

# FCC RF Exposure Report

**FCC ID** : SQG-PINNACLE1  
**Equipment** : LTE Modem  
**Model No.** : Pinnacle 100  
**Brand Name** : Laird Connectivity  
**Applicant** : Laird Connectivity, Inc.  
**Address** : W66N220 Commerce Court, Cedarburg,  
Wisconsin 53012, USA  
**Standard** : 47 CFR FCC Part 2.1091  
**Received Date** : Apr. 16, 2019  
**Tested Date** : Apr. 16, 2019 ~ May 29, 2020

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:



Along Chen / Assistant Manager

Approved by:



Gary Chang / Manager



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## Release Record

| Report No. | Version | Description   | Issued Date   |
|------------|---------|---------------|---------------|
| FA950303   | Rev. 01 | Initial issue | Jun. 11, 2020 |

## 1 MPE EVALUATION OF MOBILE DEVICES

### 1.1 LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE

| Frequency Range (MHz) | Power Density (mW /cm <sup>2</sup> ) | Averaging Time (minutes) |
|-----------------------|--------------------------------------|--------------------------|
| 300~1500              | F/1500                               | 30                       |
| 1500~100000           | 1.0                                  | 30                       |

### 1.2 MPE EVALUATION FORMULA

$$Pd = \frac{Pt}{4 * Pi * R^2}$$

Where

Pd= Power density in mW/cm<sup>2</sup>

Pt= EIRP in mW

Pi= 3.1416

R= Measurement distance

### 1.3 DEVIATION FROM TEST STANDARD AND MEASUREMENT PROCEDURE

None

### 1.4 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

| Parameters      | Uncertainty |
|-----------------|-------------|
| Conducted power | ±0.808 dB   |

|                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Declaration of Conformity:</b>                                                                                                                                                                      |
| The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.                                           |
| <b>Comments and Explanations:</b>                                                                                                                                                                      |
| The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification. |

## 1.5 MPE EVALUATION RESULTS

| Frequency Range (MHz) | Maximum Conducted Power (dBm) | Rated Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Ratio* | Pass / Fail |
|-----------------------|-------------------------------|-------------------|--------------------|---------------|-------------------------------------|-----------------------------|--------|-------------|
| 1850 ~ 1910           | 24.17                         | 24.5              | 3.7                | 20            | 0.131                               | 1.000                       | 0.131  | Pass        |
| 1710 ~ 1755           | 24.08                         | 25.5              | 3.7                | 20            | 0.165                               | 1.000                       | 0.165  | Pass        |
| 824 ~ 849             | 23.98                         | 24.5              | 1.9                | 20            | 0.087                               | 0.549                       | 0.158  | Pass        |
| 699 ~ 716             | 24.21                         | 24.5              | 1.9                | 20            | 0.087                               | 0.466                       | 0.186  | Pass        |
| 777 ~ 787             | 23.67                         | 24.5              | 1.9                | 20            | 0.087                               | 0.518                       | 0.168  | Pass        |

Note: Refers to test report of FCC ID: N7NHL78. Test report no.: RF181126C15 / RF181126C15-1 / RF181126C15-2

\*Ratio = Power density / Limit.

| Frequency Range (MHz) | Maximum Conducted Power (dBm) | Rated Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Ratio* | Pass / Fail |
|-----------------------|-------------------------------|-------------------|--------------------|---------------|-------------------------------------|-----------------------------|--------|-------------|
| 2402 ~ 2480           | 6.37                          | 6.5               | 2.6                | 20            | 0.002                               | 1                           | 0.002  | Pass        |

\*Ratio = Power density / Limit.

## 1.6 MPE EVALUATION OF SIMULTANEOUS TRANSMISSION

| Mode                  | Max Ratio of Each Mode |
|-----------------------|------------------------|
| LTE                   | 0.186                  |
| BT LE                 | 0.002                  |
| Sum (WWAN 4G + BT LE) | 0.188                  |
| Limit                 | 1                      |
| Pass / Fail           | Pass                   |

## 1.7 MAXIMUM ANTENNA GAIN EVALUATION for LTE function

| Frequency Range (MHz) | Rated Power (dBm) | Max Gain to comply with MPE |               |                             | Max Gain to comply with ERP |               |
|-----------------------|-------------------|-----------------------------|---------------|-----------------------------|-----------------------------|---------------|
|                       |                   | Antenna Gain (dBi)          | Distance (cm) | Limit (mW/cm <sup>2</sup> ) | Antenna Gain (dBi)          | Limit (ERP,W) |
| 824 ~ 849             | 24.5              | <b>9.91</b>                 | 20            | 0.549                       | 16.10                       | 7             |
| 699 ~ 716             | 24.5              | <b>9.20</b>                 | 20            | 0.466                       | 12.42                       | 3             |
| 777 ~ 787             | 24.5              | <b>9.66</b>                 | 20            | 0.518                       | 12.42                       | 3             |

Note: In order to comply with both Maximum Permissible Exposure and ERP limit, the maximum antenna gain shall not be greater than boldface values in each mode.

| Frequency Range (MHz) | Rated Power (dBm) | Max Gain to comply with MPE |               |                             | Max Gain to comply with EIRP |                |
|-----------------------|-------------------|-----------------------------|---------------|-----------------------------|------------------------------|----------------|
|                       |                   | Antenna Gain (dBi)          | Distance (cm) | Limit (mW/cm <sup>2</sup> ) | Antenna Gain (dBi)           | Limit (EIRP,W) |
| 1850 ~ 1910           | 24.5              | 12.51                       | 20            | 1                           | <b>8.51</b>                  | 2              |
| 1710 ~ 1755           | 24.5              | 12.51                       | 20            | 1                           | <b>5.50</b>                  | 1              |

Note: In order to comply with both Maximum Permissible Exposure and EIRP limit, the maximum antenna gain shall not be greater than boldface values in each mode.

| Maximum Antenna gain for Simultaneous transmission MPE ( LTE + BT ) |                   |                   |                             |              |             |       |
|---------------------------------------------------------------------|-------------------|-------------------|-----------------------------|--------------|-------------|-------|
| Frequency Range (MHz)                                               | Rated Power (dBm) | Antenna Gain(dBi) | Limit (mW/cm <sup>2</sup> ) | Ratio of LTE | Ratio of BT | Limit |
| 824 ~ 849                                                           | 24.5              | 9.902             | 0.549                       | 0.998        | 0.002       | 1     |
| 699 ~ 716                                                           | 24.5              | 9.188             | 0.466                       | 0.998        | 0.002       | 1     |
| 777 ~ 787                                                           | 24.5              | 9.647             | 0.518                       | 0.998        | 0.002       | 1     |

### Conclusion

Maximum antenna gain for LTE to meet EIRP/ ERP and MPE limit is as below

| Frequency Range (MHz) | Rated Power (dBm) | Maximum antenna gain (dBi) |
|-----------------------|-------------------|----------------------------|
| 824 ~ 849             | 24.5              | 9.902                      |
| 699 ~ 716             | 24.5              | 9.188                      |
| 777 ~ 787             | 24.5              | 9.647                      |
| 1850 ~ 1910           | 24.5              | 8.51                       |
| 1710 ~ 1755           | 24.5              | 5.50                       |

## 2 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

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