



166 South Carter, Genoa City, WI 53128

Company:	Wilson Sporting Goods Co.
Model Tested:	MSC1392_ASSY Rev B
Project Number:	13059
Report Number:	28810 rev1.2

Code of Federal Regulations Title 47 Part 15 – Radio Frequency Devices

Subpart C – Intentional Radiators – Section 15.247
Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz,
5725 - 5875 MHz, and 24.0 - 24.25 GHz.

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

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
Test Configuration:	Table top, stand-alone, rotated through 3 orthogonal axes to find worst-case orientation
Model Number(s):	MSC1392_ASSY Rev B
Model(s) Tested:	MSC1392_ASSY Rev B
Serial Number(s):	Radiated units: 31696-1002, 31696-1004, 31696-1005 RF conducted unit: 31696-1001
Date of Tests:	September 4 – 6, and October 5, 2024
Test Conducted For:	Wilson Sporting Goods Co. 9509 Foster Avenue Schiller Park, Illinois, 60176, USA

NOTICE: This test report contains test data, equipment lists and/or other information regarding only the sample provided by the client for testing. 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 Test Sample" 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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Company: Wilson Sporting Goods Co.
Model Tested: MSC1392_ASSY Rev B
Project Number: 13059
Report Number: 28810 rev1.2

1.0 Summary of Test Report

It was determined that the QBID Ball Tag, model MSC1392_ASSY Rev B, complies with the requirements of Title 47 CFR Part 15, Subpart C, Section 15.247.

Subpart C Applicable Technical Requirements Tested:

Section	Description	Procedure	Note	Compliant?
15.31(e)	Supply Voltage Statement	N/A		Yes
15.203	Antenna Requirement Statement	N/A		Yes
Informative	Duty Cycle of Test Unit	ANSI C63.10-2020 Section 11.6(b)	1	NA
15.247(a)(2)	DTS Bandwidth (6 dB Bandwidth)	ANSI C63.10-2020 Section 11.8.2	1	Yes
15.247(b)(3)	Peak Output Power	ANSI C63.10-2020 Section 11.9.1.1	1	Yes
15.247(e)	Peak Power Spectral Density	ANSI C63.10-2020 Section 11.10.2	1	Yes
15.247(d)	Emissions in Non-Restricted Frequency Bands	ANSI C63.10-2020 Section 11.11	1	Yes
15.247(d) 15.205(b) 15.209(a)	Emissions in Restricted Frequency Bands	ANSI C63.10-2020 Section 11.12.1	2	Yes
15.247(d)	Authorized Band Edge	ANSI C63.10-2020 Section 6.10.4	1	Yes
15.247(d) 15.205(b) 15.209(a)	Restricted Band Edge	ANSI C63.10-2020 Section 6.10.5	2	Yes

Note 1: RF Conducted measurement.

Note 2: Radiated Emission measurement; tested in 3 orthogonal axes.



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2.0 Introduction

During September 4 - 6, and October 5, 2024 the QBID Ball Tag, model MSC1392_ASSY Rev B, as provided by Wilson Sporting Goods Co., was tested to the requirements of Title 47 CFR Part 15, Subpart C, Section 15.247. To meet these requirements, the procedures contained within this report were performed by personnel of D.L.S. Electronic Systems, Inc.

The Digital Device requirements (Part 15.109 Class B) will be addressed as an SDoC.

3.0 Test Facilities

D.L.S. Electronic Systems, Inc. is a full-service EMC/Safety Testing Laboratory accredited to ISO 17025. ANAB Certificate and Scope can be viewed at <http://www.dlsemc.com/certificate>. Our facilities are registered with the FCC, ISED Canada, and VCCI.

Wisconsin Test Facility:

D.L.S. Electronic Systems, Inc.
166 S. Carter Street
Genoa City, Wisconsin 53128

Wheeling Test Facility:

D.L.S. Electronic Systems, Inc.
1250 Peterson Drive
Wheeling, IL 60090

FCC Registration #90531

4.0 Description of Test Sample

Description:

The QBID Ball Tag is inserted into the center of a football as part of a data acquisition system used to evaluate and quantify a player's performance. Sensors pick up features like ball velocity, ball spin rate, spiral efficiency, release time, and others. The sensors deliver data via Bluetooth to a laptop. This data allows players to evaluate their level of performance.

Type of Equipment:

Portable / Hand-held (installed in football)

DTS – Bluetooth Low Energy (BLE)



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4.0 Description of Test Sample – continued

Frequency Range:

2402 – 2480 MHz

Physical Dimensions of Equipment Under Test:

Length: 32 mm x Width: 35 mm x Height: 5 mm

Power Source:

3.0 Volt DC provided by one-time use button battery soldered to circuit board

Crystal Frequencies:

32 MHz, 32.768 kHz

Transmit Frequencies Used For Test Purpose:

2402 MHz, 2440 MHz, 2480 MHz

Type of Modulation(s)

GFSK (40 Channels), 1 MHz and 2 MHz bandwidths (1 Mbps & 2 Mbps data rates)

Antenna Type:

Chip antenna.
Johanson part number: 2450AT43B100E
Gain: 1.3 dBi peak

Production Firmware / Software:

Normal Operational Firmware: 1D00D049
(This identifies the build code and the version as well.)

Firmware / Software Used for Test Purpose:

Special FCC Test Firmware: 1DFCCA50
(This identifies the build code and the version as well.)



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5.0 Test Equipment

A list of the equipment used can be found in the table below. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.

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

D.L.S. Wisconsin – Radiated Emissions 30-1000 MHz – 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
Antenna	EMCO	3104C	0005-4892	20 MHz-300 MHz	1-5-23	1-5-26
Antenna	EMCO	3146	1604	200 MHz-1 GHz	3-13-24	3-13-26
Cable	Beldin	9914	CBL-005	9 kHz-1 GHz	7-2-24	7-2-25
Cable	Pasternack Enterprises	PE3087-48	CBL-109	9 kHz-1 GHz	4-7-24	4-7-25
Cable	Pasternack Enterprises	PE3087-48	CBL-111	9 kHz-1 GHz	4-7-24	4-7-25
Cable	Coleman Cable	991079	CBL-122	9 kHz-1 GHz	4-7-24	4-7-25
Preamplifier	Rohde & Schwarz	TS-PR10	032001/004	9 kHz-1 GHz	7-2-24	7-2-25
Test Software	ETS Lindgren	TILE 7	N/A	N/A	N/A	N/A



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5.0 Test Equipment – continued

D.L.S. Wisconsin – Radiated Emissions 1-4 GHz – Site W1 – Test Equipment:

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz-26.5 GHz	3-29-23	3-29-25
Horn Antenna	EMCO	3115	9502-4451	1 GHz-18 GHz	10-9-23	10-9-25
Cable	Micro-Coax	UFB311A	CBL-100	1 GHz-18 GHz	5-16-24	5-16-25
Test Software	Rohde & Schwarz	ESK1	V1.7.1	N/A	N/A	N/A

D.L.S. Wisconsin – Radiated Emissions 4-18 GHz – Site W1 – Test Equipment:

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz-26.5 GHz	3-29-23	3-29-25
Horn Antenna	EMCO	3115	9502-4451	1 GHz-18 GHz	10-9-23	10-9-25
Cable	Micro-Coax	UFB311A	CBL-100	1 GHz-18 GHz	5-16-24	5-16-25
Cable	Mini-Circuits	CBL-2M-SMSM+	70822	1 GHz-27 GHz	5-17-24	5-17-25
High Pass Filter	Q Microwave	100462	1	4 GHz-18 GHz	5-16-24	5-16-25
Preamplifier	Com-Power	PAM-118A	18040154	1 GHz-18 GHz	4-11-24	4-11-25
Test Software	Rohde & Schwarz	ESK1	V1.7.1	N/A	N/A	N/A



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5.0 Test Equipment – continued

D.L.S. Wisconsin – Radiated Emissions 18-25 GHz – 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
Horn Antenna	A.H Systems	SAS-574	222	18 GHz-40 GHz	12-14-22	12-14-24
Cable	Pasternack Enterprises	PE3C0666-24	CBL-103	30 MHz-40 GHz	7-12-24	7-12-25
Cable	Micro-Coax	UFC142A	CBL-093	30 MHz-40 GHz	7-12-24	7-12-25
Preamplifier	Miteq	AMF-8B-180265-40-10P-H/S	438727	18 GHz-26 GHz	5-17-24	5-17-25
Test Software	ETS Lindgren	TILE 7	N/A	N/A	N/A	N/A

6.0 Test Arrangements

Measurement Arrangement:

All measurements were performed at D.L.S. Electronic Systems, Inc. and set up according to ANSI C63.10-2020, unless otherwise noted. Descriptions of procedures and measurements can be found in Section A – Measurement Data. See Section B for measurement uncertainty. See separate exhibit for photos of the test set up.

Unless otherwise noted, the bandwidth of the measuring receiver / analyzer used during testing is shown below.

Frequency Range	Bandwidth (-6 dB)
10 to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz
30 MHz to 1 GHz	120 kHz
Above 1 GHz	1 MHz



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7.0 Test Conditions

Temperature and Humidity:

70 °F at 44% RH

Supply Voltage:

3.0 Volt DC provided by one-time use button battery soldered to circuit board

Four samples were used during testing to maintain testing with a fully charged battery.

8.0 Modifications Made to EUT For Compliance

None noted at time of test.

9.0 Additional Descriptions

Following FCC Part 15 and ANSI C63.10 requirements, the EUT was programmed to transmit continuously, modulated, with a high duty cycle (highest duty cycle achievable with test software). The transmit Output power was set to a setting of 0 using the test software.

For RF Conducted measurements, a spectrum analyzer was connected through an RF cable and a 20 dB attenuator to a temporary SMA connector that was soldered to the RF circuit board in place of the antenna. Correction factors for the loss of the RF cable and attenuator were downloaded into the spectrum analyzer so that the values displayed on the spectrum analyzer are already corrected for the cable and attenuator losses, and no further corrections are needed.

For Radiated Emission measurements, the EUT was tested while transmitting from the on-board chip antenna. The device was set up on a non-conductive table for testing purposes.

The EUT was programmed for continuous transmission on the lowest, middle, and highest channels of operation in the 2.4 GHz BLE frequency band. The EUT was rotated through three orthogonal axes to find worst-case emission levels. The worst-case levels are recorded in this test report.



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9.0 Additional Descriptions – continued

See Section A for operation and setup specific to the FCC Rule part and ANSI C63.10 guidance reference for each test performed. See the separate Setup Photos exhibit for photos of the Radiated Emissions and RF Conducted measurement test setups.

10.0 FCC 15.31(e) Supply Voltage Requirement statement

FCC 15.31(e) - For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Compliance Statement: This device complies with the requirements of Part 15.31(e):

- ☒ This device is battery operated. All tests were performed using a new (or fully charged) battery.
- ☐ This device provides a constant regulated voltage to the RF circuitry regardless of supply voltage (see schematic diagrams).
- ☐ This device does not provide a constant regulated voltage to the RF circuitry regardless of supply voltage. Data has been supplied in this test report that supports compliance. Details:

11.0 FCC 15.203 Antenna Requirement statement

SECTION 15.203 ANTENNA REQUIREMENT

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.... This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221.

Statement: This wireless device (Intentional Radiator) meets the requirements of FCC Part 15.203:

- ☒ The antenna is permanently attached.
- ☐ The antenna has a unique coupling to the intentional radiator.
Description of coupling:
- ☐ This intentional radiator is professionally installed.
- ☐ This intentional radiator, in accordance with Section 15.31(d), must be measured at the installation site.



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12.0 Results

Measurements were performed in accordance with ANSI C63.10-2020. Graphical and tabular data can be found in Section A at the end of this report.

13.0 Conclusion

The QBID Ball Tag, model MSC1392_ASSY Rev B, as provided by Wilson Sporting Goods Co., tested during September 4 - 6, and October 5, 2024 **meets** the requirements of Title 47 CFR Part 15, Subpart C, Section 15.247.



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Section A – Measurement Data

A1.0 Duty Cycle of Test Unit

Rule Part:

Informative

Test Procedure:

ANSI C63.10-2020, Section 11.6(b)
Zero-span mode on a spectrum analyzer

Limit:

Informative

Results:

Duty Cycle Correction Factor: **0.48 dB** for 1 Mbps operation
 0.94 dB for 2 Mbps operation

Notes:

This test was performed using an RF Conducted test configuration. The test software was set to transmit a modulated signal at 94.6% duty cycle in 1 Mbps mode and 89.7% duty cycle in 2 Mbps mode. These same software settings were used for all RF Conducted and Radiated Emissions testing.



