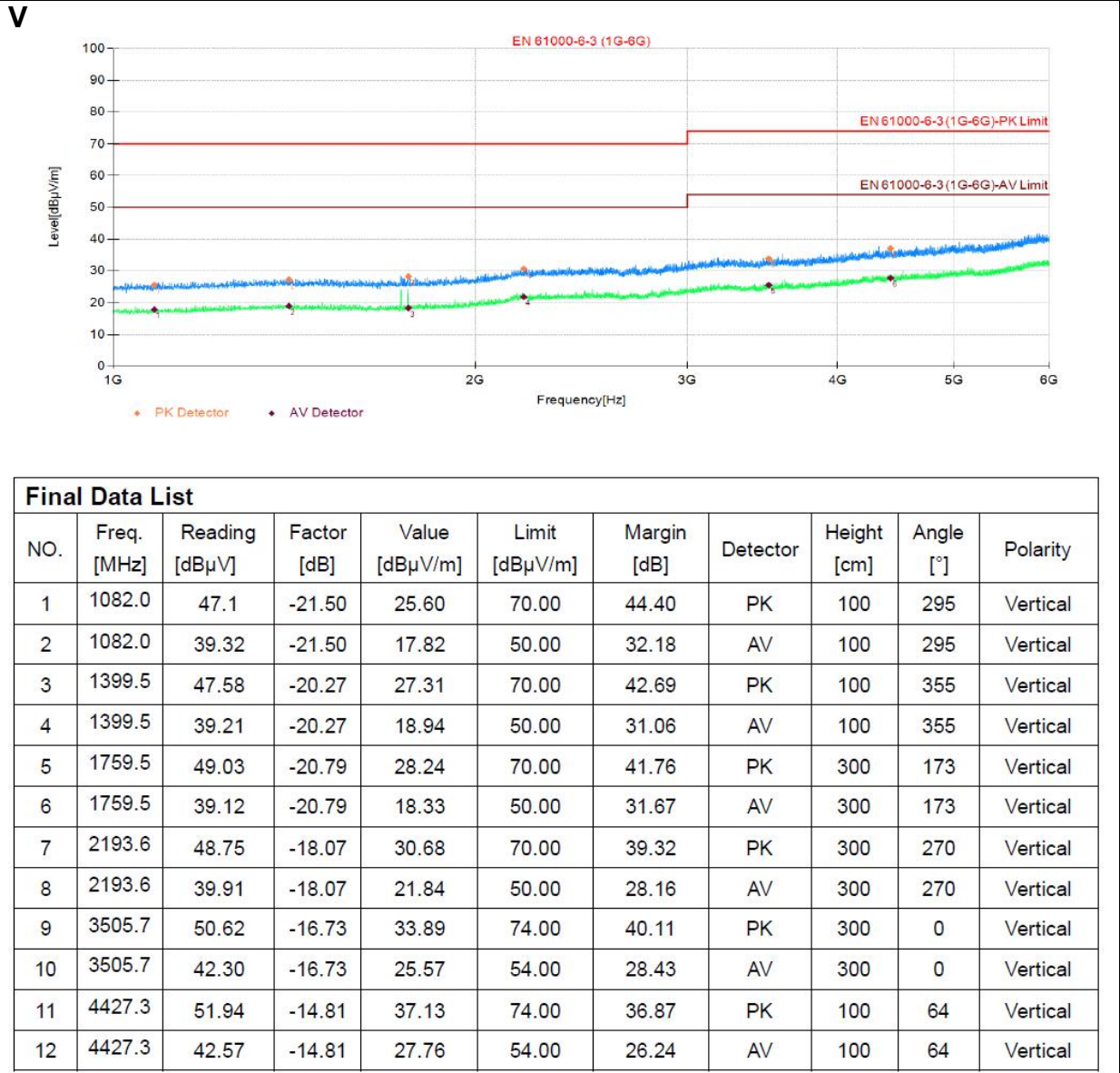
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1	1264.5	47.32	-20.50	26.82	70.00	43.18	PK	300	0	Horizontal
2	1264.5	38.84	-20.50	18.34	50.00	31.66	AV	300	0	Horizontal
3	1500.5	47.33	-20.64	26.69	70.00	43.31	PK	300	7	Horizontal
4	1500.5	39.77	-20.64	19.13	50.00	30.87	AV	300	7	Horizontal
5	1737.5	49.09	-20.89	28.20	70.00	41.80	PK	100	93	Horizontal
6	1737.5	39.16	-20.89	18.27	50.00	31.73	AV	100	93	Horizontal
7	2492.1	51.14	-18.25	32.89	70.00	37.11	PK	100	219	Horizontal
8	2492.1	41.20	-18.25	22.95	50.00	27.05	AV	100	219	Horizontal
9	3823.2	52.1	-15.97	36.13	74.00	37.87	PK	100	2	Horizontal
10	3823.2	41.11	-15.97	25.14	54.00	28.86	AV	100	2	Horizontal
11	4831.3	51.78	-13.92	37.86	74.00	36.14	PK	300	244	Horizontal
12	4831.3	43.83	-13.92	29.91	54.00	24.09	AV	300	244	Horizontal



