ECE TYPE-APPROVAL CERTIFICATE

E24

Communication Concerning: Approval granted
~~Approval extended~~
~~Approval refused~~
~~Approval withdrawn~~
~~Production definitively discontinued~~

Of a type of electrical/electronic sub-assembly with regard to Regulation No.10.

Approval No: ***E24-10R-052272*** Extension No: ***N/A***

Reason for extension: ***N/A***

1. Make (trade name of manufacturer): KWATT AVEMASTER

2. Type and general commercial description: ***KW-288-02***
LED working lamp

Variant(s): ***Eight:***
KW-288-01, KW-288-03, KW-288-04, KW-223,KW-224, MW-243, KW-244, 043010

3. Means of identification of type, if marked on the component: ***Printing***

3.1 Location of that marking: ***on the back of ESA***

4. Category of vehicle: ***N/A***

5. Name and address of manufacturer: ***Shenzhen Watt Auto Electrical Co., Ltd. 4/F, Block E & F, No.10 Building, Huafeng Science & Technology Park, Tangwei, Fuyong Street, Bao'an District, Shenzhen City, Guangdong Province, P.R. China.***

6. In the case of components and separate technical units, location and method of affixing of the ECE approval mark: ***Printing on the lens***

7. Address(es) of assembly plant(s): ***See point 5. above***

NATIONAL STANDARDS AUTHORITY OF IRELAND NSAI Certification TRANSPORT DEPARTMENT

NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (+353+1) 807 3800, Facsimile: 01-807 3844

Approval No: ***E24-10R-052272*** Extension No: ***N/A***

8.	Additional information (where applicable):	***See appendix***
9.	Technical service responsible for carrying out the tests:	***TÜV Rheinland Kraftfahrt GmbH Am Grauen Stein, 51105 Cologne, Germany***
10.	Date of test report:	***10.08.2017***
11.	Number of test report:	***87-R10-957/17-00***
12.	Remarks (if any):	***See Appendix***
13.	Place:	***Dublin***
14.	Date:	***15th August, 2017***
15.	Signature:	

16. The index to the information package lodged with the approval authority, which may be obtained on request is attached.

NATIONAL STANDARDS AUTHORITY OF IRELAND NSAI Certification TRANSPORT DEPARTMENT

NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (+353+1) 807 3800, Facsimile: 01-807 3844

Approval No: ***E24-10R-052272*** Extension No: ***N/A***

Appendix

To type-approval communication concerning the type approval
of an electrical/electronic sub-assembly under Regulation No.10.

1.	Additional information	
1.1.	Electrical system rated voltage:	***12V, negative ground***
1.2.	This ESA can be used on any vehicle type with the following restrictions:	***See manufacturer's specifications.***
1.2.1	Installation conditions, if any:	***See manufacturer's specifications.***
1.3.	This ESA can only be used on the following vehicle types:	***N/A***
1.3.1	Installation conditions, if any:	***N/A***
1.4.	The specific test method(s) used and the frequency ranges covered to determine immunity were:	***Bulk current injection method*** *Frequency range: 20 -400 MHz* ***Free field testing method*** *Frequency range: 400 - 2000 MHz*
1.5.	Laboratory accredited to ISO 17025 and recognized by the Approval Authority responsible for carrying out the tests:	***TÜV Rheinland Kraftfahrt***
2.	Remarks:	***N/A***

Appendix to type-approval communication concerning the
type approval of a vehicle under Regulation No.10.

1.	Additional information	
2.	Special devices for the purpose of Annex 4 to this Regulation:	***N/A***
3.	Electrical system rated voltage:	***N/A***
4.	Type of bodywork:	***N/A***
5.	List of electronic systems installed in the tested vehicle(s) not limited to the items in the information document:	***N/A***
5.1	Vehicle equipped with 24 GHz short-range radar equipment (yes/no):	***N/A***
6.	Laboratory accredited to ISO 17025 and recognized by the Approval Authority responsible for carrying out the tests:	***N/A***
7.	Remarks:	***N/A***

NATIONAL STANDARDS AUTHORITY OF IRELAND
NSAI Certification
TRANSPORT DEPARTMENT

NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (+353+1) 807 3800, Facsimile: 01-807 3844

Approval No: ***E24-10R-052272*** Extension No: ***N/A***

Index to the Information Package

Date of issue:	***15th August, 2017***
Date of latest amendment:	***N/A***
Reason for extension/revision:	***N/A***

1. Additional conditions, and advisory notes on legal alternatives.

2. Test report(s)

- numbers(s):	***87-R10-957/17-00***
- date of issue:	***10.08.2017***
- date of latest amendment:	***N/A***

3. Information document

- number(s):	***EMC-KW-288-02***
- date of issue:	***27.06.2017***
- date of latest amendment:	***N/A***

Documentation: ***20 pages***

NATIONAL STANDARDS AUTHORITY OF IRELAND NSAI Certification TRANSPORT DEPARTMENT

NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (+353+1) 807 3800, Facsimile: 01-807 3844

Approval No: ***E24-10R-052272*** Extension No: ***N/A***

Appendix: **Additional conditions, and advisory notes on legal alternatives**

A: Additional conditions:

1. The attached technical report, with any of its attachments, forms part of this Type Approval certificate.
2. Each type from series production shall be to the measurements specified in the attached drawings, and shall be manufactured only from the materials specified in the Approval documents.
3. Changes in the type are permitted only with the explicit permission of NSAI. Breaches of this requirement will lead to a withdrawal of the Type Approval, and in addition may be subject to criminal prosecution.
4. At regular intervals, any tests or associated checks prescribed by the applicable legislation to verify continued conformity with the approved type shall be carried out. The manufacturer shall demonstrate compliance with this by submitting to NSAI evidence of adequate arrangements and documented control plans for each type approved.
5. Any set of samples or test pieces showing evidence of non-conformity shall give rise to further sampling and testing and all steps shall be taken to restore conformity of production.
6. This Type Approval will expire when it is surrendered by the holder, or withdrawn by NSAI, or when the approved type no longer conforms to legal requirements. The recall of the Type Approval can be issued by NSAI when the conditions required for the issuing or continuation of the Type Approval are no longer current, or when the Approval holder is in breach of the duties attached to the Type Approval, or when it is established that the approved type no longer meets the requirements of traffic safety.
7. Changes in the company name, address or manufacturing site, as well as in any of the sales or other agents specified in the issuing of the approval must immediately be notified to NSAI.
8. The duties imposed by the issuing of this certificate are not transferable. The legal protection of third parties is not affected by this certificate.
9. When the manufacture or sale of the system, component or separate technical unit has not been started within one year of the date of issue of this certificate, then NSAI is to be informed. This requirement also applies when the manufacture or sale has been halted for more than one year, or when it ought to have been halted for more than one year. The initial commencement of manufacture or sale, or the resumption of manufacture or sale, shall then be notified to NSAI within one month of commencement or resumption.

B: Legal Options:

Any objection to the requirements set out in this certificate shall be made within one month of the date of issue. The objection shall be made, in writing, to NSAI in Dublin.

NATIONAL STANDARDS AUTHORITY OF IRELAND NSAI Certification TRANSPORT DEPARTMENT

NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (+353+1) 807 3800, Facsimile: 01-807 3844

Type : **KW-288-02**
Manufacturer : **SHENZHEN WATT AUTO ELECTRICAL CO., LTD.**

TEST REPORT

according to ECE-Regulation

Uniform provisions concerning the approval of vehicles with regard to electromagnetic compatibility

ECE-R10

including all amendments until

05 series of amendments

Approval Status

UNECE approval : E24-10R-052272 Ext.00

Structure of the Test Report

Item No.

0. General information

0.1.	Make (trade name of the manufacturer)	: KWATT AVEMASTER
0.2.	Type	: KW-288-02
0.3.	Category of vehicle	: Not applicable
0.4.	Name and address of the manufacturer	: SHENZHEN WATT AUTO ELECTRICAL CO., LTD. 4/F, Block E & F, No.10 Building, Huafeng Science & Technology Park, Tangwei, Fuyong Street, Bao'an District, Shenzhen City, Guangdong Province, P.R. China.
0.5.	No. of the information folder	: EMC-KW-288-02-00
	- Date of issue	: June 27, 2017
	- Date of last change	: Not applicable

1. Tested ~~vehicle(s) /~~ object(s)

1.1. Description

1.1.1. ~~Vehicle /~~ object

Commercial description	: LED working lamp
Type(s) ~~/variant(s) /version(s)~~	: KW-288-02
Identification number	: Not applicable

1.1.2. Condition of ~~vehicle(s)/~~Object(s) : New ~~/ used / pretested~~

1.2. Worst case selection : The determination of the worst case was done according to internal procedures of the Technical Service (QMA 1.301.005, section 6.2.2.2.).

1.3. Remarks : The results of the test refer exclusively to the object(s) mentioned under point 1.1 of this report.

2. Test record

2.1.	Equipment for measuring and testing	: The test facilities / measurement equipment used were in compliance with the test requirements
2.1.1.	Specifications for the test site	: Not applicable
2.2.	Test results	
	Remark concerning extension	: ~~The ESA has been tested according the amendments mentioned in Appendix 0.~~ ~~The actual measurement test of the ESA was not re-quired. The test result of the previous test are still valid.~~
2.2.1.	General requirements	
2.2.2.	Test results – radiated narrowband electromagnetic emissions	: The requirements of the standards are met (Test data see Appendix 1)
2.2.3.	Test results – radiated broadband electromagnetic emissions	: The requirements of the standards are met (Test data see Appendix 1)
2.2.4.	Test results – Immunity to electromagnetic radiation	: The requirements of the standards are met (Test data see Appendix 1)
2.2.5.	Test results – conducted Emission	: The requirements of the standards are met (Test data see Appendix 1)
2.2.6	Test results – immunity to conducted transients	: The requirements of the standards are met (Test data see Appendix 1)
2.3.	Additional information	

The results of the test refer exclusively to the object(s) mentioned under point 1.1. of this report.

Test site	: Zhejiang Kezheng Electronic Information Product Testing Co., Ltd. No. 36, Macheng Road, Hangzhou, Zhejiang, China.
Test date	: July 16, 2017 to August 01, 2017
2.4. Remarks	: Not applicable

3. List of Appendices

Appendix 0	:	List of modifications
Appendix 1	:	Test protocol

4. Statement of conformity

The in point 0.5. mentioned information folder and the type described in that comply with the requirements mentioned on page 1.

With regard to the required level of performance to be achieved, the tested items were representative for the type to be approved (see point 1.2).

The mentioned test results refer to the ~~vehicle(s)/~~object(s) described under point 1.1 of this report.

Engineering centre Shanghai, August 10, 2017
HH/LS

Heng Huang
Expert Technical Service

Type : **KW-288-02**
Manufacturer : **SHENZHEN WATT AUTO ELECTRICAL CO., LTD.**

List of modifications **Appendix 0**

Correction of : ---

Modification of : ---

Addition of : ---

Deletion of : ---

Test protocol **Appendix 1**

Test object

Trade name : KWATT AVEIMASTER

Type(s) ~~/variant(s) /version(s)~~ : KW-288-02

Technical data of the tested ESA type

Electrical system rated voltage	:	12V/24V DC, negative ground
This ESA can be used on any vehicle type with the following restrictions	:	No restriction
Installation conditions	:	Connected to the battery of the vehicle
This ESA can be used on the following vehicle types	:	No restriction
Installation conditions	:	No restriction