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Section A

A1.1 Duty Cycle – 1 Mbps

Test Date: 09-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Duty Cycle of Test Unit
Operator: cbrandt

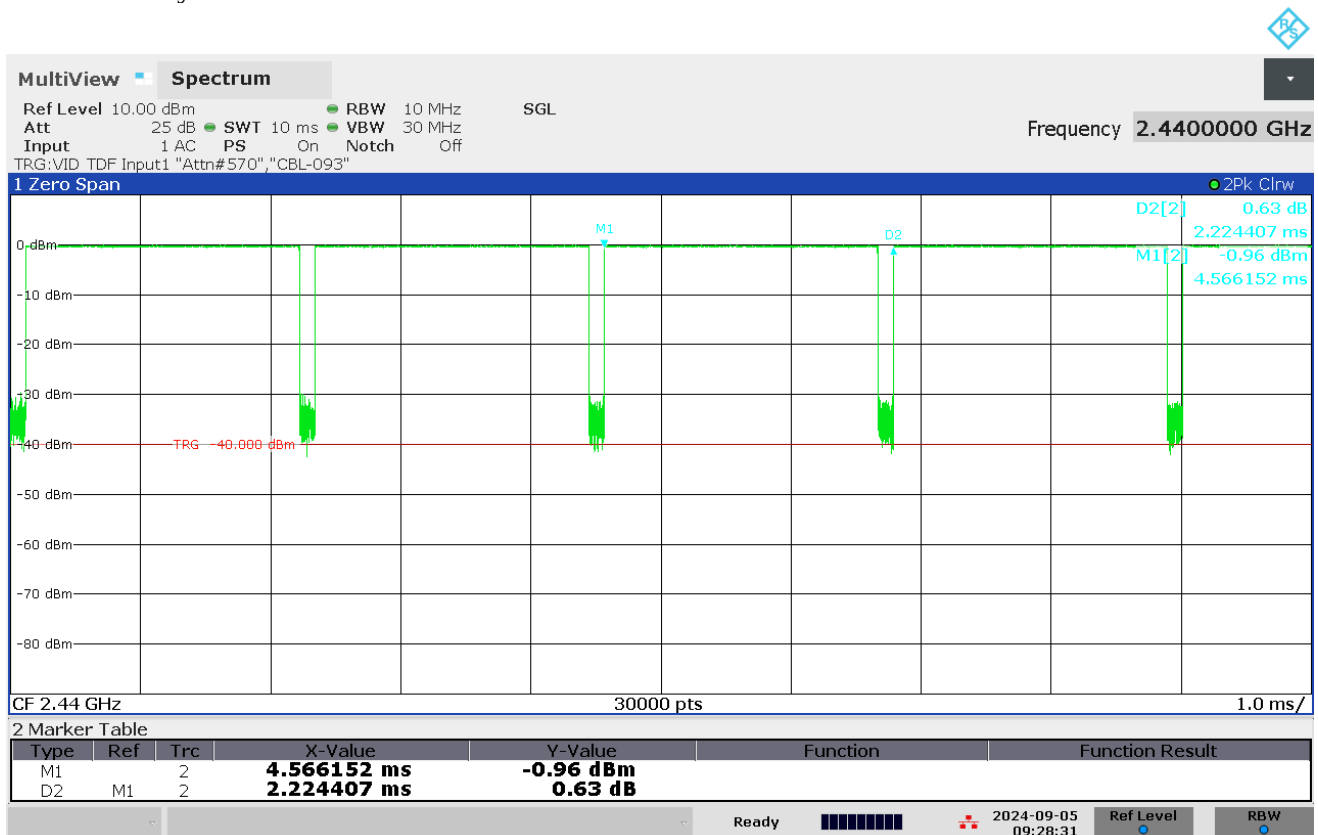
Comment: Data rate: 1 Mbps
Mid Channel: 2440 MHz

ON + OFF time = 2.234469 ms

Duty cycle x = (2.10307 ms / 2.224407 ms) = 0.9455 = 94.6%

Voltage Duty Cycle Correction Factor = $20 \log (1/0.946) = 0.48 \text{ dB}$

One cycle: 2.224407 ms



09:28:32 AM 09/05/2024



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Section A

Test Date: 09-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Duty Cycle of Test Unit
Operator: cbrandt

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

ON + OFF time = 2.234469 ms

Duty cycle $x = (2.10307 \text{ ms} / 2.224407 \text{ ms}) = 0.9455 = 94.6\%$

Voltage Duty Cycle Correction Factor = $20 \log (1/0.946) = 0.48 \text{ dB}$

ON time during one cycle = 2.10307 ms



09:29:46 AM 09/05/2024



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Section A

A1.2 Duty Cycle – 2 Mbps

Test Date: 09-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Duty Cycle of Test Unit
Operator: cbrandt

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

ON + OFF time = 2.234469 ms

Duty cycle x = (1.057202 ms / 1.178206 ms) = 0.8973 = 89.7%

Voltage Duty Cycle Correction Factor = $20 \log (1/0.946) = 0.94 \text{ dB}$

One cycle: 1.178206 ms



09:41:13 AM 09/05/2024



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Section A

Test Date: 09-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Duty Cycle of Test Unit
Operator: cbrandt

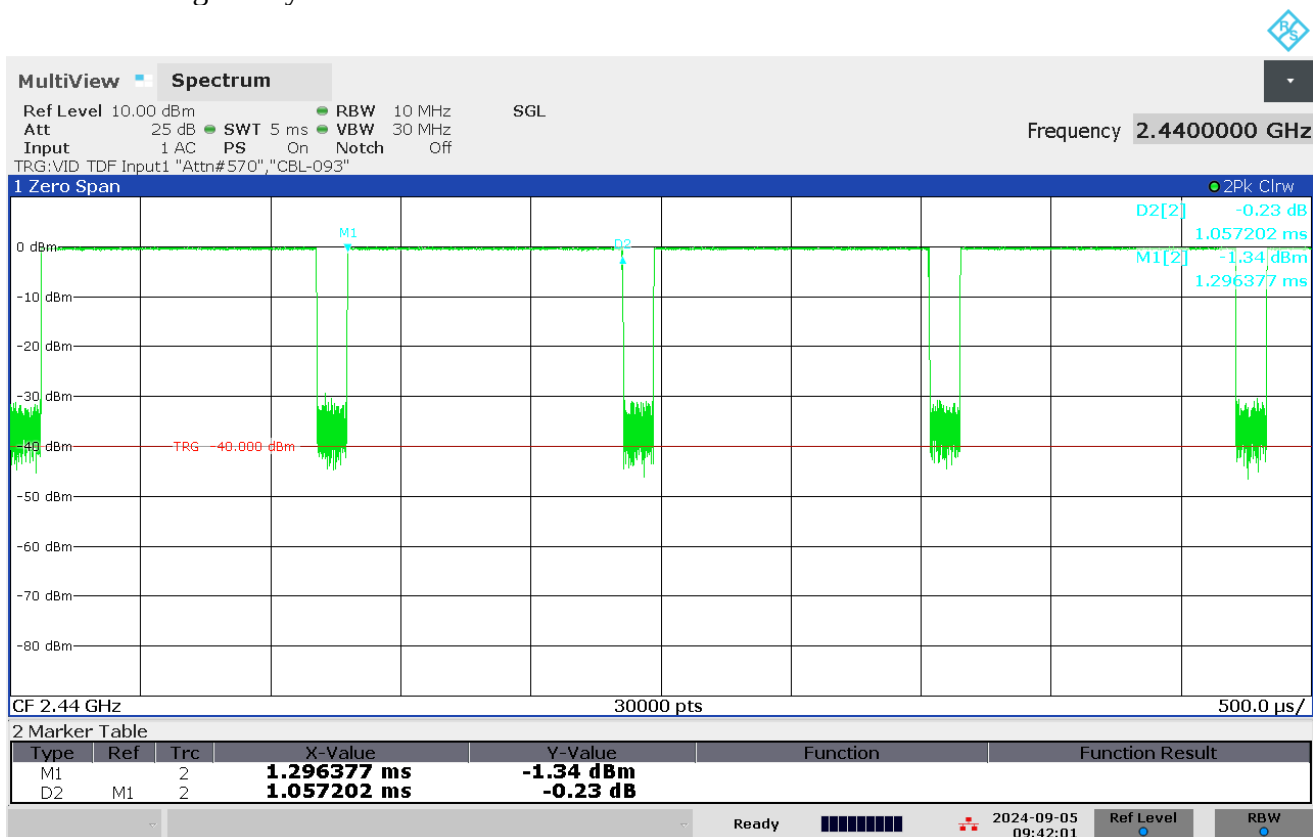
Comment: Data rate: 2 Mbps
Mid Channel: 2440 MHz

ON + OFF time = 2.234469 ms

Duty cycle x = (1.057202 ms / 1.178206 ms) = 0.8973 = 89.7%

Voltage Duty Cycle Correction Factor = $20 \log(1/0.946) = 0.94 \text{ dB}$

ON time during one cycle = 1.057202 ms



09:42:01 AM 09/05/2024



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Section A

A2.0 DTS Bandwidth (6 dB bandwidth)

Rule Part:

Section 15.247(a)(2)

Test Procedure:

ANSI C63.10-2020, Section 11.8.2

DTS Bandwidth

Option 2: Automatic bandwidth measurement function of spectrum analyzer

Limit:

Minimum 6 dB bandwidth must be at least 500 kHz.

Results:

Compliant.

Minimum 6 dB bandwidth = **701 kHz**.

Notes:

This test was performed using an RF Conducted test configuration. The test software was set to transmit a modulated signal at 94.6% duty cycle in 1 Mbps mode and 89.7% duty cycle in 2 Mbps mode. These same software settings were used for all RF Conducted and Radiated Emissions testing.



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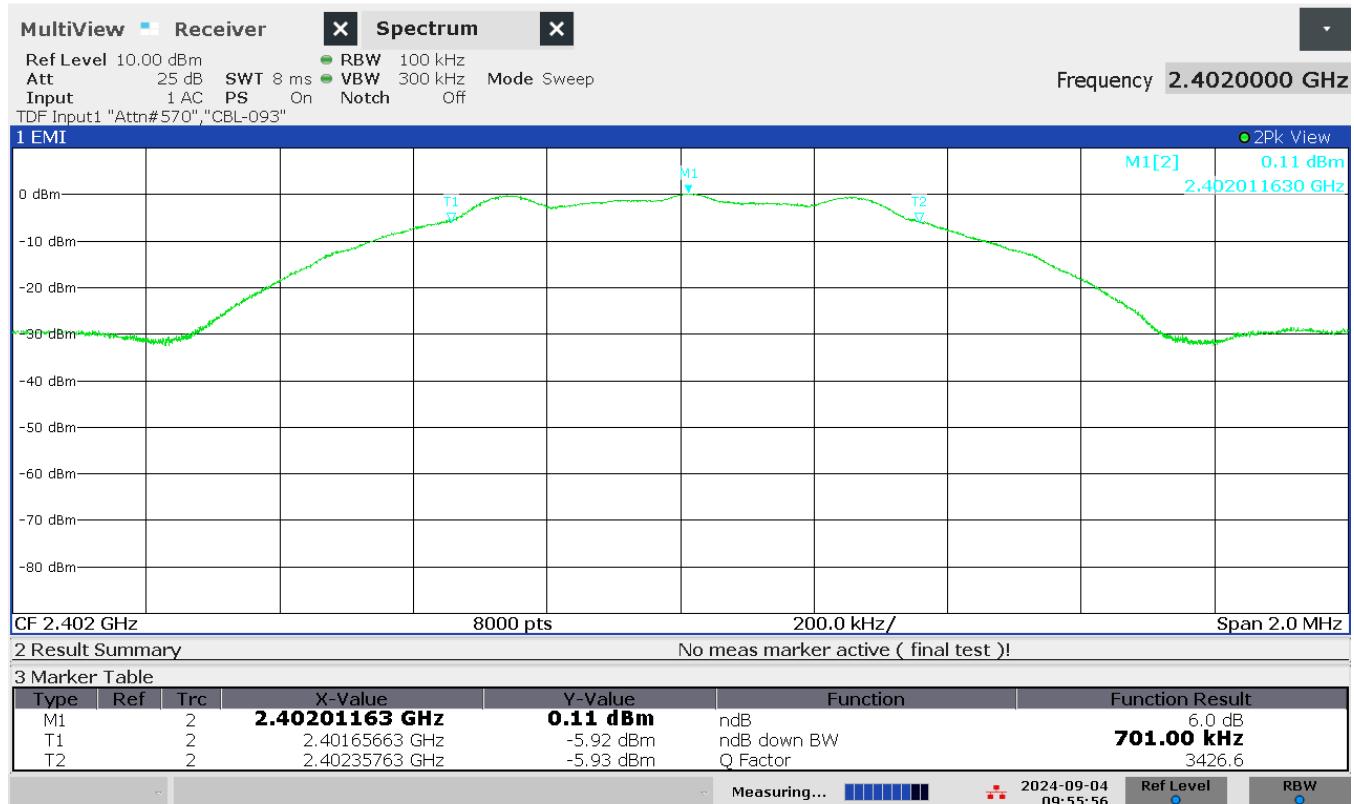
Section A

