



166 South Carter, Genoa City, WI 53128

Company:	Wilson Sporting Goods Co.
Model Evaluated:	MSC1392_ASSY Rev B
Evaluation Exhibit:	RF Exposure
Project Number:	13059
Report Number:	28811 rev1.0

RF EXPOSURE STATEMENT OF COMPLIANCE

FCC Title 47 CFR Part 1.1307(b)(3)(i)(A)
FCC Title 47 CFR Part 2.1093(c)(1)

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

for

SAR Exemption Thresholds – Portable Device – General Population

FCC ID: 2AHBQ-QBIDB1

(Handheld use with antenna distance to external surface of device < 5 mm)

Formal Name:	QBID Ball Tag
Kind of Equipment:	Portable / Battery powered motion sensor with Bluetooth Low Energy (BLE) Transceiver
Frequency Range(s):	2402 – 2480 MHz
Evaluation Method:	SAR Exemption based on transmission output power lower than SAR test exemption levels
Model Number:	MSC1392_ASSY Rev B
Date of Evaluation:	March 10, 2025
Conducted For:	Wilson Sporting Goods Co. 9509 Foster Avenue Schiller Park, Illinois, 60176, USA

NOTICE: This report contains test data, and/or other information regarding only the sample provided by the client for testing and evaluation. This test report shall not be used to claim product approval or endorsement by any governmental, regulatory, or accrediting agency. Please see the "Description of Device" page listed inside of this report.

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SIGNATURE PAGE

Report By:

Craig Brandt
Test Engineer

Reviewed By:

Brian Mattson
General Manager

Approved By:

Brian Mattson
General Manager



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CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

DLS Electronic Systems, Inc.

**1250 Peterson Drive
Wheeling, IL 60090**

(and satellite locations as shown on the scope)

Fulfills the requirements of

ISO/IEC 17025:2017

and

**U.S. Federal Communication Commission (FCC) EMC and Telecommunications (EC&T)
Testing Designation Program**

and

**Recognition of Telecommunications Testing - Innovation, Science, and Economic Development
(ISED) Canada**

and

**FDA Accreditation Scheme for Conformity Assessment (ASCA) Pilot Program -Basic Safety
and Essential Performance of Medical Electrical Equipment, Medical Electrical Systems, and
Laboratory Medical Equipment**

In the field of

TESTING

This certificate is valid only when accompanied by a current scope of accreditation document.

The current scope of accreditation can be verified at www.anab.org

Jason Stine, Vice President
Expiry Date: 23 April 2026
Certificate Number: AT-1859



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory
quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

SATELLITE SITE

DLS Electronic Systems, Inc. (OATS Site)

**166 South Carter
Genoa City, Wisconsin 53128**

www.dlsemc.com



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1.0 Transmitter Information

Maximum RF Conducted Power (measured)	0.42 dBm
Antenna Type:	chip antenna
Antenna Gain:	1.3 dBi = -0.85 dBd
Maximum Effective Radiated Power ERP (calculated 0.42 dBm - 0.85 dBd):	-0.43 dBm
Rated Output Power per firmware setting:	0 dBm
RF power accuracy according to transmitter specification datasheet:	+/- 4 dB
Maximum Rated RF Output Power including acceptable tolerances due to component and production variations and tune up procedures:	4 dBm
Frequency Range:	2.402 – 2.480 GHz

2.0 Rule Part

Title 47 CFR Part 1.1307(b)(3)(i)(B)
Title 47 CFR Part 2.1093(c)(1)
FCC KDB 447498 D04 Interim General RF Exposure Guidance v01

3.0 Evaluation Procedure

FCC KDB 447498 D04 Interim General RF Exposure Guidance v01

2.1.3	SAR-Based Exemption
B.4	SAR-Based Exemption

SAR test exemption based on output power lower than SAR test exemption levels.

ANSI C63.10-2020

Section 11.9.1.1	Maximum peak conducted output power (RBW $\geq$ 6 dB Emission Bandwidth)
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4.0 SAR Test Exemption Threshold

Per FCC Title 47 CFR Part 1.1307(b)(3)(i)(B), the device is exempt from SAR testing if the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula (for separation distances less than 20 cm).

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} (d/20 \text{ cm})^x$$

Where

$$x = -\log_{10} (60/ERP_{20 \text{ cm}} \sqrt{f}) \text{ and } f \text{ is in GHz}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = 3060 \text{ when } f \text{ is between 1.5 GHz and 6 GHz}$$

d = the separation distance (cm)

5.0 Threshold Calculation

With a minimum separation distance of 0.5 cm from the radiating element:

$$P_{th} \text{ (mW)} = 3060 [(0.5/20 \text{ cm}) ^{-\log_{10} (60/(3060\sqrt{2.480}))}]$$

$$P_{th} \text{ (mW)} = 3060 [(0.5/20 \text{ cm}) ^{-\log_{10} (60/4818.89)}]$$

$$P_{th} \text{ (mW)} = 3060 [(0.5/20 \text{ cm}) ^{-\log_{10} (0.01245)}]$$

$$P_{th} \text{ (mW)} = 3060 [(0.5/20 \text{ cm}) ^{1.905}]$$

$$P_{th} \text{ (mW)} = 3060 [0.000887311]$$

$$P_{th} \text{ (mW)} = \underline{\underline{2.71 \text{ mW}}}$$



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6.0 Output Power

Measured RF Conducted Output Power: 0.42 dBm = **1.10 mW**

Calculated Effective Radiated Power (ERP):

0.42 dBm conducted + (-0.85) dBd antenna gain = -0.43 dBm = **0.91 mW**

Maximum Rated ERP:

The maximum rated RF Conducted output power (including tolerances) = 4 dBm.