Test results

1. Radiated narrow band / broadband electromagnetic emissions:

Radiated broadband electromagnetic emissions : as shown in table 1and 3

Radiated narrowband electromagnetic emissions : as shown in table 2 and 4

Antenna position : horizontal and vertical

Rated voltage : DC 12V/24V

Maximum broadband QP value for 12V systems (table 1):

Frequency (MHz)	Test results (dBµV/m)		Reference QP Limit (dBµV/m)	Margin to QP reference value (dBµV/m)
	hor.	vert.		
150.55	38.43	---	56.58	18.15
150.55	---	35.38	56.58	21.20

Maximum narrowband AV value for 12V systems (table 2):

Frequency (MHz)	Test results (dBµV/m)		Reference AV Limit (dBµV/m)	Margin to AV reference value (dBµV/m)
	hor.	vert.		
150.50	26.98	---	46.58	19.60
219.95	---	23.93	49.07	25.14

Maximum broadband QP value for 24V systems (table 3):

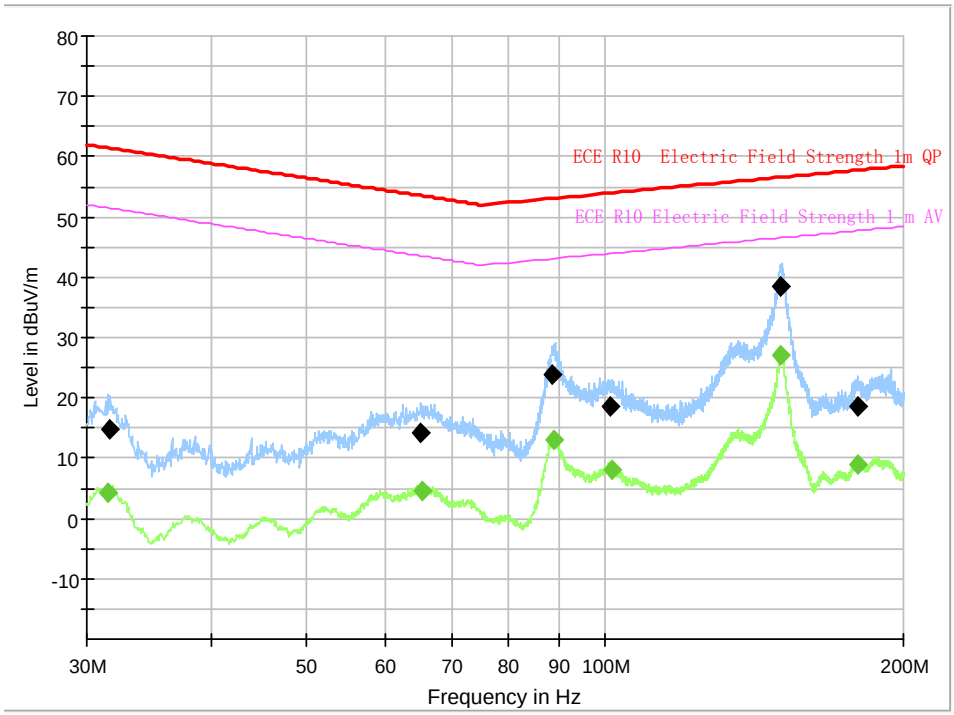
Frequency (MHz)	Test results (dBµV/m)		Reference QP Limit (dBµV/m)	Margin to QP reference value (dBµV/m)
	hor.	vert.		
239.30	50.31	---	59.62	9.31
342.25	---	49.23	61.98	12.75

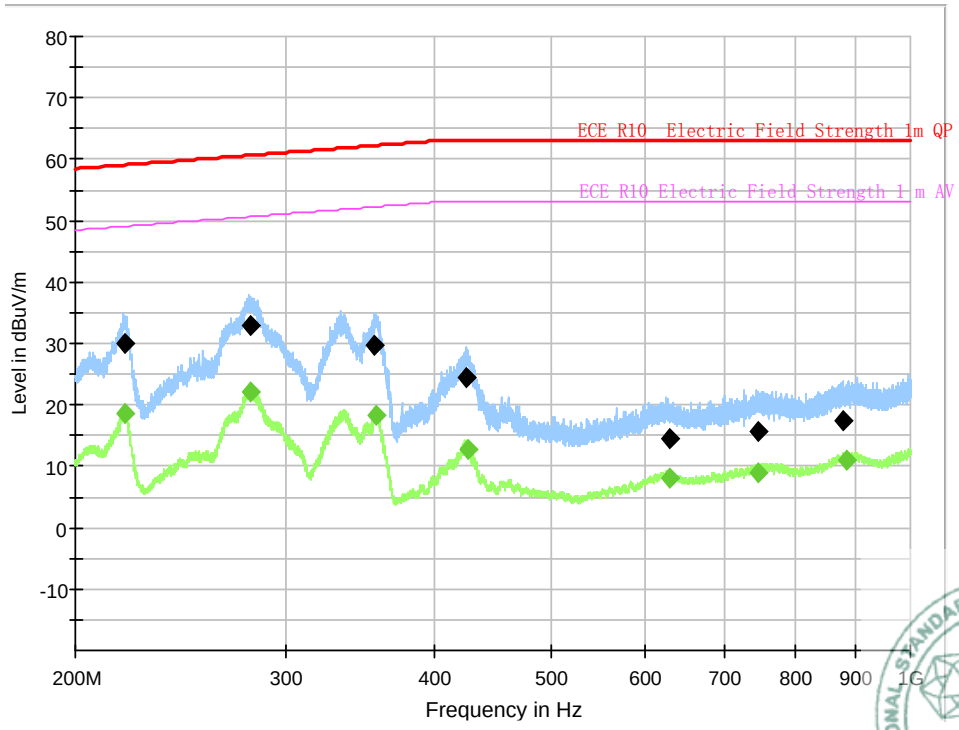
Maximum narrowband AV value for 24V systems (table 4):

