

EMC TEST REPORT



Product Type : PEDELEC

Model / Serial No. : M/SFM01,W/SFL01

Applicant : StoneFly s.r.o.

No. 4830016236300

TÜV SÜD Certification and Testing (China) Co., Ltd.

PART 1—EMC EMISSION TEST REPORT

Project Number : 4830016236300 Date of Issue: June 22,2016

Model / Serial No. : M/SFM01,W/SFL01

Product Type : PEDELEC

Applicant : StoneFly s.r.o.

Manufacturer : ACETRIKES BICYCLE(TAICANG) CO., LTD

License holder : StoneFly s.r.o.

Address : Mládeznicka 2,98401 Lucenec,Slovakia

Test Result : ☒ Positive ☐ Negative

Total pages including
Appendices



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EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to the following regulations:

☐ - EMC - Directive 2014/30/EU

☐ - EN 61000-6-3: 2007

☐ - EN 55011: 2007/A2: 2007

☐ - EN 55011: 2009

■ - EN 15194: 2009/A1:2011

☐ - EN 55014-1: 2006/A1: 2009

☐ - EN 55015: 2006/A1: 2007/A2: 2009

☐ - EN 55022: 2006/A1: 2007

☐ - EN 61000-3-2: 2006/A1: 2009/A2: 2009

☐ - EN 61000-3-3: 2008

☐ - Group 1

☐ - Class A

☐ - Group 2

☐ - Class B

☐ - Household appliances and similar

☐ - Electric tools

☐ - Others_____.

☐ - Class A

☐ - Class B

Environmental Conditions In The Laboratory:

Temperature:	<u>Actual</u> 24-26 °C
Relative Humidity:	56-58 %
Atmospheric Pressure:	1026-1028 mBar

Power Supply Utilized:

Power supply system : 36V DC

Statement of Measurement Uncertainty:

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Conducted Emission	0.15MHz to 30MHz	3.21 dB
Radiated Emission (Electric field)	30MHz to 1GHz	3.85 dB (Horizontal)
		4.01 dB (Vertical)
Radiated Emission (Electric field)	1GHz to 18GHz	3.33 dB (Horizontal)
		3.58 dB (Vertical)
Radiated Emission (Magnetic field)	9KHz to 30MHz	3.03dB
Disturbance power	30MHz to 300MHz	2.99 dB
Harmonic	50Hz to 2KHz	3.92%
Flicker	dc	1.844%
	dmax	1.856%
	dt	6.244%
	Pst/Plt	6.244%

Symbol Definitions:

- - Applicable
- - Not Applicable

Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The **CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)** measurements were performed at the following test location:

■ - Test not applicable

□ - Test Area - C

Test Equipment Used:

Model Number	Manufacturer	Description	TUV PS Number
□ DIA1512D	Schaffner	Discontinuous Interference Analyser	487/750206
□ - ESHS30	Rohde & Schwarz	EMI Test Receiver	70-7/63-97-01
□ -	TÜV PS	Artificial Hand	95-01
□ - ENV4200	Rohde & Schwarz	LISN	48-7/60-99-13
□ - EN55015/B7	M&E	energy saving lamp active	707/609702
□ - NSLK8127	Schwarzbeck	LISN	487/600215
□ - ESH3-Z5	Rohde & Schwarz	LISN	70-7/60-96-03

Remarks: Test equipment used is calibrated on a regular basis.

Emissions Test Conditions: RADIATED EMISSIONS (Magnetic Field)

The *RADIATED EMISSIONS (MAGNETIC FIELD)* measurements were performed at the following test location:

☒ - Test not applicable

☐ - Test Area -

Testing was performed at a test loop diameter of:

☐ - 2 meters

☐ - __ meters

Test Equipment Used:

Model Number	Manufacturer	Description	TUV PS Number
☐ - ESHS30	Rohde & Schwarz	EMI Test Receiver	70-7/63-97-01
☐ - HM020	Rohde & Schwarz	Triple-loop Antenna	48-7/62-99-11

Remarks: Test equipment used is calibrated on a regular basis.

Emissions Test Conditions: INTERFERENCE POWER

The *INTERFERENCE POWER* measurements were performed by using the absorbing clamp on the mains and interface cables in the frequency range 30 MHz - 300 MHz at the following test location:

☒ - Test not applicable

☐ - Test Area - B

Test Equipment Used:

	Model Number	Manufacturer	Description	TUV PS Number
☐ -	MDS-21	Rohde & Schwarz	Absorbing Clamp	70-7/60-95-02
☐ -	ESVS 30	Rohde & Schwarz	EMI Test Receiver	70-7/63-95-02

Remarks: Test equipment used is calibrated on a regular basis.

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The **RADIATED EMISSIONS (ELECTRIC FIELD)** measurements, in the frequency range of 30 MHz-1000 MHz, were tested in a horizontal and vertical polarization at the following test location:

☐ - Test not applicable

■ - Test Area - E

Testing was performed at a test distance of:

☐ - 3 meters

■ - 10 meters

Test Equipment Used:

Model Number	Manufacturer	Description	TUV PS Number
■ - ESIB 7	Rohde & Schwarz	EMI Test Receiver	487/630408
■ - VULB9168	Schwarzbeck	Bilog Antenna	48-7/62-02-14
■ - 10m	TDK	Semi-anechoic Chamber	487/770201
☐ - 3m	Jinlida	Fully Anechoic Room	

Remarks: Test equipment used is calibrated on a regular basis.

