TEST REPORT

Applicant:	UCLOUDLINK (SINGAPORE) PTE. LTD
Address:	80 ROBINSON ROAD #02-00, SINGAPORE
Equipment Type:	4G LTE Wireless Router
Model Name:	GLMR23A01
Brand Name:	GlocalMe
FCC ID:	2BB6E-GLMR23A01
Test Standard:	47 CFR Part 2.1091 KDB 447498 D04 v01
Sample Arrival Date:	Jul. 14, 2023
Test Date:	Jul. 20, 2023 - Sep. 05, 2023
Date of Issue:	Sep. 25, 2023

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Xiong Lining **Checked by:** Xu Rui **Approved by:** Tolan Tu

(Testing Director)

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Sep. 20, 2023	Initial Issue
Rev. 02	Sep. 25, 2023	Update RF module Model Name

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☑ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	UCLOUDLINK (SINGAPORE) PTE. LTD
Address	80 ROBINSON ROAD #02-00, SINGAPORE

2.2 Manufacturer Information

Manufacturer	UCLOUDLINK (SINGAPORE) PTE. LTD
Address	80 ROBINSON ROAD #02-00, SINGAPORE

2.3 General Description for Equipment under Test (EUT)

EUT Name	4G LTE Wireless Router
Model Name Under Test	GLMR23A01
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Ancillary Equipment

Note: Not applicable.

2.5 Technical Information

Network and Wireless connectivity	EC25-AFXD 3G Network WCDMA/HSDPA/HSUPA Band 2/4/5 EC25-AFXD 4G Network LTE FDD Band 2/4/5/12/13/14/66/71 EG120K-NA 4G Network LTE FDD Band 2/4/5/7/12/13/14/25/26/30/66/71 LTE TDD Band 41/48 LTE CA Uplink(UL): CA_5B, CA_7C, CA_41C WIFI 802.11a, 802.11b, 802.11g, 802.11n and 802.11ac U-NII-1/3

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	WCDMA, LTE, 2.4G WLAN, 5G WLAN		
Frequency Range	WWAN EC25-AFXD		
	WCDMA Band 2	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	WCDMA Band 4	TX: 1710 ~ 1755 MHz	RX: 2110 ~ 2155 MHz
	WCDMA Band 5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE Band 2	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	LTE Band 4	TX: 1710 ~ 1755 MHz	RX: 2110 ~ 2155 MHz
	LTE Band 5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE Band 12	TX: 699 ~ 716 MHz	RX: 729 ~ 746 MHz
	LTE Band 13	TX: 777 ~ 787 MHz	RX: 746 ~ 756 MHz
	LTE Band 14	TX: 788 ~ 798 MHz	RX: 758 ~ 768 MHz
	LTE Band 66	TX: 1710 ~ 1780 MHz	RX: 2110 ~ 2200 MHz
	LTE Band 71	TX: 663 ~ 698 MHz	RX: 617 ~ 652 MHz
	WWAN EG120K-NA		
	LTE Band 2	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	LTE Band 4	TX: 1710 ~ 1755 MHz	RX: 2110 ~ 2155 MHz
	LTE Band 5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE Band 7	TX: 2500 ~ 2570 MHz	RX: 2620 ~ 2690 MHz
	LTE Band 12	TX: 699 ~ 716 MHz	RX: 729 ~ 746 MHz
	LTE Band 13	TX: 777 ~ 787 MHz	RX: 746 ~ 756 MHz
	LTE Band 14	TX: 788 ~ 798 MHz	RX: 758 ~ 768 MHz
	LTE Band 25	TX: 1850 ~ 1915 MHz	RX: 1930 ~ 1995 MHz
	LTE Band 26	TX: 814 ~ 824 MHz & 824 ~ 849 MHz	RX: 859 ~ 869 MHz & 869 ~ 894 MHz
	LTE Band 30	TX: 2305 ~ 2315 MHz	RX: 2350 ~ 2360 MHz
	LTE Band 66	TX: 1710 ~ 1780 MHz	RX: 2110 ~ 2200 MHz
	LTE Band 71	TX: 663 ~ 698 MHz	RX: 617 ~ 652 MHz
	LTE Band 41	TX: 2496 ~ 2690 MHz	RX: 2496 ~ 2690 MHz
	LTE Band 48	TX: 3550 ~ 3700 MHz	RX: 3550 ~ 3700 MHz
	WLAN		
	802.11b/g /n(HT20/HT40)	2412 ~ 2462 MHz	
	802.11a	5150 ~ 5250 MHz	

