# SAR Exemption Evaluation Report

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|---|---|---|
| Product Name | : | Solos |
| Model No. | : | 33-00045-00 |
| FCC ID | : | ZAOSOLOS002 |

| | | |
|---|---|---|
| Applicant | : | Kopin Display Corp. |
| Address | : | 125 North Drive, Westborough, Massachusetts ,United States,01581 |

| | | |
|---|---|---|
| Date of Receipt | : | Dec. 06, 2017 |
| Test Date | : | Dec. 06, 2017~ Jan. 19, 2018 |
| Issued Date | : | Feb. 01, 2018 |
| Report No. | : | 17C2013R-RF-US- P20V02 |
| Report Version | : | V 1.1 |

# Test Report Certification

Issued Date : Feb. 01, 2018
Report No. : 17C2013R-RF-US-P20V02

| | | |
|---|---|---|
| Product Name | : | Solos |
| Applicant | : | Kopin Display Corp. |
| Address | : | 125 North Drive, Westborough, Massachusetts ,United States,01581 |
| Manufacturer | : | Kopin Display Corp. |
| Address | : | 125 North Drive, Westborough, Massachusetts ,United States,01581 |
| Model No. | : | 33-00045-00 |
| FCC ID | : | ZAOSOLOS002 |
| EUT Voltage | : | 3.4~4.425V |
| Test Voltage | : | AC120V/60Hz |
| Applicable Standard | : | KDB 447498D01V06<br>FCC Part1.1310 |
| Test Result | : | Complied |
| Performed Location | : | DEKRA Testing & Certification (Suzhou) Co., Ltd.<br>No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China<br>TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098<br>FCC Designation Number: CN1199 |

Documented By : Kathy Feng

( Project Assistant: Kathy Feng)

Reviewed By : Frank he

(Senior Engineer: Frank He )

Approved By : Harry Zhao

(Engineering Manager: Harry Zhao)

# 1. RF Exposure Evaluation

## 1.1. Limits

According to **KDB 447498 D01 General RF Exposure Guidance v06**

**4.3.1 Standalone SAR test exclusion considerations**

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

2) At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following, and as illustrated in Appendix B:

a) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·( f(MHz)/150)] mW, at 100 MHz to 1500 MHz

b) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

3) The 1-g and 10-g SAR test exclusion thresholds for below 100 MHz at test separation distances ≤ 50 mm are determined by:

a) The power threshold at the corresponding test separation distance at 100 MHz in step 2) is multiplied by [1 + log(100/f(MHz))] for test separation distances > 50 mm and < 200 mm

b) The power threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by ½ for test separation distances ≤ 50 mm

c) SAR measurement procedures are not established below 100 MHz. When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any test results to be acceptable. Note: when the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

## 1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.
The temperature and related humidity: 18℃and 78% RH.

## 1.3. Test Result of RF Exposure Evaluation

| | | |
|---|---|---|
| Product Name | : | Solos |
| Test Item | : | RF Exposure Evaluation |
| Test Site | : | AC-6 |

- Antenna Gain:

**BT2.1:**

| | | | | | | |
|---|---|---|---|---|---|---|
| Antenna manufacturer | N/A | | | | | |
| Antenna Delivery | ☒ | 1*TX+1*RX | ☐ | 2*TX+2*RX | ☐ | 3*TX+3*RX |
| Antenna technology | ☒ | SISO | | | | |
| | ☐ | MIMO | ☐ | Basic | | |
| | | | ☐ | CDD | | |
| | | | ☐ | Beam-forming | | |
| Antenna Type | ☐ | External | ☐ | Dipole | | |
| | ☒ | Internal | ☐ | PIFA | | |
| | | | ☐ | PCB | | |
| | | | ☒ | Chip Antenna | | |
| | | | ☐ | Metal plate type F antenna | | |
| | | | ☐ | Monopole antenna | | |
| Antenna Gain | 2.72dBi | | | | | |

**BT4.2:**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna manufacturer | N/A | | | | | | | |
| Antenna Delivery | ☒ | 1*TX+1*RX | ☐ | 2*TX+2*RX | ☐ | 3*TX+3*RX | | |
| Antenna technology | ☒ | SISO | | | | | | |
| | ☐ | MIMO | ☐ | Basic | | | | |
| | | | ☐ | CDD | | | | |
| | | | ☐ | Beam-forming | | | | |
| Antenna Type | ☐ | External | ☐ | Dipole | | | | |
| | ☒ | Internal | ☐ | PIFA | | | | |
| | | | ☐ | PCB | | | | |
| | | | ☒ | Chip Antenna | | | | |
| | | | ☐ | Stamping Antenna | | | | |
| | | | ☐ | Metal plate type F antenna | | | | |
| | | | ☐ | Monopole antenna | | | | |
| Antenna Gain | 1.0dBi | | | | | | | |

Based on The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm and the formula below:

$$\text{Estimated SAR} = \sqrt{f(GHz)} * \frac{(\text{Max Power of channel, mW})}{\text{Min. Separation Distance, mm}}$$

The Maximum tune up power is 1dBm for BDR/EDR and -7dBm for BLE.

| Band | Exposure Condition | Pmax (dBm) | Pmax (mw) | Distance (mm) | f(GHz) | calculation result | Stand-alone Test exclusion threshold | SAR Test |
|---|---|---|---|---|---|---|---|---|
| BT2.1 | Head | 1.0 | 1.259 | 5 | 2.48 | 0.397 | 3.00 | No |
| BT4.2 | Head | -7.0 | 0.200 | 5 | 2.48 | 0.063 | 3.00 | No |

Conclusion: 2400MHz-2480MHz SAR was not required.

The End