A2.1 DTS Bandwidth – 1 Mbps

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: DTS (6 dB) Bandwidth – RF Conducted
Operator: cbrandt

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

6 dB Bandwidth = **701 kHz**



09:55:57 AM 09/04/2024



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Project Number:
Report Number:

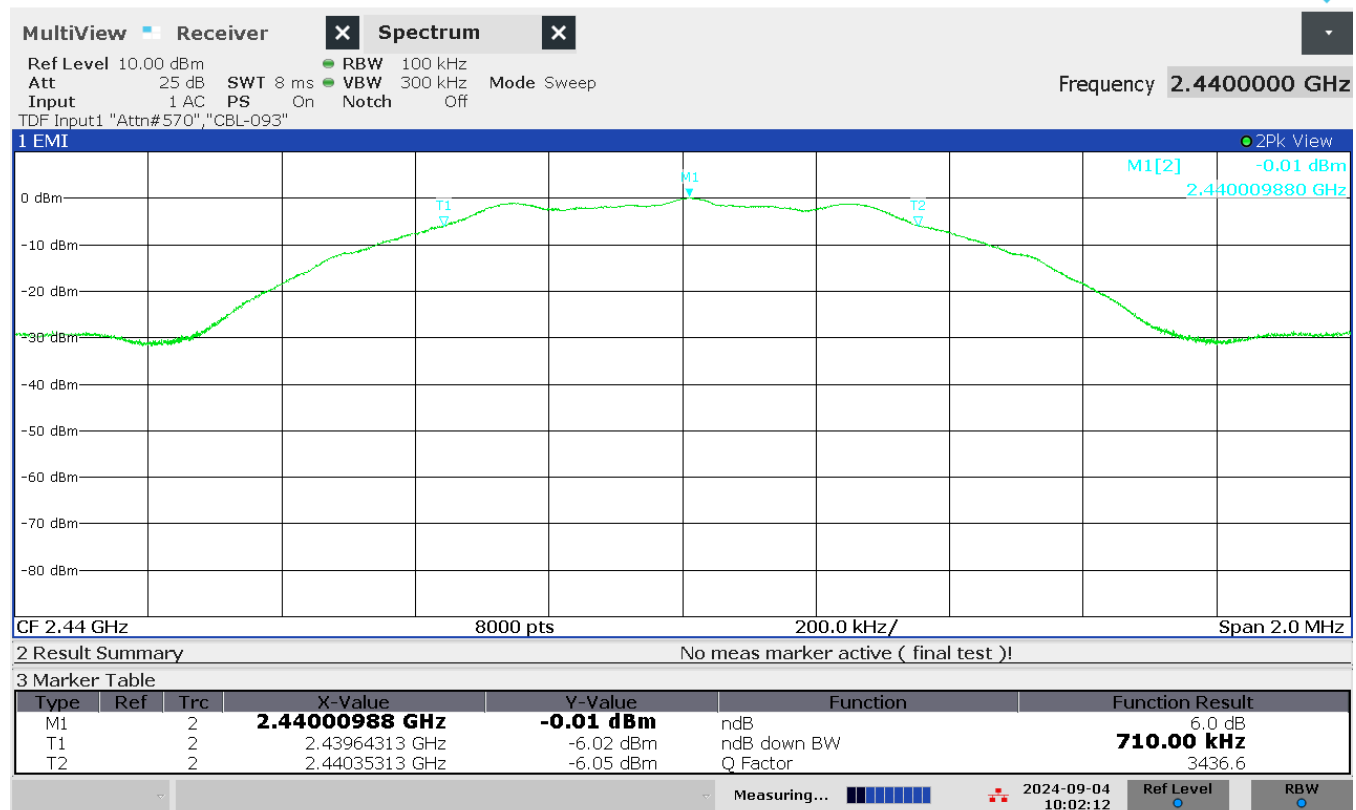
Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: DTS (6 dB) Bandwidth – RF Conducted
Operator: cbrandt

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

6 dB Bandwidth = 710 kHz



10:02:13 AM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

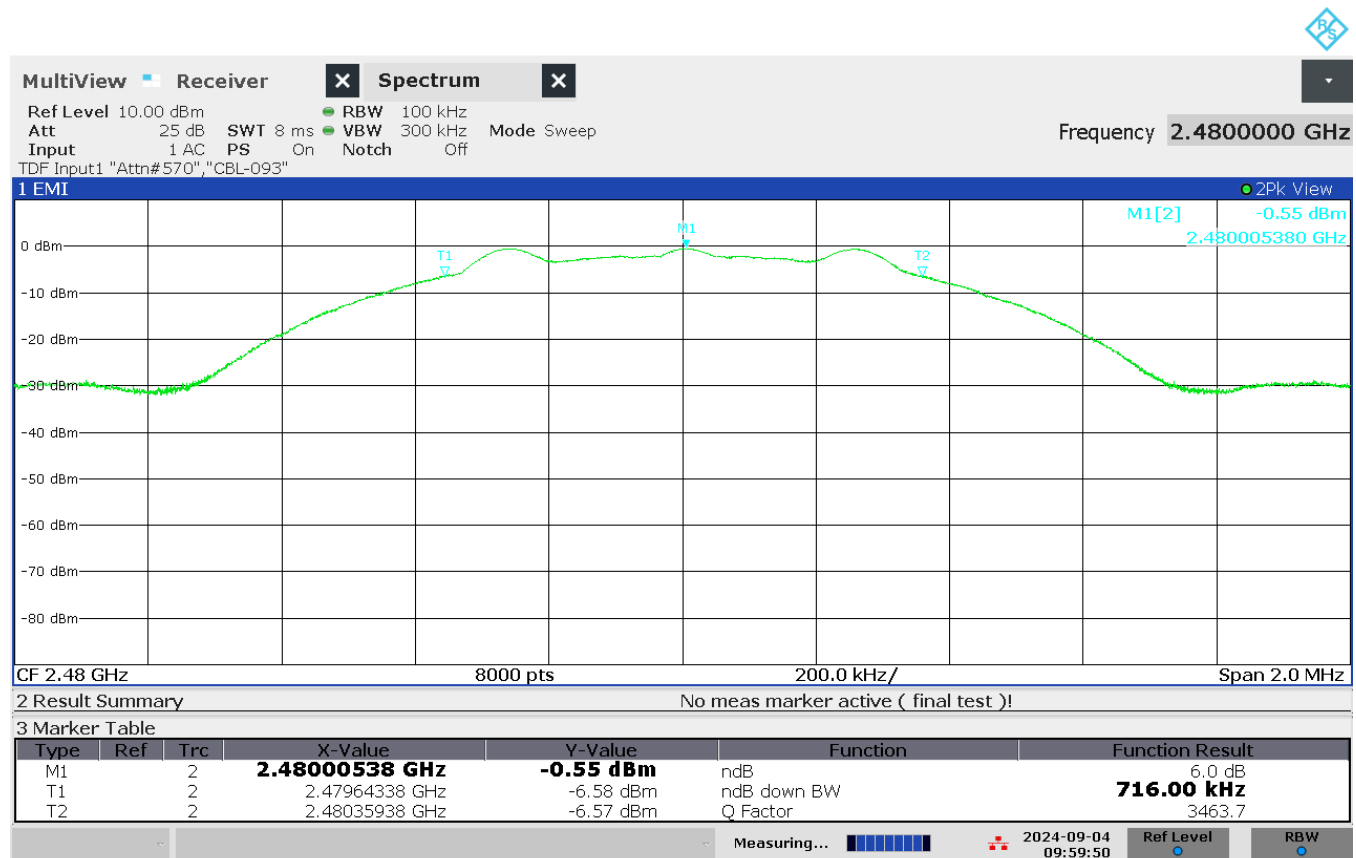
Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: DTS (6 dB) Bandwidth – RF Conducted
Operator: cbrandt

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

6 dB Bandwidth = 716 kHz



09:59:51 AM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

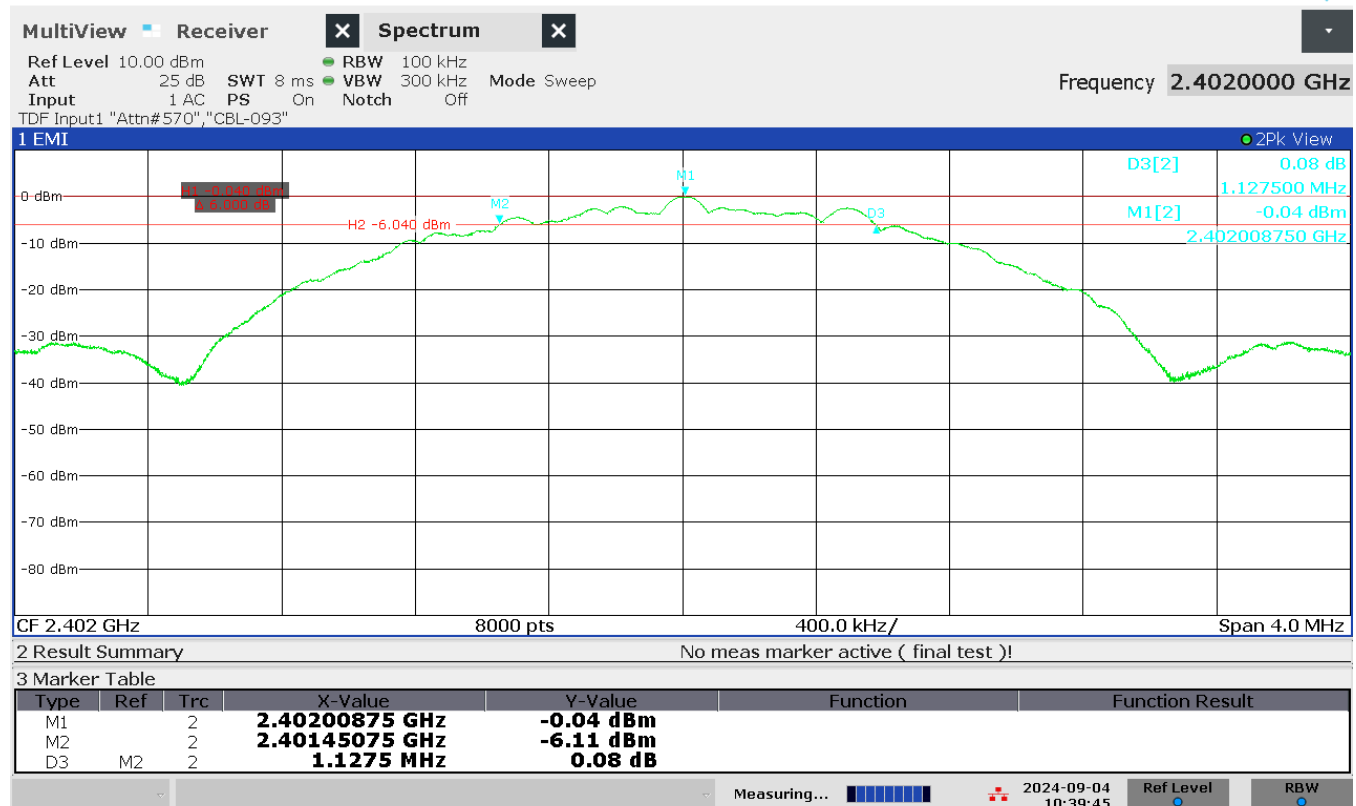
Section A

A2.2 DTS Bandwidth – 2 Mbps

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: DTS (6 dB) Bandwidth – RF Conducted
Operator: cbrandt

