CE TEST REPORT

for

High Power LED Driver

Model No.: HPD004B

of

Applicant: Semicon-Optronics Channel Corp.
Address: 9F, No.563, Sec. 1, Beising Rd., Jhudong, Hsinchu, 31042, Taiwan

Tested and Prepared by

ETS Product Service (Taiwan) Co., Ltd.

FCC Registration No.: 930600
Industry Canada filed test laboratory Reg. No. IC 5679
A2LA Accredited No.: 2300.01
PTCRB Accredited Type Certification Test House

Report No.: W6M20707-8262-E-11

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.
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ETS Product Service (Taiwan) Co., Ltd.
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Test location, where different from ETS Product Service (Taiwan) Co., Ltd.
Name : ./.
Street : ./.
Town : ./.
Country : ./.
Telephone : ./.
Fax : ./.

Details of applicant
Name : Semicon-Optronics Channel Corp.
Street : 9F, No.563, Sec. 1, Beising Rd., Jhudong,
Town : Hsinchu, 31042,
Country : Taiwan
Telephone : ./.
Fax : ./.

Test item
Description of test item
Type of Product : High Power LED Driver
Type identification : HPD004B
Power supply : Input: 10-24 V AC/DC, 60/50 Hz ; Output: 2-24 V AC/DC, 0.8 A
Multi-listing Model number : HPD Series

Test Standards

Special statement: The standards applied to this test sample were under the demand of the applicant. Any deviation from the applicable product standards is the responsibility of the applicant.
Electro - Magnetic Compatibility

Test – Result

Device : High Power LED Driver
Model No. : HPD004B
Manufacturer : Semicon-Optronics Channel Corp.
9F, No.563, Sec. 1, Beising Rd., Jhudong, Hsinchu, 31042, Taiwan

☒ 1st test  ☐ test after modification  ☐ production test

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<th>Test Emission / Immunity</th>
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<th>Test failed</th>
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<td>IEC/EN 61000-4-3 (2006)</td>
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Technical responsibility for area of testing:

Steven Chuang

Tester:

Jay Chaing

Issue Date : August 20, 2007

August 20, 2007

Note:
1. The result of this test report is valid only in connection to the sample has been tested at the laboratory of ETS Product Service (Taiwan) Co., Ltd.
2. This test report shall always be duplicated in full pages unless the written approval of the testing laboratory is obtained.

Registration number: W6M20707-8262-E-11
### Test equipment utilized

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Registration number: W6M20707-8262-E-11
<table>
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<th>ETSTW-RE 034</th>
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Radiated electromagnetic Emission

Test Equipment

a) Triple Loop Antenna
   For your reference please find it in our test equipment list at page 3 to 4 as number : ETSTW-RE 048
b) SPECTRUM ANALYZER
   For your reference please find it in our test equipment list at page 3 to 4 as number : ETSTW-RE 055

Test Procedures

• Test configuration

The test configuration corresponds to the standard CISPR 15. The lighting equipment under test is placed in the centre of the antenna. (see picture 1)
In the case of lighting equipment incorporating more than one lamp, all the lamps are operated simultaneously. The earth terminal of the lighting equipment shall be connected to the reference earth of the V-network. The observation of the equipment under test is realized by 3 video cameras and by a microphone.

• Test parameter and marginal conditions

The test are carried out with a frequency range between 9 kHz to 30 MHz. Further information please find in test report.
Radiated electromagnetic emission acc. EN 55015

**Picture 1**

Registration number: W6M20707-8262-E-11
Electrostatic Discharge

Test Equipment

a) ESD Simulator (ESD2000)
   For your reference please find it in our test equipment list at page 3 to 4 as number : ETSTW-EMS 004
b) EMC Immunity Test System (TRA2000IN6)
   For your reference please find it in our test equipment list at page 3 to 4 as number : ETSTW-EMS 003
c) Frequency Converter (YF-6020)
   For your reference please find it in our test equipment list at page 3 to 4 as number : ETSTW-EMS 002

Test Procedures

• Test configuration

The test configuration is in correspondence to the standard IEC/EN 61000-4-2. The equipment under test is placed on a wooden table with one metal plate on its top and one metal plate under the table, which is grounded. Both plates are connected with two 470 kΩ resistors in series. (see picture 2)

• Test parameters and marginal conditions

The test is carried out with ±2kV, ±4kV contact discharge and ±2kV, ±4kV and ±8kV air discharge. Time between two discharges ≥ 1 second
Ten discharges for every point every voltage and polarity
The tested points please find in the test protocol.
Electrostatic Discharge according to EN 61000 - 4 - 2