		5725 ~ 5850 MHz
	802.11n(HT20/HT40)	5150 ~ 5250 MHz
		5725 ~ 5850 MHz
	802.11ac(VHT20/ VHT40/VHT80)	5150 ~ 5250 MHz
		5725 ~ 5850 MHz
Antenna Type	WWAN EC25-AFXD	PIFA Antenna
	WWAN EG120K-NA	Dipole Antenna
	WLAN	PIFA Antenna
Exposure Category	General Population/Uncontrolled Exposure	
Product Type	Mobile Device	

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices
2	KDB 447498 D04 v01	447498 D04 Interim General RF Exposure Guidance v01

4 DEVICE CATEGORY AND LEVELS LIMITS

Mobile Device:

CFR Title 47 §2.1091(b)

(b) For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

FCC KDB 447498 D04 General RF Exposure Guidance v01 Limit

Evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP20cm in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

$$P_{\text{th}}\ (\text{mW}) = ERP_{20\,\text{cm}}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases} \qquad (\text{B.1})$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i. e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold Pth (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by Formula (B.2).

$$P_{\text{th}}\,(\text{mW}) = \begin{cases} ERP_{20\,\text{cm}}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\,\text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases} \qquad \text{(B.2)}$$

where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\,\text{cm}}\sqrt{f}}\right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ is per Formula (B.1).
The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

5 ASSESSMENT RESULT

5.1 Output Power

WCDMA-EC25-AFXD			
Mode	Band 2	Band 4	Band 5
Conducted Power (dBm)	23.17	23.39	23.01
Antenna Gain (dBi)	1.68	2.34	3.45
EIRP/ERP (dBm)	24.85	25.73	24.31
Note: This report listed the worst case conducted power value, please refer to BL-SZ2370759-501 for more details.			

LTE-EC25-AFXD			
Mode	Band 2	Band 4	Band 5
Conducted Power (dBm)	23.85	23.72	23.61
Antenna Gain (dBi)	1.68	2.34	3.45
EIRP/ERP (dBm)	25.53	26.06	24.91
Mode	Band 12	Band 13	Band 14
Conducted Power (dBm)	23.74	23.85	23.90
Antenna Gain (dBi)	0.43	3.79	3.79
EIRP/ERP (dBm)	22.02	25.49	25.54
Mode	Band 66	Band 71	/
Conducted Power (dBm)	23.82	23.47	/
Antenna Gain (dBi)	2.34	0.20	/
EIRP/ERP (dBm)	26.16	23.67	/
Note: This report listed the worst case conducted power value, please refer to BL-SZ2370759-501 for more details.			

LTE-EG120K-NA			
Mode	Band 2	Band 4	Band 5
Conducted Power (dBm)	23.35	23.14	23.19
Antenna Gain (dBi)	2.00	2.80	-0.01
EIRP/ERP (dBm)	25.35	25.94	21.03
Mode	Band 7	Band 12	Band 13
Conducted Power (dBm)	22.93	23.05	23.09
Antenna Gain (dBi)	2.97	-0.14	-0.29
EIRP/ERP (dBm)	25.90	20.76	20.65
Mode	Band 14	Band 25	Band 26 (Part22)
Conducted Power (dBm)	23.15	23.09	23.02
Antenna Gain (dBi)	-0.28	2.00	-0.01
EIRP/ERP (dBm)	20.72	25.09	20.86
Mode	Band 26 (Part90)	Band 30	Band 66
Conducted Power (dBm)	23.09	22.73	23.42
Antenna Gain (dBi)	-0.01	1.05	2.80
EIRP/ERP (dBm)	20.93	23.78	26.22
Mode	Band 71	Band 41	Band 48
Conducted Power (dBm)	23.46	22.91	22.67
Antenna Gain (dBi)	-0.6	2.98	0.29
EIRP/ERP (dBm)	22.86	25.89	22.96
Note: This report listed the worst case conducted power value, please refer to BL-SZ2370759-502 for more details.			

2.4G WIFI			
Mode	Main Antenna	Aux. Antenna	MIMO
Conducted Power (dBm)	23.71	22.05	24.80
Antenna Gain (dBi)	3.33	2.37	2.88
EIRP (dBm)	27.04	24.42	27.68
Note: This report listed the worst case conducted power value, please refer to BL-SZ2370759-601 for more details.			

