TEST REPORT

Applicant:	Queclink Wireless Solutions Co., Ltd.
Address:	No.30, Lane 500, Xinlong Road, Minhang District, Shanghai, China
Equipment Type:	Intelligent 4G Dash Camera with Full Featured Telematics
Model Name:	CV200XNA
Brand Name:	QUECLINK
FCC ID:	YQD-CV200XNA
Test Standard:	47 CFR Part 2.1091 KDB 447498 D04 v01
Sample Receipt Date:	July 31, 2023 - Aug. 01, 2023
Test Date:	Aug. 08, 2023 - Aug. 14, 2023
Date of Issue:	Aug. 31, 2023

ISSUED BY:

Kunshan Balun Communications Technology Co., Ltd.

Tested by: Yang Wenting **Checked by:** Ye Feng **Approved by:** Luo Biao (General Manager)

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Aug. 31, 2023	Initial Issue

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Kunshan Balun Communications Technology Co., Ltd.
Address	Room 101, Building 5, No. 1689, Zizhu Road, Yushan, Kunshan, Jiangsu, China

1.2 Test Location

Name	Kunshan Balun Communications Technology Co., Ltd.
Location	Room 101, Building 5, No. 1689, Zizhu Road, Yushan, Kunshan, Jiangsu, China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as an accredited testing laboratory. The designation number is CN1352.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Queclink Wireless Solutions Co., Ltd.
Address	No.30, Lane 500, Xinlong Road, Minhang District, Shanghai, China

2.2 Manufacturer Information

Manufacturer	Queclink Wireless Solutions Co., Ltd.
Address	No.30, Lane 500, Xinlong Road, Minhang District, Shanghai, China

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	Intelligent 4G Dash Camera with Full Featured Telematics
Model Name Under Test	CV200XNA
Series Model Name	N/A
Description of Model name differentiation	N/A
Sample No.	SC-EC2360729-S02, SC-EC2360729-S03
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	120 mm(L) x 60 mm(W) x 70 mm(H)
Weight (Approx.)	220.0 g

2.5 Ancillary Equipment

N/A

Technical Information

All Network and Wireless connectivity for EUT	3G Network WCDMA/HSDPA/HSUPA/DC-HSDPA/HSPA+ Band 2/4/5 4G Network FDD LTE Band 2/4/5/7/12/13/14/17/25/26/66/71 TDD LTE Band 41 Bluetooth (BR+EDR+BLE) 2.4G WIFI 802.11b, 802.11g, 802.11n(HT20/40), 5G WIFI 802.11a, 802.11n(HT20/40), 802.11ac(VHT20/40/80), U-NII-1/2A/2C/3, 5.8G SRD, GPS, GLONASS, BDS

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

Operating Mode	Bluetooth, WIFI, WCDMA, LTE		
Frequency Range	Bluetooth	2400 ~ 2483.5 MHz	
	2.4G WIFI	2412 ~ 2462 MHz	
	5G WIFI	5150 ~ 5250 MHz	
		5250 ~ 5350 MHz	
		5470 ~ 5725 MHz	
		5725 ~ 5850 MHz	
	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 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 17	TX:704 ~ 716 MHz	RX: 734 ~ 746 MHz
	LTE Band 25	TX: 1850 ~ 1915 MHz	RX: 1930 ~ 1995 MHz
	LTE Band 26	TX: 814 ~ 849 MHz	RX: 859 ~ 894 MHz
	LTE Band 66	TX: 1710 ~ 1780 MHz	RX: 2110 ~ 2180 MHz
	LTE Band 71	TX: 663 ~ 698 MHz	RX: 617 ~ 652 MHz
	LTE Band 41	TX: 2496 ~ 2690 MHz	RX: 2496 ~ 2690 MHz
Antenna Type	Bluetooth	FPC Antenna	
	WIFI	FPC Antenna	
	WWAN	FPC Antenna	
Exposure Category	General Population/Uncontrolled Exposure		
EUT 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

For 300MHz to 6000Mhz

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

For 6000MHz to 10000Mhz

Frequencies above 300 kHz but at distances R＞λ/2π, R is the antenna-person separation distance.
λ=wavelength of transmitted signal.
Can calculate from the frequency of operation using v=f*λ
v=speed of light=3*108 m/s
f=frequency(Hz)
Primarily an MPE-based exclusion but also SAR-based where λ/2π is＜20cm.

