

Radio Exposure Evaluation Report

FCC ID : 2AXZJ-CTX0700
Equipment : Telematics Control Unit
Brand Name : Lucid USA, Inc
Model Name : P11-K29000
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 Part 2.1091

The product was received on Sep. 08, 2020, and testing was started from Sep. 08, 2020 and completed on Oct. 01, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 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. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Allen Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issued Date
FA000705	01	Initial issue of report	Nov. 25, 2020
FA000705	02	Add Antenna Information (This report is the latest version replacing for the report issued on Nov. 25, 2020)	Nov. 26, 2020
FA000705	03	Update Equipment and Model name (This report is the latest version replacing for the report issued on Nov. 26, 2020)	Dec. 16, 2020

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: Ann Hou

1 General Description

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	
	10	2505 – 2565	2625 – 2685	

LTE Band 12	15	2507.5 – 2562.5	2627.5 – 2682.5
	20	2510 - 2560	2630 - 2680
	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
LTE Band 13	10	704.0 - 711.0	734.0 - 741.0
	5	779.5 - 784.5	748.5 - 753.5
	10	782.0	751.0

1.2 Testing Location

Testing Location			
☒	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)	
		TEL : 886-3-327-3456	FAX : 886-3-327-0973
Test site Designation No. TW1190 with FCC.			
☐	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.)	
		TEL : 886-3-656-9065	FAX : 886-3-656-9085
Test site Designation No. TW0006 with FCC.			

1.3 Antenna Information

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

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	2.85	2.33	2.11	6.3	w/o cable
		0.57	-1.99	-2.51	-2.73	1.46	with cable

Ant.	Port	WWAN 4G Gain (dBi)							Remark (Note. 3)
		LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 7	LTE Band 12	LTE Band 13	LTE Band 29	
3~4	1~2	2.33	2.11	6.3	1.88	6.8	6.8	5.7	w/o cable
		-2.51	-2.73	1.46	-2.96	1.96	1.96	0.86	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.

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

2.2 MPE Calculation Method

The MPE was calculated at 25 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

2.4GHz WLAN

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)
2.4G;G1D	-1.31	21.98	20.67	0.50	21.17	0.13092	25	0.01667	1.00000
2.4G;D1D	-0.88	19.60	18.72	0.50	19.22	0.08356	25	0.01064	1.00000

5GHz WLAN

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)
5.2G;D1D	-3.34	17.59	14.25	0.50	14.75	0.02985	25	0.00380	1.00000
5.8G;D1D	-3.72	18.28	14.56	0.50	15.06	0.03206	25	0.00408	1.00000

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)
850;GXW	0.57	31.64	32.21	0.50	32.71	1.86638	25	0.23763	0.54947
1900;GXW	-1.99	28.26	26.27	0.50	26.77	0.47534	25	0.06052	1.00000
02;F9W	-2.51	22.53	20.02	0.50	20.52	0.11272	25	0.01435	1.00000
04;F9W	-2.73	23.29	20.56	0.50	21.06	0.12764	25	0.01625	1.00000
05;F9W	1.46	23.63	25.09	0.50	25.59	0.36224	25	0.04612	0.55760
02;G7D	-2.51	22.20	19.69	0.50	20.19	0.10447	25	0.01330	1.00000
02;W7D	-2.51	21.49	18.98	0.50	19.48	0.08872	25	0.01130	1.00000
04;G7D	-2.73	22.18	19.45	0.50	19.95	0.09886	25	0.01259	1.00000
04;W7D	-2.73	21.34	18.61	0.50	19.11	0.08147	25	0.01037	1.00000
05;G7D	1.46	22.49	23.95	0.50	24.45	0.27861	25	0.03547	0.55767
05;W7D	1.46	21.76	23.22	0.50	23.72	0.23550	25	0.02999	0.54980
07;G7D	-2.96	20.37	17.41	0.50	17.91	0.06180	25	0.00787	1.00000
07;W7D	-2.96	19.65	16.69	0.50	17.19	0.05236	25	0.00667	1.00000
12;G7D	1.96	22.25	24.21	0.50	24.71	0.29580	25	0.03766	0.47167
12;W7D	1.96	21.48	23.44	0.50	23.94	0.24774	25	0.03154	0.47167
13;G7D	1.96	22.02	23.98	0.50	24.48	0.28054	25	0.03572	0.52133
13;W7D	1.96	21.25	23.21	0.50	23.71	0.23496	25	0.02992	0.51967

**Co-TX (2.4GHz WLAN + 5GHz WLAN + WWAN)**

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm2)	S Limit (mW/cm2)	Ratio (S/Limit)
2.4G;G1D	-1.31	21.98	20.67	0.50	21.17	0.13092	25	0.01667	1.00000	0.01667
5.8G;D1D	-3.72	18.28	14.56	0.50	15.06	0.03206	25	0.00408	1.00000	0.00408
850;GXW	0.57	31.64	32.21	0.50	32.71	1.86638	25	0.23763	0.54947	0.43248
									Sum Ratio	0.45323
									Ratio Limit	1

————THE END————