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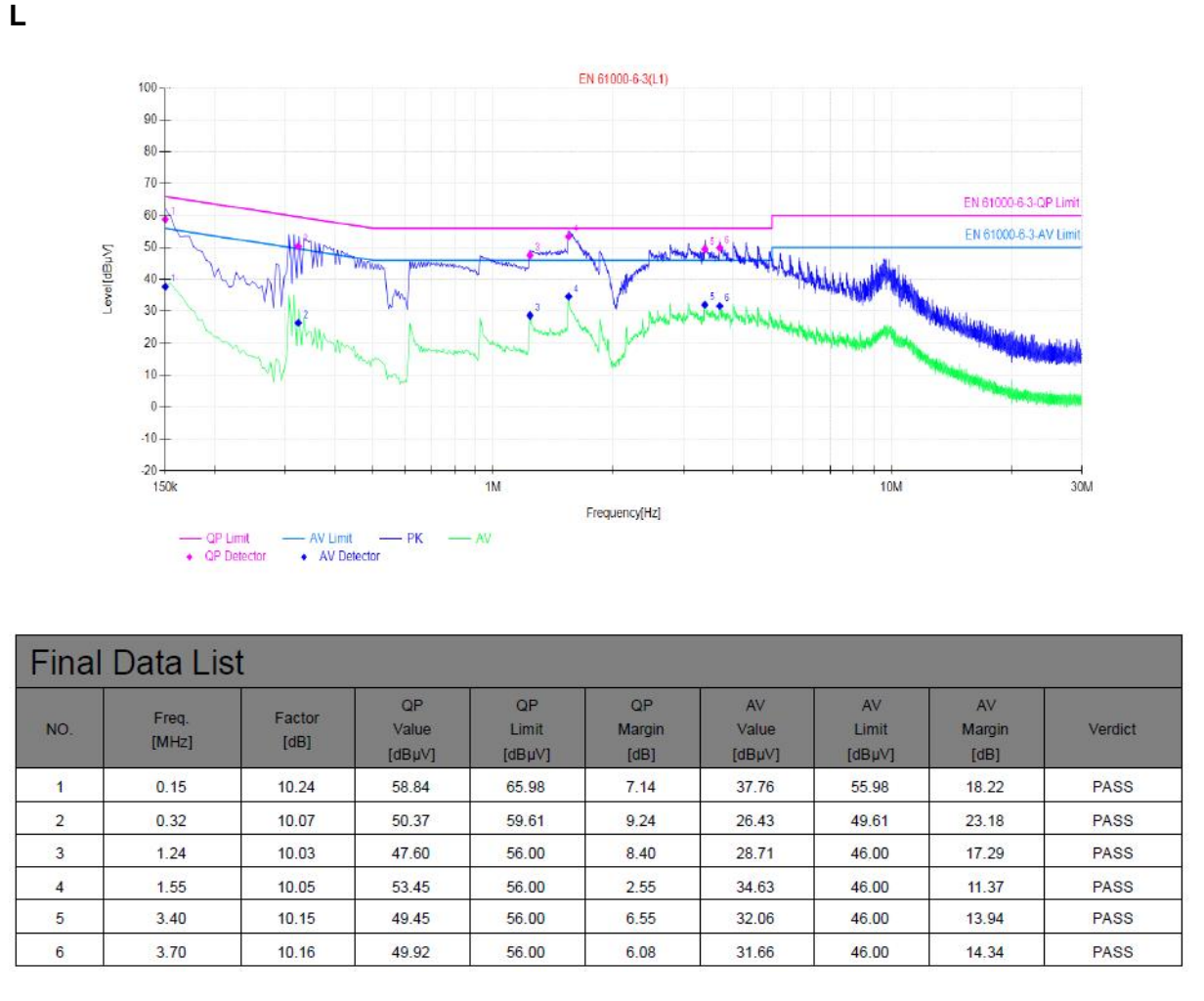
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TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