TABLE B.1—THRESHOLDS FOR SINGLE RF SOURCES
SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

RF Source Frequency			Minimum Distance			Threshold ERP
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	–	1.34	159 m	–	35.6 m	1,920 R^2
1.34	–	30	35.6 m	–	1.6 m	3,450 R^2/f^2
30	–	300	1.6 m	–	159 mm	3.83 R^2
300	–	1,500	159 mm	–	31.8 mm	0.0128 $R^2 f$
1,500	–	100,000	31.8 mm	–	0.5 mm	19.2R^2
Subscripts L and H are low and high; λ is wavelength. From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.						

5 ASSESSMENT RESULT

5.1 Output Power

WCDMA			
Mode	Band 2	Band 4	Band 5
Conducted Power (dBm)	24.27	23.46	25.02
Antenna Gain (dBi)	-2.20	-2.20	-3.70
EIRP/ERP (dBm)	22.07	21.26	19.17
Note: This report listed the worst case conducted power value, please refer to BL-EC2370017-501 report for more details.			

LTE					
Mode	Band 2	Band 4	Band 5	Band 7	Band 12
Conducted Power (dBm)	24.48	23.31	25.24	23.04	25.11
Antenna Gain (dBi)	-2.20	-2.20	-3.70	-2.70	-3.70
EIRP/ERP (dBm)	22.28	21.11	19.39	20.34	19.26
Note: This report listed the worst case conducted power value, please refer to BL-EC2370017-501 report for more details.					

LTE					
Mode	Band 13	Band 14	Band 17	Band 25	Band 26
Conducted Power (dBm)	25.96	25.47	25.04	24.20	25.57
Antenna Gain (dBi)	-3.70	-3.70	-3.70	-2.20	-3.70
EIRP/ERP (dBm)	20.11	19.62	19.19	22.00	19.72
Note: This report listed the worst case conducted power value, please refer to BL-EC2370017-501 report for more details.					

LTE			
Mode	Band 66	Band 71	Band 41
Conducted Power (dBm)	23.81	26.11	22.81
Antenna Gain (dBi)	-2.20	-4.20	-2.70
EIRP/ERP (dBm)	21.61	19.76	20.11
Note: This report listed the worst case conducted power value, please refer to BL-EC2370017-501 report for more details.			

Mode	Bluetooth	2.4G WIFI	5G WIFI
Conducted Power (dBm)	11.89	22.68	13.88
Antenna Gain (dBi)	-1.50	-1.50	2.60
EIRP	10.39	21.18	16.48
Note: This report listed the worst case conducted power value, please refer to BL-EC2370017-601, BL-EC2370017-602, BL-EC2370017-603 and BL-EC2370017-604 report for more details.			