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

6 dB Bandwidth = 1.128 MHz



10:39:45 AM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

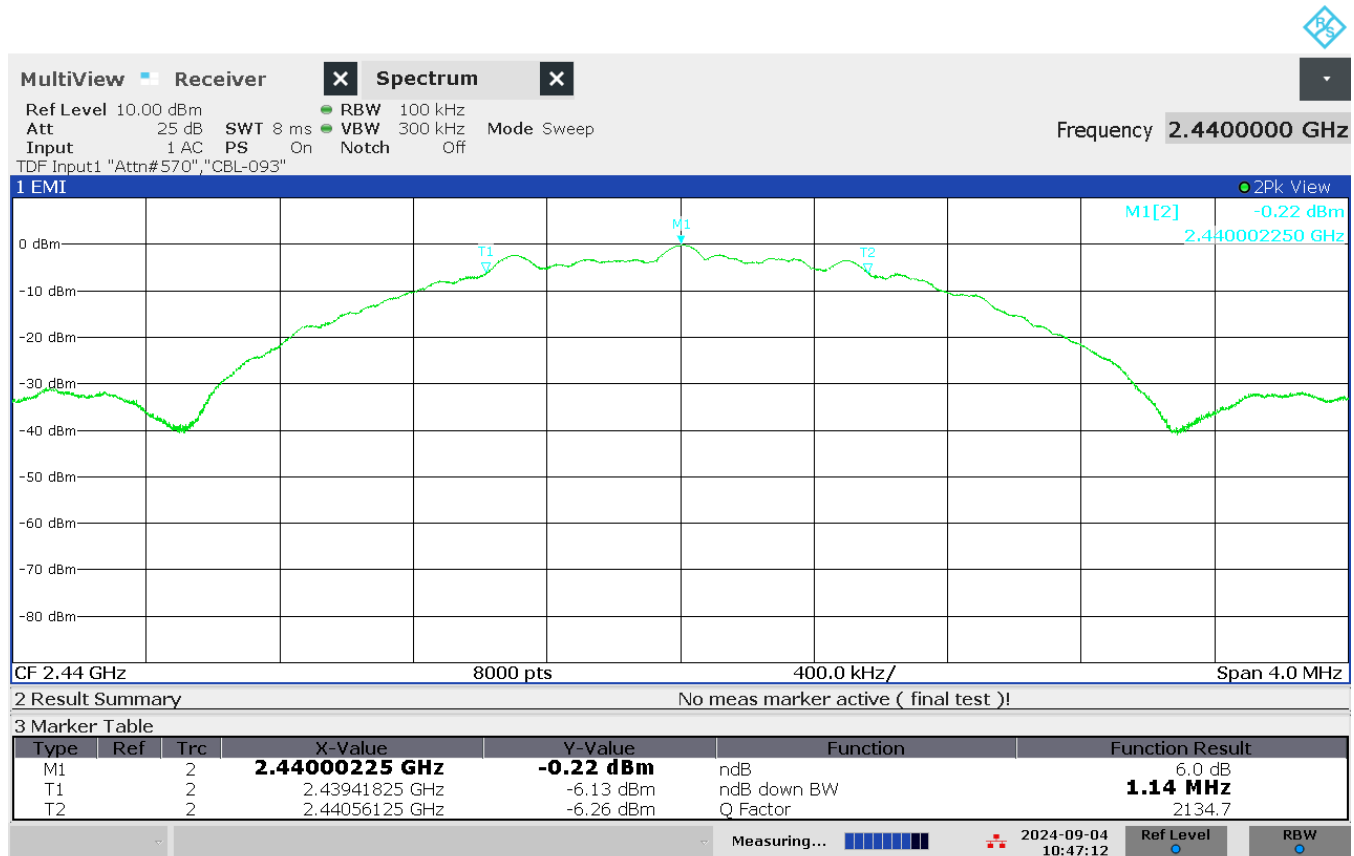
Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: DTS (6 dB) Bandwidth – RF Conducted
Operator: cbrandt

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

6 dB Bandwidth = **1.140 MHz**



10:47:13 AM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

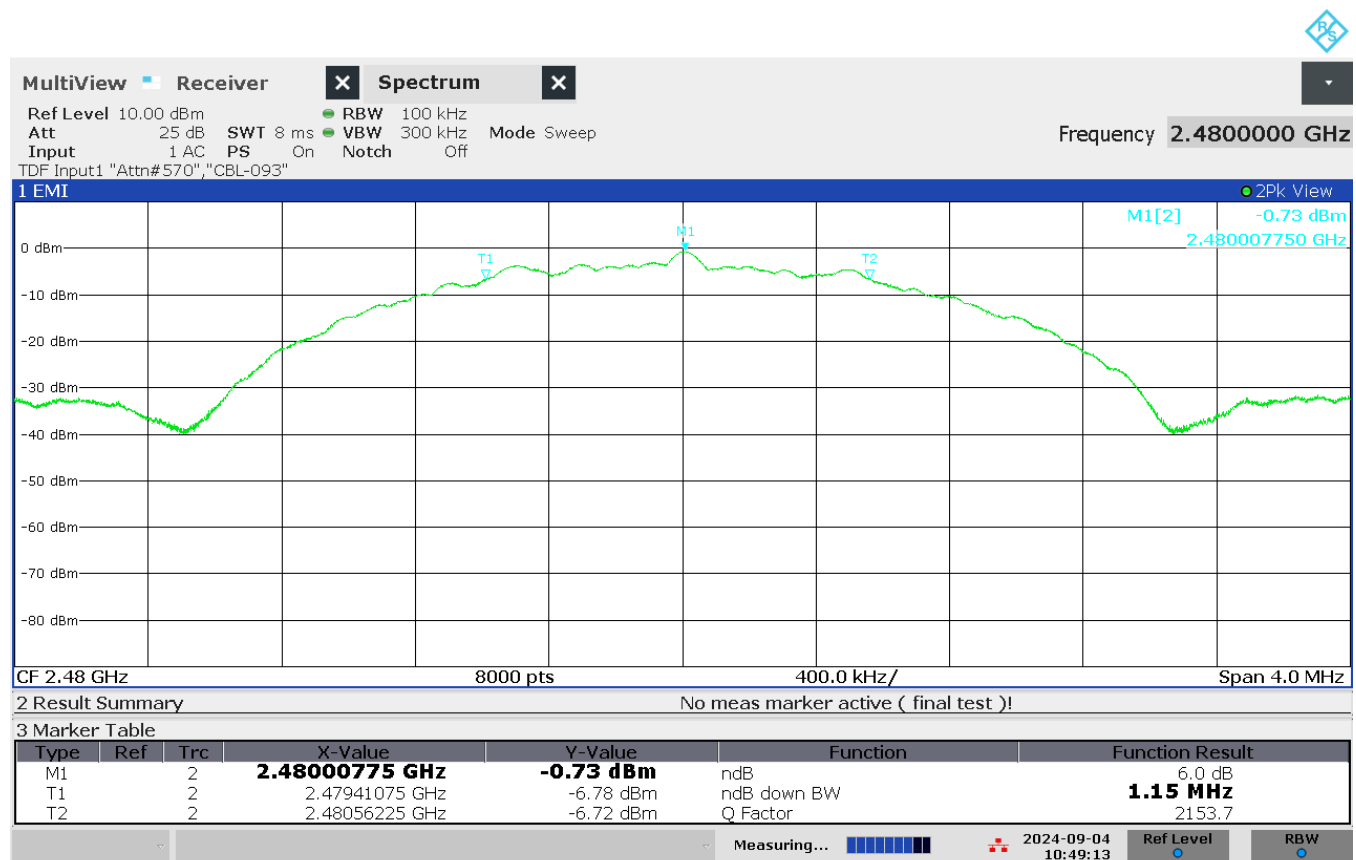
Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: DTS (6 dB) Bandwidth – RF Conducted
Operator: cbrandt

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

6 dB Bandwidth = **1.150 MHz**



10:49:13 AM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

A3.0 Peak Output Power

Rule Part:

Section 15.247(b)(3)

Test Procedure:

ANSI C63.10-2020, Section 11.9.1.1
Maximum peak conducted output power
RBW $\geq$ DTS bandwidth method

Limit:

1 Watt (30 dBm) RF Conducted

Results:

Compliant
Maximum Peak Output Power measured 0.42 dBm = **1.102 mW**

Notes:

This test was performed using an RF Conducted test configuration. The test software was set to transmit a modulated signal at 94.6% duty cycle in 1 Mbps mode and 89.7% duty cycle in 2 Mbps mode. These same software settings were used for all RF Conducted and Radiated Emissions testing.



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
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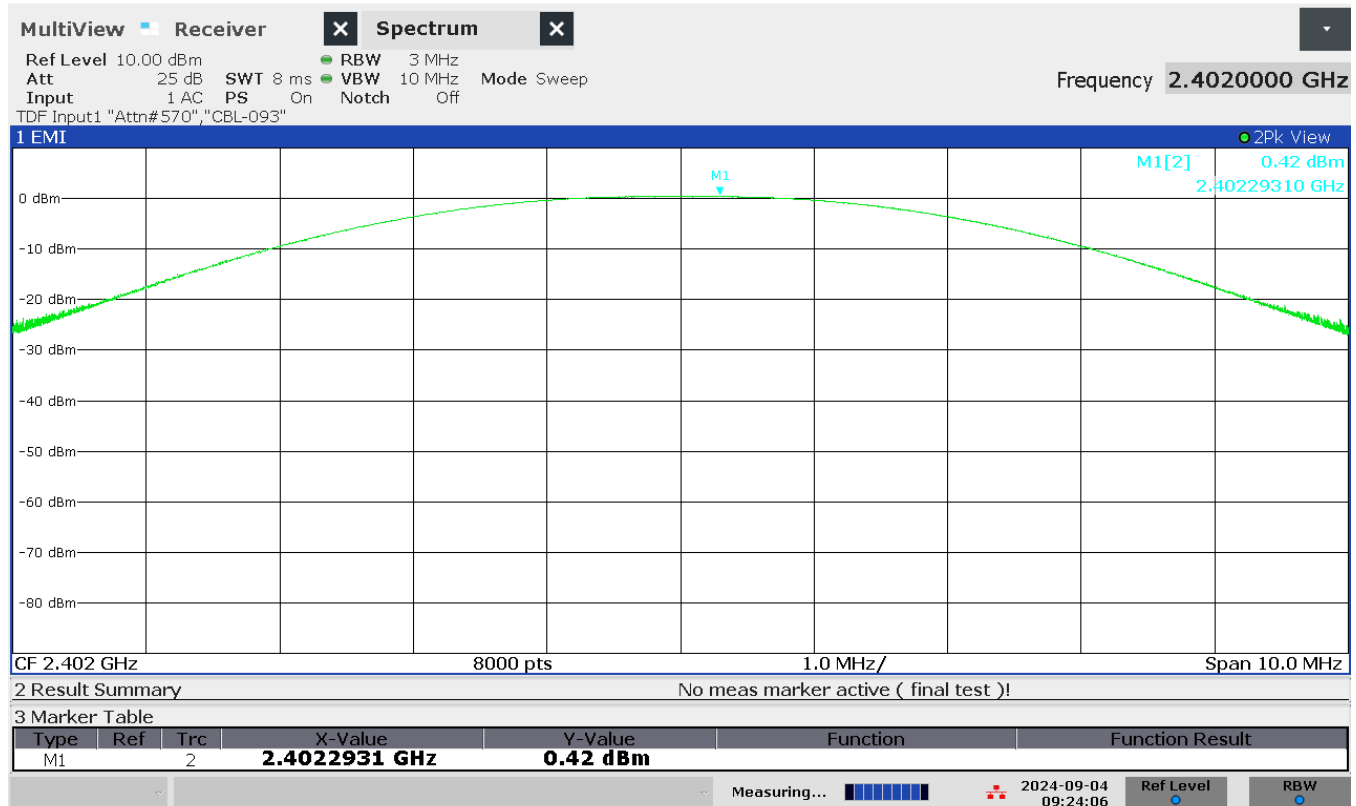
Section A

A3.1 Peak Output Power – 1 Mbps

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:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

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:
Model Tested:
Project Number:
Report Number:

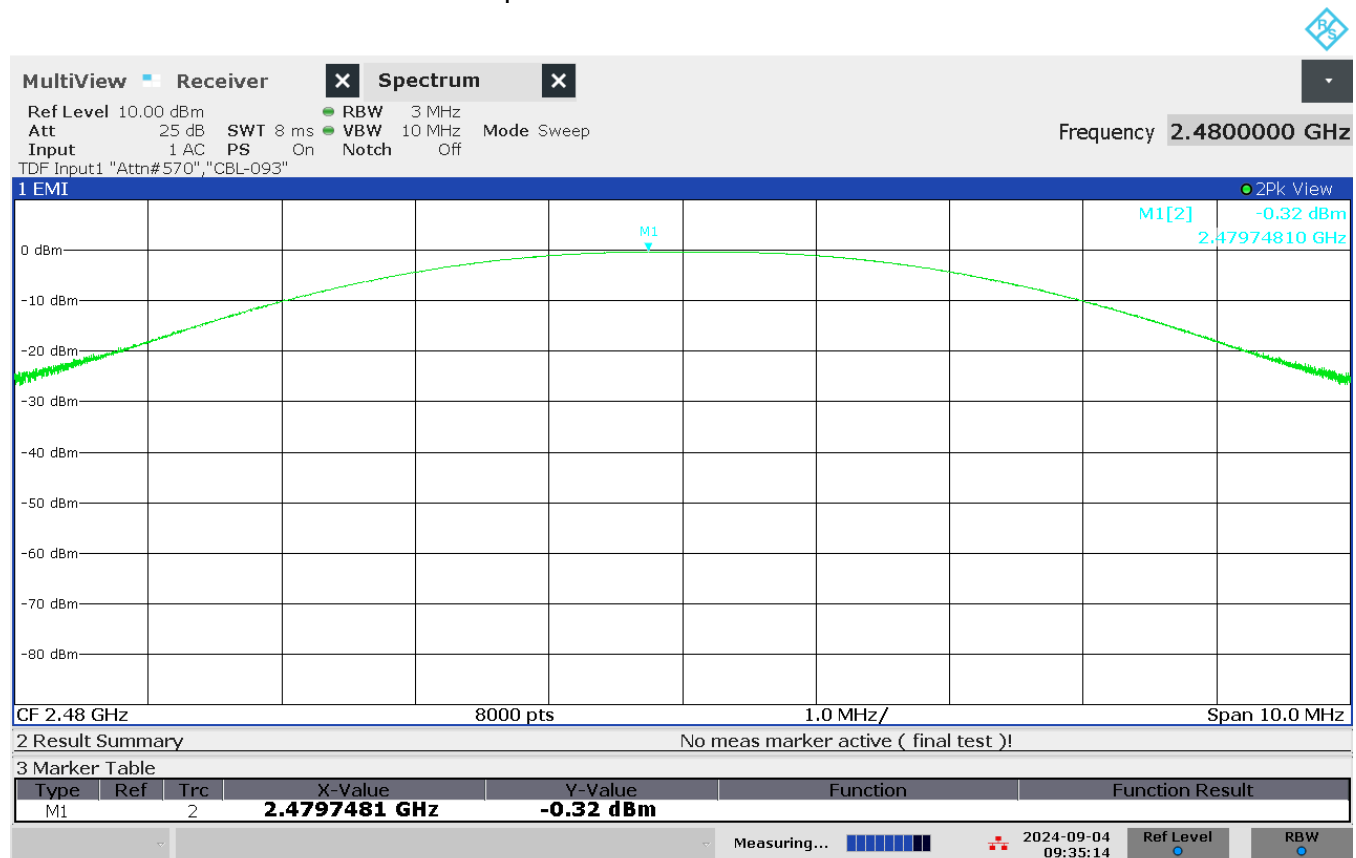
Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

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:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

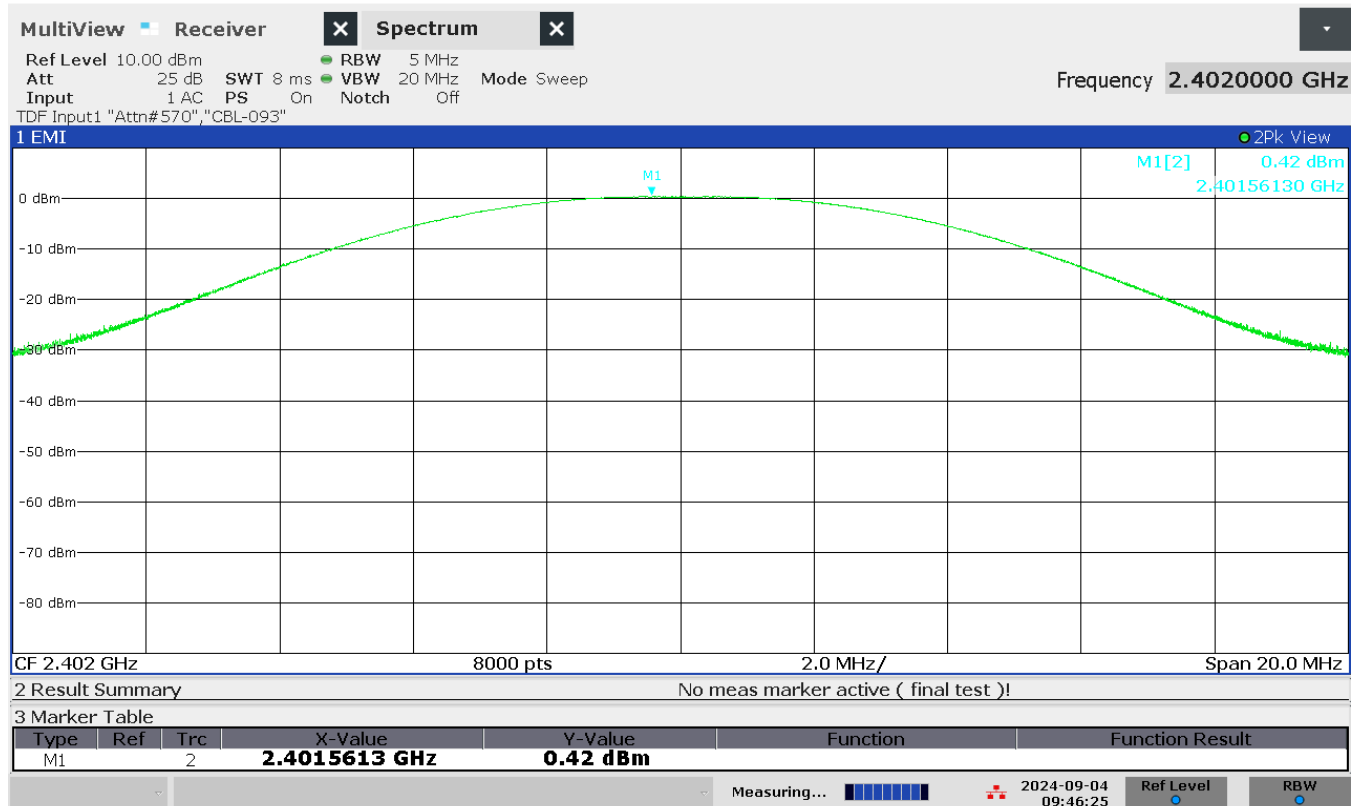
Section A

A3.2 Peak Output Power – 2 Mbps

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:
Model Tested:
Project Number:
Report Number:

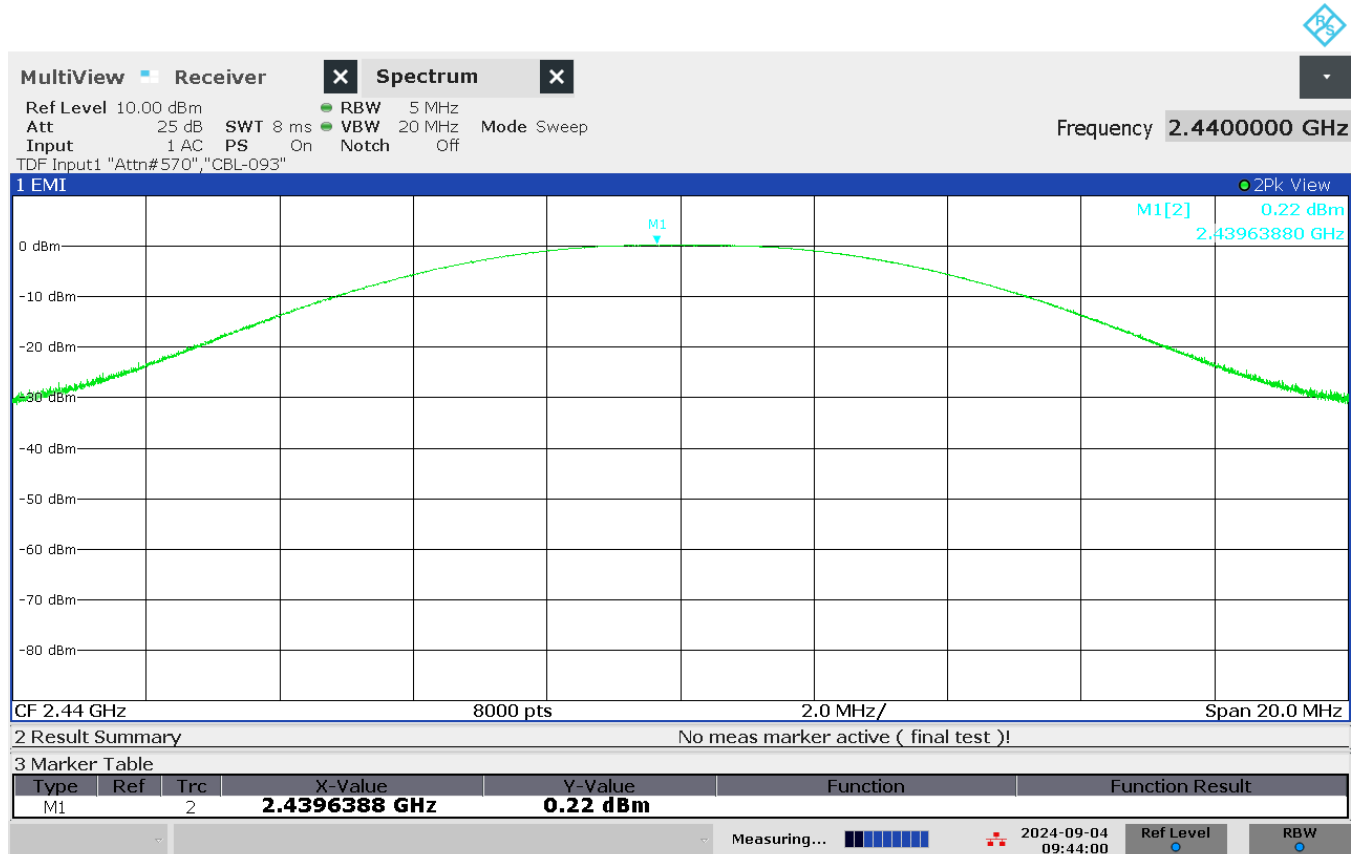
Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

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



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

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



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

A4.0 Peak Power Spectral Density

Rule Part:

Section 15.247(e)

Test Procedure:

ANSI C63.10-2020, Section 11.10.2
Maximum Peak Power Spectral Density
Method PKPSD (peak PSD)

Limit:

+8 dBm in any 3 kHz band during continuous transmission

Results:

Compliant
Peak Power Spectral Density measured **-13.93 dBm/3kHz.**

Notes:

This test was performed using an RF Conducted test configuration. The test software was set to transmit a modulated signal at 94.6% duty cycle in 1 Mbps mode and 89.7% duty cycle in 2 Mbps mode. These same software settings were used for all RF Conducted and Radiated Emissions testing.