4 dBm + (-0.85) dBd antenna gain = 3.15 dBm = **2.07 mW**

7.0 Conclusion

With a minimum separation distance of 5 mm, this is a *portable* device as defined by FCC KDB 447498 D04 Interim General RF Exposure Guidance v01. The QBID Ball Tag, model MSC1392_ASSY Rev B, as provided by Wilson Sporting Goods Co., **meets** the SAR test exemption based on the worst-case maximum output power of the device. With acceptable tolerances included, the conducted output power, effective radiated power, and the maximum rated power are all lower than the SAR test exemption threshold for portable devices operating in a general population environment.

This device complies with the RF exposure requirements of FCC Title 47 CFR Part 1.1307(b)(3)(i)(B) and Part 2.1093(c)(1).

Section A – Test Equipment

D.L.S. Wisconsin – RF Conducted – Site 2 – Test Equipment:

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESW-44	103075	2 Hz-44 GHz	3-29-23	3-29-25
Cable	Micro-Coax	UFC142A	CBL-093	30 MHz-40 GHz	7-12-24	7-12-25
20 dB Attenuator	Aeroflex/ Weinschel	75A-20-12	1071	30 MHz-40 GHz	7-12-24	7-12-25



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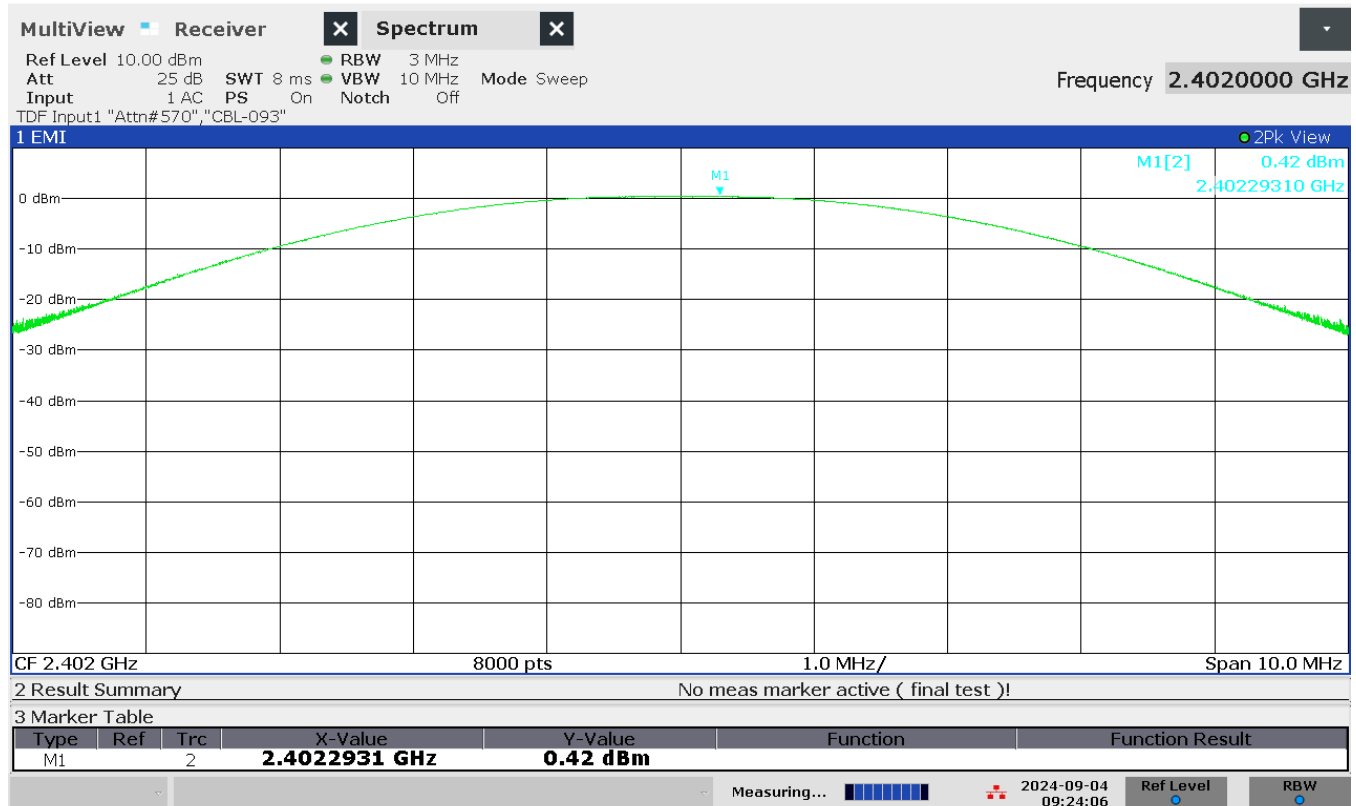
28811 rev1.0

Section B – Measurement Data

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Peak Output Power – RF Conducted
Operator: cbrandt