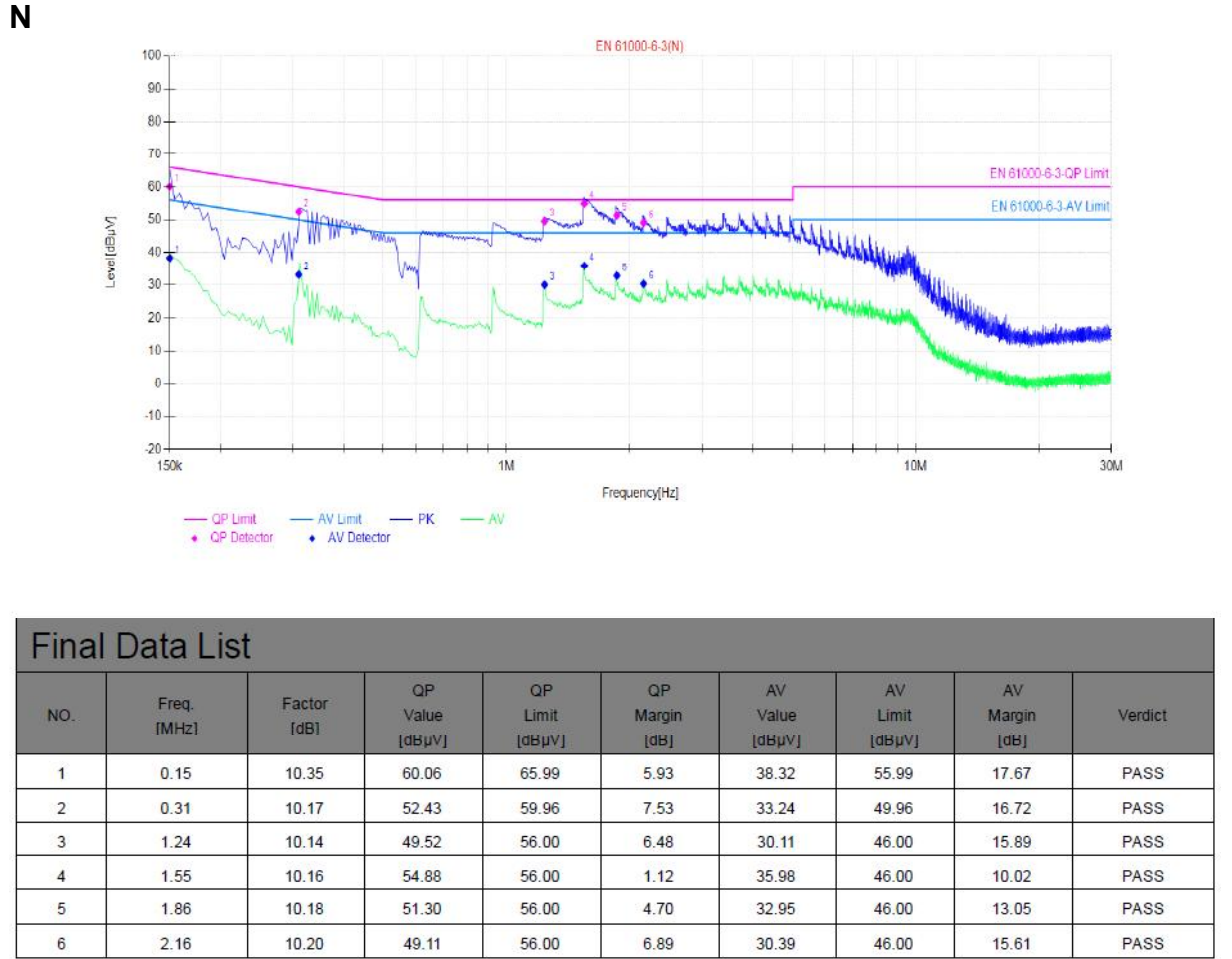
**Diagram No. 3
Mode 1**



TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

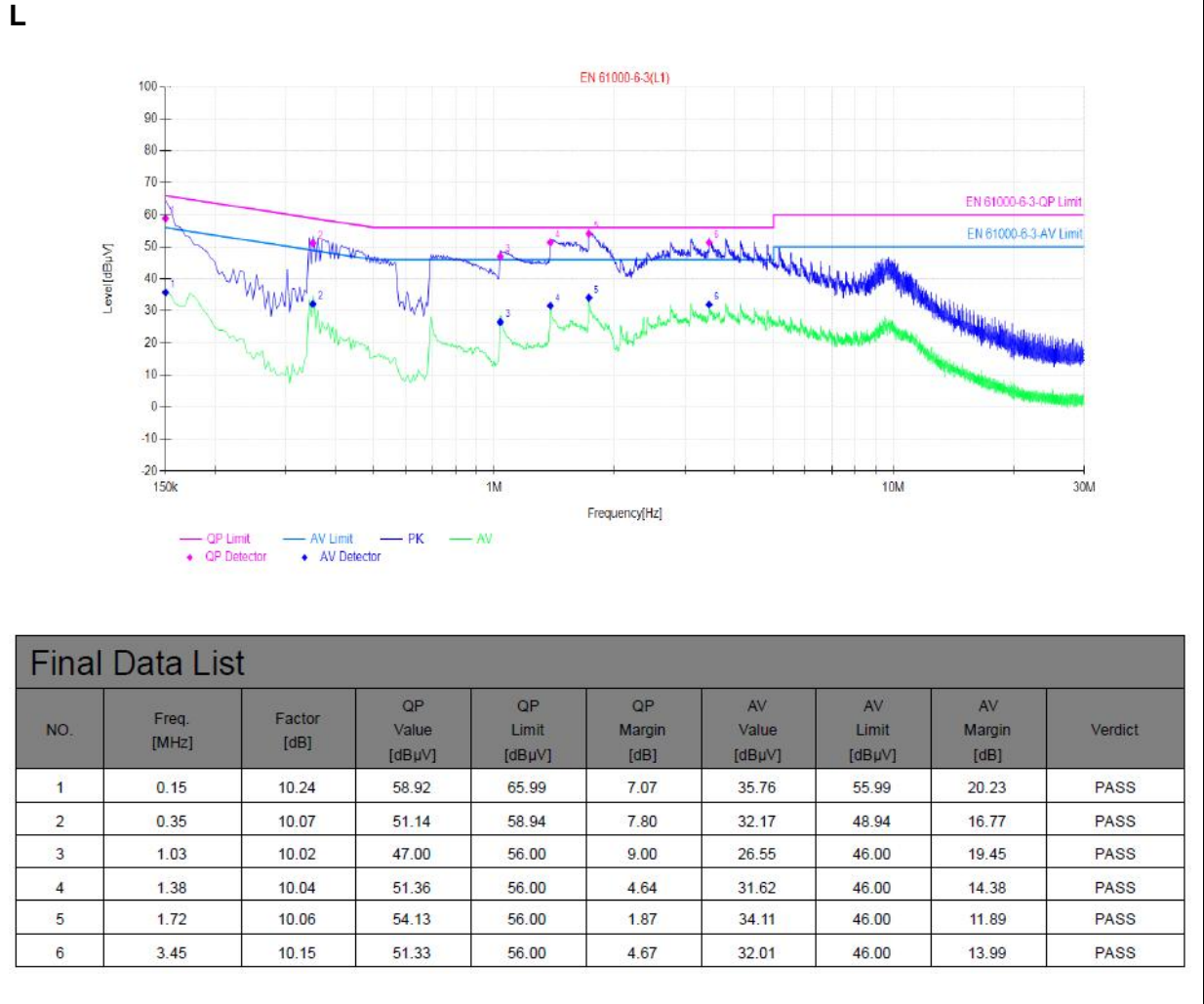
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TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