5.2G WIFI			
Mode	Main Antenna	Aux. Antenna	MIMO
Conducted Power (dBm)	14.20	14.16	17.38
Antenna Gain (dBi)	0.82	0.25	0.54
EIRP (dBm)	15.02	14.41	17.92
5.8G WIFI			
Mode	Main Antenna	Aux. Antenna	MIMO
Conducted Power (dBm)	14.37	14.12	17.43
Antenna Gain (dBi)	1.87	2.94	2.44
EIRP (dBm)	16.24	17.06	19.87
Note: This report listed the worst case conducted power value, please refer to BL-SZ2370759-602 for more details.			

5.2 Tune-up power

Mode		Conducted Power Range (dBm)	EIRP Range (dBm)	ERP Range (dBm)
WCDMA (EC25-AFXD)	Band 2	[21.50,23.50]	[23.18,25.18]	[21.03,23.03]
	Band 4	[21.50,23.50]	[23.84,25.84]	[21.69,23.69]
	Band 5	[21.50,23.50]	/	[22.80,24.80]
LTE (EC25-AFXD)	Band 2	[22.00,24.00]	[23.68,25.68]	[21.53,23.53]
	Band 4	[22.00,24.00]	[24.34,26.34]	[22.19,24.19]
	Band 5	[22.00,24.00]	/	[23.30,25.30]
	Band 12	[22.00,24.00]	/	[20.28,22.28]
	Band 13	[22.00,24.00]	/	[23.64,25.64]
	Band 14	[22.00,24.00]	/	[23.64,25.64]
	Band 66	[22.00,24.00]	[24.34,26.34]	[22.19,24.19]
	Band 71	[22.00,24.00]	[22.20,24.20]	[20.05,22.05]
LTE (EG120K-NA)	Band 2	[21.50,23.50]	[23.50,25.50]	[21.35,23.35]
	Band 4	[21.50,23.50]	[24.30,26.30]	[22.15,24.15]
	Band 5	[21.50,23.50]	/	[19.34,21.34]
	Band 7	[21.50,23.50]	[24.47,26.47]	[22.32,24.32]
	Band 12	[21.50,23.50]	/	[19.21,21.21]
	Band 13	[21.50,23.50]	/	[19.06,21.06]
	Band 14	[21.50,23.50]	/	[19.07,21.07]
	Band 25	[21.50,23.50]	[23.50,25.50]	[21.35,23.35]
	Band 26 (Part22)	[21.50,23.50]	/	[19.34,21.34]
	Band 26 (Part90)	[21.50,23.50]	/	[19.34,21.34]
	Band 30	[21.50,23.50]	[22.55,24.55]	[20.40,22.40]
	Band 66	[21.50,23.50]	[24.30,26.30]	[22.15,24.15]
	Band 71	[21.50,23.50]	[20.90,22.90]	[18.75,20.75]
	Band 41	[21.50,23.50]	[24.48,26.48]	[22.33,24.33]
	Band 48	[21.50,23.50]	[21.79,23.79]	[19.64,21.64]
2.4G WIFI	Main	[22.00,24.00]	[25.33,27.33]	[23.18,25.18]
	Aux.	[20.50,22.50]	[22.87,24.87]	[20.72,22.72]
	MIMO	[23.00,25.00]	[25.88,27.88]	[23.73,25.73]
5.2G WIFI	Main	[13.00,15.00]	[13.82,15.82]	[11.67,13.67]
	Aux.	[13.00,15.00]	[13.25,15.25]	[11.10,13.10]
	MIMO	[15.50,17.50]	[16.04,18.04]	[13.89,15.89]
5.8G WIFI	Main	[13.00,15.00]	[14.87,16.87]	[12.72,14.72]
	Aux.	[13.00,15.00]	[15.94,17.94]	[13.79,15.79]
	MIMO	[15.50,17.50]	[17.94,19.94]	[15.79,17.79]

Note1: ERP= EIRP -2.15dB.

Note2: According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value Pth.

