

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) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
5GHz WLAN	5150-5250 5725-5850	5180-5240 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 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 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 (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 (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 (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 (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		
☒	Hsinhua (TAF: 3785)	ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.) TEL: 886-3-327-3456 FAX: 886-3-327-0973
Test site Designation No. TW3785 with FCC.		
☐	Wen 33rd.St. (TAF: 3785)	ADD: No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: 886-3-318-0787 FAX: 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 ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f ²)*	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 ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	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:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

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 ²)	S Limit (mW/cm ²)	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 ²)	S Limit (mW/cm ²)	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—————