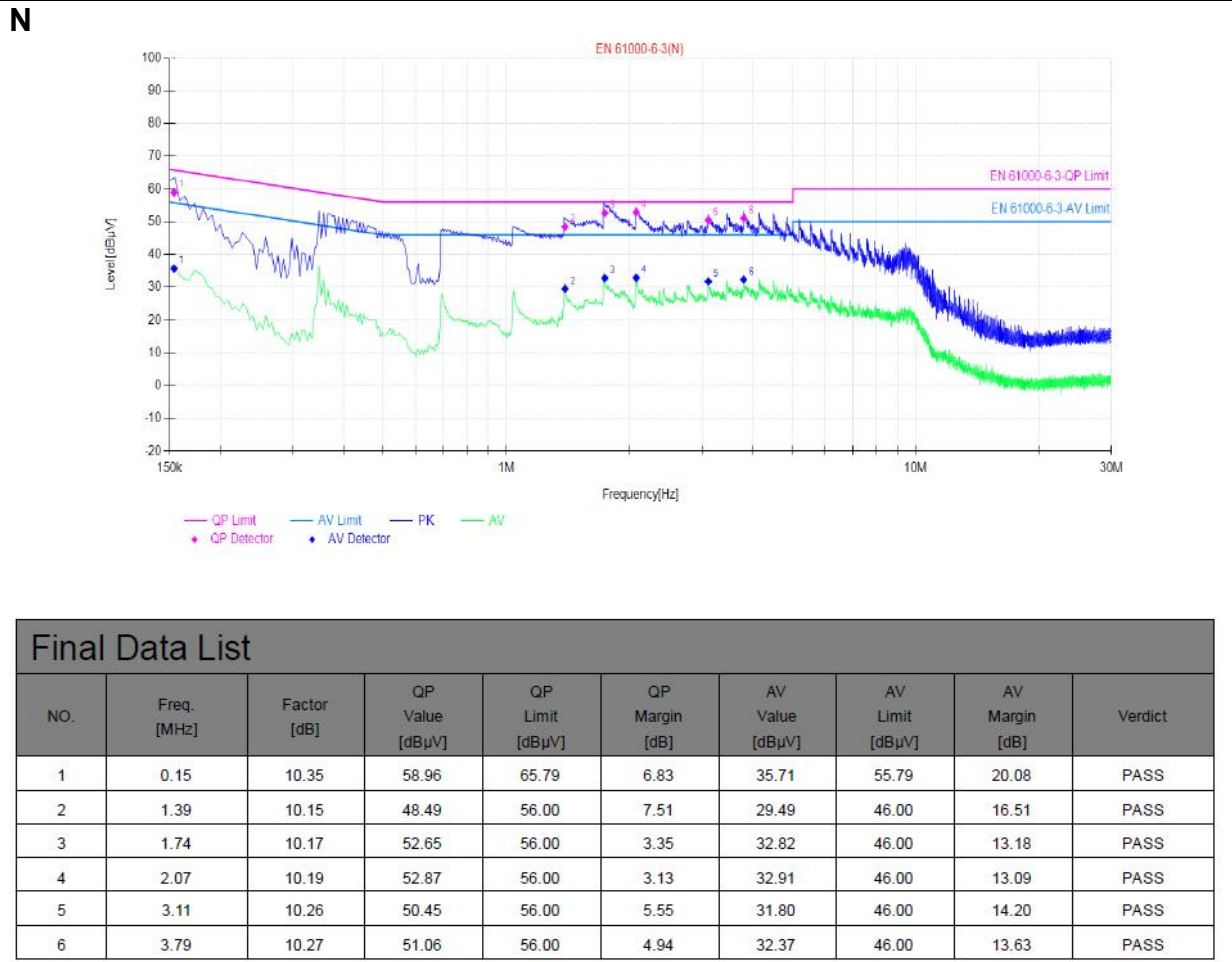
**Continued
Mode 2**



TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

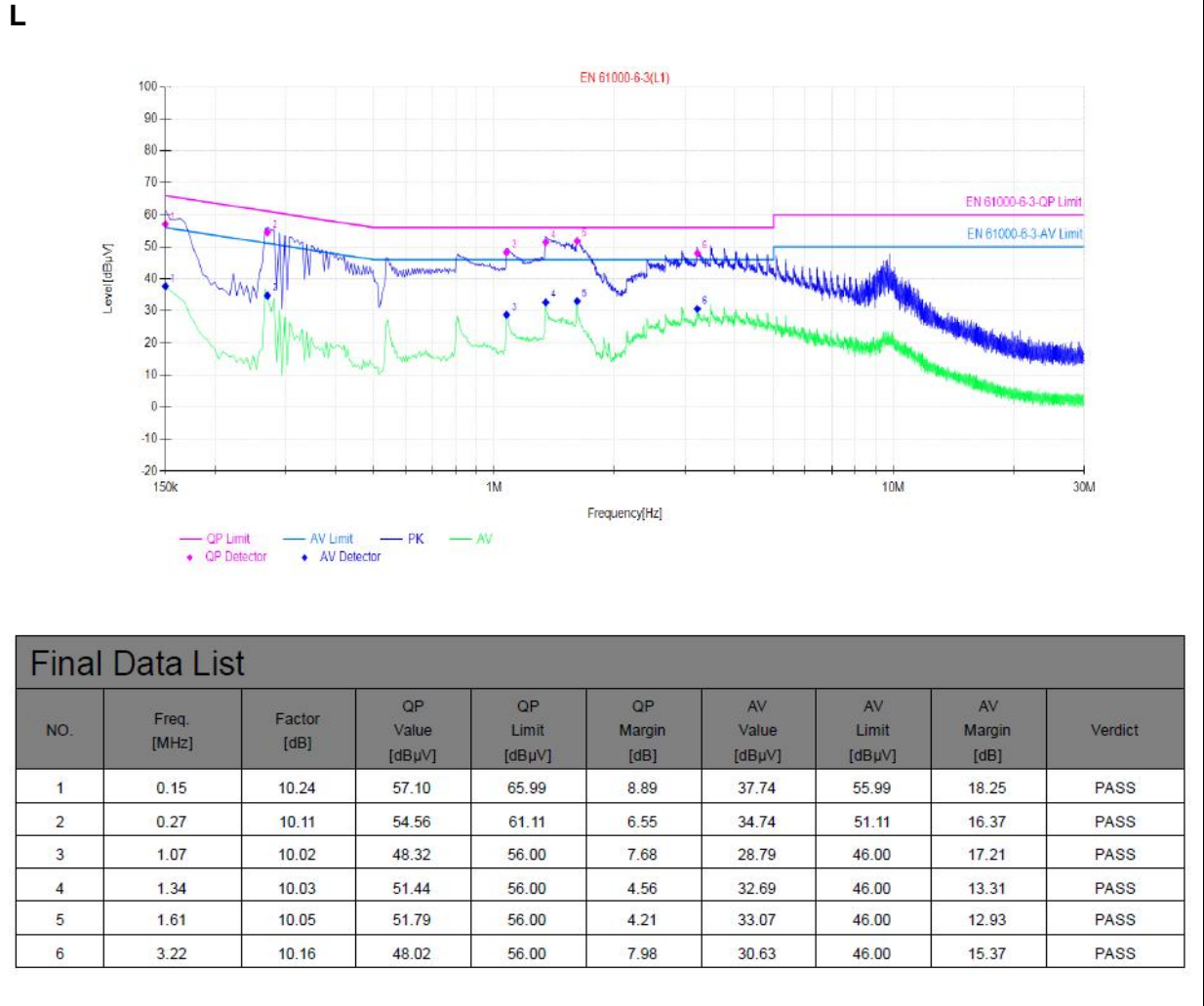
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TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

