



Radio Frequency Exposure Evaluation Report

For:

Georama, Inc. DBA QualSights

Model Name:

QS-CO-001

Product Description:

Electronic device for automatically tracking product usage or consumption

FCC ID: 2A2OVCO1

ISED ID: 28061-CO1

Applied Rules and Standards:

CFR 47 Part 1 (1.1307 & 1.1310), Part 2 (2.1091)

ISED RSS-102 Issue 5

Report number: EMC_MPCON-004-21001_MPE

DATE: 2022-03-29



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1. Assessment

This RF Exposure evaluation report provides information about compliance of the below identified device with the RF Exposure limits for mobile devices as defined in FCC CFR 47 Part 1 (1.1307 & 1.1310), Part 2 (2.1091), and ISSED RSS-102 Issue 5, under given conditions (measured or rated RF output power, antenna gain, distance towards human body, multiple transmitter information as presented by the applicant). In addition, maximum antenna gain or minimum distance towards the human body is calculated, respectively, where relevant.

Company Name	Product Description	Model #
Georama, Inc. DBA QualSights	Electronic device for automatically tracking product usage or consumption	QS-CO-001

Responsible for Testing Laboratory:

2022-03-29	Compliance	Kevin Wang (EMC Lab Manager)	kevin. wang@cetecom.com Digitally signed by: kevin. wang@cetecom.com DN: CN = kevin.wang@cetecom.com Date: 2022.04.08 10:57:51 -0700
Date	Section	Name	Signature

Responsible for the Report:

2022-03-29	Compliance	Kris Lazarov (Senior EMC Engineer)	Kris Lazarov Digitally signed by Kris Lazarov Date: 2022.04.08 10:50:33 -0700
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section 3.

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2. Administrative Data

2.1. Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
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Compliance Manager:	Kevin Wang
Responsible Project Leader:	Sangeetha Sivaraman

2.2. Identification of the Client

Applicant's Name:	Georama, Inc. DBA QualSights
Street Address:	2045 W Grand Ave Ste B, PMB 75887
City/Zip Code	Chicago, IL 60612
Country	USA

2.3. Identification of the Manufacturer

Manufacturer's Name:	Same as the client
Manufacturers Address:	
City/Zip Code	
Country	

3. Equipment under Assessment

Model No:	QS-CO-001
HW Version :	Rev 001
SW Version :	1.14
FCC-ID :	2A20VCO1
ISED-ID:	28061-CO1
FWIN:	N/A
HVIN:	QS-CO-001
PMN:	QualSights Smart Coaster
Product Description:	Electronic device for automatically tracking product usage or consumption
Transceiver Technology	- BLE / Zigbee - 802.11b.g.n 2.4 GHz
Co-located Transmitters/ Antennas?	Bluetooth with WiFi can transmit simultaneously
Power Supply/ Rated Operating Voltage Range	3.7V typical / 4.2V max
Operating Temperature Range	-20°C to + 60°C
Sample Revision	☐ Prototype ☐ Production ☒ Pre-Production
Device Category	☐ Fixed Installation ☒ Mobile ☐ Portable
Exposure Category	☐ Occupational/ Controlled ☒ General Population/ Uncontrolled

3.1. Antenna Information

Radio Technology	Conducted RF Power (dBm)	Peak Antenna Gain (dBi)
Bluetooth / Zigbee 2.4 GHz	8 dBm ± 1 dB	1.3
WiFi 2.4 GHz	19.5 dBm ± 2 dB	1

Note: The power levels, and antenna gain were provided by the manufacturer.

4. RF Exposure Limits

For the specific described radio apparatus the following basic limits and rules apply

4.1. Power Density Limits

1.4.1. FCC 1.1310(e)

Frequency Range (MHz)	Power density (mW/cm ²)	Averaging time (minutes)
300-1500	f/1500	30
1500 – 100.000	1.0	30

2.4.1. RSS-102 i5

Frequency Range (MHz)	Power density (mW/cm ²)	Averaging time (minutes)
300 – 6000	$0.02619 \times f \text{ (MHz)}^{0.6834}$	6

4.2. Routine Environmental Evaluation Categorical Exclusion Limits

1.4.2. FCC 2.1091(c)

- Operating frequency < 1.5GHz: excluded if ERP < 1.5W / 31.8dBm
- Operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm

Per KDB 447498 D01 FCC allows calculative estimation of RF exposure for mobile applications when routine environmental evaluation categorical exclusion applies and also for fixed applications.

2.4.2. RSS-102, cl. 2.5

- 300MHz <= operating frequency < 6 GHz: excluded if EIRP < $0.0131 \times f \text{ (MHz)}^{0.6834} \text{ W}$

4.3. RF Exposure Estimation (MPE Estimation)

Having available the source based average output power and peak antenna gain or the ERP/EIRP of the specified device and for a known minimum distance of its radiating structures from the body of persons according to its use cases (at least 20cm) the power density at that distance can be estimated by the following formula for plane-wave equivalent conditions (far-field conditions), when ground reflection is neglected.

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

Where: S = power density (mW/cm² or W/m²)

P = power input to the antenna (mW or W)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm or m)

5. Evaluations

5.1. Compliance with MPE (Power Density) limits

Power Density Calculation						
Band of Operation MHz	EIRP dBm	Maximum Duty Cycle %	Distance cm	Power Density mW/cm ²	Limit FCC / ISED mW/cm ²	Verdict
BLE / Zigbee 2400 - 2480	9	1:1	20	0.002	1.000 / 0.547	Pass
WiFi 2400 - 2480	21.5	1:1	20	0.028	1.000 / 0.547	Pass

Conclusion:

- The equipment fulfills the MPE limits for the minimum 20cm distance between the antenna and the human body

5.2. Routine Environmental Evaluation Applicability Simultaneous Transmission

- Possible simultaneous transmissions: According to the manufacturer the Wi-Fi can operate simultaneously with the Bluetooth. Theoretically the worst case of simultaneous transmission is with the two transmitters operating at the highest output power mode.

Transmission Mode	Sum of the ratios for the highest Power Densities	Limits for the Highest Combined Ratio	Exempt from Routine evaluation
Wi-Fi + BDR	$0.004 + 0.051 = 0.055$	< 1	Yes

Note: Power Density to Applicable limit for Stand Alone Operation are derived from table in section 5.1

Conclusion:

- The equipment is excluded from simultaneous transmission MPE test.

6. Revision History

Date	Report Name	Changes to report	Report prepared by
2022-03-29	EMC_MPCON-004-21001_MPE	Initial Version	Kris Lazarov

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