Comment: Data rate: 1 Mbps
Low Channel: 2402 MHz

Peak Output Power = 0.42 dBm = **1.102 mW**



09:24:07 AM 09/04/2024



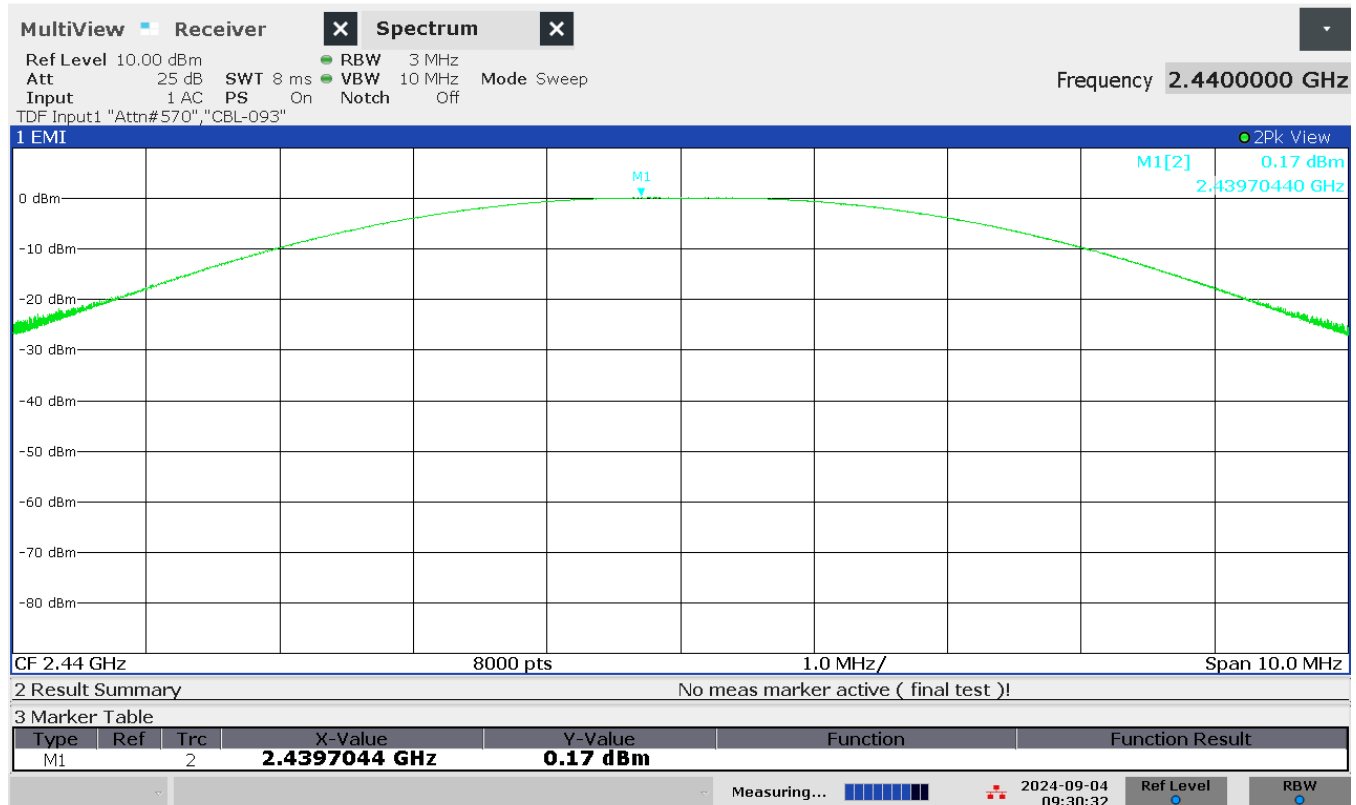
166 South Carter, Genoa City, WI 53128

Company: Wilson Sporting Goods Co.
Model Evaluated: MSC1392_ASSY Rev B
Evaluation Exhibit: RF Exposure
Project Number: 13059
Report Number: 28811 rev1.0

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Peak Output Power – RF Conducted
Operator: cbrandt