5.2 Turn-up power

Mode	Conducted Power Range (dBm)	EIRP Range (dBm)	ERP Range (dBm)
WCDMA Band 2	[23.00,25.00]	[21.00,23.00]	[18.00,20.00]
WCDMA Band 4	[22.00,24.00]	[20.00,22.00]	[18.00,20.00]
WCDMA Band 5	[23.50,25.50]	[20.00,22.00]	[18.00,20.00]
LTE Band 2	[23.00,25.00]	[21.00,23.00]	[18.50,20.50]
LTE Band 4	[22.00,24.00]	[20.00,22.00]	[18.00,20.00]
LTE Band 5	[23.50,25.50]	[20.00,22.00]	[18.00,20.00]
LTE Band 7	[21.50,23.50]	[18.50,20.50]	[16.50,18.50]
LTE Band 12	[23.50,25.50]	[20.00,22.00]	[18.00,20.00]
LTE Band 13	[24.00,26.00]	[21.00,23.00]	[18.50,20.50]
LTE Band 14	[24.00,26.00]	[20.00,22.00]	[18.00,20.00]
LTE Band 17	[23.50,25.50]	[20.00,22.00]	[18.00,20.00]
LTE Band 25	[22.50,24.50]	[20.00,22.00]	[18.00,20.00]
LTE Band 26	[24.00,26.00]	[20.00,22.00]	[18.00,20.00]
LTE Band 66	[22.00,24.00]	[20.00,22.00]	[18.00,20.00]
LTE Band 71	[24.50,26.50]	[20.00,22.00]	[18.00,20.00]
LTE Band 41	[21.00,23.00]	[18.50,20.50]	[16.00,18.00]
Bluetooth	[10.00,12.00]	[9.00,11.00]	[6.50,8.50]
2.4G WIFI	[21.00,23.00]	[19.50,21.50]	[17.50,19.50]
5G WIFI	[12.00,14.00]	[15.00,17.00]	[13.00,15.00]
Note1: ERP= EIRP -2.15dB Note2: According KDB 447498 D04, used the greater of maximun 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 Band 2	25.00	316.23	200	3060.00	0.103	Pass
WCDMA Band 4	24.00	251.19	200	3060.00	0.082	Pass
WCDMA Band 5	25.50	354.81	200	1680.96	0.211	Pass
LTE Band 2	25.00	316.23	200	3060.00	0.103	Pass
LTE Band 4	24.00	251.19	200	3060.00	0.082	Pass
LTE Band 5	25.50	354.81	200	1680.96	0.211	Pass
LTE Band 7	23.50	223.87	200	3060.00	0.073	Pass
LTE Band 12	25.50	354.81	200	1425.96	0.249	Pass
LTE Band 13	26.00	398.11	200	1585.08	0.251	Pass
LTE Band 14	26.00	398.11	200	1607.52	0.248	Pass
LTE Band 17	25.50	354.81	200	1436.16	0.247	Pass
LTE Band 25	24.50	281.84	200	3060.00	0.092	Pass
LTE Band 26	26.00	398.11	200	1660.56	0.240	Pass
LTE Band 66	24.00	251.19	200	3060.00	0.082	Pass
LTE Band 71	26.50	446.68	200	1352.52	0.330	Pass
LTE Band 41	23.00	199.53	200	3060.00	0.065	Pass
Bluetooth	12.00	15.85	200	3060.00	0.005	Pass
2.4G WIFI	23.00	199.53	200	3060.00	0.065	Pass
5G WIFI	17.00	50.12	200	3060.00	0.016	Pass

5.4 Collocated Power Density Calculation

Evolution mode	Frequency(MHz)	Power /Limit	Σ(Power / Limit) of WWAN Max+ 2.4G WIFI + Bluetooth	Verdict
WWAN Max	663MHz ~ 698MHz	0.330	**0.400**	Pass
2.4G WIFI	2400MHz ~ 2483.5MHz	0.065		
Bluetooth	2400MHz ~ 2483.5MHz	0.005		

Evolution mode	Frequency(MHz)	Power /Limit	Σ(Power / Limit) of WWAN Max+ 5G WIFI Max + Bluetooth	Verdict
WWAN Max	663MHz ~ 698MHz	0.330	**0.351**	Pass
5G WIFI Max	5250MHz ~ 5350MHz	0.016		
Bluetooth	2400MHz ~ 2483.5MHz	0.005		

Note:

1. Σ(Power / Limit): This is a summation of [(power density for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + WLAN + Bluetooth.
2. Both of the WWAN/WIFI/Bluetooth can transmit simultaneously, the formula of calculated the MPE is CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1
   CPD = Calculation power
   LPD = Limit of power
3. Both of the 2.4GHz WLAN and 5GHz WLAN can't transmit simultaneously at same time.
4. The worst-case situation is 0.400, which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.
5. The DUT work frequency range used is 2400 MHz ~ 2483.5 MHz, 5250 MHz~ 5350 MHz, and 663 MHz ~ 698 MHz the result close to the limit by the above formula, so we select worst case power to calculate the exclusion power threshold.
6. 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

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--END OF REPORT--