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
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Section A

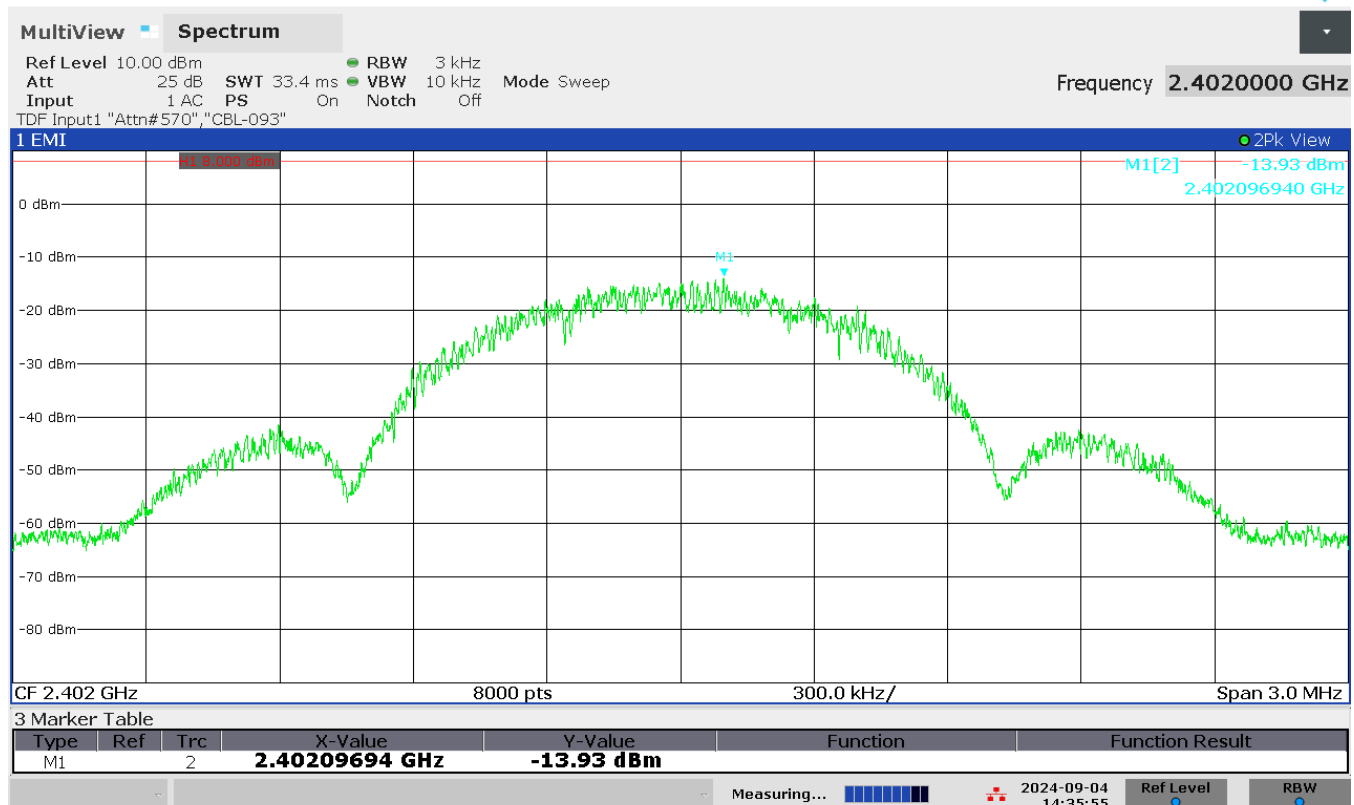
A4.1 Peak Power Spectral Density – 1 Mbps

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Power Spectral Density – RF Conducted
Operator: cbrandt
Detector: Peak; max hold

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

Limit: +8 dBm/3kHz

Power Spectral Density (peak PSD) = -13.93 dBm/3kHz



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166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

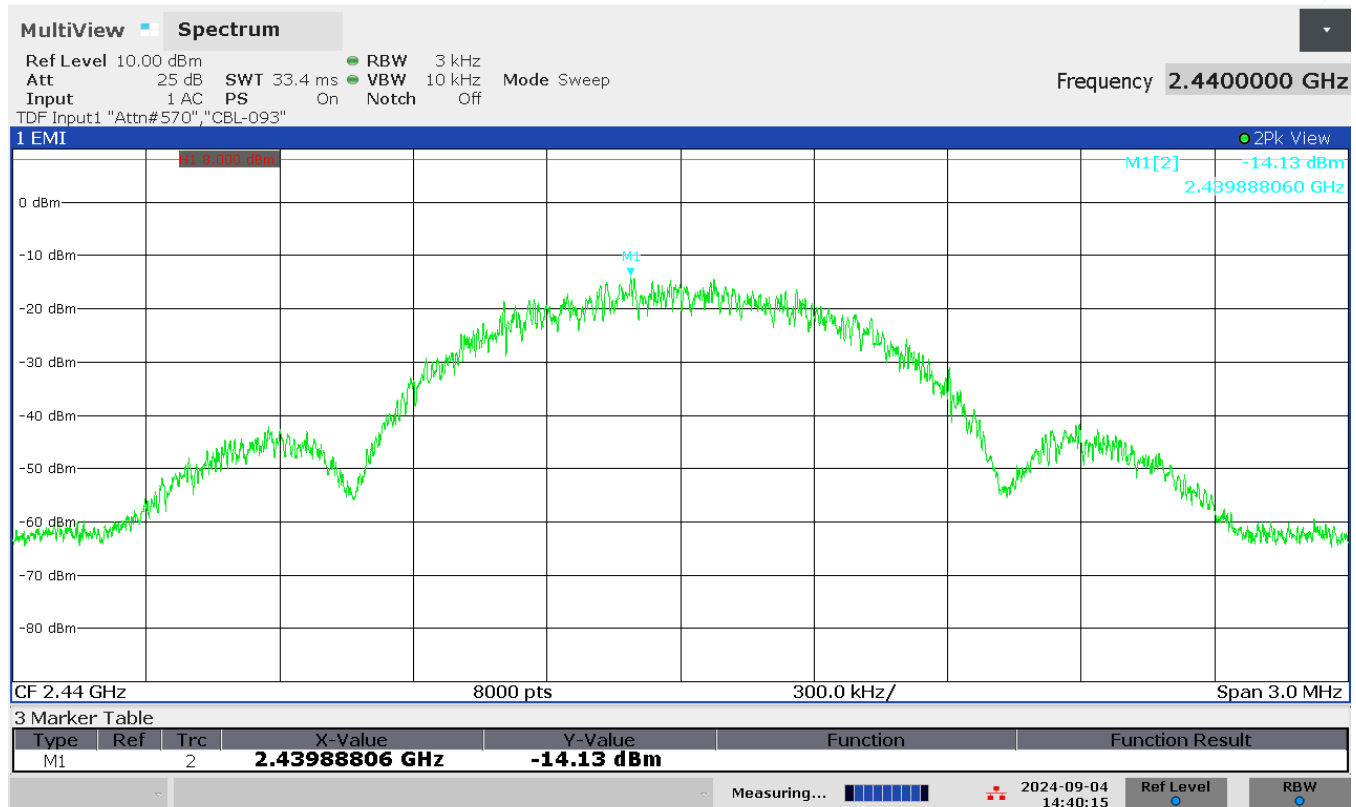
Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Power Spectral Density – RF Conducted
Operator: cbrandt
Detector: Peak; max hold

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

Limit: +8 dBm/3kHz

Power Spectral Density (peak PSD) = -14.13 dBm/3kHz



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166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

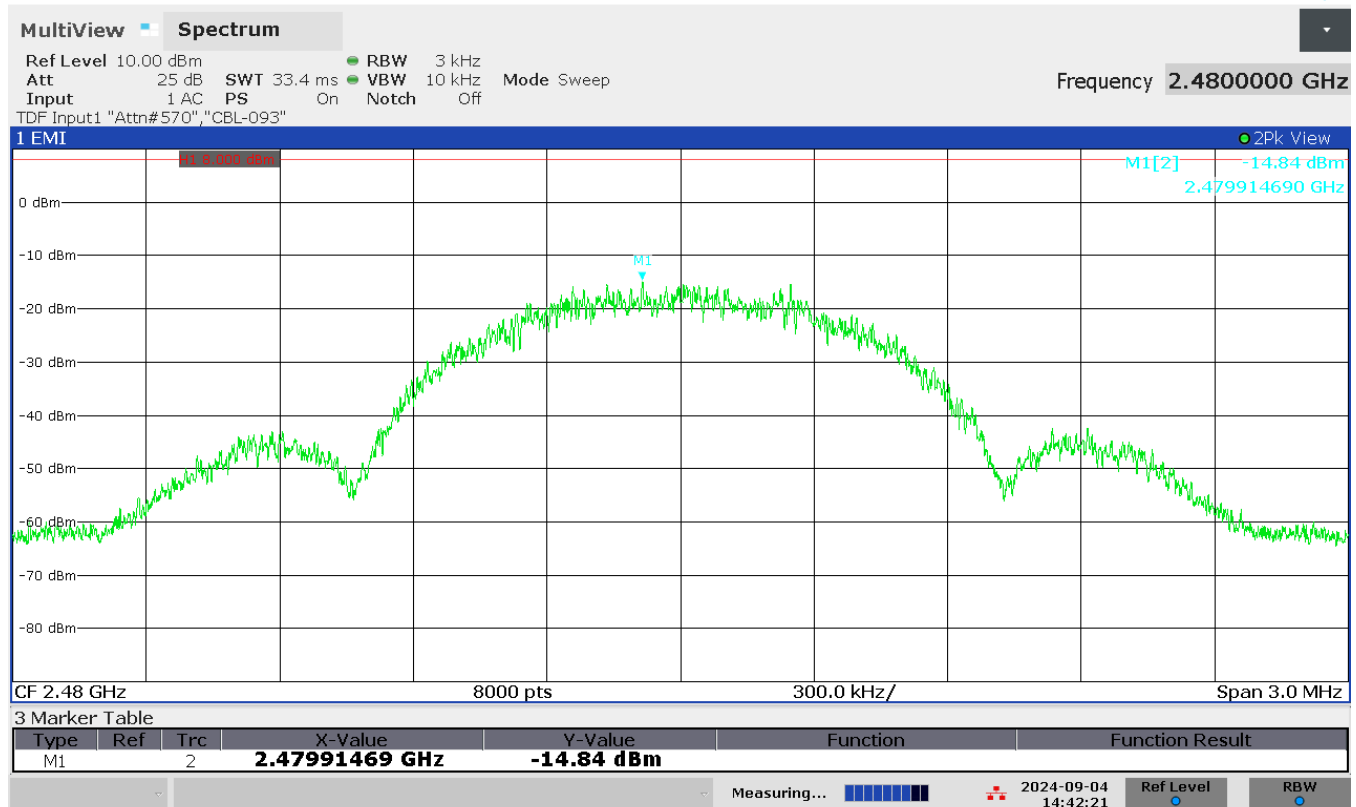
Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Power Spectral Density – RF Conducted
Operator: cbrandt
Detector: Peak; max hold

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

Limit: +8 dBm/3kHz

Power Spectral Density (peak PSD) = -14.84 dBm/3kHz



02:42:22 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

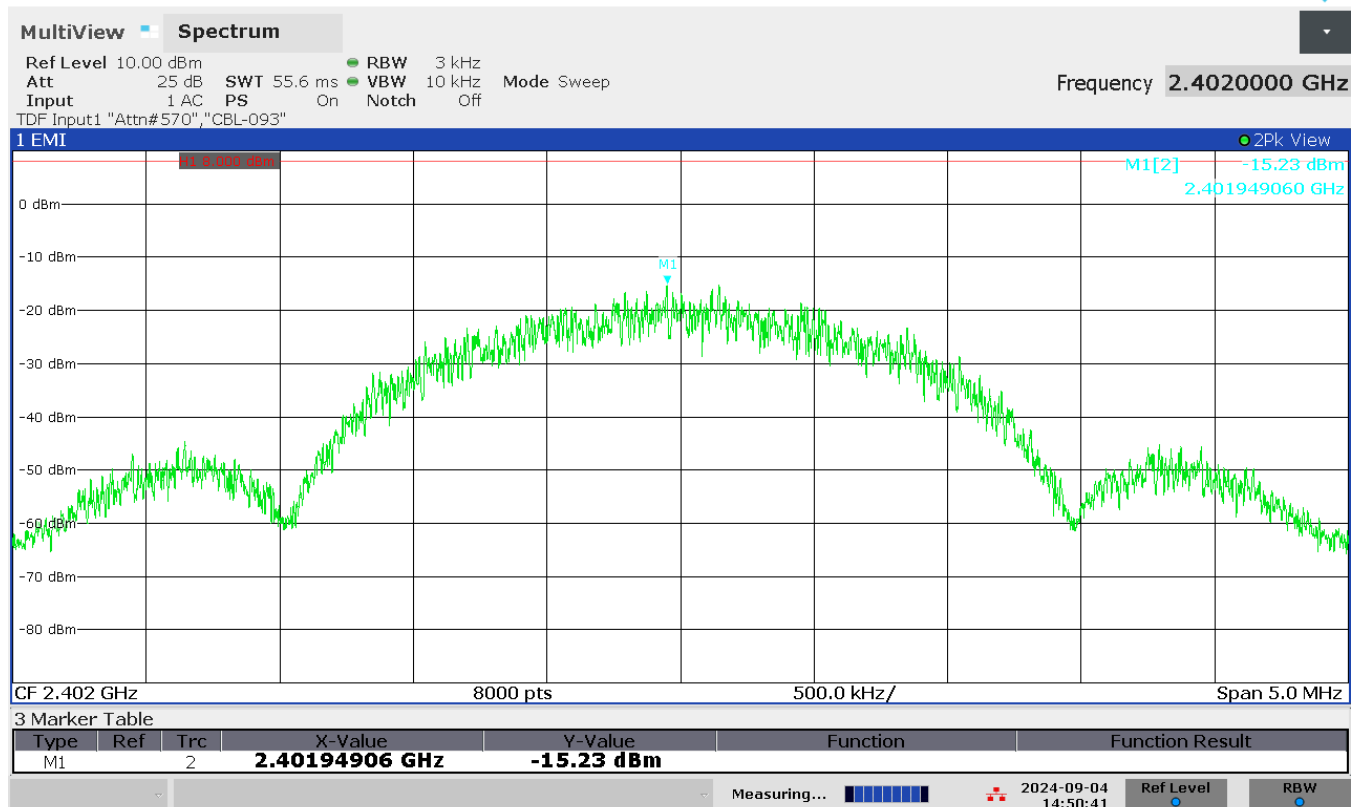
A4.2 Peak Power Spectral Density – 2 Mbps