Emissions Test Conditions: CONDUCTED EMISSIONS (Harmonics and Flicker)

The *Harmonic Current Emissions and Voltage Fluctuations and Flicker* measurements were performed at the following test location:

☒ - Test not applicable

☐ - Test Area - F

Test Equipment Used:

Model Number	Manufacturer	Description	TUV PS Number
☐ - PM 6000	Voltech	Universal Power Analyzer	48-7/74-07-41
☐ - IEC Standard 555	Voltech	Reference Impedance Network	70-7/57-95-01
☐ - C15003ix-400/3-CTS	California Instruments	AC Power Supply Testing System	48-7/68-99-10

Remarks: Test equipment used is calibrated on a regular basis.

Equipment Under Test (EUT) Test Operation Mode - Emissions Tests:

The equipment under test was operated under the following conditions during emissions testing:

- ☐ - Standby
- ☐ - Test Program (H - Pattern)
- ☐ - Test Program (Color Bar)
- ☐ - Test Program (Customer Specified)
- ☒ - Normal Operating Mode
- ☒ - Running (Apply a load in order to achieve 75% continuous rated power).

Configuration of the equipment under test:

- ☒ - See Constructional Data Form in Appendix B - Page B1
- ☒ - See Product Information Form(s) in Appendix B - Page B2-B4

The following peripheral devices and interface cables were connected during the testing:

- | | |
|---|--------------|
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - unshielded power cable | |
| ☐ - unshielded cables | |
| ☐ - shielded cables | |
- TUV
PS.No.: _____
- ☐ - customer specific cables
 - ☐ - _____
 - ☐ - _____

Emissions Test Results:

Conducted Emissions, 150 kHz - 30 MHz

☐ - PASS

☐ - FAIL

☒ - NOT APPLICABLE

Minimum limit margin -- dB At -- MHz

Maximum limit exceeding -- dB At -- MHz

Remarks: _____

Radiated Emissions (Magnetic Field), 9 kHz - 30 MHz

☐ - PASS

☐ - FAIL

☒ - NOT APPLICABLE

Minimum limit margin -- dB At -- MHz

Maximum limit exceeding -- dB At -- MHz

Remarks: _____

Interference Power at the Mains and Interface Cables, 30 MHz - 300 MHz

☐ - PASS

☐ - FAIL

☒ - NOT APPLICABLE

Minimum limit margin -- dB At -- MHz

Maximum limit exceeding -- dB At -- MHz

Remarks: _____

Radiated Emissions (Electric Field), 30 MHz - 1000 MHz

☒ - PASS

☐ - FAIL

☐ - NOT APPLICABLE

Minimum limit margin >6 dB At 30-1000 MHz

Maximum limit exceeding -- dB At -- MHz

Remarks: _____

Harmonic Current Emissions and Voltage Fluctuations and Flicker

☐ - PASS

☐ - FAIL

☒ - NOT APPLICABLE

Harmonic measurement exceeding limit -- Above At -- Harmonic

Flicker measurement exceeding limit -- Above The -- Requirement

Remarks: _____

GENERAL REMARKS:

The electric structures of M/SFM01 and W/SFL01 are same, so we choose W/SFL01 to do the emission test.

SUMMARY:

All tests according to the regulations cited on page 3 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

■- **Fulfills** the general approval requirements cited on page 3.

□ - **Does not** fulfill the general approval requirements cited on page 3.

Sample Receipt Date:	<u>June 3 , 2016</u>
Testing Start Date:	<u>June 3, 2016</u>
Testing End Date:	<u>June 5, 2016</u>

- TÜV SÜD CERTIFICATION AND TESTING (CHINA) CO., LTD. -

Reviewed by:

Prepared by:



Review Engineer



Project Engineer

Photograph of Test Setup:
Conducted Emissions 150 kHz - 30 MHz

■ - Test not applicable

Photograph of Test Setup:
Interference Power 30 MHz - 300 MHz

■ - Test not applicable

Photograph of Test Setup:
Radiated Emissions 30 MHz - 1000 MHz

☐ - Test not applicable



Photograph of Test Setup:
Harmonic Current/Voltage Fluctuations and Flicker

■ - Test not applicable

Appendix A

Test Data Sheets

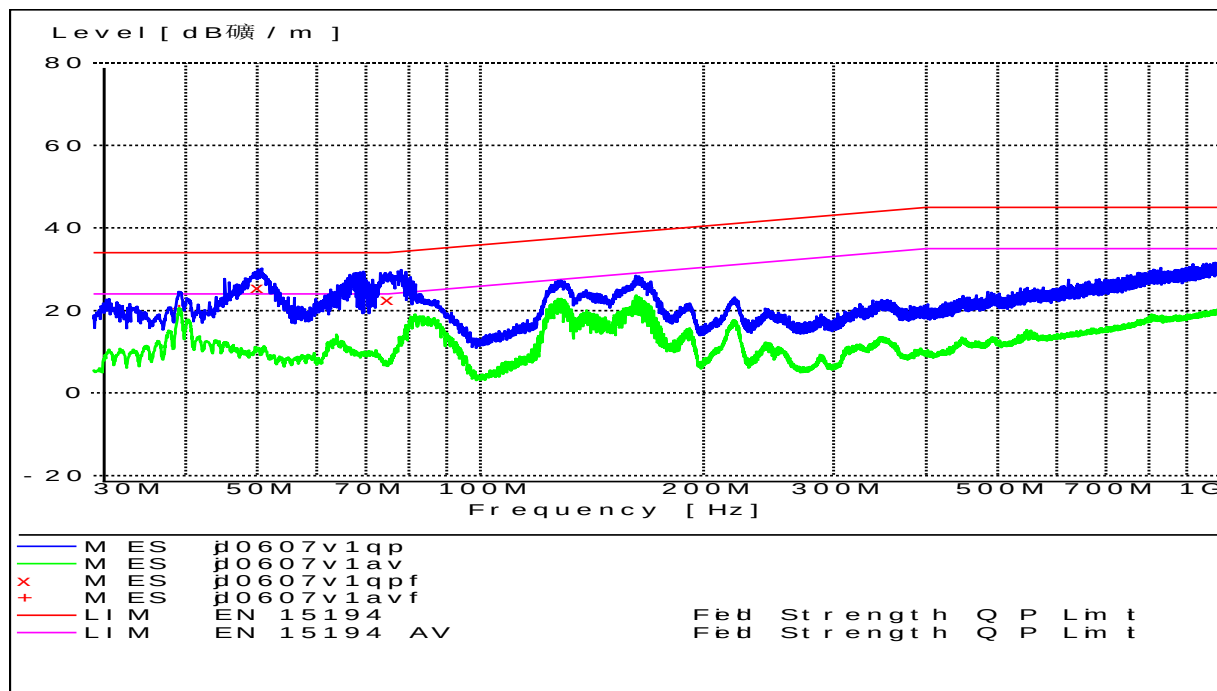
30-1000MHz Radiated Emission Test

W/SFL01

EUT: PEDELEC
Manufacturer: ACETRIKES BICYCLE(TAICANG) CO., LTD
Operating Condition: Power on
Test Site: TUV 10m Chamber
Operator: JIDA
Test Specification: EN15194
Comment: Vertical

SCAN TABLE: "EN15194"

Short Description: Field Strength QP Limit
Start Stop Step Detector Meas. IF Transducer
Frequency Frequency Width Time Bandw.
30.0 MHz 1.0 GHz 50.0 kHz MaxPeak 1.0 ms 120 kHz 310N15
Average



MEASUREMENT RESULT: "jd0607v1qpf"

07.06.2016 10:41
Frequency Level
MHz dBμV/m

50.100000 25.45
75.000000 22.67

MEASUREMENT RESULT: "jd0607v1avf"

07.06.2016 10:41

Frequency	Level
MHz	dB μ V/m

39.150000	20.52
-----------	-------

127.550000	20.72
------------	-------

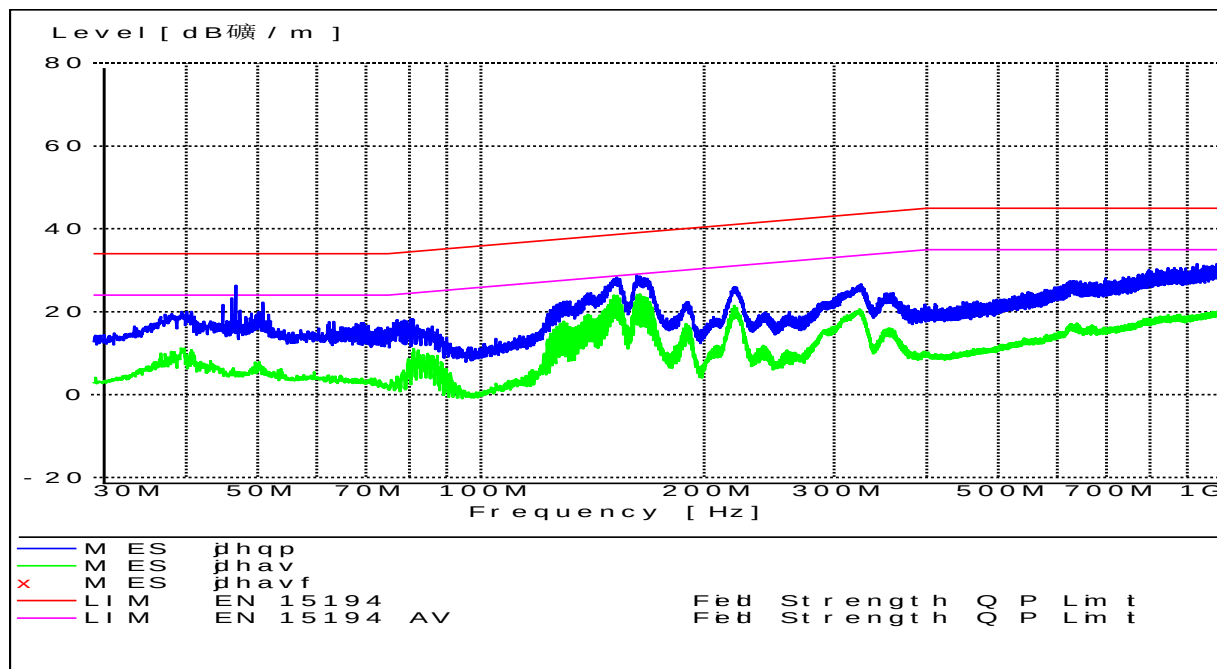
30-1000MHz Radiated Emission Test

W/SFL01

EUT: PEDELEC
Manufacturer: ACETRIKES BICYCLE(TAICANG) CO., LTD
Operating Condition: Power on
Test Site: TUV 10m Chamber
Operator: JIDA
Test Specification: EN15194
Comment: Horizontal

SCAN TABLE: "EN15194"

Short Description: Field Strength QP Limit
Start Stop Step Detector Meas. IF Transducer
Frequency Frequency Width Time Bandw.
30.0 MHz 1.0 GHz 50.0 kHz MaxPeak 1.0 ms 120 kHz 310N15
Average



MEASUREMENT RESULT: "jdhavf"

07.06.2016 10:57
Frequency Level
MHz dBμV/m

152.400000 22.24
152.850000 21.89

Appendix B

CONSTRUCTIONAL DATAFORM FOR EMC – TESTING

Applicant : StoneFly s.r.o.

