



# 시험 성적서

## TEST REPORT

페이지(page) : ( 1 ) / ( 총(Total) 7 )

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                                                                                       |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------|--|
| 성적서 번호<br>Report No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                          | ICRT-TR-E191922-0A                                                                    |  |
| 신청자<br>Client                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 기관명<br>Name                              | SENA TECHNOLOGIES, Inc                                                                |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 주 소<br>Address                           | 19, Heolleung-ro 569-gil, Gangnam-gu, Seoul, Korea                                    |  |
| 시험대상품목<br>Sample description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          | 50R                                                                                   |  |
| 모델명<br>Type designation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          | SP76                                                                                  |  |
| 정 격<br>Ratings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          | DC 3.7 V                                                                              |  |
| 시험기간<br>Date of test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                          | 08. Oct. 2019 ~ 21. Oct. 2019                                                         |  |
| 시험방법/항목<br>Test Method/Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                          | FCC rule §1.1310                                                                      |  |
| 시험결과<br>Test Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                          | Refer to 3. Maximum Permissible Exposure                                              |  |
| 확 인<br>Affirmation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 작성자<br>Tested by                         | 기술책임자<br>Technical Manager                                                            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 성 명<br>Name Yeong-Hwan, Hong (Signature) | 성 명<br>Name Jun-Hui, Lee (Signature)                                                  |  |
| <p><input type="checkbox"/> 위 성적서는 고객이 제공한 시료에 대한 시험결과 이며, 용도 이외의 사용은 금합니다.<br/>This is certified that the above mentioned products have been tested for the sample provided by customer and forbid the use except for original purpose.</p> <p><input type="checkbox"/> 위 성적서는 한국인정기구(KOLAS)인정과 관련이 없습니다.<br/>The above test report is not related to accreditation by Korea Laboratory Accreditation scheme.</p> <p><input type="checkbox"/> 위 성적서는 주식회사 아이씨알의 승인 없이는 복제 및 재발급이 금지됩니다.<br/>No part of this document may be duplicated or reproduced by any means without the express written permission of the ICR.</p> |                                          |                                                                                       |  |
| <p><b>2019. 10. 22</b></p> <p><b>주식회사 아이씨알 대표이사</b></p> <p>The head of INTERNATIONAL CERTIFICATION REGISTRAR</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                          |  |  |

본 성적서의 진위 확인은 G4B 혹은 ICR 홈페이지에서 가능합니다.

경기도 김포시 양촌읍 황금3로7번길 112

112, Hwanggeum3-ro 7beon-gil, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea



## Contents

|                                                                 |   |
|-----------------------------------------------------------------|---|
| 1. Applicant & Manufacturer & Test Laboratory Information ..... | 3 |
| 1.1 Applicant information.....                                  | 3 |
| 1.2 Manufacturer Information .....                              | 3 |
| 1.3 Test Laboratory Information .....                           | 3 |
| 2. Equipment under Test(EUT) Information.....                   | 4 |
| 2.1 General Information.....                                    | 4 |
| 2.2 Additional Information.....                                 | 4 |
| 2.3 Mode of operation during the test .....                     | 5 |
| 2.4 Modifications of EUT .....                                  | 5 |
| 3. Maximum Permissible Exposure .....                           | 6 |
| 3.1 RF Exposure calculation .....                               | 6 |
| 3.2 Result .....                                                | 6 |

### Revision History

| Issued Report No.  | Issued Date | Revisions     | Effect Section |
|--------------------|-------------|---------------|----------------|
| ICRT-TR-E191922-0A | 22-Oct-2019 | Initial Issue | All            |
|                    |             |               |                |
|                    |             |               |                |