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Power Spectral Density – RF Conducted
Operator: cbrandt
Detector: Peak; max hold

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

Limit: +8 dBm/3kHz

Power Spectral Density (peak PSD) = -15.23 dBm/3kHz



02:50:41 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
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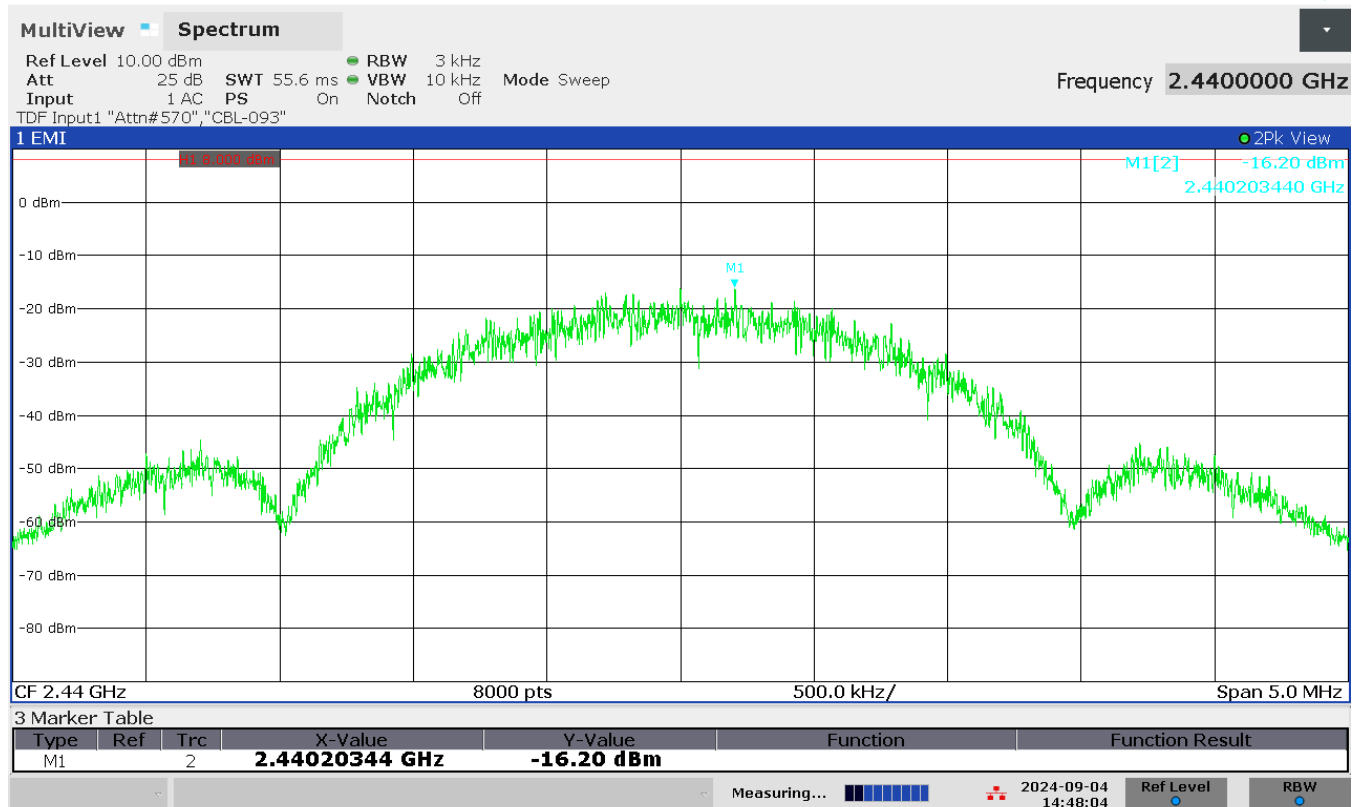
Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Power Spectral Density – RF Conducted
Operator: cbrandt
Detector: Peak; max hold

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

Limit: +8 dBm/3kHz

Power Spectral Density (peak PSD) = -16.20 dBm/3kHz



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166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

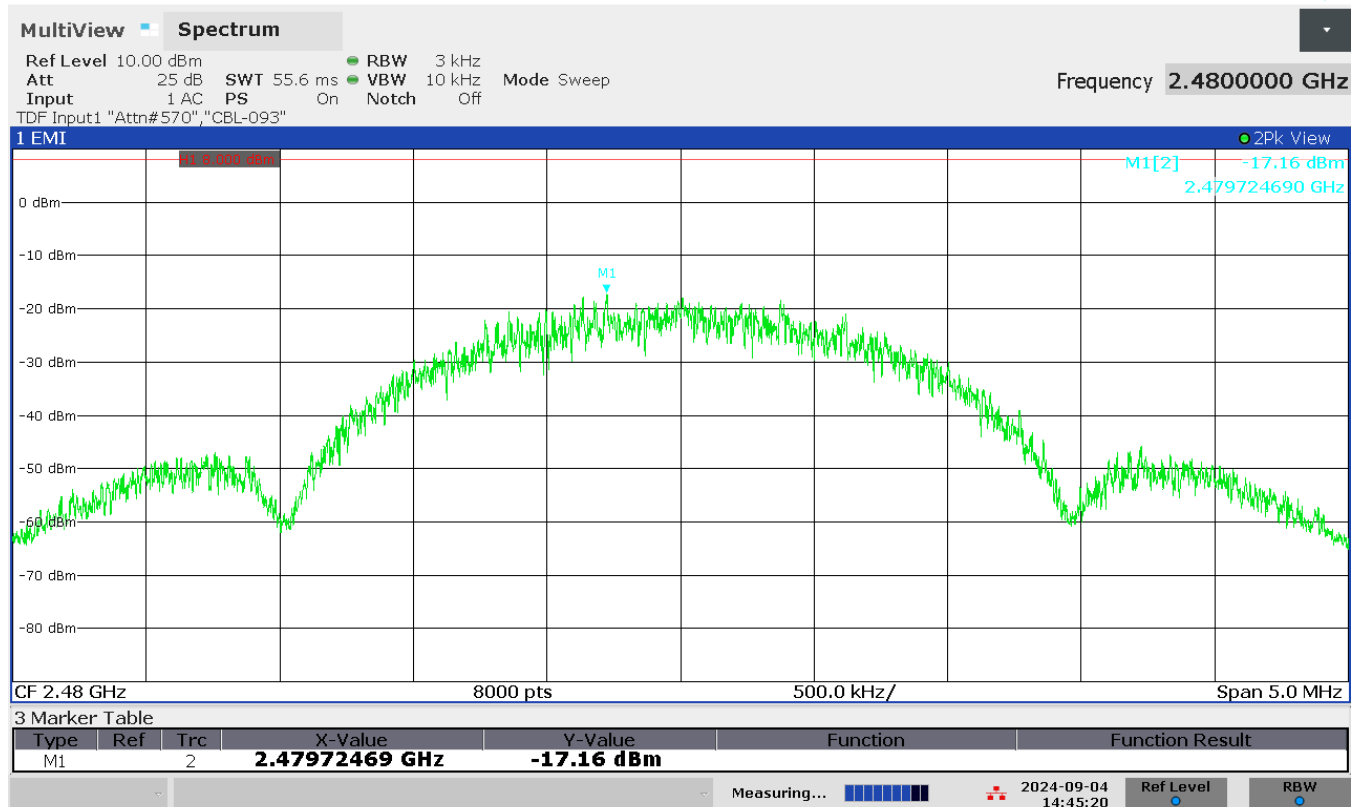
Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Power Spectral Density – RF Conducted
Operator: cbrandt
Detector: Peak; max hold

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

Limit: +8 dBm/3kHz

Power Spectral Density (peak PSD) = -17.16 dBm/3kHz



02:45:20 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

A5.0 Emissions in Non-Restricted Frequency Bands – RF Conducted

Rule Part:

Section 15.247(d)

Test Procedure:

ANSI C63.10-2020, Section 11.11
Emissions in non-restricted frequency bands

Limit:

20 dB down from the highest emission level within the authorized band as measured with a 100 kHz resolution bandwidth (RBW)

Results:

Compliant

Notes:

This test was performed using an RF Conducted test configuration. The test software was set to transmit a modulated signal at 94.6% duty cycle in 1 Mbps mode and 89.7% duty cycle in 2 Mbps mode. These same software settings were used for all RF Conducted and Radiated Emissions testing.



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
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Section A

A5.1a Emissions – Non-Restricted Bands – 1 Mbps – Low Channel

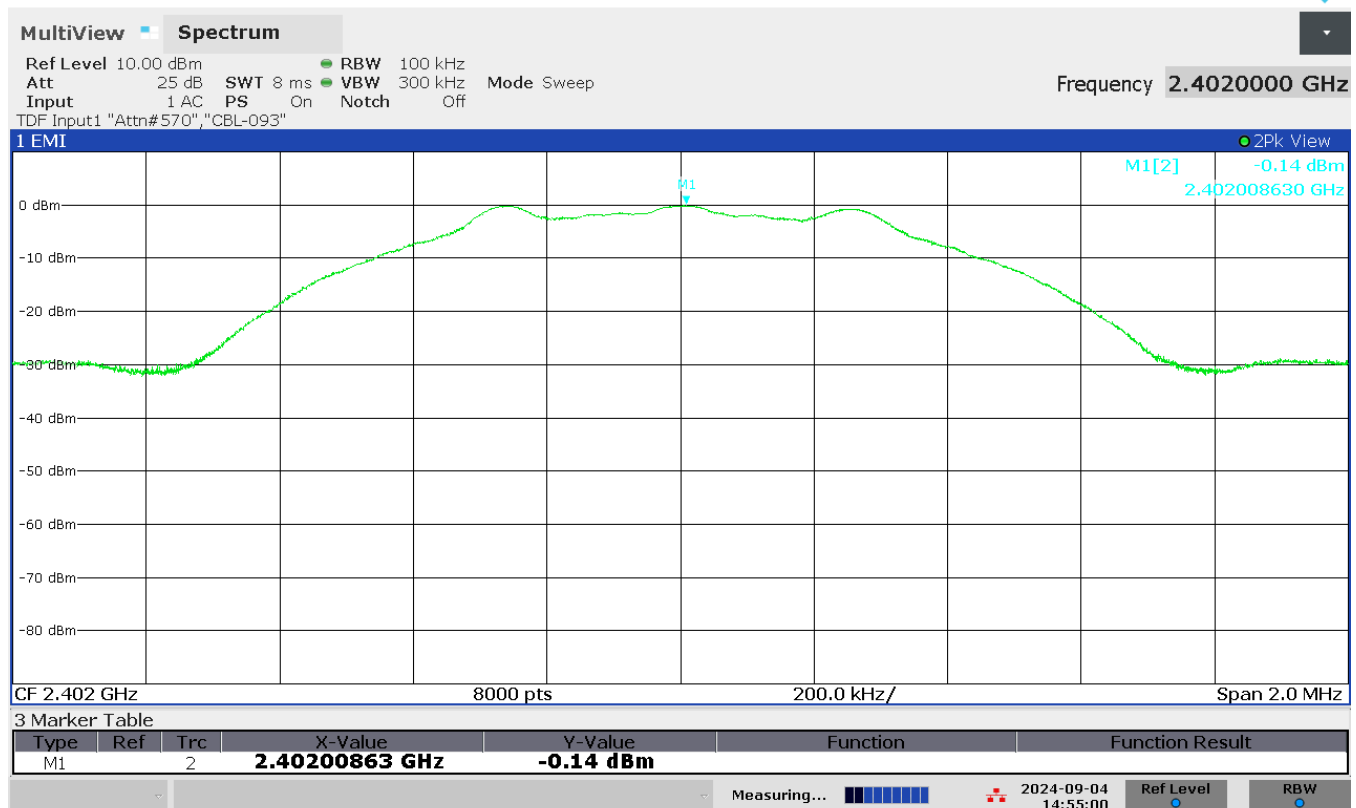
Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
Low Channel: 2402 MHz