Address : Mládežnicka 2,98401 Lucenec,Slovakia

Factory : ACETRIKES BICYCLE(TAICANG) CO., LTD

Type : Pedelec

Model : M/SFM01,W/SFL01 Rated voltage : 36V DC

Protection class : III Rated Input Power : 250W

Configuration of equipment:

Motor

Controller

Sensor

Battery

Short description of the EUT (Purpose of system, area of use, Function of the system):

Electric power assistance cycle

Sources of Interference

Motor, Controller

Internal frequencies:

--

Noise suppression components:

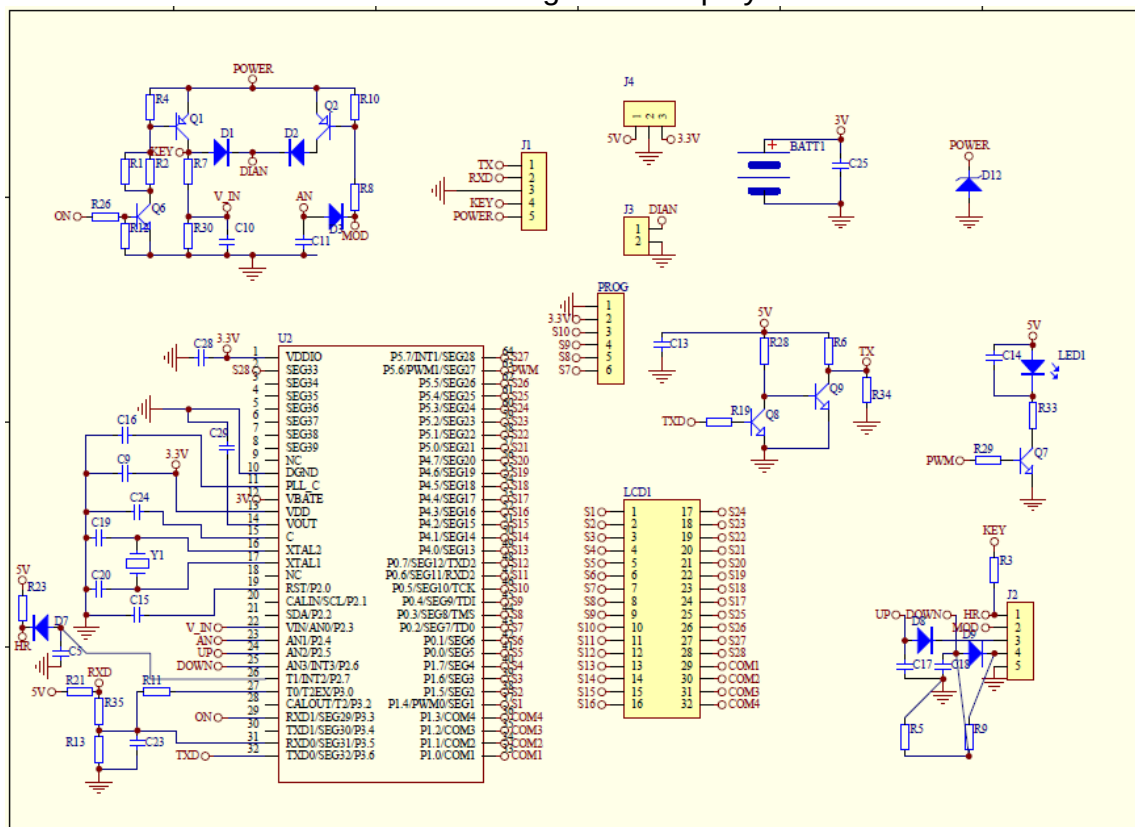
--

Measures for electromagnetic shielding:

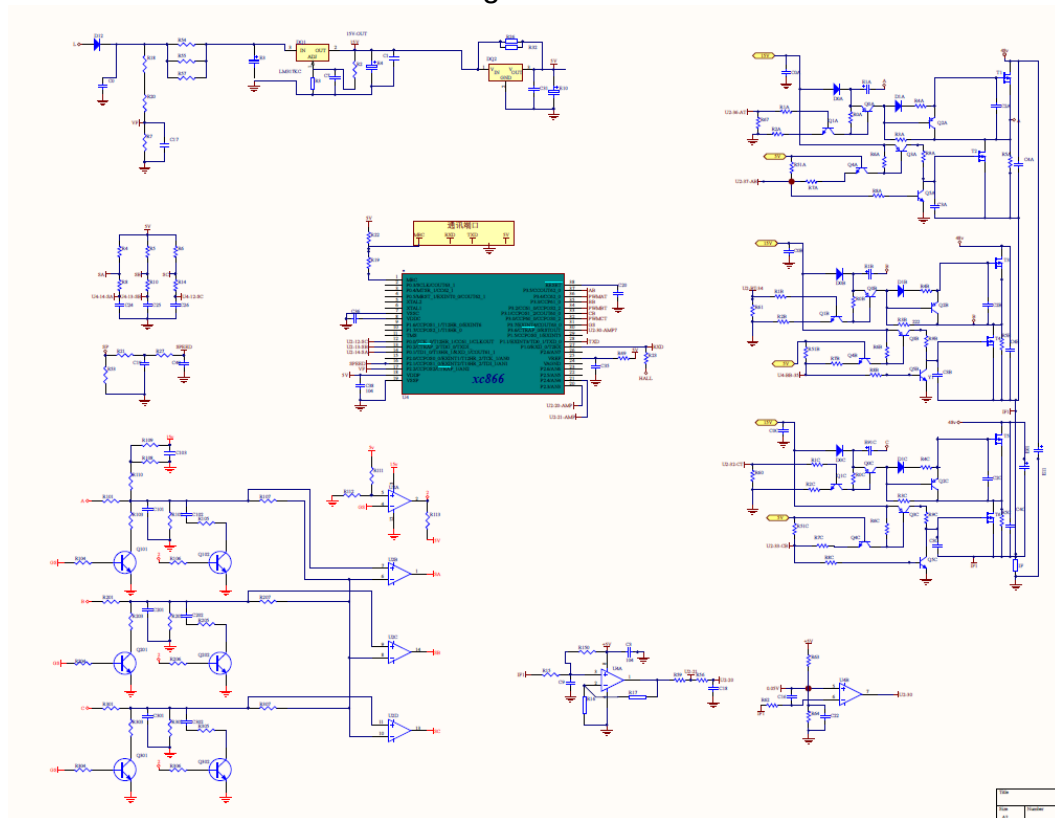
--

O If applicable, if necessary complete overleaf

Circuit diagram of display



Circuit diagram of controller





Product Service

Components

TABLE: list of critical parts/components			
Component Name	Manufacturer	Model	Main Technical Parameter
Battery	PORTAPOWER(HK)Limited	36V8.7Ah	36V8.7Ah
Charger	PORTAPOWER(HK)Limited	C060L1001	42V1.35A
Controller	Nanjing Taigao Technology Development CO., LTD	TGK-36W-WM	36V14A
brake lever	TEKTRO (WUXI)TECHNOLOGY CORP.	C310AL	/
Motor	AIKEMA ELECTRIC (SUZHOU) CO., LTD.	100SX(ZYJZ-100F)	36V250W
Sensor	Nanjing Taigao Technology Development CO., LTD	TGK-SL12	5V
Display	KING-METER ELECTRIC CO.,LTD	J-LCD	36V
Front light	Spanninga Bicycle Components(Foshan) Co.,Ltd	KENDO	36V
Rear light	Spanninga Bicycle Components(Foshan) Co.,Ltd	SRF	36V

Appendix C

Photo documents













PART 2- EMC IMMUNITY TEST REPORT

Project Number : 4830016236300 Date of Issue: June 22,2016

Model / Serial No. : M/SFM01,W/SFL01

Product Type : PEDELEC

Applicant : StoneFly s.r.o.

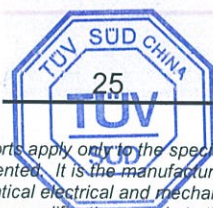
Manufacturer : ACETRIKES BICYCLE(TAICANG) CO., LTD

License holder : StoneFly s.r.o.

Address : Mládežnicka 2,98401 Lucenec,Slovakia

Test Result : ☒ Positive ☐ Negative

Total pages including
Appendices



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DIRECTORY - IMMUNITY



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IMMUNITY TEST REGULATIONS :

The immunity tests were performed according to the following regulations:

☐ - EMC - Directive 2014/30/EU

- ☐ - EN 61000-6-1: 2007
 - ☐ - EN 61000-6-2: 2005
 - ☐ - EN 55020: 2007
 - ☐ - EN 55024: 1998/A2: 2003
 - - EN 15194: 2009/A1:2011
 - ☐ - EN 60601-1-2: 2007
 - ☐ - EN 61547: 1995/A1: 2000
 - ☐ - EN 61547: 2009
 - ☐ - EN 60974-10: 2007
-

- - IEC 61000-4-2: 2008
- - ISO 11451-1: 2005
- ☐ - IEC 61000-4-4: 2004
- ☐ - IEC 61000-4-5: 2005
- ☐ - IEC 61000-4-6: 2006
- ☐ - IEC 61000-4-8: 2003
- ☐ - IEC 61000-4-11: 2004

Symbol Definitions:

- - Applicable
- ☐ - Not Applicable

Note: For undated references, the latest edition of the publication at the time of testing (including amendments) was applied.

Environmental Conditions In The Laboratory:

	<u>Actual</u>
Temperature:	24-26 °C
Relative Humidity:	56-58 %
Atmospheric Pressure:	1026-1028 mBar

Power Supply Utilized:

Power supply system : 36V DC

Symbol Definitions:

- - Applicable
- - Not Applicable

Immunity Test Conditions: ELECTROSTATIC DISCHARGE (ESD)

The immunity against *ELECTROSTATIC DISCHARGE (ESD)* events was performed in the following location:

☐ - Test not applicable

■ - Test Area - A

Test Equipment Used:

Model Number	Manufacturer	Description	TUV PS Number
☐ - NSG435	Schaffner	ESD Generator	707/759602
☐ - PESD3010	HAEFELY	ESD Simulator System	487/750508
☐ - ---	TÜV Product Service (Shanghai).	Horizontal Coupling Plane	---
■ - ---	TÜV Product Service (Shanghai).	Vertical Coupling Plane	---
■ - ONYX 30	HAEFELY	ESD simulator	487/751520

Remarks: Test equipment used is calibrated on a regular basis.

Test Specification:

Discharge Voltage (Air):

☐ - 2 kV	■ - 8 kV	☐ - 6 kV
☐ - 4 kV	☐ - 15 kV	☐ - _ kV

Discharge Voltage (Contact):

☐ - 2 kV	☐ - 6 kV	☐ - _ kV
■ - 4 kV	☐ - 8 kV	

Discharge Impedance:

■ - 330 Ω / 150 pF	☐ - 150 Ω / 150 pF
--------------------	---

Discharge Repetition Rate:

■ - ≥ 2 sec.