## **1. Applicant & Manufacturer & Test Laboratory Information**

### **1.1 Applicant information**

|                |                                                    |
|----------------|----------------------------------------------------|
| Applicant      | SENA TECHNOLOGIES.Inc                              |
| Address        | 19, Heolleung-ro 569-gil, Gangnam-gu, Seoul, Korea |
| Contact Person | Seunghyun Kim                                      |
| Telephone No.  | +82-2-573-7772                                     |
| Fax No.        | +82-2-573-7710                                     |
| E-mail         | shkim77@sena.com                                   |

### **1.2 Manufacturer Information**

|              |                                                    |
|--------------|----------------------------------------------------|
| Manufacturer | SENA TECHNOLOGIES.Inc                              |
| Address      | 19, Heolleung-ro 569-gil, Gangnam-gu, Seoul, Korea |

### **1.3 Test Laboratory Information**

|                                   |                                                                                     |
|-----------------------------------|-------------------------------------------------------------------------------------|
| Conducted tests were performed at |                                                                                     |
| Laboratory                        | ICR Co., Ltd.                                                                       |
| Address                           | 112, Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea |
| Telephone No.                     | +82-2-6351-9002                                                                     |
| Fax No.                           | +82-2-6351-9007                                                                     |
| RRA No.                           | KR0165                                                                              |
| KOLAS No.                         | KT652                                                                               |



## 2. Equipment under Test(EUT) Information

### 2.1 General Information

|                       |                       |      |
|-----------------------|-----------------------|------|
| Product Name          | 50R                   |      |
| Brand Name            | -                     |      |
| Model Name            | SP76                  |      |
| Additional Model Name | -                     |      |
| FCC ID                | S7A-SP76              |      |
| Hardware Version      | 1.0                   |      |
| Software Version      | 2.6.0 (CSR Bluetest3) |      |
| Power Supply          | DC 3.7 V              |      |
| EUT Firmware Version  | 1.0                   |      |
| Target Power          | Bluetooth BDR         | 16.0 |
|                       | Bluetooth EDR         | 4.0  |
|                       | Bluetooth LE          | 4.0  |
|                       | Mesh                  | 15.0 |
| EUT Serial Number     | Test 2                |      |

### 2.2 Additional Information

|                        |                                                |                                                                           |
|------------------------|------------------------------------------------|---------------------------------------------------------------------------|
| Equipment Class        | Bluetooth BDR/EDR                              | DSS-Part 15 Spread Spectrum Transmitter / Frequency hopping systems (FHS) |
|                        | Bluetooth LE / Mesh                            | DTS-Digital Transmission System                                           |
| Device Type            | Stand-alone                                    |                                                                           |
| Operating Frequency    | Bluetooth BDR/EDR/LE                           | 2 402 MHz ~ 2 480 MHz                                                     |
|                        | Mesh                                           | 2 405 MHz ~ 2 475 MHz                                                     |
| RF Output Power        | Bluetooth BDR/EDR                              | 15.30 dBm                                                                 |
|                        | Bluetooth LE                                   | 10.13 dBm                                                                 |
|                        | Mesh                                           | 17.81 dBm                                                                 |
| Number of Channel      | Bluetooth BDR/EDR                              | 79                                                                        |
|                        | Bluetooth LE                                   | 40                                                                        |
|                        | Mesh                                           | 100                                                                       |
| Modulation Type        | Bluetooth BDR/EDR                              | GFSK / $\pi/4$ -DQPSK / 8DPSK                                             |
|                        | Bluetooth LE / Mesh                            | GFSK                                                                      |
| Antenna Type           | PCB Pattern Antenna                            |                                                                           |
| Antenna Gain           | Bluetooth BDR/EDR/LE                           | 0.93 dBi                                                                  |
|                        | Mesh                                           | 0.46 dBi                                                                  |
| Antenna Operating Mode | Single Antenna Equipment with only one antenna |                                                                           |



### **2.3 Mode of operation during the test**

- The EUT is continuous transmission mode during the test with set at Low Channel, Middle Channel, and High Channel. To get a maximum radiated emission levels from the EUT, the EUT was moved throughout the XY, YZ, XZ planes.