Frequency (MHz)	Test results (dBµV/m)		Reference AV Limit (dBµV/m)	Margin to AV reference value (dBµV/m)
	hor.	vert.		
239.50	43.74	---	49.63	5.89
343.00	---	42.50	51.99	9.49

Type : **KW-288-02**
Manufacturer : **SHENZHEN WATT AUTO ELECTRICAL CO., LTD.**

Horizontal Polarity Test Result Diagram for 12V systems (Broadband and Narrowband)

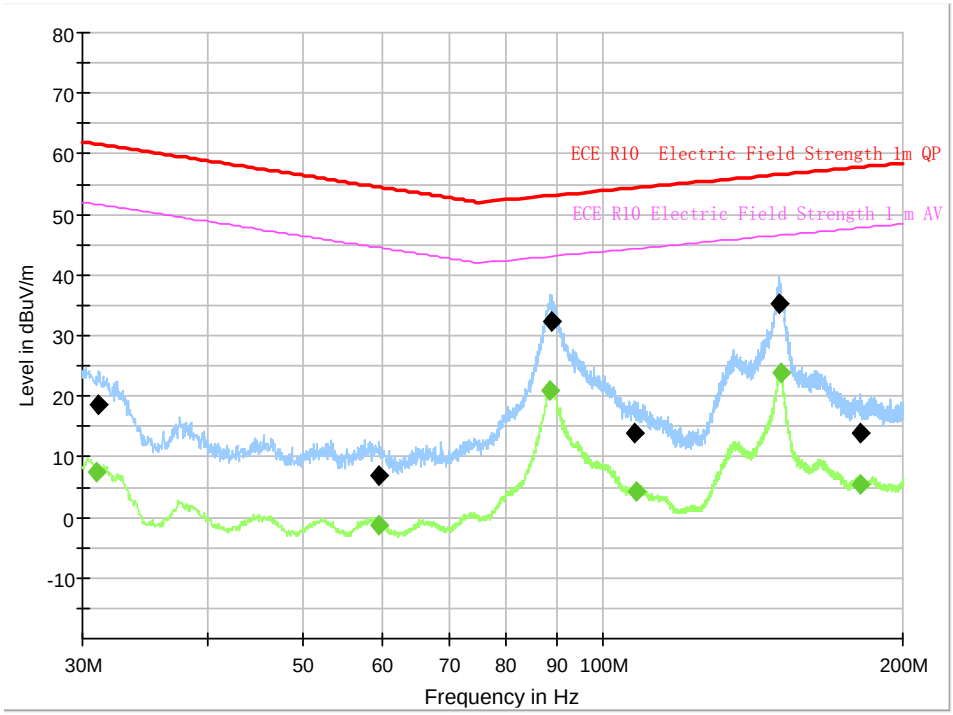


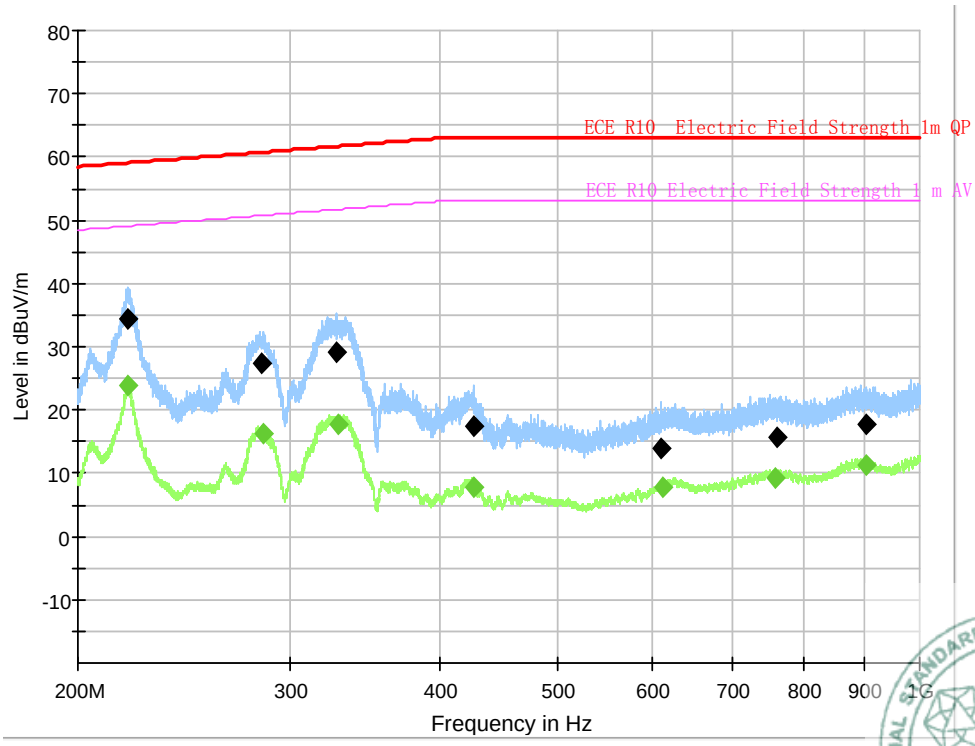


Remark:
The blue scanning beam is QP value for broadband; the green scanning beam is AV value for narrowband.