Number of Discharges:

■ - ≥ 10 at all locations

Kind of Discharges:

■ - Air discharge	■ - Conducted discharge (relay)
■ - Direct	■ - Indirect

Polarity:

■ - Positive	■ - Negative
--------------	--------------

Location of Discharge:

☐ - See Data Record(s) in Appendix A
■ - Each location on the surface touchable by hand
☐ - See drawing in Appendix A
■ - VCP

Result:

■ - No degradation of function	- Met Criterion A
☐ - Distortion of function	- Met Criterion B
☐ - Error of function	- Met Criterion C
☐ - Loss of function	- Unrecoverable Failure

Remarks: _____

Immunity Test Conditions: RADIATED ELECTROMAGNETIC FIELDS

The immunity against *RADIATED ELECTROMAGNETIC FIELDS* exposure was performed in the following location:

☐ - Test not applicable

■ - Test Area – F

Test Equipment Used:

Model Number	Manufacturer	Description	TUV PS Number
☐ - SME 06	Rohde & Schwarz	Signal Generator	487/390201
■- SMB-100A	Rohde & Schwarz	Signal Generator	487/391120
■- CBA1G-500	TESEQ	Power Amplifier	487/400908
■- NRP-2	ROHDE&SCHWARZ	Power Meter	487/390201
■- CBA3G-100	TESEQ	Power Amplifier	487/400909
■- DC7144A	Amplifier Research	Coupler	487/571117
■- DC6180A	Amplifier Research	Coupler	487/571116
☐ - AT1080	Amplifier Research	Log-periodic Antenna	487/620519
☐ - AT4002A	Schwarzbeck	Horn Antenna	487/620213
■ - TS9980	ROHDE & SCHWARZ	EMS Test System	
■ - TS 998JC	Rohde & Schwarz	Stripline	487/620315
■ - 9128Ds	Schwarzbeck	Antenna	487/621432

Remarks: Test equipment used is calibrated on a regular basis.

Test Specification:

Frequency Range:

- ☒ - 20 MHz - 80 MHz ☒ - 1000 MHz - 2000 MHz
☐ - 9 kHz - 27 MHz ☒ - 80 MHz - 1000 MHz

Field Strength:

- ☐ - 1 V/m ☐ - 3 V/m
☐ - 10 V/m ☒ - 30 V/m

Distance Antenna - EUT:

- ☐ - 1 m ☒ - 2 m

Modulation:

- ☒ - AM : 80 % 1 kHz
☐ - FM : ___ kHz dev. ___ kHz
☒ - sine wave:
☐ - unmodulated
☒ - Pulse ON/OFF Duty Cycle: 12.5 %

Step:

- ☒ - ≤ 0.0015 decades / sec ☒ - 1%

Polarization of Antenna:

- ☒ - Horizontal ☒ - Vertical

Result:

- ☒ - No degradation of function - Met Criterion A
☐ - Distortion of function - Met Criterion B
☐ - Error of function - Met Criterion C
☐ - Loss of function - Unrecoverable Failure

Remarks: _____

Immunity Test Conditions: FAST TRANSIENTS (BURST)

The immunity against *FAST TRANSIENTS (BURST)* events was performed in the following test location:

☒ - Test not applicable

☐ - Test Area -

Test Equipment Used:

Model Number	Manufacturer	Description	TUV PS Number
☐ - EFT500	EM Test	EFT/Burst Generator	70-7/75-96-01
☐ - CNI503	EM Test.	Coupling Network	487/609909
☐ - CDN125	Schaffner	Capacitive Coupling Clamp	48-7/60-99-08
☐ - TDS 524A	Tektronix	Digital Oscilloscope	70-7/38-96-01

Remarks: Test equipment used is calibrated on a regular basis.

Test Specification:

Pulse Amplitude - AC Power Port: ☐ - 1,0 kV ☐ - 2,0 kV
☐ - 4,0 kV ☐ - ____ kV

Pulse Amplitude - DC Power Port: ☐ - 1,0 kV ☐ - 2,0 kV
☐ - 4,0 kV ☐ - ____ kV

Pulse Amplitude - Signal/Data Non control Port: ☐ - 0,5 kV ☐ - 1,0 kV
☐ - 2,0 kV ☐ - ____ kV

Pulse Amplitude - Process: Measurement & Control Port ☐ - 0,5 kV ☐ - 1,0 kV
☐ - 2,0 kV ☐ - ____ kV

Burst Frequency: ☐ - 2,5 kHz ☐ - 5,0 kHz ☐ - ____ kHz

Time of Coupling: ☐ - 60 seconds ☐ - 120 seconds

Coupling Method: ☐ - Coupling/decoupling network ☐ - Coupling clamp

Polarity: ☐ - Positive ☐ - Negative

Immunity Test Conditions: FAST TRANSIENTS (BURST), continued

Location of Coupling:

name of lines:	_____	☐ - shielded	☐ - unshielded
type of lines:		☐ - passive	☐ - active
status of lines:		☐ - analog	☐ - digital
kind of transmission:			
length of lines:	_____		

name of lines:		☐ - shielded	☐ - unshielded
type of lines:		☐ - passive	☐ - active
status of lines:		☐ - analog	☐ - digital
kind of transmission:			
length of lines:	_____		

name of lines:	_____	☐ - shielded	☐ - unshielded
type of lines:		☐ - passive	☐ - active
status of lines:		☐ - analog	☐ - digital
kind of transmission:			
length of lines:	_____		

Result:

☐ - No degradation of function	- Met Criterion A
☐ - Distortion of function	- Met Criterion B
☐ - Error of function	- Met Criterion C
☐ - Loss of function	- Unrecoverable Failure

Remarks: _____

Immunity Test Conditions: SURGE TRANSIENTS

The immunity against *SURGE TRANSIENTS* events was performed in the following test location:

☒ - Test not applicable

☐ - Test Area -

Test Equipment Used:

Model Number	Manufacturer	Description	TUV PS Number
☐ - VCS 500	EM TEST	Surge Generator	70-7/75-96-03
☐ - CNI503	EM Test.	Coupling Network	487/609909
☐ - TDS 524A	Tektronix	Digital Oscilloscope	70-7/38-96-01

Remarks: Test equipment used is calibrated on a regular basis.