Comment: Data rate: 1 Mbps
Mid Channel: 2440 MHz

Peak Output Power = 0.17 dBm = **1.040 mW**



09:30:33 AM 09/04/2024



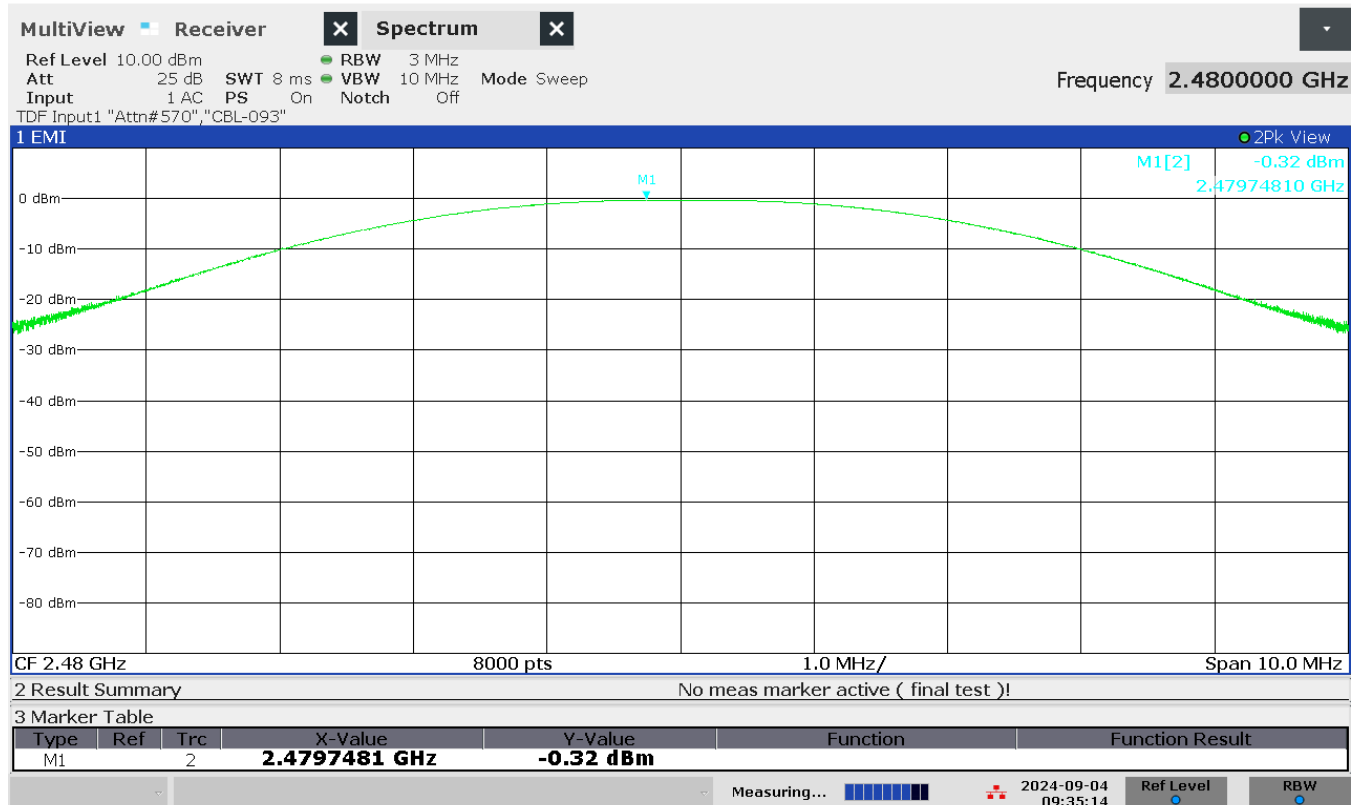
166 South Carter, Genoa City, WI 53128

Company: Wilson Sporting Goods Co.
Model Evaluated: MSC1392_ASSY Rev B
Evaluation Exhibit: RF Exposure
Project Number: 13059
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Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Peak Output Power – RF Conducted
Operator: cbrandt

Comment: Data rate: 1 Mbps
High Channel: 2480 MHz

Peak Output Power = -0.32 dBm = **0.929 mW**



09:35:15 AM 09/04/2024



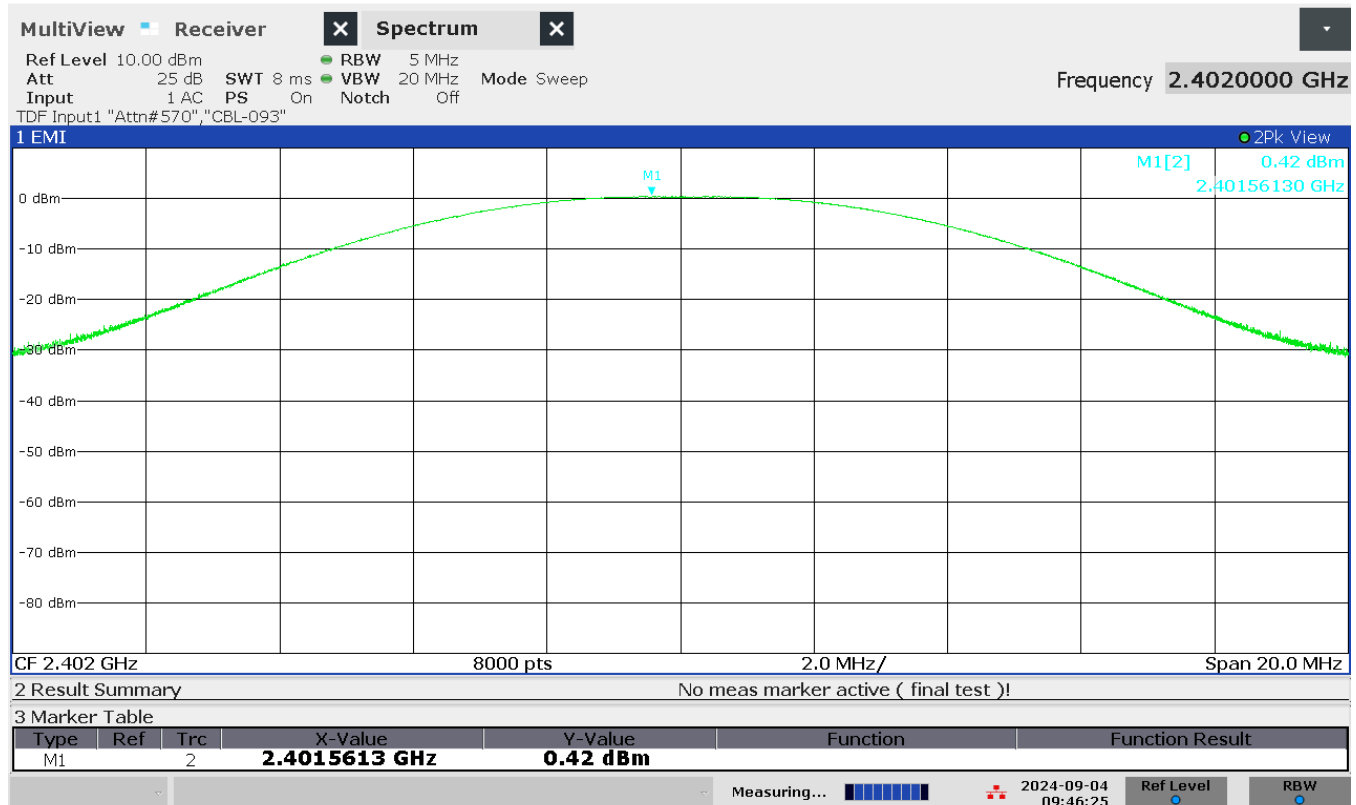
166 South Carter, Genoa City, WI 53128

Company: Wilson Sporting Goods Co.
Model Evaluated: MSC1392_ASSY Rev B
Evaluation Exhibit: RF Exposure
Project Number: 13059
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Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Peak Output Power – RF Conducted
Operator: cbrandt