5.3 RF Exposure Evaluation Result

Evolution mode		Maximum power (dBm)	Maximum power (mw)	Distance (mm)	Threshold Power (mW)	Power / Limit	Verdict
WCDMA (EC25-AFXD)	Band 2	23.50	223.87	200	3060.00	0.073	Pass
	Band 4	23.69	233.88	200	3060.00	0.076	Pass
	Band 5	24.80	302.00	200	1680.96	0.180	Pass
LTE (EC25-AFXD)	Band 2	24.00	251.19	200	3060.00	0.082	Pass
	Band 4	24.19	262.42	200	3060.00	0.086	Pass
	Band 5	25.30	338.84	200	1680.96	0.202	Pass
	Band 12	24.00	251.19	200	1425.96	0.176	Pass
	Band 13	25.64	366.44	200	1521.84	**0.241**	Pass
	Band 14	25.64	366.44	200	1546.32	0.237	Pass
	Band 66	24.19	262.42	200	3060.00	0.086	Pass
	Band 71	24.00	251.19	200	1352.52	0.186	Pass
LTE (EG120K-NA)	Band 2	23.50	223.87	200	3060.00	0.073	Pass
	Band 4	24.15	260.02	200	3060.00	0.085	Pass
	Band 5	23.50	223.87	200	1680.96	0.133	Pass
	Band 7	24.32	270.40	200	3060.00	0.088	Pass
	Band 12	23.50	223.87	200	1425.96	0.157	Pass
	Band 13	23.50	223.87	200	1521.84	0.147	Pass
	Band 14	23.50	223.87	200	1546.32	0.145	Pass
	Band 25	23.50	223.87	200	3060.00	0.073	Pass
	Band 26 (Part22)	23.50	223.87	200	1680.96	0.133	Pass
	Band 26 (Part90)	23.50	223.87	200	1660.56	0.135	Pass
	Band 30	23.50	223.87	200	3060.00	0.073	Pass
	Band 66	24.15	260.02	200	3060.00	0.085	Pass
	Band 71	23.50	223.87	200	1258.68	**0.178**	Pass
	Band 41	24.33	271.02	200	3060.00	0.089	Pass
	Band 48	23.50	223.87	200	3060.00	0.073	Pass
2.4G WIFI	Main	25.18	329.61	200	3060.00	0.108	Pass
	Aux.	22.72	187.07	200	3060.00	0.061	Pass
	MIMO	25.73	374.11	200	3060.00	**0.122**	Pass
5.2G WIFI	Main	15.00	31.62	200	3060.00	0.010	Pass
	Aux.	15.00	31.62	200	3060.00	0.010	Pass
	MIMO	17.50	56.23	200	3060.00	0.018	Pass
5.8G WIFI	Main	15.00	31.62	200	3060.00	0.010	Pass
	Aux.	15.79	37.93	200	3060.00	0.012	Pass
	MIMO	17.79	60.12	200	3060.00	**0.020**	Pass

5.4 Collocated Power Calculation

Evolution mode	Frequency (MHz)	Power /Limit	Σ(Power / Limit) of LTE Band 13 (EC25-AFXD) + LTE Band 71 (EG120K-NA) + 2.4G WIFI + 5.8G WIFI	Verdict
LTE Band 13 (EC25-AFXD)	746 ~ 756	0.241	**0.561**	Pass
LTE Band 71 (EG120K-NA)	617 ~ 652	0.178		
2.4G WIFI	2412 ~ 2462	0.122		
5.8G WIFI	5725 ~ 5850	0.020		

Note:

1. Σ(Power / Limit): This is a summation of [(power for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding Power limit)], for LTE Band 13 (EC25-AFXD) + LTE Band 71 (EG120K-NA) + 2.4G WIFI + 5.8G WIFI.
2. Both of the 0.746GHz/0.617GHz/2.412GHz/5.725GHz can transmit simultaneously, the formula of calculated the Power is
   CP1 / LP1 + CP2 / LP2 + ……etc. < 1
   CP = Calculation power
   LP = Limit of power
3. The worst-case situation is 0.561, which is less than “1”. This confirmed that the device comply with FCC KDB 447498 D04 Power limit.
4. The DUT work frequency range used is 746 MHz ~ 756 MHz, 617 MHz ~ 652 MHz, 2412 MHz ~ 2462 MHz, 5725 MHz ~ 5850 MHz the result close to the limit by the above formula, so we select worst case power to calculate the exclusion power threshold.
5. More power list please refer to RF test report.

5.5 Conclusion

This EUT is deemed to comply with the reference level limits, therefore the basic restrictions are compliant with human exposure limits.

Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
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--END OF REPORT--