Test Specification:

Pulse Amplitude - AC Power Port:

☐ - 1,0 kV (phase and phase) (phase and neutral)	☐ - 2,0 kV (phase and protective earth) (neutral and protective earth)
☐ - 4,0 kV	☐ - 0,5 kV

Pulse Amplitude - DC Power Port:

☐ - 1,0 kV	☐ - 2,0 kV
☐ - 4,0 kV	☐ - ____ kV

Pulse Amplitude - Signal/Data
Non control Port:

☐ - 0,5 kV	☐ - 1,0 kV
☐ - 2,0 kV	☐ - ____ kV

Pulse Amplitude - Process:
Measurement & Control Port

☐ - 0,5 kV	☐ - 1,0 kV
☐ - 2,0 kV	☐ - ____ kV

Source Impedance:

☐ - 2 Ω + 18 μ F (phase and phase) (phase and neutral)	☐ - 12 Ω + 9 μ F (phase and protective earth) (neutral and protective earth)
☐ - 42 Ω + 0,1 μ F	☐ - 42 Ω + 0,5 μ F

Number of Surges:

☐ - 10 surges/angle	☐ - __ surges /angle
--	---

Angle:

☐ - 0 °	☐ - 90 °
☐ - 270 °	

Repetition Rate:

☐ - 60 sec.	☐ - ____ sec.
------------------------------------	--------------------------------------

Polarity:

☐ - Positive	☐ - Negative
-------------------------------------	-------------------------------------

Immunity Test Conditions: SURGE TRANSIENTS, continued

Location of Coupling:

name of lines:	_____	☐ - shielded	☐ - unshielded
type of lines:		☐ - passive	☐ - active
status of lines:		☐ - analog	☐ - digital
kind of transmission:			
length of lines:	_____		

name of lines:	_____	☐ - shielded	☐ - unshielded
type of lines:		☐ - passive	☐ - active
status of lines:		☐ - analog	☐ - digital
kind of transmission:			
length of lines:	_____		

name of lines:	_____	☐ - shielded	☐ - unshielded
type of lines:		☐ - passive	☐ - active
status of lines:		☐ - analog	☐ - digital
kind of transmission:			
length of lines:	_____		

Result:

☐ - No degradation of function	- Met Criterion A
☐ - Distortion of function	- Met Criterion B
☐ - Error of function	- Met Criterion C
☐ - Loss of function	- Unrecoverable Failure

Remarks: _____

Immunity Test Conditions: CONDUCTED DISTURBANCE

The immunity against *CONDUCTED DISTURBANCE* events, induced by radio frequency fields above 9 kHz, was performed in the following test location:

☒ - Test not applicable

☐ - Test Area -

Test Equipment Used:

Model Number	Manufacturer	Description	TUV PS Number
☐ - NSG 2070	Schaffner	RF-Generator	48-7/75-99-01
☐ - CDN725	Schaffner	EM Clamp	48-7/60-99-02
☐ - INA726	Schaffner	De-coupling Clamp	48-7/60-99-03
☐ - CDN M2	Schaffner	Coupling/decoupling Network	48-7/60-99-05
☐ - CDN M3	Schaffner	Coupling/decoupling Network	48-7/60-99-06
☐ - MD720	Schaffner	Monitoring Probe	48-7/60-99-07

Remarks: Test equipment used is calibrated on a regular basis.

Test Specification:

Frequency Range: ☐ - 0,15 MHz - 230 MHz ☐ - 0,15 MHz - 80 MHz

Voltage Level (EMF): ☐ - 1 V ☐ - 3 V
☐ - 10 V ☐ - ___ V

Modulation: ☐ - AM : 80 % 1 kHz
☐ - FM : ___ kHz dev. ___ kHz
☐ - sine wave:
☐ - unmodulated
☐ - Pulse ON/OFF Duty Cycle: ___ %

Step: ☐ - ≤ 0.0015 decades / sec

Immunity Test Conditions: CONDUCTED DISTURBANCE, continued

Location of Coupling:

name of lines:	_____	☐ - shielded	☐ - unshielded
type of lines:		☐ - passive	☐ - active
status of lines:		☐ - analog	☐ - digital
kind of transmission:			
length of lines:	_____		

name of lines:	_____	☐ - shielded	☐ - unshielded
type of lines:		☐ - passive	☐ - active
status of lines:		☐ - analog	☐ - digital
kind of transmission:			
length of lines:	_____		

name of lines:	_____	☐ - shielded	☐ - unshielded
type of lines:		☐ - passive	☐ - active
status of lines:		☐ - analog	☐ - digital
kind of transmission:			
length of lines:	_____		

Result:

- | | |
|---|-------------------------|
| ☐ - No degradation of function | - Met Criterion A |
| ☐ - Distortion of function | - Met Criterion B |
| ☐ - Error of function | - Met Criterion C |
| ☐ - Loss of function | - Unrecoverable Failure |

Remarks: _____

Immunity Test Conditions: PF FREQUENCY MAGNETIC FIELD

The immunity against *PF FREQUENCY MAGNETIC FIELD* exposure, induced by power frequency magnetic fields, was performed in the following test location:

☒ - Test not applicable

☐ - Test Area –

Test Equipment Used :

Model Number	Manufacturer	Description	TUV PS Number
☐ - INA702	Schaffner	Magnetic Field Coil	487/440201
☐ - INA2141	Schaffner	Induction Coil Interface	487/440202
☐ - 4500L	California Instrument	Power Source	707/689501

Remarks: Test equipment used is calibrated on a regular basis.

