

# Radio Exposure Evaluation Report

**FCC ID** : 2AXZJ-CTX0710

**Equipment** : Telematics Control Unit

**Brand Name** : Lucid USA, Inc

**Model Name** : P11-K290G0

**Applicant** : Lucid USA, Inc  
Lucid Motors, Inc 7373 Gateway Blvd, Newark,  
California, United States, 94560

**Manufacturer** : Lucid USA, Inc  
Lucid Motors, Inc 7373 Gateway Blvd, Newark,  
California, United States, 94560

**Standard** : 47 CFR FCC Part 2 Subpart J, section 2.1091

The product was received on May 20, 2021, and testing was started from May 20, 2021 and completed on Jun. 12, 2021. We, SPORTON INTERNATIONAL INC. Hsinhua Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR FCC Part 2 Subpart J, section 2.1091 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Hsinhua Laboratory, the test report shall not be reproduced except in full.



Approved by: Allen Lin

**SPORTON INTERNATIONAL INC. Hsinhua Laboratory**  
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### **Photographs of EUT V01**





## Summary of Test Result

| Report Clause | Ref Std. Clause | Test Items          | Result (PASS/FAIL) | Remark |
|---------------|-----------------|---------------------|--------------------|--------|
| 2             | -               | Exposure evaluation | PASS               | -      |

**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:**

None

**Reviewed by: Sam Tsai**

**Report Producer: Debby Hung**

# 1 General Description

## 1.1 Information

### 1.1.1 EUT General Information

| RF General Information |                        |                           |                                                                                                 |
|------------------------|------------------------|---------------------------|-------------------------------------------------------------------------------------------------|
| Evaluation Mode        | Frequency Range (MHz)  | Operating Frequency (MHz) | Modulation Type                                                                                 |
| 2.4GHz WLAN            | 2400-2483.5            | 2412-2462                 | 802.11b: DSSS (DBPSK, DQPSK, CCK)<br>802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)                 |
| 5GHz WLAN              | 5150-5250<br>5725-5850 | 5180-5240<br>5745-5825    | 802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)<br>802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) |

| RF General Information |                 |                    |                    |                              |
|------------------------|-----------------|--------------------|--------------------|------------------------------|
| Evaluation Mode        | Bandwidth (MHz) | TX Frequency (MHz) | RX Frequency (MHz) | Modulation Type              |
| GSM 850                | 0.2             | 824.2 – 849.2      | 869.2 – 894.2      | GSM/GPRS: GMSK<br>EDGE: 8PSK |
| PCS 1900               | 0.2             | 1850.2 - 1909.8    | 1930.2 - 1989.8    |                              |
| WCDMA Band V           | 5               | 826.4 - 846.6      | 871.4 - 891.6      | HSDPA: QPSK/16QAM            |
| WCDMA Band II          | 5               | 1852.4 - 1907.6    | 1932.4 - 1987.6    |                              |
| WCDMA Band IV          | 5               | 1712.4 - 1752.6    | 2112.4 - 2152.6    |                              |
| LTE Band 2             | 1.4             | 1850.7 - 1909.3    | 1930.7 - 1989.3    | QPSK / 16 QAM                |
|                        | 3               | 1851.5 - 1908.5    | 1931.5 - 1988.5    |                              |
|                        | 5               | 1852.5 - 1907.5    | 1932.5 - 1987.5    |                              |
|                        | 10              | 1855.0 - 1905.0    | 1935.0 - 1985.0    |                              |
|                        | 15              | 1857.5 - 1902.5    | 1937.5 - 1982.5    |                              |
|                        | 20              | 1860.0 - 1900.0    | 1940.0 - 1980.0    |                              |
| LTE Band 4             | 1.4             | 1710.7 - 1754.3    | 1.4                |                              |
|                        | 3               | 1711.5 - 1753.5    | 3                  |                              |
|                        | 5               | 1712.5 - 1752.5    | 5                  |                              |
|                        | 10              | 1715.0 - 1750.0    | 10                 |                              |
|                        | 15              | 1717.5 - 1747.5    | 15                 |                              |
|                        | 20              | 1720.0 - 1745.0    | 20                 |                              |
| LTE Band 5             | 1.4             | 824.7 - 848.3      | 869.7 - 893.3      |                              |
|                        | 3               | 825.5 - 847.5      | 870.5 - 892.5      |                              |
|                        | 5               | 826.5 - 846.5      | 871.5 - 891.5      |                              |
|                        | 10              | 829.0 - 844.0      | 874.0 - 889.0      |                              |