Type : **KW-288-02**
Manufacturer : **SHENZHEN WATT AUTO ELECTRICAL CO., LTD.**

Vertical Polarity Test Result Diagram for 12V systems (Broadband and Narrowband)

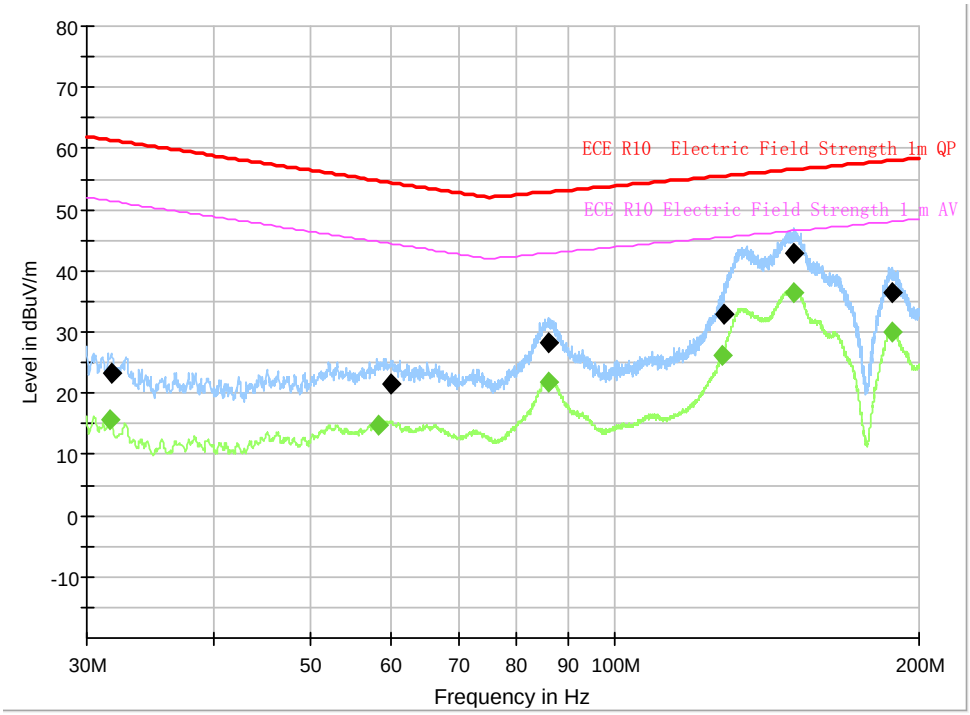


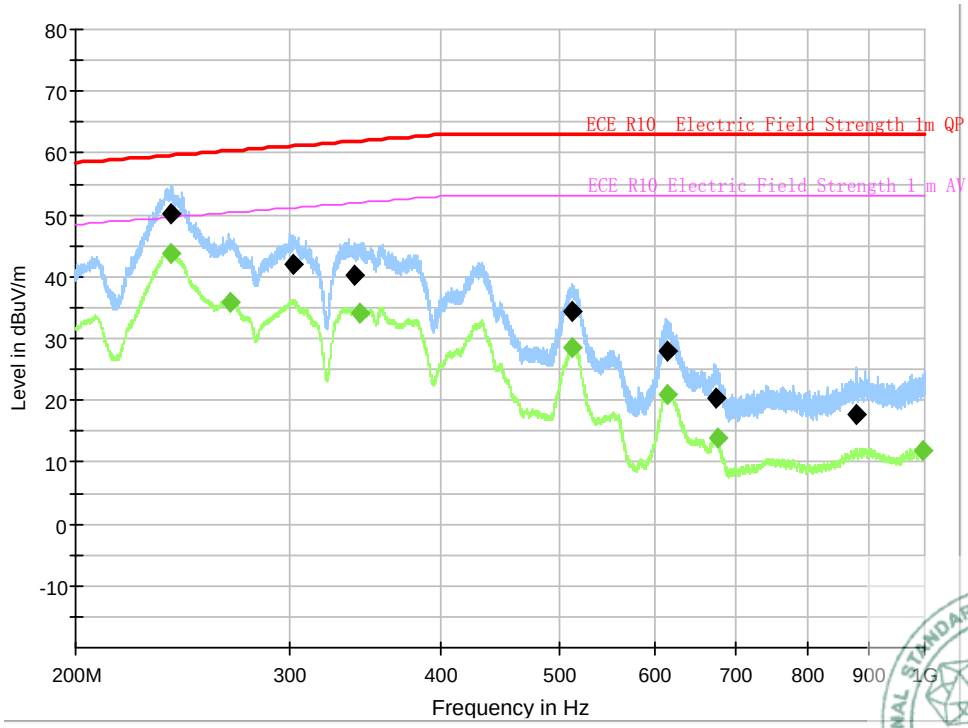


Remark:
The blue scanning beam is QP value for broadband; the green scanning beam is AV value for narrowband.

Type : **KW-288-02**
Manufacturer : **SHENZHEN WATT AUTO ELECTRICAL CO., LTD.**

Horizontal Polarity Test Result Diagram for 24V systems (Broadband and Narrowband)