Test Specification:

<u>Frequency Range:</u>	☐ - 50 Hz	☐ - 60 Hz	☐ - 400 Hz
<u>Field level (EMF):</u>	☐ - 1 A/m ☐ - 30 A/m	☐ - 3 A/m ☐ - 100 A/m	☐ - 10 A/m ☐ - ____ A/m
<u>Short Field (1-3 sec):</u>	☐ - 300 A/m	☐ - 1000 A/m	☐ - ____ A/m
<u>Duration:</u>	☐ - <u>180</u> seconds		
<u>Axis of Orientation:</u>	☐ - X-axis	☐ - Y-axis	☐ - Z-axis

Result :

☐ - No degradation of function	- Met Criterion A
☐ - Distortion of function	- Met Criterion B
☐ - Error of function	- Met Criterion C
☐ - Loss of function	- Unrecoverable Failure

Remarks: _____

Immunity Test Conditions: VOLTAGE DIPS, INTERRUPTIONS & VARIATIONS

The immunity against *VOLTAGE DIPS, INTERRUPTIONS & VARIATIONS* events, induced by radio frequency fields above 9 kHz, was performed in the following test location:

☒ - Test not applicable

☐ - Test Area -

Test Equipment Used:

Model Number	Manufacturer	Description	TUV PS Number
☐ - C15003ix-400/3-CTS	California Instruments	AC Power Supply Testing System	48-7/68-99-10

Remarks: Test equipment used is calibrated on a regular basis.

Test Specification:

Nominal Mains Voltage (U_T): ☐ - 230 Vac ☐ - ____ Vac ☐ - ____ Vdc

Level of Reduction (dip): ☐ - 200 ms voltage dips in 30% of U_T
☐ - 500 ms voltage dips in 60% of U_T
☐ - 500 ms voltage dips in 30% of U_T

Duration of Interruption ($>.95*U_T$): ☐ - 5000 ms ☐ - 10 ms

Voltage Fluctuation: ☐ - $U_T + 10\%$ ☐ - $U_T - 10\%$

Result:

☐ - No degradation of function	- Met Criterion A
☐ - Distortion of function	- Met Criterion B
☐ - Error of function	- Met Criterion C
☐ - Loss of function	- Unrecoverable Failure

Remarks: _____

Equipment Under Test (EUT) Test Operation Mode - Immunity Tests:

The equipment under test was operated under the following conditions during immunity testing :

- ☐ - Standby
- ☐ - Test Program (H - Pattern)
- ☐ - Test Program (Color Bar)
- ☐ - Test Program (Customer Specified)
- ☒ - Normal Operating Mode

■ - standstill mode

90% of the design maximum assistance speed

90% of the "start up assistance mode"

Configuration of the equipment under test:

- - See Constructional Data Form in Appendix A - Page A1
- - See Product Information Form(s) in Appendix A - Page A1

The following peripheral devices and interface cables were connected during the testing:

- | | |
|---|-------------------|
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - unshielded power cable | |
| ☐ - unshielded cables | |
| ☐ - shielded cables | TÜVPS. No.: _____ |
| ☐ - customer specific cables | |
| ☐ - _____ | |
| ☐ - _____ | |



Product Service

GENERAL REMARKS:

The electric structures of M/SFM01 and W/SFL01 are same, so we choose W/SFL01 to do the immunity test.

SUMMARY:

All tests according to the regulations cited on page 3 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements cited on page 3.

□ - **Does not** fulfill the general approval requirements cited on page 3.

Sample Receipt Date: June 3, 2016

Testing Start Date: June 3, 2016

Testing End Date: June 6, 2016

- TÜV SÜD CERTIFICATION AND TESTING (CHINA) CO., LTD. -

Reviewed by:

Prepared by:

Review Engineer

Project Engineer

Photograph of Test Setup:
Electrostatic Discharge (ESD)

☐ - Test not applicable

IEC 61000-4-2

EN 61000-4-2



Photograph of Test Setup:
Radiated Electromagnetic Field

☐ - Test not applicable

ISO 11451-1



Photograph of Test Setup:
Fast transients (BURST)

■ - Test not applicable

IEC 61000-4-4
EN 61000-4-4

Photograph of Test Setup:
SURGE transients

■ - Test not applicable

IEC 61000-4-5
EN 61000-4-5

Photograph of Test Setup:
Conducted disturbance

■ - Test not applicable

IEC 61000-4-6

EN 61000-4-6

Photograph of Test Setup:
Power Frequency Magnetic field

■ - Test not applicable

IEC 61000-4-8

EN 61000-4-8

Photograph of Test Setup:
Voltage Dips, Interruptions & Variations

■ - Test not applicable

IEC 61000-4-11

EN 61000-4-11

Appendix A

Constructional Data Form

and

Product Information Form(s)

Please refer to EMC EMISSION-TEST REPORT Appendix B

Appendix B

Photo documents
of
Equipment Under Test (EUT)

Please refer to EMC EMISSION-TEST REPORT Appendix C