|             |     |                 |                 |               |
|-------------|-----|-----------------|-----------------|---------------|
| LTE Band 7  | 5   | 2502.5 – 2567.5 | 2622.5 – 2687.5 | QPSK / 16 QAM |
|             | 10  | 2505 – 2565     | 2625 – 2685     |               |
|             | 15  | 2507.5 – 2562.5 | 2627.5 – 2682.5 |               |
|             | 20  | 2510 - 2560     | 2630 - 2680     |               |
| LTE Band 12 | 1.4 | 699.7 - 715.3   | 729.7 - 745.3   |               |
|             | 3   | 700.5 - 714.5   | 730.5 - 744.5   |               |
|             | 5   | 701.5 - 713.5   | 731.5 - 743.5   |               |
|             | 10  | 704.0 - 711.0   | 734.0 - 741.0   |               |
| LTE Band 13 | 5   | 779.5 - 784.5   | 748.5 - 753.5   |               |
|             | 10  | 782.0           | 751.0           |               |
| LTE Band 29 | 3   | -               | 718.5-726.5     |               |
|             | 5   | -               | 719.5-725.5     |               |
|             | 10  | -               | 722-723         |               |
| LTE Band 66 | 1.4 | 1710.7 - 1779.3 | 2110.7 - 2179.3 |               |
|             | 3   | 1711.5 - 1778.5 | 2111.5 - 2178.5 |               |
|             | 5   | 1712.5 - 1777.5 | 2112.5 - 2177.5 |               |
|             | 10  | 1715 - 1775     | 2115 - 2175     |               |
|             | 15  | 1717.5 - 1772.5 | 2117.5 - 2172.5 |               |
|             | 20  | 1720 - 1770     | 2120 - 2170     |               |

**1.1.2 Antenna Information**

| Ant. | Brand    | Model Name                | Antenna Type | Connector |
|------|----------|---------------------------|--------------|-----------|
| 1    | Amphenol | L: UDB332-04-000-C        | FPC          | FARKA     |
| 2    | Amphenol | R: UDB332-04-100-C        | FPC          | FARKA     |
| 3    | Amphenol | L :UDB331-04-000-C-SHT180 | FPC          | FARKA     |
| 4    | Amphenol | R: UDB331-04-100-C-SHT180 | FPC          | FARKA     |

| Ant. | Port | 2.4G Gain (dBi) |       |       |       |       |       | Remark<br>(Note. 1) |
|------|------|-----------------|-------|-------|-------|-------|-------|---------------------|
|      |      | 2400            | 2420  | 2440  | 2460  | 2480  | 2500  |                     |
| 1    | 1    | 4.07            | 3.64  | 2.57  | 4.07  | 3.24  | 3.28  | w/o cable           |
|      |      | -0.88           | -1.31 | -2.38 | -0.88 | -1.71 | -1.67 | with cable          |

| Ant. | Port | 5G Gain (dBi) |       |       |       |       |       |       | Remark<br>(Note. 2) |
|------|------|---------------|-------|-------|-------|-------|-------|-------|---------------------|
|      |      | 5150          | 5200  | 5250  | 5700  | 5750  | 5800  | 5850  |                     |
| 1~2  | 1~2  | 4.04          | 4.05  | 3.53  | 3.52  | 3.62  | 4.16  | 2.26  | w/o cable           |
|      |      | -3.35         | -3.34 | -3.86 | -4.36 | -4.26 | -3.72 | -5.62 | with cable          |

| Ant. | Port | WWAN 2G/3G Gain (dBi) |          |              |              |              | Remark<br>(Note. 3) |
|------|------|-----------------------|----------|--------------|--------------|--------------|---------------------|
|      |      | GSM 850               | PCS 1900 | WCDMA Band 2 | WCDMA Band 4 | WCDMA Band 5 |                     |
| 3~4  | 1~2  | 5.41                  | 4.47     | 4.47         | 4.2          | 5.41         | w/o cable           |
|      |      | 0.57                  | -0.37    | -0.37        | -0.64        | 0.57         | with cable          |

| Ant. | Port | WWAN 4G Gain (dBi) |               |            |            |             |             | Remark<br>(Note. 3) |
|------|------|--------------------|---------------|------------|------------|-------------|-------------|---------------------|
|      |      | LTE Band 2         | LTE Band 4/66 | LTE Band 5 | LTE Band 7 | LTE Band 12 | LTE Band 13 |                     |
| 3~4  | 1~2  | 4.47               | 4.2           | 5.41       | 1.5        | 5.7         | 6.9         | w/o cable           |
|      |      | -0.37              | -0.64         | 0.57       | -3.34      | 0.86        | 2.06        | with cable          |

Note 1: WLAN 2.4G cable loss = 4.95 dB.

Note 2: WLAN 5GHz Band 1 cable loss = 7.39 dB, and 5GHz Band 4 cable loss = 7.88 dB.

Note 3: WWAN cable loss = 4.84 dB.

Note 4: The EUT has four antennas.

**For 2.4GHz function:**

For IEEE 802.11 b/g/n mode (1TX/1RX)

Ant. 1 (port 1) could transmit/receive.

**For 5GHz function:**

For IEEE 802.11 a/n/ac mode (2TX/2RX)

Ant. 1 (port 1) and Ant. 2 (port 2) could transmit/receive simultaneously.

**For WWAN function (1TX/2RX):**

Ant. 3 (port 1) could transmit, and Ant. 3 (port 1) and Ant. 4 (port 2) could receive simultaneously.