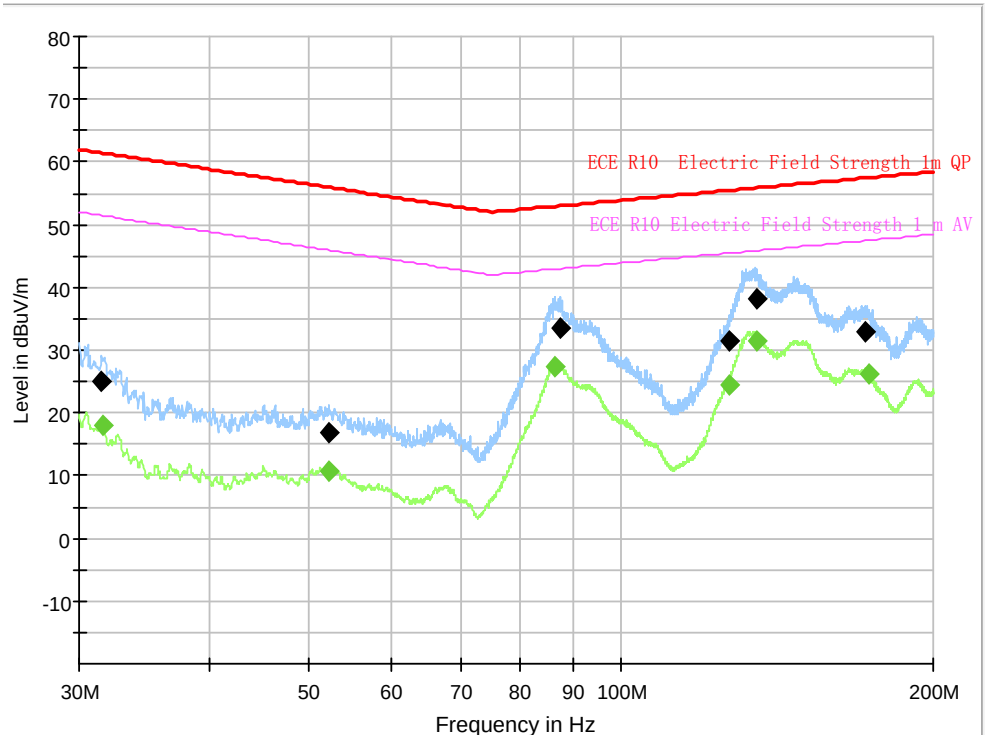


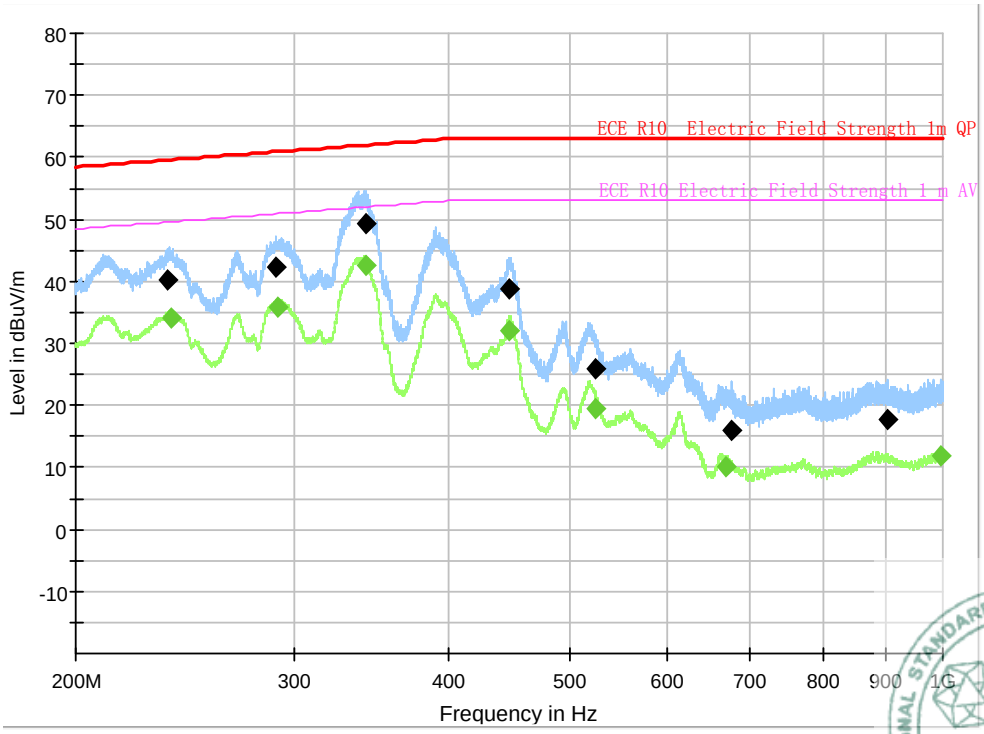


Remark:
The blue scanning beam is QP value for broadband; the green scanning beam is AV value for narrowband.

Type : **KW-288-02**
Manufacturer : **SHENZHEN WATT AUTO ELECTRICAL CO., LTD.**

Vertical Polarity Test Result Diagram for 24V systems (Broadband and Narrowband)





Remark:
The blue scanning beam is QP value for broadband; the green scanning beam is AV value for narrowband.

2. Conducted emissions

Test method : ISO 7637-2 2nd edition: 2004

Polarity of pulse amplitude	Maximum allowed value for vehicles with 12V systems	Measured Pulse amplitude True value
Positive	+ 75	+ 27.75 V
Negative	- 100	- 0.75 V

Polarity of pulse amplitude	Maximum allowed value for vehicles with 24V systems	Measured Pulse amplitude True value
Positive	+ 150	+36.00V
Negative	- 450	0.00V

3. Immunity to electromagnetic radiation

Test method : ISO 11452-4 3rd edition: 2005
Bulk current injection testing method (from 20 to 400MHz)

ISO 11452-2 2nd edition: 2004
Free field testing method (from 400 MHz to 2000MHz)

Measurement result for 12V and 24V systems:

Frequency range (MHz)	Test level	Type of modulation	Test distance	Antenna position	Result
20~400	60mA	AM, 80%	150mm	/	Passed*
400~800	30volts/m	AM, 80%	1 m	Vertical	Passed*
800~2000	30volts/m	PM, 577µs	1 m	Vertical	Passed*

Remark:
* no degradation of performance of 'immunity-related functions'.

4. Immunity to transient disturbances

Test method : ISO 7637-2 2nd edition: 2004

Measurement result for 12V systems:

Test pulse	Test level	Number of pulse / test time	Burst cycle / pulse repetition time	Required minimum function status*	Status of function true value	Result
1	-75V	5000 pulses	0.5s	C	C	Passed
2a	+37V	5000 pulses	0.2s	B	A	Passed
2b	+10V	10 pulses	0.5s	C	C	Passed
3a	-112V	1 h	90ms	A	A	Passed
3b	+75V	1 h	90ms	A	A	Passed
4	-6V	1 pulse	N/A	B	B	Passed

Measurement result for 24V systems:

Test pulse	Test level	Number of pulse / test time	Burst cycle / pulse repetition time	Required minimum function status*	Status of function true value	Result
1	-450V	5000 pulses	0.5s	C	C	Passed
2a	+37V	5000 pulses	0.2s	B	A	Passed
2b	+20V	10 pulses	0.5s	C	C	Passed
3a	-150V	1 h	90ms	A	A	Passed
3b	+150V	1 h	90ms	A	A	Passed
4	-12V	1 pulse	N/A	B	A	Passed

Remark:

* Class A: all functions of a device/system perform as designed during and after exposure to disturbance.

