RF EXPOSURE EVALUATION REPORT

FCC ID	:	2AUWW-HALOWA1B
Equipment	:	Halo Collar
Brand Name	:	Halo
Model Name	:	Halo Three
Applicant	:	Protect Animals with Satellites, LLC 5465 Legacy Dr., Suite 650, Plano, Texas 75024, United States
Manufacturer	:	RoyalTek Company Ltd., 8F,No.40, Wenhua 2nd Rd., Guishan Dist., Taoyuan City 333010, Taiwan(R.O.C.)
Standard	:	47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part2.1091 and it complies with applicable limit.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

The results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Laboratory, the test report shall not be reproduced except in full

Approved by: Cona Huang / Deputy Manager

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Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FA9O1415-05	Rev. 01	Initial issue of report	Mar. 02, 2023

1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Halo Collar
Brand Name	Halo
Model Name	Halo Three
FCC ID	2AUWW-HALOWA1B
Wireless Technology and Frequency Range	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Mode	LTE: QPSK, 16QAM WLAN: 802.11a/b/g/n HT20 Bluetooth LE
EUT Stage	Production Unit

Reviewed by: Jason Wang

Report Producer: Daisy Peng

2. Maximum RF average output power among production units

Mode		Maximum Average power(dBm)
LTE	Band 2	25.00
	Band 4	25.00
	Band 5	23.00
	Band 12	25.00
	Band 13	25.00

Mode	Maximum Average power(dBm)	
	LE	
	1M	2M
Bluetooth	11.00	11.00

	Mode	Channel	Frequency (MHz)	Tune-Up Limit
2.4GHz WLAN	802.11b 1Mbps	1	2412	13.00
		11	2462	13.00
	802.11g 6Mbps	1	2412	4.50
		11	2462	7.00
	802.11n-HT20 MCS0	1	2412	4.50
		11	2462	7.00

3. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	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				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:
S = Power Density
P = Output Power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

4. Radio Frequency Radiation Exposure Evaluation

4.1. Standalone Power Density Calculation

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit
LTE Band 2	-1.60	25.00	23.4	0.22	218.78	0.044	1.000	0.044
LTE Band 4	-0.63	25.00	24.4	0.27	273.53	0.054	1.000	0.054
LTE Band 5	-3.30	23.00	19.7	0.09	93.33	0.019	0.549	0.034
LTE Band 12	-6.25	25.00	18.8	0.07	74.99	0.015	0.466	0.032
LTE Band 13	-1.34	25.00	23.7	0.23	232.27	0.046	0.518	0.089
WLAN2.4GHz Band	0.50	13.00	13.5	0.02	22.39	0.004	1.000	0.004
Bluetooth	0.50	11.00	11.5	0.01	14.13	0.003	1.000	0.003

4.2. Collocated Power Density Calculation

WWAN Power Density / Limit	WLAN Power Density / Limit	Bluetooth Power Density / Limit	Σ(Power Density / Limit) of WWAN+WLAN+Bluetooth
0.089	0.004	0.003	0.096

Note:

1. Σ(Power Density / 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. Considering the WWAN module collocation with the WLAN and Bluetooth transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 3 collocated transmitters is compliant

Conclusion:

According to 47 CFR §1.1307, the RF exposure analysis concludes that the RF Exposure is FCC compliant.