Comment: Data rate: 2 Mbps
Low Channel: 2402 MHz

Peak Output Power = 0.42 dBm = **1.102 mW**



09:46:26 AM 09/04/2024



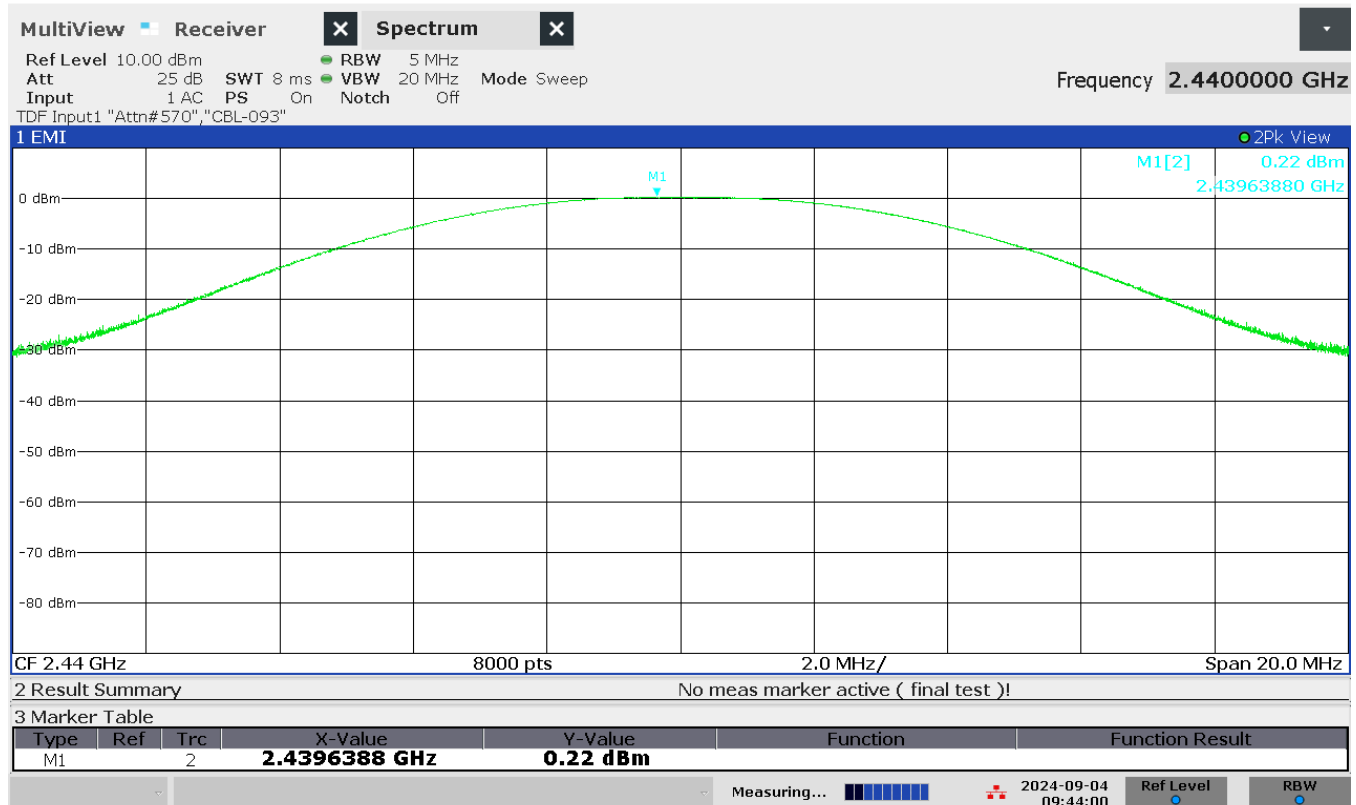
166 South Carter, Genoa City, WI 53128

Company: Wilson Sporting Goods Co.
Model Evaluated: MSC1392_ASSY Rev B
Evaluation Exhibit: RF Exposure
Project Number: 13059
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Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Peak Output Power – RF Conducted
Operator: cbrandt

