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检测
TESTING
CNAS-L4963

TEST REPORT

Applicant: Halter USA Inc.
Address: 2101 Pearl St, Boulder, CO 80302, USA
Equipment Type: Cow Collar
Model Name: P5 Omni
Brand Name: Halter
FCC ID: 2A9LG-P50
Test Standard: 47 CFR Part 2.1091-2023
KDB 447498 D04 v01
Sample Arrival Date: N/A
Test Date: N/A
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ISSUED BY:

Shanghai Tejet Communications Technology Co., Ltd. Testing Center



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Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shanghai Tejet Communications Technology Co., Ltd. Testing Center
Address	1-2/F., Building 1, No.222, Xuanlan Road, Xuanqiao, Pudong New District, Shanghai, China

1.2 Test Location

Name	Shanghai Tejet Communications Technology Co., Ltd. Testing Center
Location	1-2/F., Building 1, No.222, Xuanlan Road, Xuanqiao, Pudong New District, Shanghai, China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1352. The laboratory is a testing organization accredited by ISED as a accredited testing laboratory. The company number is 29671 and CAB identifier number is CN0142.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Halter USA Inc.
Address	2101 Pearl St, Boulder, CO 80302, USA

2.2 Manufacturer Information

Manufacturer	Halter USA Inc.
Address	2101 Pearl St, Boulder, CO 80302, USA

2.3 General Description for Equipment under Test (EUT)

EUT Name	Cow Collar
Model Name Under Test	P5 Omni
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	1
Software Version	19
Dimensions (Approx.)	L:343 mm* W: 63 mm* H: 41 mm
Weight (Approx.)	560g

2.4 Technical Information

Network and Wireless connectivity	4G Network LTE FDD Band 2/4/5/12/13/66 Bluetooth, LoRa, NFC(RX only)
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	WWAN, Bluetooth, LoRa		
Frequency Range	LTE Band2	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	LTE Band4	TX: 1710 ~ 1755 MHz	RX: 2110 ~ 2155 MHz
	LTE Band5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE Band12	TX: 699 ~ 716 MHz	RX: 729 ~ 746 MHz
	LTE Band13	TX: 777 ~ 787 MHz	RX: 746 ~ 756 MHz
	LTE Band25	TX: 1850 ~ 1915 MHz	RX: 1930 ~ 1995 MHz
	LTE Band66	TX: 1710 ~ 1780MHz	RX: 2110 ~ 2180 MHz
	LTE Band71	TX: 663 ~ 698 MHz	RX: 617~ 652 MHz
	Bluetooth	2402 ~ 2480 MHz	
	LoRa	902 ~ 928 MHz	
Antenna Type	WWAN	Dipole Antenna	
	Bluetooth	External Antenna	
	LoRa	PCB 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 2.1091-2023	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 Devices:

CFR Title 47 §2.1091(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 ERP_{20cm} in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

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

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 $\lambda/4$ 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 P_{th} (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). P_{th} is given by Formula (B.2).

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

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

LTE								
Mode	Band 2	Band 4	Band 5	Band 12	Band 13	Band 25	Band 66	Band 71
Conducted Power (dBm)	21.52	21.41	23.52	23.55	23.68	24.01	20.92	22.50
Antenna Gain (dBi)	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
EIRP/ERP (dBm)	23.52	23.41	23.37	23.40	23.53	26.01	22.92	22.35
Note: This report listed the worst case conducted power value, please refer to RF test report No.Ti-CC26030001-501 for more details.								

Bluetooth	
Mode	BLE Max
Conducted Power (dBm)	-3.09
Antenna Gain (dBi)	1.95
EIRP (dBm)	-1.14
Note: This report listed the worst case conducted power value, please refer to RF test report No. Ti-CC26030001-601 for more details.	

LoRa			
Mode	LoRa (125kHz)	LoRa (500kHz)	LoRa FSK-HS
Conducted Power (dBm)	24.38	17.69	23.89
Antenna Gain (dBi)	2.00	2.00	2.00
ERP (dBm)	24.23	17.54	23.74
Note: This report listed the worst case conducted power value, please refer to RF test report Ti-CC26030001-602 for more details.			

5.2 Tune-up power

Mode	Conducted Power Range (dBm)		EIRP Range (dBm)		ERP Range (dBm)	
LTE Band 2	21.00	23.00	23.00	25.00	20.85	22.85
LTE Band 4	20.00	22.00	22.00	24.00	19.85	21.85
LTE Band 5	23.00	25.00	/	/	22.85	24.85
LTE Band 12	23.00	25.00	/	/	22.85	24.85
LTE Band 13	23.00	25.00	/	/	22.85	24.85
LTE Band 25	23.00	25.00	25.00	27.00	22.85	24.85
LTE Band 66	20.00	22.00	22.00	24.00	19.85	21.85
LTE Band 71	22.00	24.00	/	/	21.85	23.85
Bluetooth	-4.00	-2.00	-2.05	-0.05	-4.20	-2.20
LoRa	23.00	25.00	25.00	27.00	22.85	24.85
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	f(MHz)	Distance (cm)	Maximum power (dBm)	Threshold Power (mW)	Plimit(mW)	P/Plimit	Verdict
LTE Band 2	1850	20	23.00	199.53	3060.00	0.0652	Pass
LTE Band 4	1710	20	22.00	158.49	3060.00	0.0518	Pass
LTE Band 5	824	20	25.00	316.23	1680.96	0.1881	Pass
LTE Band 12	699	20	25.00	316.23	1425.96	0.2218	Pass
LTE Band 13	777	20	25.00	316.23	1585.08	0.1995	Pass
LTE Band 25	1850	20	25.00	316.23	3060.00	0.1033	Pass
LTE Band 66	1710	20	22.00	158.49	3060.00	0.0518	Pass
LTE Band 71	663	20	24.00	251.19	1352.52	0.1857	Pass
Bluetooth	2402	20	-2.00	0.63	3060.00	0.0002	Pass
LoRa	902	20	25.00	316.23	1840.08	0.1719	Pass

5.4 Collocated Power Calculation

Evolution mode	Frequency(MHz)	Power /Limit	$\Sigma(\text{Power}/\text{Limit})$	Verdict
LTE Band12	699MHz ~ 716MHz	0.2218	0.2220	Pass
Bluetooth	2402MHz-2480MHz	0.0002		

Evolution mode	Frequency(MHz)	Power /Limit	$\Sigma(\text{Power}/\text{Limit})$	Verdict
Bluetooth	2402MHz-2480MHz	0.0002	0.1721	Pass
LoRa	902MHz-928MHz	0.1719		

Note:

1. $\Sigma(\text{Power} / \text{Limit})$: This is a summation of [(power for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding Power limit)], for WWAN+ Bluetooth, Bluetooth+ LoRa.
2. Both of the WWAN+ Bluetooth, Bluetooth+ LoRa can transmit simultaneously, the formula of calculated the Power is

$$\text{CP1} / \text{LP1} + \text{CP2} / \text{LP2} + \dots \text{etc.} < 1$$

CP = Calculation power
LP = Limit of power
3. The worst-case situation is 0.2220, which is less than “1”. This confirmed that the device comply with FCC KDB 447498 D04 Power limit.
4. 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--