Typical position for indirect discharge to HCP

Typical position for direct application

Typical position for indirect discharge to VCP

Horizontal coupling plane (HCP) 1.6 m x 0.8 m

Ground reference plane

Wooden table H = 0.8 m

Insulation

Resistor 470k Ω

Power supply

Picture 2
RF Electromagnetic Field (80-1000 MHz)

Test Equipment

a) Biconical Antenna (3109)
   For your reference please find it in our test equipment list at page 3 to 4 as number: ETSTW-RE 029
b) Log-Periodic Dipole Antenna (HL223)
   For your reference please find it in our test equipment list at page 3 to 4 as number: ETSTW-RE 043
c) MICROWAVE HORN ANTENNA (AT4560)
   For your reference please find it in our test equipment list at page 3 to 4 as number: ETSTW-RE 018
d) Biconical Antenna (HK116)
   For your reference please find it in our test equipment list at page 3 to 4 as number: ETSTW-RE 042
e) SIGNAL GENERATOR (SML03)
   For your reference please find it in our test equipment list at page 3 to 4 as number: ETSTW-RS 006
f) RF Power Amplifier (150W1000)
   For your reference please find it in our test equipment list at page 3 to 4 as number: ETSTW-RS 004
g) Electric Field Probe Type 8.3 (EMR-20)
   For your reference please find it in our test equipment list at page 3 to 4 as number: ETSTW-RS 005
h) Millivoltmeter (URV 55)
   For your reference please find it in our test equipment list at page 3 to 4 as number: ETSTW-RE 032
i) Power Sensor (URV5-Z4)
   For your reference please find it in our test equipment list at page 3 to 4 as number: ETSTW-RE 034

Test Procedures

• Test configuration

The test configuration is contained inside of a shielded chamber and corresponds to the standard IEC/EN 61000-4-3. The equipment under test is placed in the facility on a wooden table 0.8m high on the center axis of the chamber. The power supply and the RF connection points are close to the equipment under test at the floor of the chamber inside a connection box. The cables to this connection box are shielded and below the double floor. The transmitting antenna is placed in a height of 1.5m, in a distance of 3.0m. The RF-generators are placed in a special room adjacent to the chamber. (see picture 3) The observation of the equipment under test is realized by 3 video cameras and by a microphone. In order to establish the severity of the test for EUTs an wires which must be tested close to the earth reference plane or which have larger sides than 1.5m x 1.5 m, the intensity of the field is also recorded at 0,4 m height, and for the full width and height of the EUT.

• Test parameters and marginal conditions

The tests are carried out with a field strength by 3 V/m (measured in the unmodulated field) with amplitude modulated signal by a depth of 80 % by a sinusoidal audio signal of 1 kHz. The logarithmic step was 1% and the dwell time was 1s dependent of the EUT cycle time. Further information please find in test protocol.
RF - Field according to
EN 61000 - 4 - 3

Lines < 3 m on 1 m total length, low-induction bunched
Real cabling < 1 m
Lines > 3 m or not defined
Irradiated length has to be 1 m

Absorber or disturbance filter
Absorber elements placed as required in partly covered anechoic chambers to reduce the ground reflection

Uniform area
Non-conductive table
Field-generating antenna

Picture 3
Radiated electromagnetic Emission

**Emission**

**Standard**: EN 55015

**Device**: HPD004B

**Date**: July 05, 2007

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<th>Frequency Marker (MHz)</th>
<th>Reading (dBuV)</th>
<th>Correction Factor (dB)</th>
<th>Detector</th>
<th>Test Result (dBuA)</th>
<th>Compliance Limit (dBuA)</th>
<th>Margin (dB)</th>
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<td>PK</td>
<td>12.75</td>
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<td>75.25</td>
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<td>5.9</td>
<td>1</td>
<td>PK</td>
<td>6.90</td>
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<td>28.10</td>
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<tr>
<td>1.257723</td>
<td>3.9</td>
<td>1</td>
<td>PK</td>
<td>4.90</td>
<td>32</td>
<td>27.10</td>
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<tr>
<th>Frequency Marker [MHz]</th>
<th>Reading [dBuV]</th>
<th>Correction Factor (dB)</th>
<th>Detector</th>
<th>Test Result [dBuA]</th>
<th>Compliance Limit [dBuA]</th>
<th>Margin (dB)</th>
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</thead>
<tbody>
<tr>
<td>0.119598</td>
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<td>PK</td>
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<td>65</td>
<td>54.42</td>
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<td>PK</td>
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<td>40.5</td>
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Temperature: 23.9 °C
Pressure: 921 hPa
Rel. humidity: 52 %
### Z axis