Comment: Data rate: 2 Mbps
Mid Channel: 2440 MHz

Peak Output Power = 0.22 dBm = **1.052 mW**



09:44:00 AM 09/04/2024



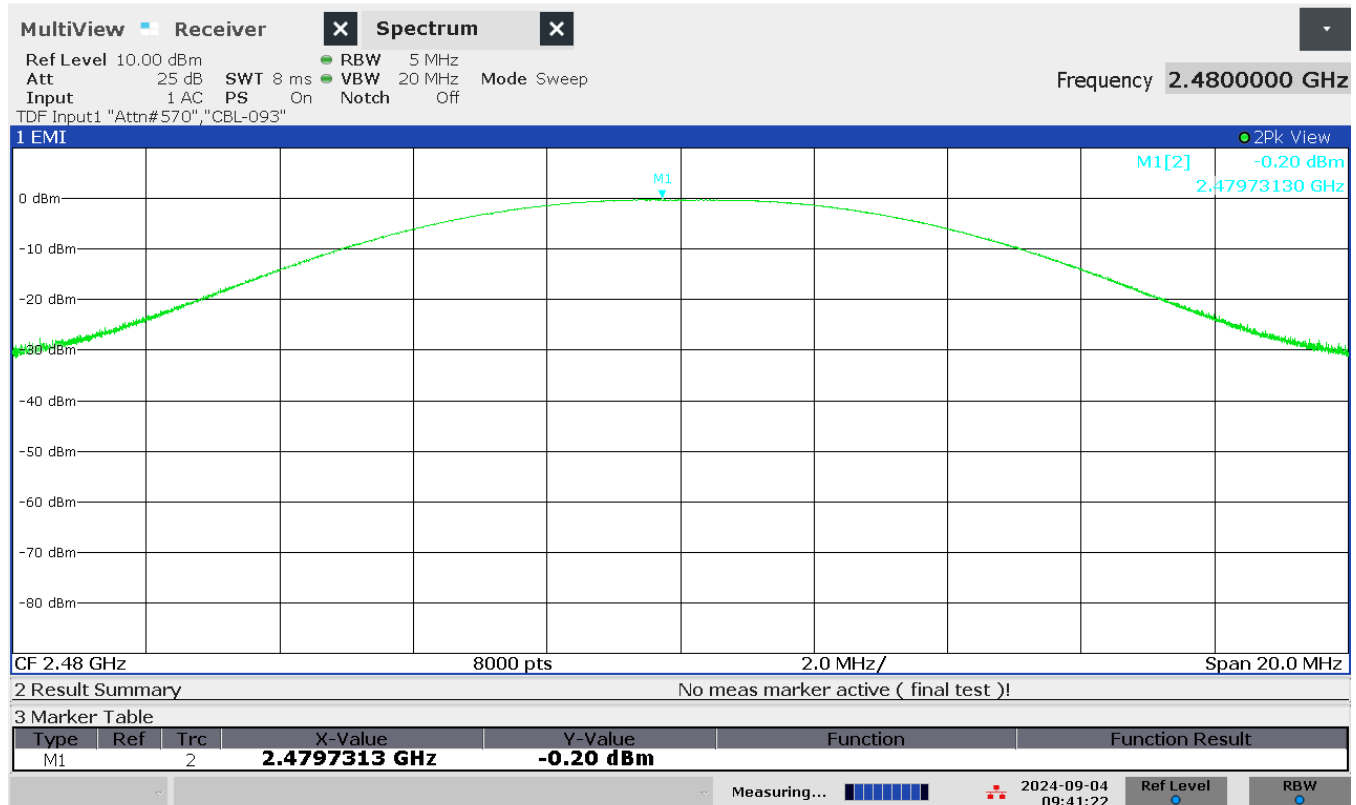
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Model Evaluated: MSC1392_ASSY Rev B
Evaluation Exhibit: RF Exposure
Project Number: 13059
Report Number: 28811 rev1.0

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Peak Output Power – RF Conducted
Operator: cbrandt

Comment: Data rate: 2 Mbps
High Channel: 2480 MHz

Peak Output Power = -0.20 dBm = **0.955 mW**



09:41:23 AM 09/04/2024

"High Frequency Ceramic Solutions"

2.4 GHz WLAN, Home RF, Bluetooth, 802.11 b/g, Antenna P/N 2450AT43B100 With Ground Clearance Requirements Minimized

Detail Specification: 11/14/2016

Page 1 of 5

Tip: This antenna "loves" to be mounted on PCB corners for optimum performance

General Specifications

Part Number	2450AT43B100	Input Power	2W max. (CW)
Frequency Range	2400 - 2500 Mhz	Reel Quantity	1,000
Peak Gain	1.3 dBi typ. (XZ-V)	Operating Temperature	-40 to +105°C
Average Gain	-0.5 dBi typ. (XZ-V)	Storage Temperature	-40 to +105°C
Return Loss	9.5 dB min.	Recommended Storage Conditions (for unused product on T&R)	+5 to +35°C, Humidity: 45-75%RH, 18 months max.
Radiation Pattern	Omnidirectional		

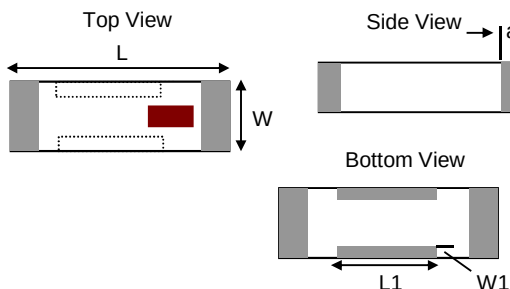
Would you like us to tune the antenna to your PCB? Contact us at:
www.johansontechnology.com/ask-a-question

Part Number Explanation

P/N Suffix	Packaging Style	Bulk	Suffix = S	Eg. 2450AT43B100S
		T & R	Suffix = E	Eg. 2450AT43B100E
	Termination Style	100% Tin	Suffix = None	Eg. 2450AT43B100(E or S)
	Evaluation Board	2450AT43B100-EB1SMA (comes pre-tuned with SMA connector)		

Mechanical Dimensions

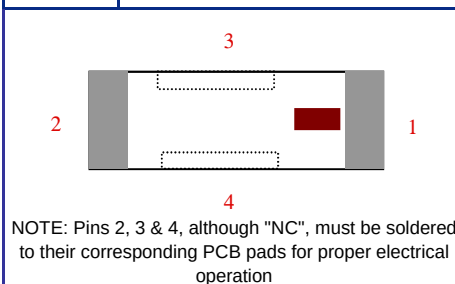
	In	mm
L	0.276 ± 0.008	7.00 ± 0.20
W	0.079 ± 0.008	2.00 ± 0.20
L1	0.102 ± 0.008	2.60 ± 0.20
W1	0.020 ± 0.008	0.50 ± 0.20
T	0.079 +.004/-0.008	2.00 +0.1/-0.2
a	0.020 ± 0.012	0.50 ± 0.30



Want the layout file? Request it at:
www.johansontechnology.com/ask-a-question

Terminal Configuration

No.	Function
1	Feed Point
2	NC
3	NC
4	NC



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Ver 2.1

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"High Frequency Ceramic Solutions"