Class B: all functions of a device/system perform as designed during exposure. However, one or more of them can go beyond specified tolerance. All functions return automatically to within normal limits after exposure is removed. Memory functions shall remain class A.

Class C: one or more functions of a device/system do not perform as designed during exposure but return automatically to normal operation after exposure is removed.

Class D: one or more functions of a device/system do not perform as designed during exposure and do not return to normal operation until exposure is removed and the device/system is reset by simple "operator/use" action.

Class E: one or more functions of a device/system do not perform as designed during and after exposure and cannot be returned to proper operation without repairing or replacing the device/system.

	INFORMATION DOCUMENT NO. EMC-KW-288-02 FOR TYPE APPROVAL OF AN ELECTRIC/ELECTRONIC SUB-ASSEMBLY WITH RESPECT TO ELECTROMAGNETIC COMPATIBILITY ACCORDING TO ECE R10.05 ANNEX 2B	Page: 1
		Application date: June 27, 2017

1.	Make (trade name of manufacturer)	:	KWATT AVEIMASTER
2.	Type	:	KW-288-02
2.1	Variants (if applicable)	:	KW-288-01, KW-288-03, KW-288-04, KW-223, KW-224, MW-243, KW-244, 043010
3.	Means of identification of type, if marked on the component/~~separate technical unit~~ [1)]	:	Printing on the back of ESA
3.1.	Location of that marking	:	Refer to page 3
4.	Name and address of manufacturer	:	SHENZHEN WATT AUTO ELECTRICAL CO., LTD. 4/F, Block E & F, No.10 Building, Huafeng Science & Technology Park, Tangwei, Fuyong Street, Bao'an District, Shenzhen City, Guangdong Province, P.R. China.
	Name and address of authorized representative, if any	:	---
5.	In the case of components and separate technical units, location and method of affixing of the approval mark	:	Printing on the lens Loaction refer to page 3
6.	Address (es) of assembly plant(s)	:	Same as above item 4.
7.	This ESA shall be approved as a component /~~ STU~~.		
8.	Any restrictions of use and conditions for fitting	:	No restrictions
9.	Electrical system rated voltage	:	DC 12V/24V, negative ground

Appendix 1:
Description of the ESA chosen to represent the type (electronic block diagram and list of main component constituting the ESA , e.g. make and type of microprocessor, crystal, etc.).

List of contents

This information document consists of pages 1 to 7 including Appendix and Attachments.

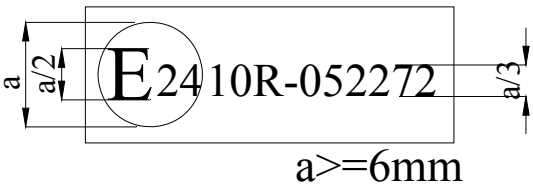
NATIONAL STANDARDS AUTHORITY OF IRELAND NSAI Certification TRANSPORT DEPARTMENT

1.	Input range	:	DC 12V ~ 28V, negative ground
2.	Consumption power	:	12V/24V 30W
3.	Resource of X-tal or oscillator	:	No
4.	Main dimensions	:	288.8mm × 50.5mm × 66.3mm