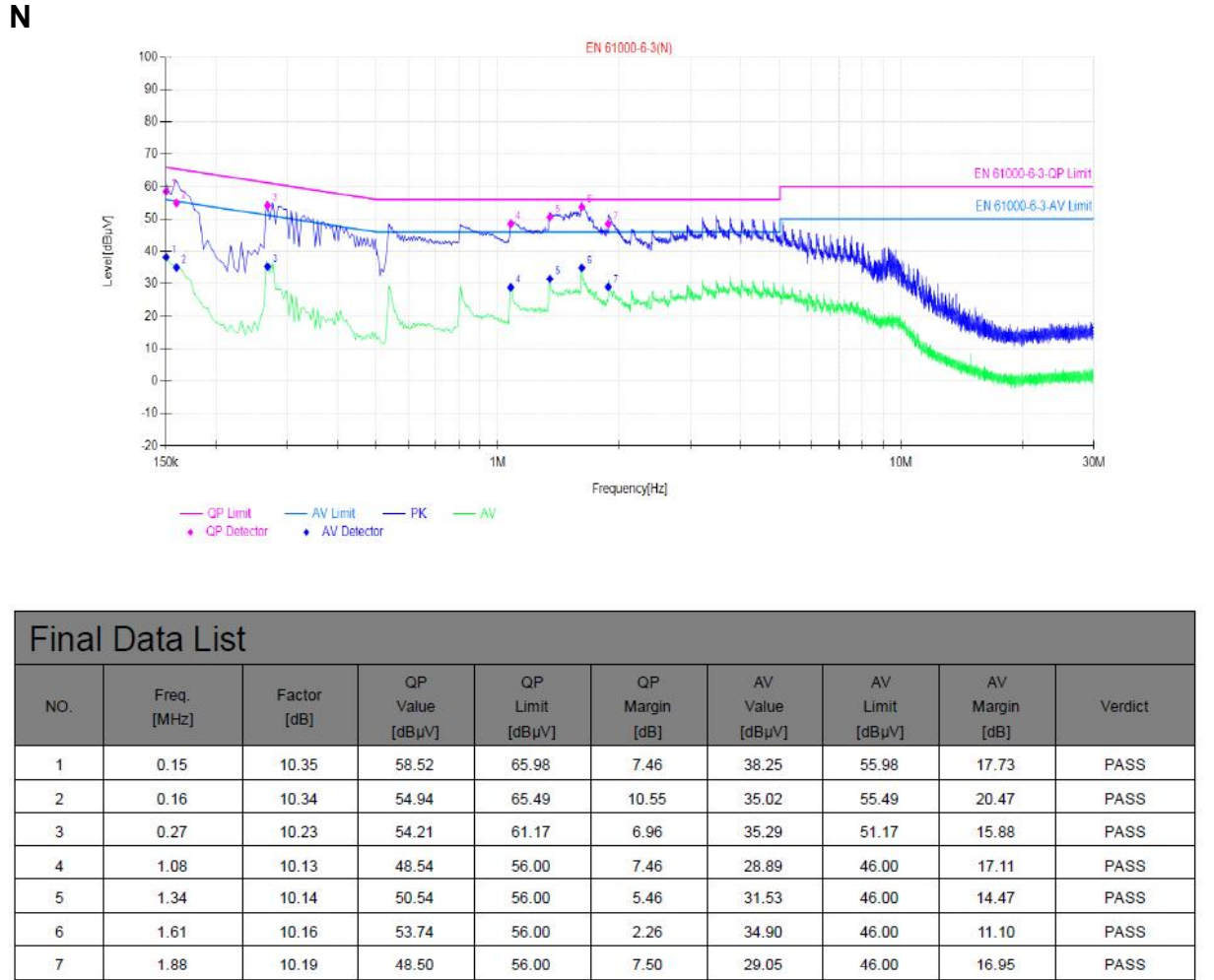
**Continued
Mode 3**



TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

Continued





TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

Table No. 1
100% Load

Average harmonic current results				
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	8.684			
2	1.533E-3			PASS
3	227.286E-3	9.882	2.30	PASS
4	1.497E-3			PASS
5	121.367E-3	10.646	1.14	PASS
6	2.213E-3			PASS
7	350.868E-3	45.567	770.00E-3	PASS
8	2.627E-3			PASS
9	204.697E-3	51.174	400.00E-3	PASS
10	1.632E-3			PASS
11	83.447E-3	25.287	330.00E-3	PASS
12	1.840E-3			PASS
13	172.330E-3	82.062	210.00E-3	PASS
14	2.492E-3			PASS
15	104.255E-3	69.503	150.00E-3	PASS
16	1.296E-3			PASS
17	28.484E-3	21.521	132.35E-3	PASS
18	1.286E-3			PASS
19	69.659E-3	58.824	118.42E-3	PASS
20	1.730E-3			PASS
21	50.525E-3	31.439	160.71E-3	PASS
22	1.189E-3			PASS
23	22.735E-3	15.493	146.74E-3	PASS
24	1.190E-3			PASS
25	35.068E-3	25.976	135.00E-3	PASS
26	1.530E-3			PASS
27	37.989E-3	30.392	124.99E-3	PASS
28	1.121E-3			PASS
29	17.145E-3	14.731	116.39E-3	PASS
30	1.149E-3			PASS
31	20.347E-3	18.690	108.87E-3	PASS
32	1.340E-3			PASS
33	28.351E-3	27.721	102.27E-3	PASS
34	1.039E-3			PASS
35	14.775E-3	15.321	96.44E-3	PASS
36	1.133E-3			PASS
37	7.076E-3	7.757	91.21E-3	PASS
38	1.148E-3			PASS
39	17.724E-3	20.482	86.53E-3	PASS
40	1.017E-3			PASS



TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

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	0.406				0.421				
2	0.004	0.347	1.080	n/a	0.005	0.308	1.620	n/a	PASS
3	0.010	0.445	2.300	PASS	0.012	0.358	3.450	PASS	PASS
4	0.002	0.571	0.430	n/a	0.003	0.522	0.645	n/a	PASS
5	0.010	0.854	1.140	PASS	0.010	0.589	1.710	PASS	PASS
6	0.002	0.566	0.300	n/a	0.002	0.499	0.450	n/a	PASS
7	0.010	1.358	0.770	PASS	0.011	0.975	1.155	PASS	PASS
8	0.001	0.541	0.230	n/a	0.002	0.435	0.345	n/a	PASS
9	0.010	2.600	0.400	PASS	0.011	1.790	0.600	PASS	PASS
10	0.001	0.654	0.184	n/a	0.002	0.646	0.276	n/a	PASS
11	0.010	3.002	0.330	PASS	0.010	2.063	0.495	PASS	PASS
12	0.002	1.354	0.153	n/a	0.002	0.977	0.230	n/a	PASS
13	0.009	4.395	0.210	PASS	0.009	3.002	0.315	PASS	PASS
14	0.001	0.886	0.131	n/a	0.001	0.698	0.197	n/a	PASS
15	0.008	5.448	0.150	PASS	0.008	3.732	0.225	PASS	PASS
16	0.001	0.959	0.115	n/a	0.001	0.852	0.173	n/a	PASS
17	0.007	5.356	0.132	PASS	0.008	3.780	0.199	PASS	PASS
18	0.001	1.049	0.102	n/a	0.001	0.805	0.153	n/a	PASS
19	0.006	5.330	0.118	PASS	0.007	3.749	0.178	PASS	PASS
20	0.001	1.214	0.092	n/a	0.001	0.923	0.138	n/a	PASS
21	0.006	5.287	0.107	PASS	0.006	3.633	0.161	PASS	PASS
22	0.001	1.545	0.084	n/a	0.001	1.164	0.125	n/a	PASS
23	0.005	5.353	0.098	PASS	0.006	3.851	0.147	PASS	PASS
24	0.001	1.571	0.077	n/a	0.001	1.166	0.115	n/a	PASS
25	0.005	5.930	0.090	PASS	0.006	4.130	0.135	PASS	PASS
26	0.001	1.531	0.071	n/a	0.001	1.137	0.106	n/a	PASS
27	0.005	5.833	0.083	n/a	0.005	4.083	0.125	PASS	PASS
28	0.001	1.474	0.066	n/a	0.001	1.095	0.099	n/a	PASS
29	0.005	6.016	0.078	n/a	0.005	4.143	0.116	n/a	PASS
30	0.001	1.521	0.061	n/a	0.001	1.147	0.092	n/a	PASS
31	0.005	6.295	0.073	n/a	0.005	4.417	0.109	n/a	PASS
32	0.001	1.637	0.058	n/a	0.001	1.252	0.086	n/a	PASS
33	0.004	6.096	0.068	n/a	0.004	4.193	0.102	n/a	PASS
34	0.001	1.881	0.054	n/a	0.001	1.394	0.081	n/a	PASS
35	0.004	6.206	0.064	n/a	0.004	4.388	0.096	n/a	PASS
36	0.001	1.813	0.051	n/a	0.001	1.349	0.077	n/a	PASS
37	0.004	6.231	0.061	n/a	0.004	4.372	0.091	n/a	PASS
38	0.001	1.818	0.048	n/a	0.001	1.431	0.073	n/a	PASS
39	0.004	6.220	0.058	n/a	0.004	4.379	0.087	n/a	PASS
40	0.001	1.884	0.046	n/a	0.001	1.429	0.069	n/a	PASS



TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

25% 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	0.412				0.437				
2	0.001	0.089	1.080	n/a	0.001	0.070	1.620	n/a	PASS
3	0.008	0.337	2.300	PASS	0.009	0.257	3.450	PASS	PASS
4	0.001	0.256	0.430	n/a	0.001	0.203	0.645	n/a	PASS
5	0.011	1.007	1.140	PASS	0.012	0.707	1.710	PASS	PASS
6	0.001	0.361	0.300	n/a	0.001	0.268	0.450	n/a	PASS
7	0.014	1.868	0.770	PASS	0.015	1.279	1.155	PASS	PASS
8	0.001	0.442	0.230	n/a	0.001	0.340	0.345	n/a	PASS
9	0.015	3.638	0.400	PASS	0.015	2.482	0.600	PASS	PASS
10	0.001	0.599	0.184	n/a	0.001	0.457	0.276	n/a	PASS
11	0.014	4.263	0.330	PASS	0.014	2.924	0.495	PASS	PASS
12	0.002	1.309	0.153	n/a	0.002	0.951	0.230	n/a	PASS
13	0.013	5.986	0.210	PASS	0.013	4.259	0.315	PASS	PASS
14	0.001	0.844	0.131	n/a	0.001	0.623	0.197	n/a	PASS
15	0.010	6.919	0.150	PASS	0.011	4.772	0.225	PASS	PASS
16	0.001	0.917	0.115	n/a	0.001	0.705	0.173	n/a	PASS
17	0.009	6.550	0.132	PASS	0.009	4.563	0.199	PASS	PASS
18	0.001	0.951	0.102	n/a	0.001	0.738	0.153	n/a	PASS
19	0.007	6.201	0.118	PASS	0.008	4.359	0.178	PASS	PASS
20	0.001	1.243	0.092	n/a	0.001	0.953	0.138	n/a	PASS
21	0.006	5.451	0.107	PASS	0.006	3.920	0.161	PASS	PASS
22	0.001	1.396	0.084	n/a	0.001	1.053	0.125	n/a	PASS
23	0.005	5.058	0.098	n/a	0.005	3.641	0.147	PASS	PASS
24	0.001	1.227	0.077	n/a	0.001	0.941	0.115	n/a	PASS
25	0.004	4.637	0.090	n/a	0.005	3.482	0.135	n/a	PASS
26	0.001	1.203	0.071	n/a	0.001	0.926	0.106	n/a	PASS
27	0.004	4.586	0.083	n/a	0.004	3.492	0.125	n/a	PASS
28	0.001	1.263	0.066	n/a	0.001	0.949	0.099	n/a	PASS
29	0.003	4.168	0.078	n/a	0.004	3.258	0.116	n/a	PASS
30	0.001	1.346	0.061	n/a	0.001	1.019	0.092	n/a	PASS
31	0.003	4.458	0.073	n/a	0.004	3.366	0.109	n/a	PASS
32	0.001	1.554	0.058	n/a	0.001	1.154	0.086	n/a	PASS
33	0.003	4.441	0.068	n/a	0.003	3.188	0.102	n/a	PASS
34	0.001	1.686	0.054	n/a	0.001	1.273	0.081	n/a	PASS
35	0.003	4.300	0.064	n/a	0.003	3.133	0.096	n/a	PASS
36	0.001	1.747	0.051	n/a	0.001	1.283	0.077	n/a	PASS
37	0.003	4.740	0.061	n/a	0.003	3.594	0.091	n/a	PASS
38	0.001	1.741	0.048	n/a	0.001	1.292	0.073	n/a	PASS
39	0.003	5.643	0.058	n/a	0.004	4.135	0.087	n/a	PASS
40	0.001	1.816	0.046	n/a	0.001	1.375	0.069	n/a	PASS



TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

Table No. 2

100% Load

	EUT values	Limit	Result
Pst	0.065	1.00	PASS
Plt	0.035	0.65	PASS
dc [%]	0.007	3.30	PASS
dmax [%]	0.106	4.00	PASS
Tmax [s]	0.000	0.50	PASS

50% Load

	EUT values	Limit	Result
Pst	0.038	1.00	PASS
Plt	0.035	0.65	PASS
dc [%]	0.146	3.30	PASS
dmax [%]	0.21	4.00	PASS
Tmax [s]	0.000	0.50	PASS

25% Load

	EUT values	Limit	Result
Pst	0.033	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0	3.30	PASS
dmax [%]	< 0.2	4.00	PASS
Tmax [s]	0.000	0.50	PASS

TEST REPORT N°: BMH-ESH-P21080066B-1-A3

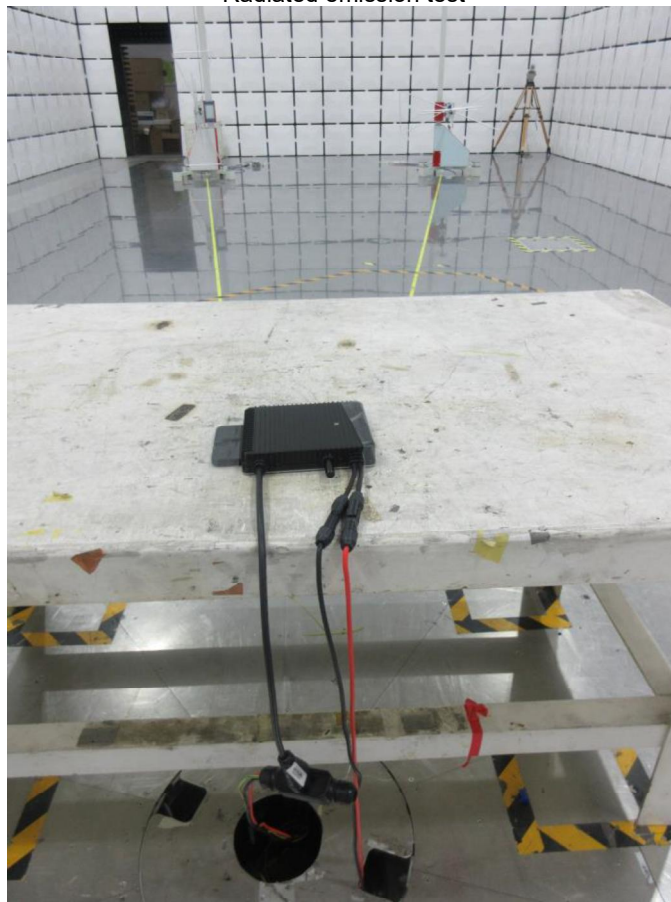
Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