2.4 GHz WLAN, Home RF, Bluetooth, 802.11 b/g, Antenna

P/N 2450AT43B100

With Ground Clearance Requirements Minimized

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Detail Specification: 11/14/2016

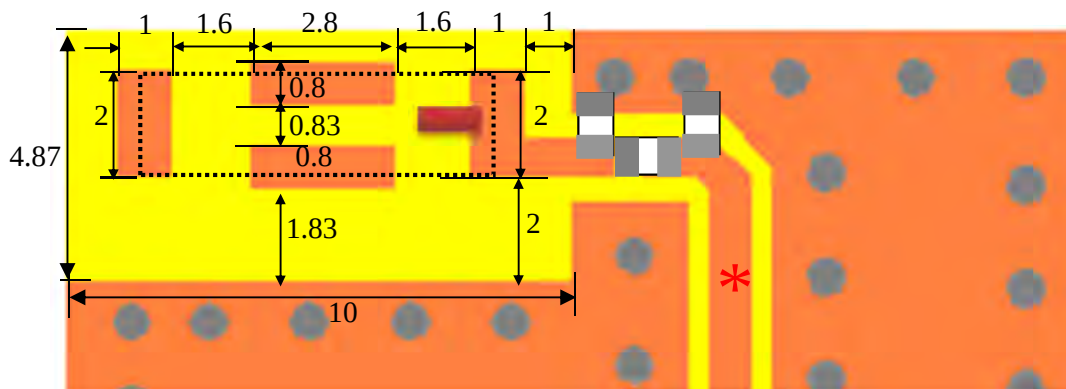
Mounting and Layout Guidelines:

Mount these devices with red mark facing up. Units: mm

Need help designing the antenna in? Use our antenna design services!

www.johansontechnology.com/ipc-antenna-services

We provide 2 Free layout reviews and if you need us to tune and characterize the antenna on your design (anechoic chamber) we can do that too (lab fee may apply for the latter).



IMPORTANT! Matching circuit and component values will be different on your PCB, this will depend on PCB layout and shape, encasement, etc

*Antenna feed line width should be designed to provide 50 Ω impedance otherwise improper operation

Note 1: Pins 2, 3 & 4, although "NC", must be soldered to their corresponding PCB pads for proper operation

Note 2: It is recommended that the designer leave available slots for a "pi" (or shunt-series-shunt) network. The antenna matching network values above are used when antenna is mounted on Johanson's evaluation board. The matching values on client's PCB will be different. Go to: www.johansontechnology.com/tuning and see how to obtain the new values. If you need need us to tune it for you or would like the layout files, please contact our RF Applications Eng Team at: www.johansontechnology.com/ask-a-question

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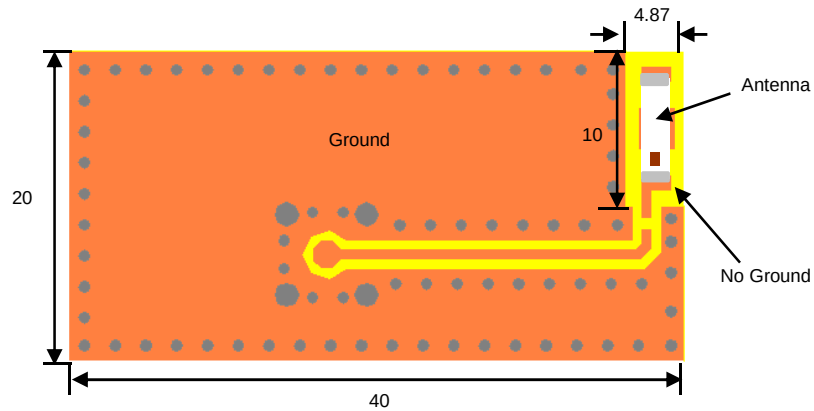
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Detail Specification: 11/14/2016

EVB used to characterize the antenna

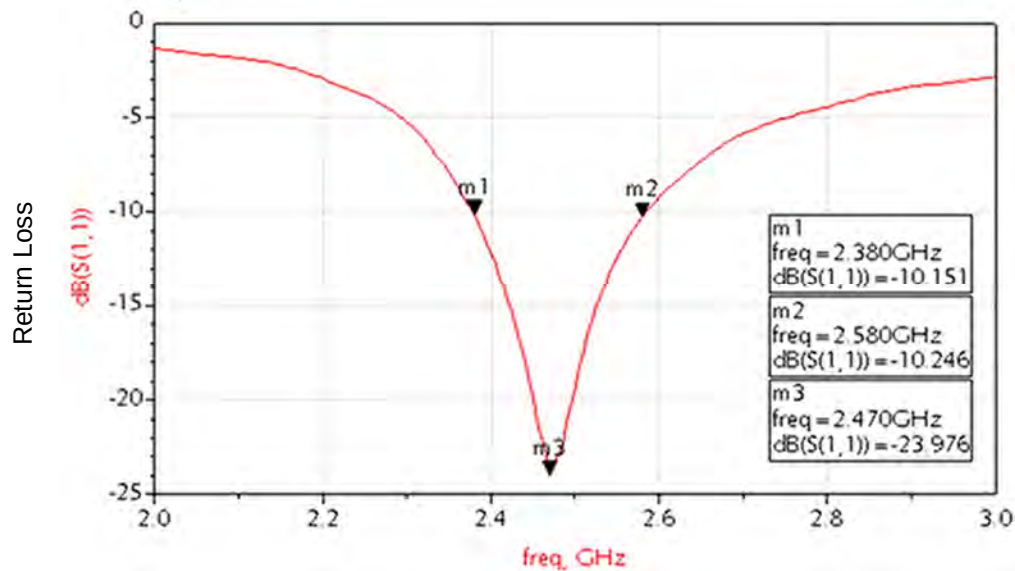
Would you like to order this pre-tuned EVB? Click on:

www.johansontechnology.com/request-a-sample and please reference p/n: 2450AT43B100-EB1SMA
(comes with SMA connector)