### **2.4 Modifications of EUT**

- None



### 3. Maximum Permissible Exposure

#### 3.1 RF Exposure calculation

According to the FCC rule §1.1310 the limit for General Population/Uncontrolled exposure is 1 mW/cm<sup>2</sup> for the device operating 1 500 MHz ~ 100 000 MHz.

| Kind of EUT                 | 50R                                                                                                                                                                                                                                                                                                                                                                                                                               |           |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Operating Frequency Band    | <input type="checkbox"/> WLAN(802.11b/g/n(HT20)): 2 412 MHz ~ 2 462 MHz<br><input type="checkbox"/> WLAN(802.11n(HT40)): 2 422 MHz ~ 2 452 MHz<br><input type="checkbox"/> WLAN: 5 180 MHz ~ 5 320 MHz / 5 500 MHz ~ 5 700 MHz<br><input type="checkbox"/> WLAN: 5 745 MHz ~ 5 825 MHz<br><input checked="" type="checkbox"/> Bluetooth: 2 402 MHz ~ 2 480 MHz<br><input checked="" type="checkbox"/> Mesh: 2 405 MHz ~ 2 480 MHz |           |
| Max. Output Power           | Bluetooth BDR                                                                                                                                                                                                                                                                                                                                                                                                                     | 15.30 dBm |
|                             | Bluetooth EDR                                                                                                                                                                                                                                                                                                                                                                                                                     | 9.58 dBm  |
|                             | Bluetooth LE                                                                                                                                                                                                                                                                                                                                                                                                                      | 10.13 dBm |
|                             | Mesh                                                                                                                                                                                                                                                                                                                                                                                                                              | 17.81 dBm |
| Exposure Evaluation Applied | <input type="checkbox"/> MPE<br><input type="checkbox"/> SAR<br><input checked="" type="checkbox"/> N/A                                                                                                                                                                                                                                                                                                                           |           |

#### 3.2 Result

According to the procedure, KDB 447498 D01, the standalone SAR test exclusion threshold is

$$[(\text{Max. Power of channel, including tune-up tolerance, mW}) / (\text{Min. test separation distance, mm})] \times [\sqrt{f(\text{GHz})}] < 3$$

$$= (24.66/30) \times \sqrt{2.480} = 1.295 \text{ at Bluetooth BDR}$$

$$= (3.60/30) \times \sqrt{2.480} = 0.189 \text{ at Bluetooth EDR}$$

$$= (6.43/30) \times \sqrt{2.480} = 0.337 \text{ at Bluetooth LE}$$

$$= (8.69/30) \times \sqrt{2.475} = 0.456 \text{ at Mesh}$$

Conclusion: The SAR test exclusion threshold is less than 3, so the device meets the RF Exposure Requirement and excluded SAR Test.



페이지(page) : ( 7 )/( 총(Total) 7 )

| Operating Mode | Frequency<br>(MHz) | Target Power<br>(Average power)<br>W / tolerance | Max tune up power |       | Separation<br>distance<br>(mm) | RF<br>exposure | Limit |
|----------------|--------------------|--------------------------------------------------|-------------------|-------|--------------------------------|----------------|-------|
|                |                    | (dBm)                                            | (dBm)             | (mW)  |                                |                |       |
| Bluetooth BDR  | 2 480              | 13.42 ± 0.5                                      | 13.92             | 24.66 | 30                             | 1.295          | 3.00  |
| Bluetooth EDR  | 2 480              | 5.06 ± 0.5                                       | 5.56              | 3.60  | 30                             | 0.189          | 3.00  |
| Bluetooth LE   | 2 480              | 7.58 ± 0.5                                       | 8.08              | 6.43  | 30                             | 0.337          | 3.00  |
| Mesh           | 2 475              | 8.89 ± 0.5                                       | 9.39              | 8.69  | 30                             | 0.456          | 3.00  |

- END OF REPORT.