10 TEST PHOTO

Conducted emission test

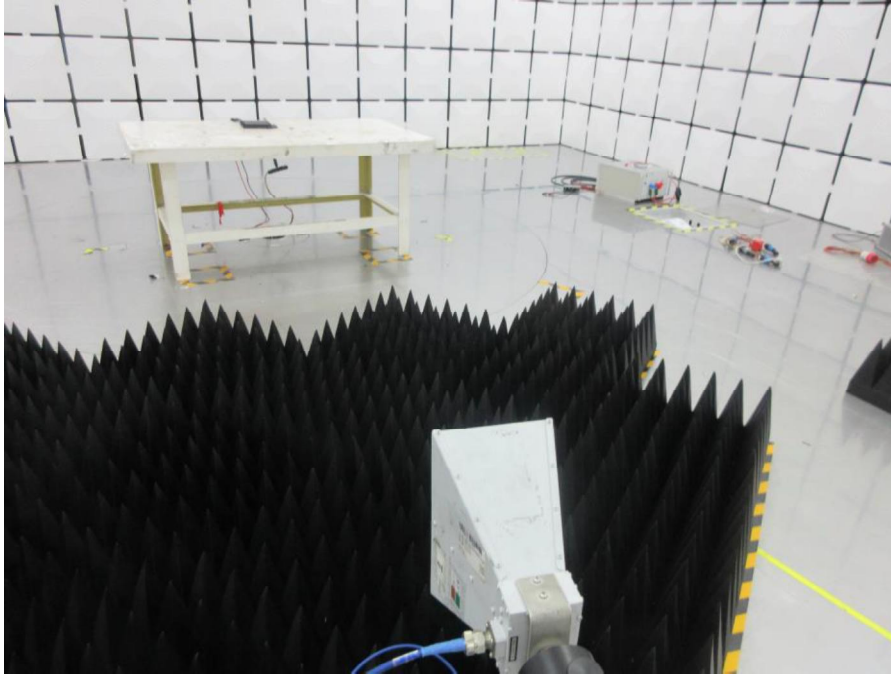


Radiated emission test

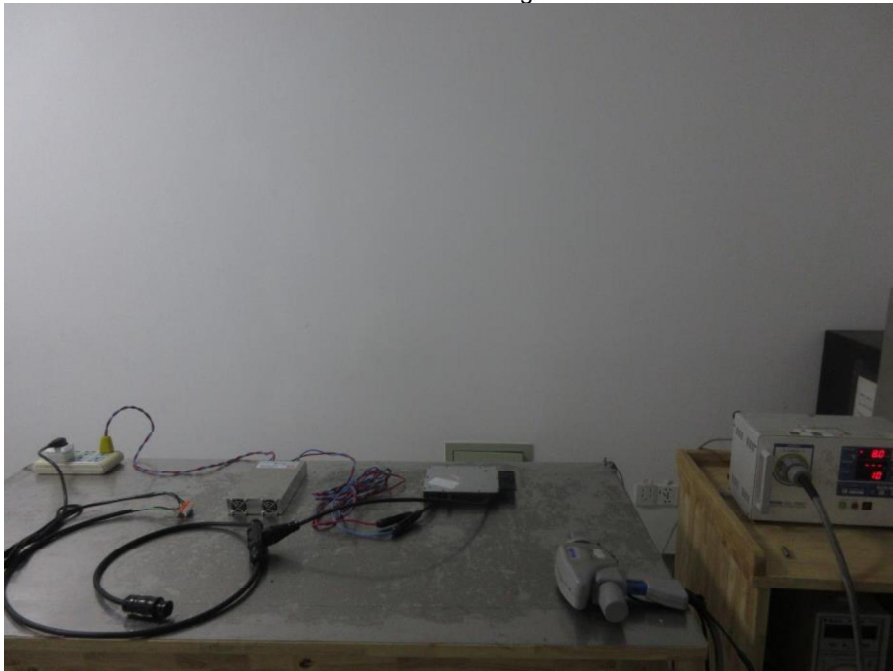


TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

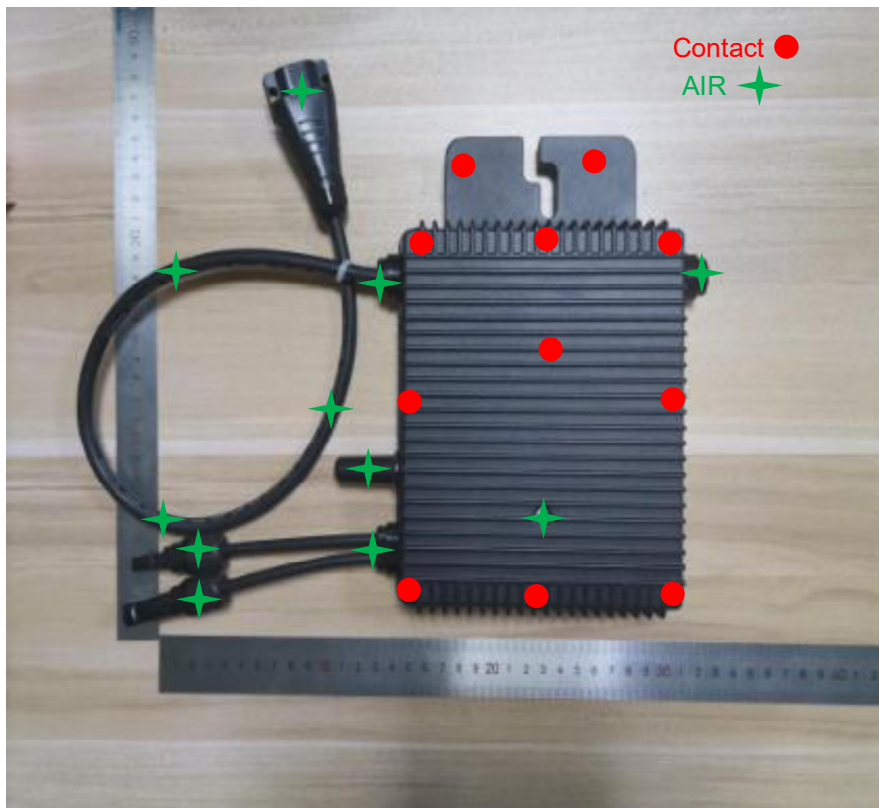
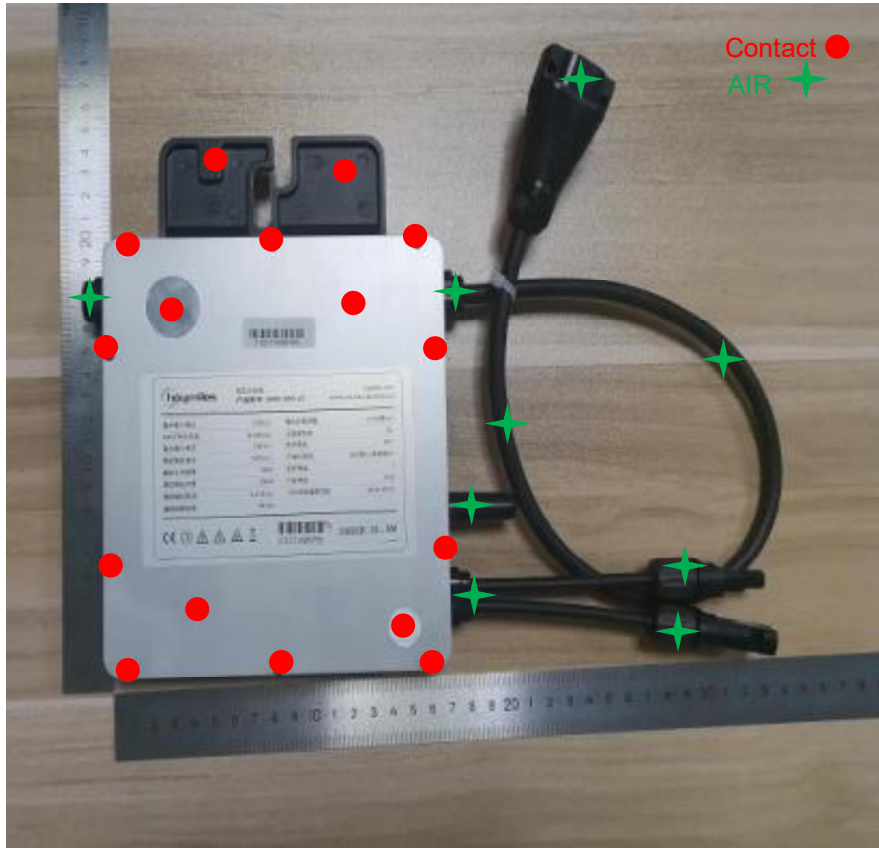