Typical Electrical Characteristics (T=25°C)

With Proper Matching Circuit



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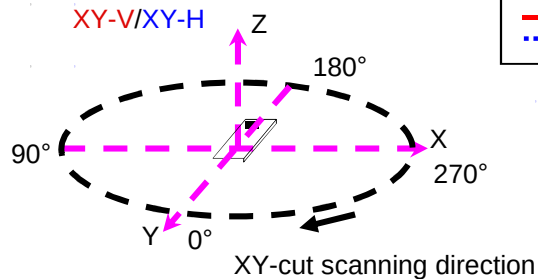
P/N 2450AT43B100

With Ground Clearance Requirements Minimized

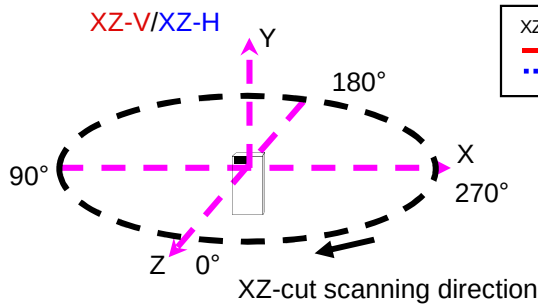
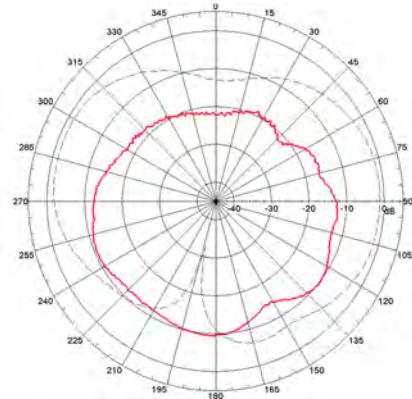
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Detail Specification: 11/14/2016

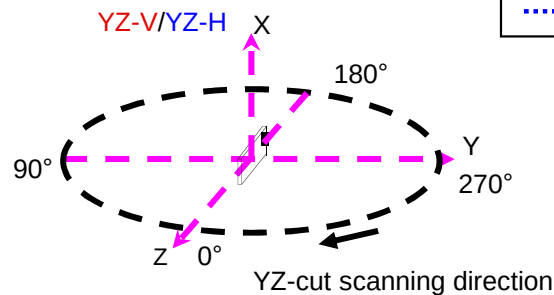
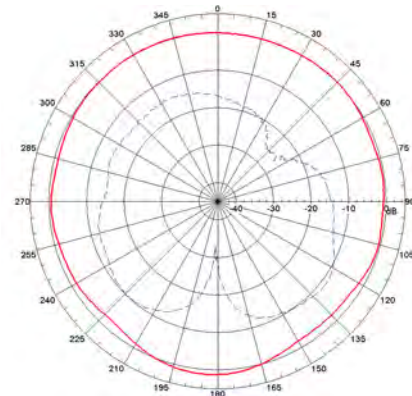
Typical Electrical Characteristics/Radiation Patterns (T=25°C)



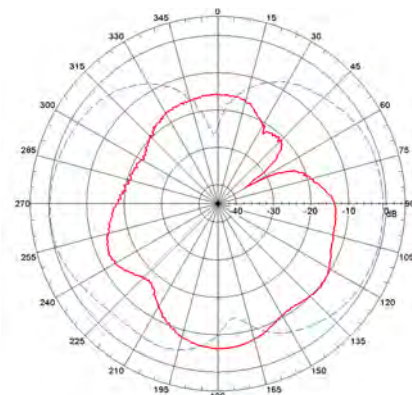
XY cut @2.45GHz
— Vertical
- - - Horizontal



XZ cut @2.45GHz
— Vertical
- - - Horizontal



YZ cut @2.45GHz
— Vertical
- - - Horizontal



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###

Antenna layout review, tuning, and characterization services

www.johansontechnology.com/ipc-antenna-services

More SMD Chip Antennas at:

www.johansontechnology.com/antennas

Soldering Information

www.johansontechnology.com/ipcsoldering-profile

Antenna layout and tuning techniques (How to obtain the new antenna matching values)

www.johansontechnology.com/tuning

Packaging information

<http://www.johansontechnology.com/tape-reel-packaging>

RoHS2 (6/6) full compliance

www.johansontechnology.com/rohs-compliance

MSL Info

www.johansontechnology.com/msl-rating

P/N Explanation and Breakdown

www.johansontechnology.com/ipc-pn-explained

Recommended Storage Conditions of uninstalled product still on T&R

-40 ~ +85 °C, Humidity 45~75%RH, 18 mos. Max

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Technical Author: Manuel Carmona



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Section D – Measurement Uncertainty

Radiated & RF Conducted Emission 30 MHz to 25 GHz Uncertainty

Parameter	Expanded Uncertainty (K=2)
Occupied Channel Bandwidth	+/- 1.14%
RF Output Power, Conducted	+/- 0.89 dB
Unwanted Emissions, Conducted	+/- 2.62 dB
All Emissions, Radiated	+/- 4.95 dB
DC and Low Frequency Voltages	+/- 2.42%
Time	+/- 0.01%
Duty Cycle	+/- 0.05%



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END OF REPORT

Revision #	Date	Comments	By
1.0	03-11-2025	Initial Release	CB