**1.1.3 Accessories**

| Accessories               |             |                                                  |
|---------------------------|-------------|--------------------------------------------------|
| DC Power Cable            | Signal Line | 2.51 meter, non-shielded cable, w/o ferrite core |
| USB 3.0 Cable             | Signal Line | 0.5 meter, non-shielded cable, w/o ferrite core  |
| RJ45 Cable                | Signal Line | 0.5 meter, non-shielded cable, w/o ferrite core  |
| APTIV Cable               | Signal Line | 15 meter, shielded cable, w/o ferrite core       |
| Antenna Cable (WiFi*2)    | Signal Line | 5.41 meter, shielded cable, w/o ferrite core     |
| Antenna Cable (LTE L & R) | Signal Line | 5.83 meter, shielded cable, w/o ferrite core     |
| GPS Cable                 | Signal Line | 5.16 meter, shielded cable, w/o ferrite core     |

Reminder: Regarding to more detail and other information, please refer to user manual.

**1.2 Testing Location**

| Test Lab. : Sporton International Inc. Hsinhua Laboratory |                             |                                                                                                                                                         |
|-----------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/>                       | Hsinhua<br>(TAF: 3785)      | <b>ADD:</b> No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)<br><b>TEL:</b> 886-3-327-3456 <b>FAX:</b> 886-3-327-0973          |
| Test site Designation No. TW3785 with FCC.                |                             |                                                                                                                                                         |
| <input type="checkbox"/>                                  | Wen 33rd.St.<br>(TAF: 3785) | <b>ADD:</b> No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)<br><b>TEL:</b> 886-3-318-0787 <b>FAX:</b> 886-3-318-0287 |
| Test site Designation No. TW0008 with FCC.                |                             |                                                                                                                                                         |

## 2 Maximum Permissible Exposure

### 2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|------------------------------------------|------------------------------------------------------------------|
| 0.3-3.0               | 614                               | 1.63                              | (100)*                                   | 6                                                                |
| 3.0-30                | 1842 / f                          | 4.89 / f                          | (900 / f <sup>2</sup> )*                 | 6                                                                |
| 30-300                | 61.4                              | 0.163                             | 1.0                                      | 6                                                                |
| 300-1500              | -                                 | -                                 | F/300                                    | 6                                                                |
| 1500-100,000          | -                                 | -                                 | 5                                        | 6                                                                |

(B) Limits for General Population / Uncontrolled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|------------------------------------------|------------------------------------------------------------------|
| 0.3-1.34              | 614                               | 1.63                              | (100)*                                   | 30                                                               |
| 1.34-30               | 824/f                             | 2.19/f                            | (180/f <sup>2</sup> )*                   | 30                                                               |
| 30-300                | 27.5                              | 0.073                             | 0.2                                      | 30                                                               |
| 300-1500              | -                                 | -                                 | F/1500                                   | 30                                                               |
| 1500-100,000          | -                                 | -                                 | 1.0                                      | 30                                                               |

Note: f = frequency in MHz ; \*Plane-wave equivalent power density

#### Multiple Transmitters Condition

Co-location as simultaneously transmitting (co-transmitting) and the evaluation shall be consider that simultaneous transmissions from co-located devices the individual transmitters are evaluated separately. After sum of the individual value (basic restriction / reference level) are measured/calculated also have to under basic restriction / reference level.

Co-transmitting mode: 2.4GHz WLAN + WWAN ; 5GHz WLAN + WWAN

### 2.2 MPE Calculation Method

The MPE was calculated at 22 cm to show compliance with the power density limit.  
The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

**E** = Electric field (V/m)

**P** = RF output power (W)

**G** = EUT Antenna numeric gain (numeric)

**d** = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

## 2.3 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

### Co-TX (2.4GHz WLAN + WWAN)

| Mode     | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Tune-up EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) | Ratio (S/Limit) |
|----------|----------|-------------|------------|----------------|--------------------|------------------|---------------|-------------------------|-------------------------------|-----------------|
| 2.4G;G1D | -2.38    | 19.60       | 17.22      | 0.50           | 17.72              | 0.05916          | 22            | 0.00973                 | 1.00000                       | 0.00973         |
| 850;GXW  | 0.57     | 33.89       | 34.46      | 0.50           | 34.96              | 3.13329          | 22            | 0.51516                 | 0.56587                       | 0.91039         |
|          |          |             |            |                |                    |                  |               |                         | Sum Ratio                     | 0.92012         |
|          |          |             |            |                |                    |                  |               |                         | Ratio Limit                   | 1               |

### Co-TX (5GHz WLAN + WWAN)

| Mode     | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Tune-up EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) | Ratio (S/Limit) |
|----------|----------|-------------|------------|----------------|--------------------|------------------|---------------|-------------------------|-------------------------------|-----------------|
| 5.8G;D1D | -3.72    | 15.95       | 12.23      | 0.50           | 12.73              | 0.01875          | 22            | 0.00308                 | 1.00000                       | 0.00308         |
| 850;GXW  | 0.57     | 33.89       | 34.46      | 0.50           | 34.96              | 3.13329          | 22            | 0.51516                 | 0.56587                       | 0.91039         |
|          |          |             |            |                |                    |                  |               |                         | Sum Ratio                     | 0.91347         |
|          |          |             |            |                |                    |                  |               |                         | Ratio Limit                   | 1               |

————THE END————