<table>
<thead>
<tr>
<th>Frequency Marker [MHz]</th>
<th>Reading [dBuV]</th>
<th>Correction Factor (dB)</th>
<th>Detector</th>
<th>Test Result (dBuA)</th>
<th>Compliance Limit [dBuA]</th>
<th>Margin (dB)</th>
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<td>PK</td>
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<td>58</td>
<td>45.90</td>
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</table>

**Note**

1. The formula of measured value as: Test Result = Reading + Correction Factor
2. The Correction Factor = Cable loss + Antenna factor+ Switch Insertion Loss
3. Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average
4. All not in the table noted test results are more than 20 dB below the relevant limits.
6. See attached diagram as appendix
## Electrostatic Discharge (ESD)

**Standard**: IEC/EN 61000 - 4 - 2  
**Device**: HPD004B  
**Date**: July 05, 2007

<table>
<thead>
<tr>
<th>Test point</th>
<th>Table (T)</th>
<th>Floor (F)</th>
<th>Contact (C)</th>
<th>Air (A)</th>
<th>Voltage (kV)</th>
<th>Polarity (+ / -)</th>
<th>Note</th>
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<tr>
<td>Housing</td>
<td>T</td>
<td>A</td>
<td></td>
<td></td>
<td>2, 4, 8</td>
<td>+ / -</td>
<td>A</td>
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<tr>
<td>Housing</td>
<td>T</td>
<td>C</td>
<td></td>
<td></td>
<td>2, 4</td>
<td>+ / -</td>
<td>A</td>
</tr>
<tr>
<td>Indirect</td>
<td>T</td>
<td>C</td>
<td></td>
<td></td>
<td>2, 4</td>
<td>+ / -</td>
<td>A</td>
</tr>
</tbody>
</table>

- **Temperature**: 24.8 °C  
- **Pressure**: 990 hPa  
- **Rel. humidity**: 50 %
ESD discharge points

The top of EUT

The bottom of EUT
The front of EUT

The back of EUT
The left of EUT

The right of EUT
Note:

- **A**: Normal performance within the specification.
- **B**: Temporary degradation or less of function or performance which is self recoverable
- **C**: Temporary degradation or loss of function or performance which requires operator intervention or system reset
- **D**: Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data.

**NA**: Not Applicable

Explanation: ./.
Interference Immunity Against Electromagnetic Irradiation

RF Field

Standard: IEC/EN 61000 - 4 - 3
Device: HPD004B
Date: July 05, 2007

Testequipment: Anechoic Chamber, Generator SMG (R&S), Monitoring System, Amplifier 10W1000/150L (ar), Antenna SAS-200/521 (AHS)

Severity Level: 2 (3 V/m) Modulation Frequency: 1kHz (80%AM) Pulsmodulation: 1 Hz (0.5s on;0.5s off)

Temperature: 24.8 °C
Pressure: 990 hPa
Rel. humidity: 50%

Note:
- □ A : No loss of performance or function
- □ B : Temporary loss of function or performance which is self recoverable
- □ C : Temporary loss of function or perform. which req. operate intervention or system reset
- □ D : Loss of function which is not recoverable
Appendix

A  Measurement diagrams

Radiated electromagnetic Emission
(The measurement diagrams plots attached below are preliminary wideband scan with a peak detector and for reference only. The final test results are listed on page 11-12.)

B  Photos

1. External Photos
2. Internal Photos
3. Set Up Photo of Radiated Emission
4. Set Up Photo of ESD
5. Set Up Photo of RF-Field
Spurious emissions under normal conditions in accordance to the EN 55015 / CNS 14115

Order Number: W6M20707-8262
Test Site / Operator: ETS / Carey
Temperature/Voltage: Temp.: 23.9°C / Unom.: 24VDC
Test Specification: Loop antenna
Type: X mode
Spurious emissions under normal conditions in accordance to the EN 55015 / CNS 14115

Order Number: W6M20707-8262
Test Site / Operator: ETS / Catty
Temperature/Voltage: Temp.: 23.9°C / Unom.: 24VDC
Test Specification: Loop antenna
Type: Y mode
Spurious emissions under normal conditions in accordance to the EN 55015 / CNS 14115

Order Number: W6M20707-8262
Test Site / Operator: ETS / Catey
Temperature/Voltage: Temp.: 23.9°C / Unom.: 24VDC
Test Specification: Loop antenna
Type: Z mode
Pictures

External Photos
Internal Photos
Set Up Photo of Radiated Emission
Set Up Photo of ESD

Set Up Photo of RF-Field