Front View

Rear View

E-mark designation



Dimensional drawing

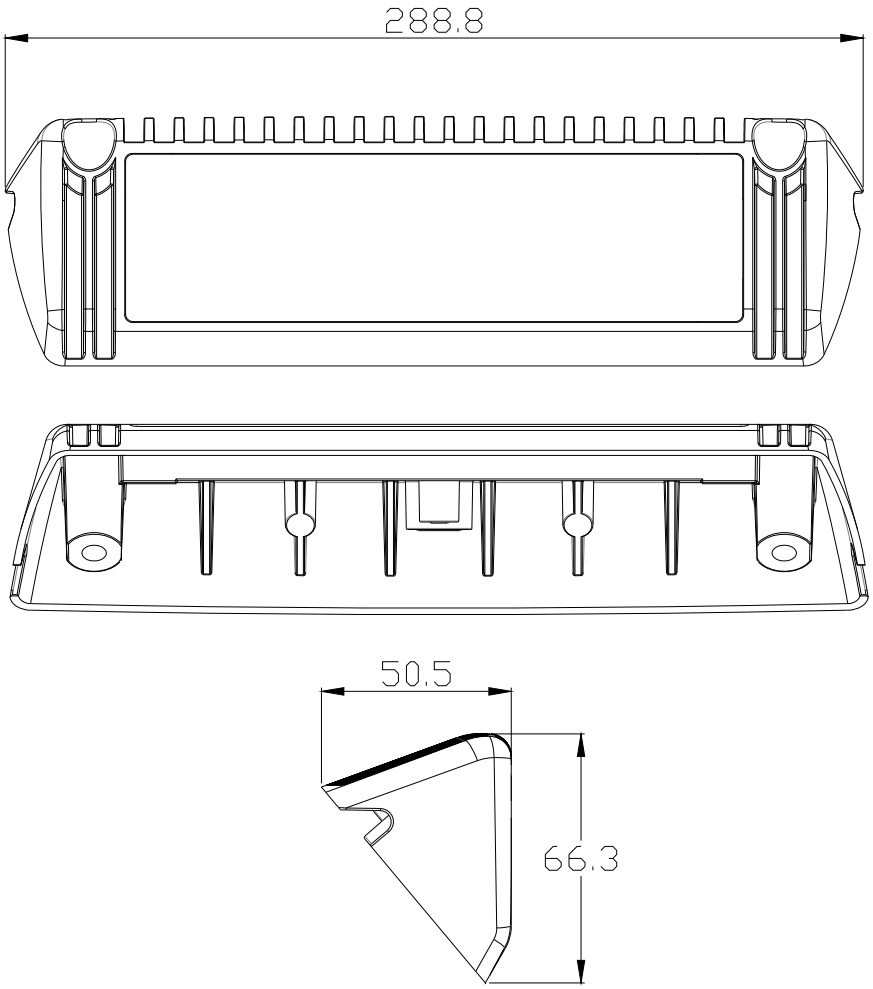
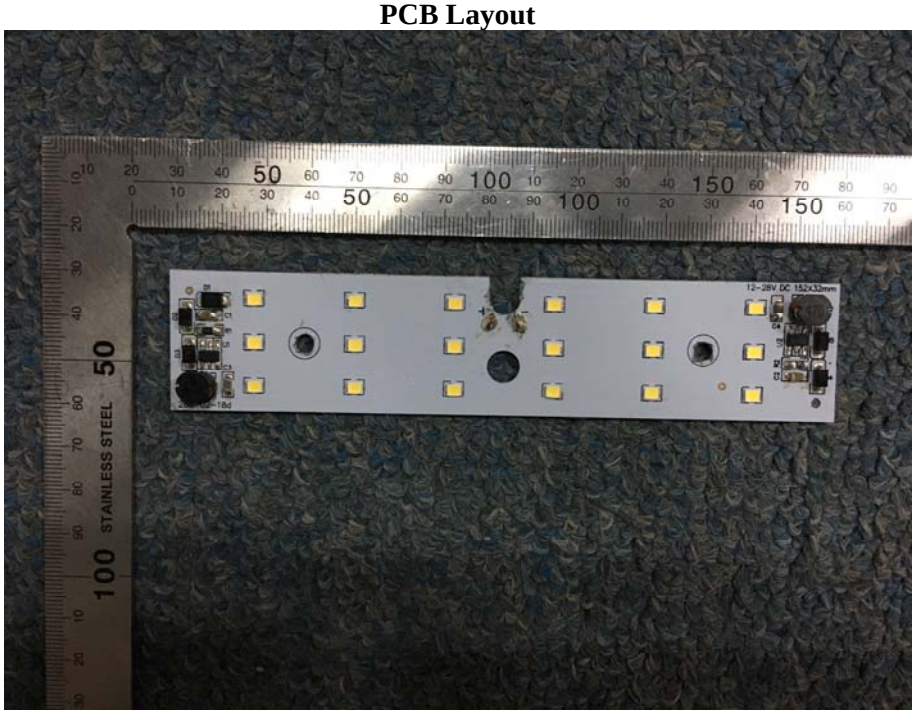
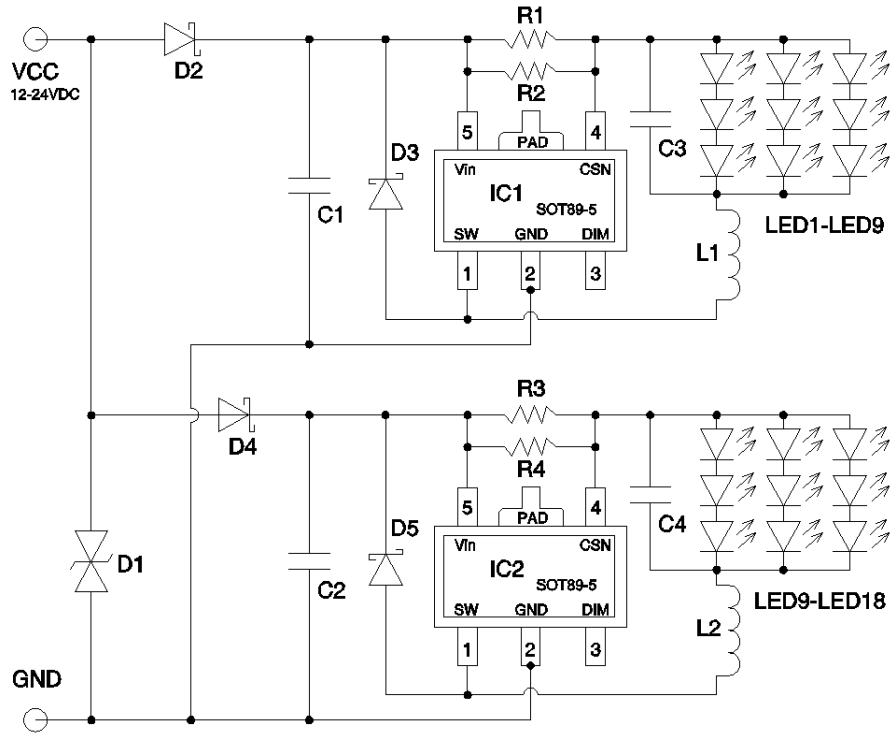


Photo of PCB

PCB Layout



Circuit Diagram



Bill of Materials

No.	Description	Amount	Unit	Symbol or P/N
1	Transient voltage suppressor	1	piece	SMBJ30CA (D1)
2	Schottky diode	4	piece	SS26 (D2-D5)
3	Chip capacitors	2	piece	22uF/50V (C1-C2)
4	Chip capacitors	2	piece	10uF/50V (C3-C4)
5	Chip resistor	4	piece	0.24Ω (R1-R4)
6	Power management IC	2	piece	PT4115 (IC1-IC2)
7	SMD shielded inductors	2	piece	47uH (L1-L2)
8	High performance light emitting diode	18	piece	2835 SMDs (LED1-LED18)