Electrostatic discharges test



TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28



TEST REPORT N°: BMH-ESH-P21080066B-1-A3

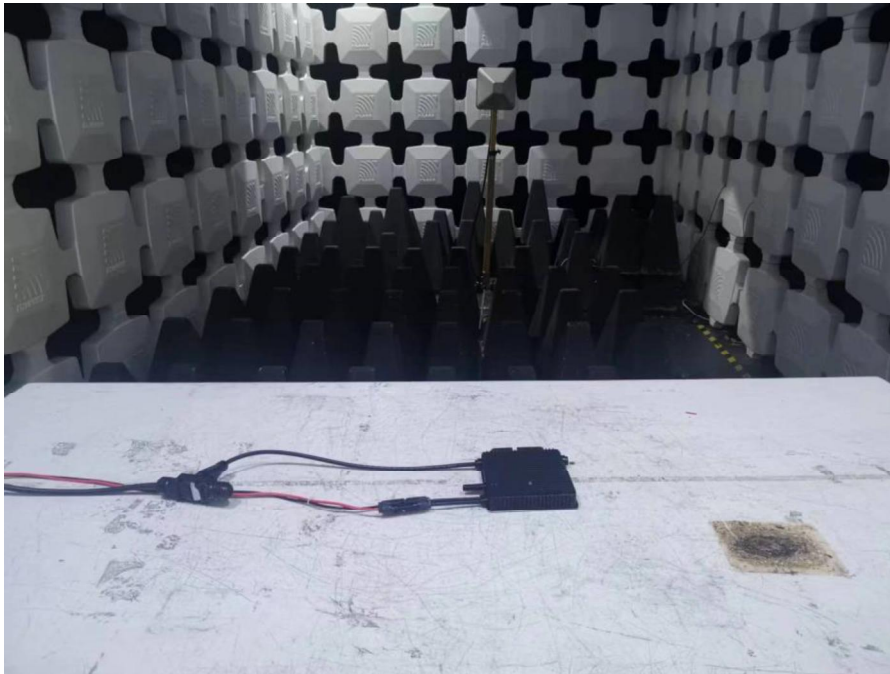
Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

Radiated radio-frequency electromagnetic field test

Below 1GHz



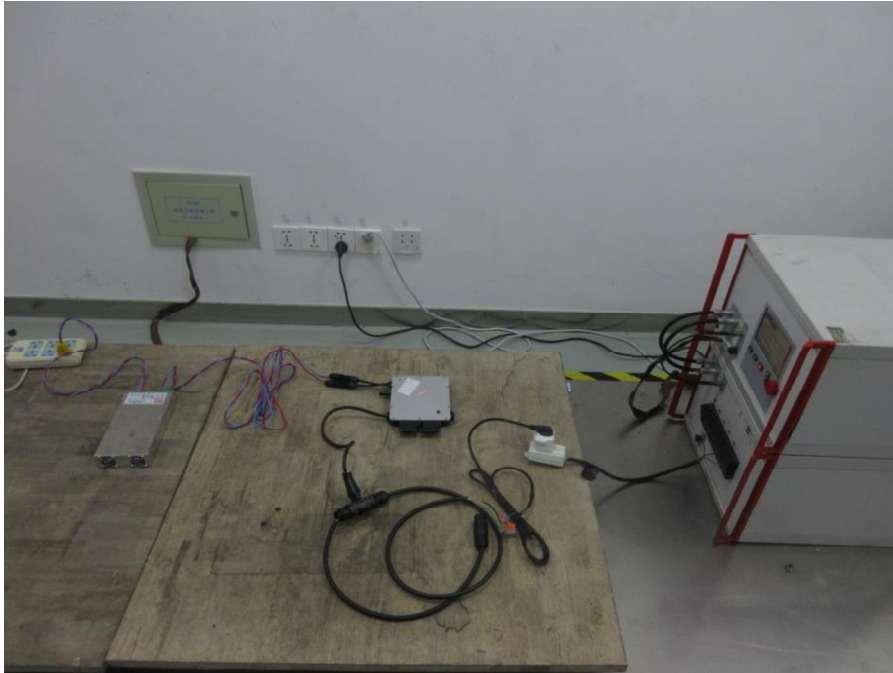
Above 1GHz



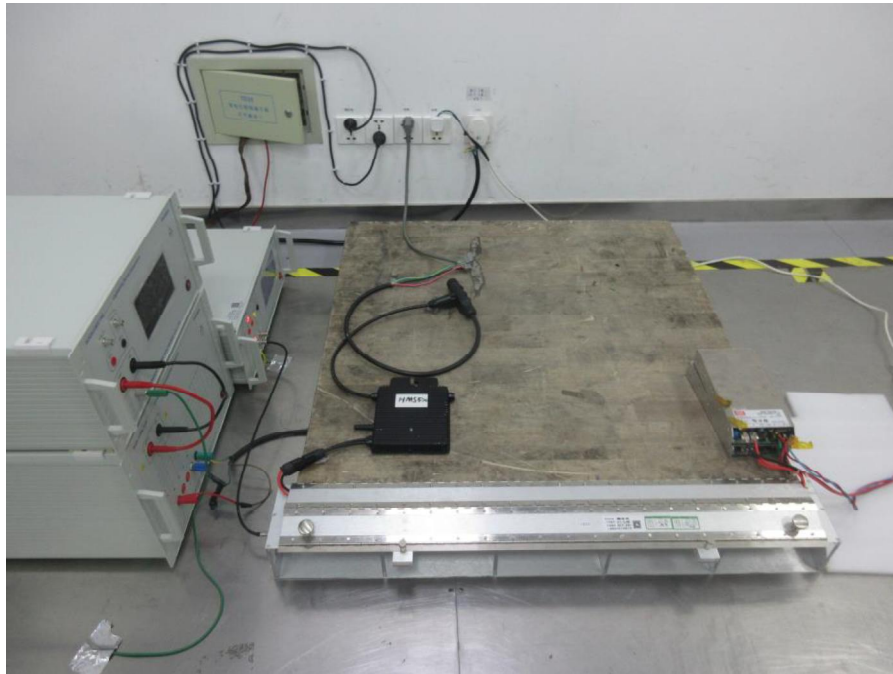
TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

Fast transients/bursts test and surge test
AC Port



Fast transients/bursts test
DC Port



TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

Conducted disturbances induced by radio-frequency fields test
AC Port



DC Port



TEST REPORT N°: BMH-ESH-P21080066B-1-A3

Supplement "A3" to test report No.: BMH-ESH-P21080066B-1-A2 dated on 2023-09-28

Harmonic, Voltage dips and voltage interruptions test