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: **Approved by:**

Along Chen / Assistant Manager **Gary Chang / Manager**

Testing Laboratory 2732

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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^2)	Averaging Time (minutes)
300~1500	F/1500	30
1500~100000	1.0	30

1.2 MPE EVALUATION FORMULA

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

Where

Pd= Power density in mW/cm^2
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

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
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^2)	Limit (mW/cm^2)	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^2)	Limit (mW/cm^2)	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^2)	Antenna Gain (dBi)	Limit (ERP,W)
824 ~ 849	24.5	**9.91**	20	0.549	16.10	7
699 ~ 716	24.5	**9.20**	20	0.466	12.42	3
777 ~ 787	24.5	**9.66**	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^2)	Antenna Gain (dBi)	Limit (EIRP,W)
1850 ~ 1910	24.5	12.51	20	1	**8.51**	2
1710 ~ 1755	24.5	12.51	20	1	**5.50**	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^2)	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.

Linkou	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C..

If you have any suggestion, please feel free to contact us as below information

Tel: 886-3-271-8666
Fax: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

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