Reference Level measurement

Limit = -0.14 dBm – 20 dB = -20.14 dBm



02:55:01 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

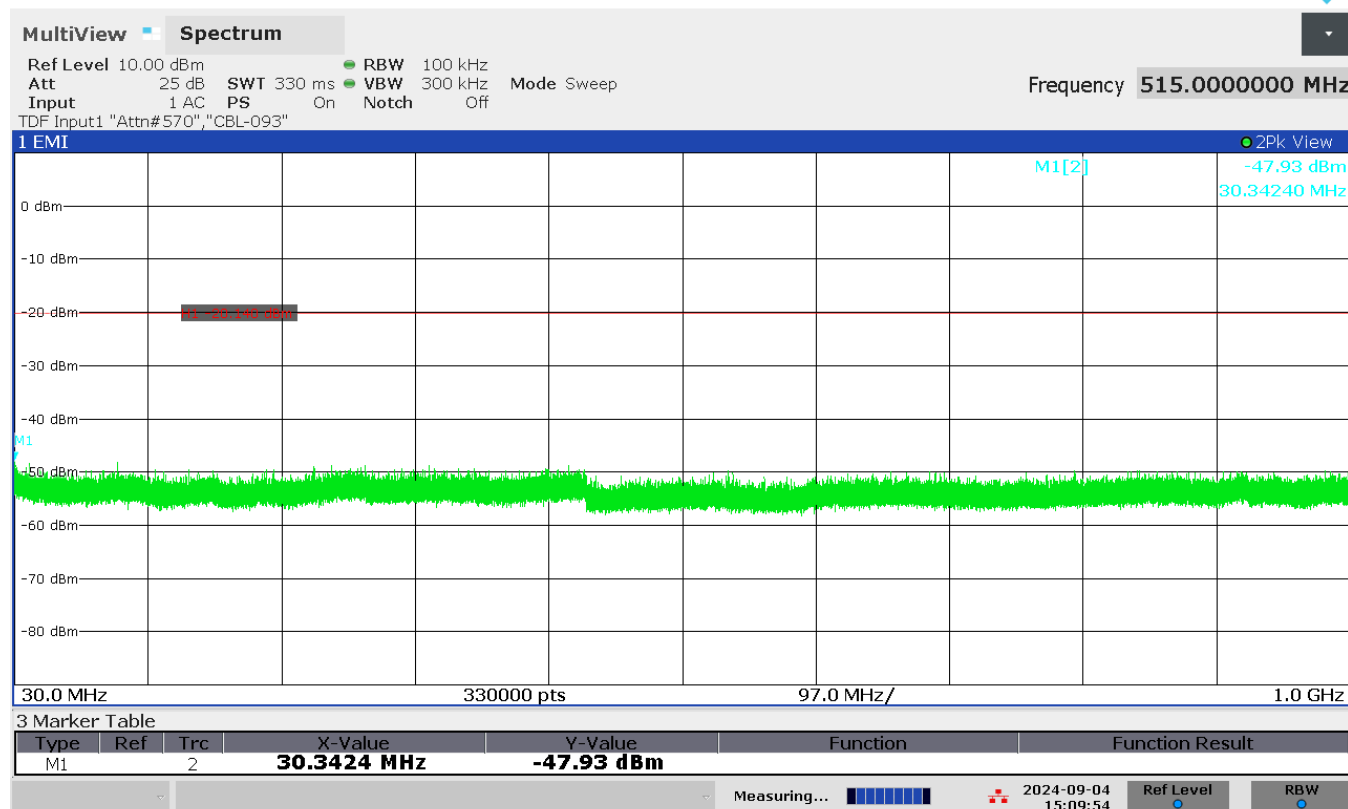
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
Low Channel: 2402 MHz

Emission Level measurement

Limit = -0.14 dBm – 20 dB = -20.14 dBm

Frequency Range 30-1000 MHz



03:09:55 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

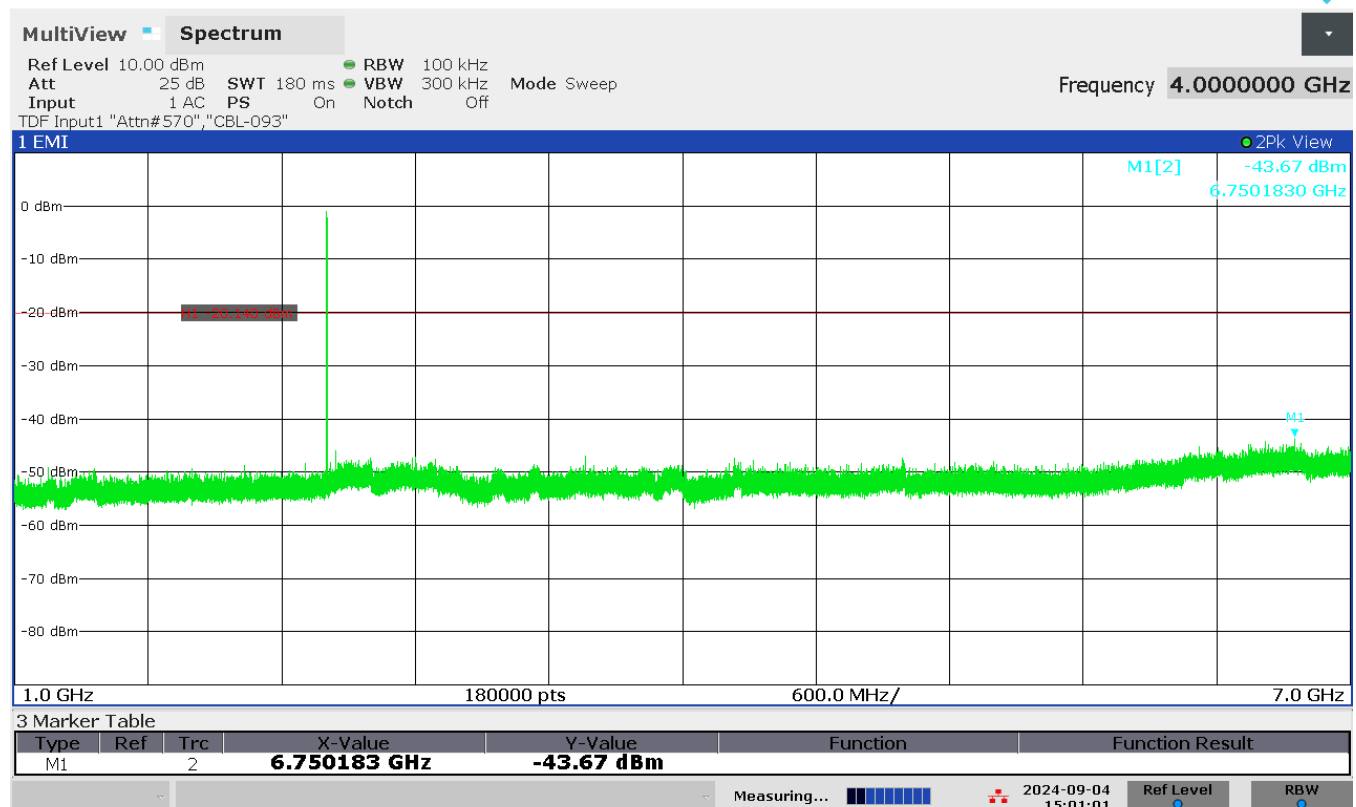
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
Low Channel: 2402 MHz

Emission Level measurement

Limit = $-0.14 \text{ dBm} - 20 \text{ dB} = -20.14 \text{ dBm}$

Frequency Range 1-7 GHz



03:01:01 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

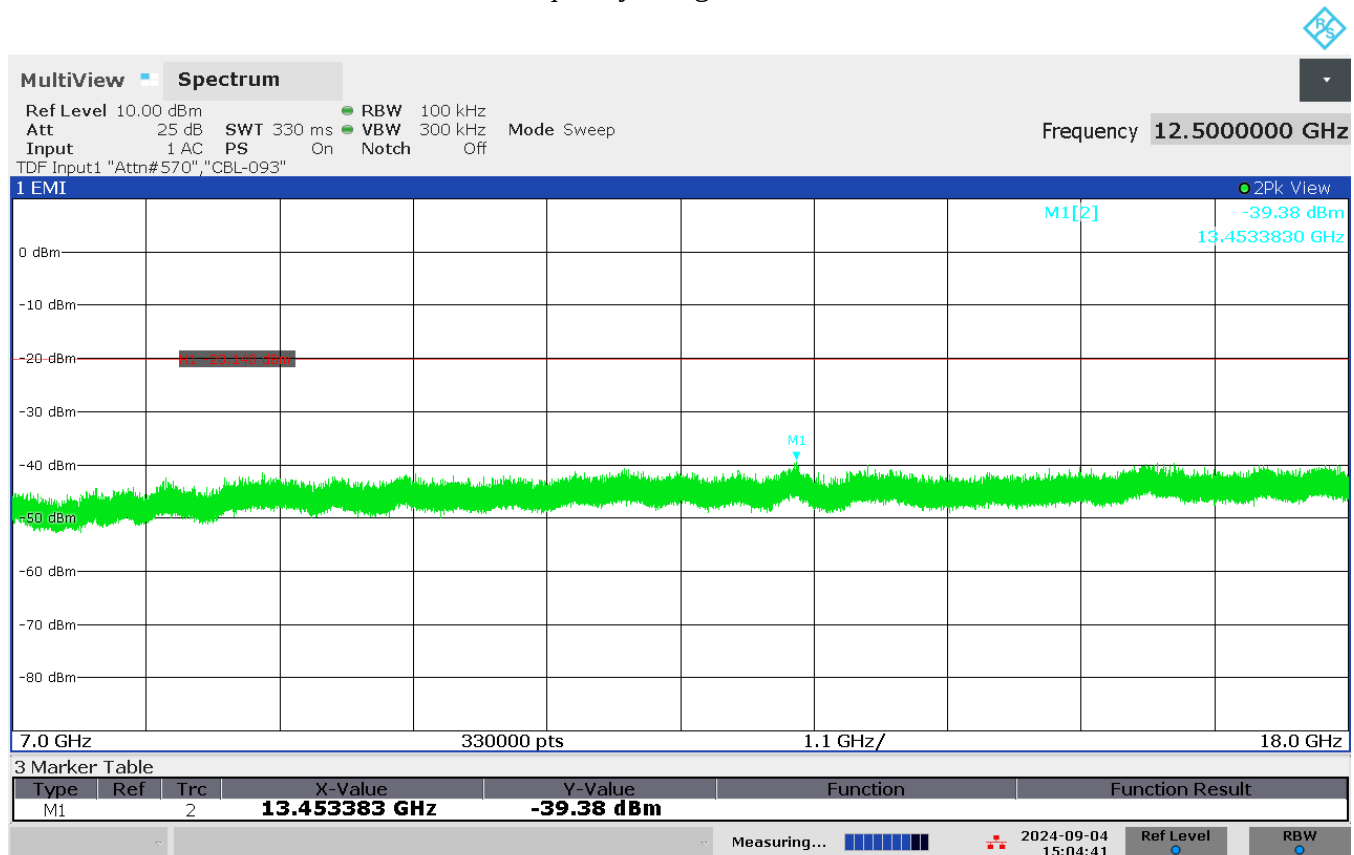
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
Low Channel: 2402 MHz

Emission Level measurement

Limit = -0.14 dBm – 20 dB = -20.14 dBm

Frequency Range 7-18 GHz



03:04:41 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

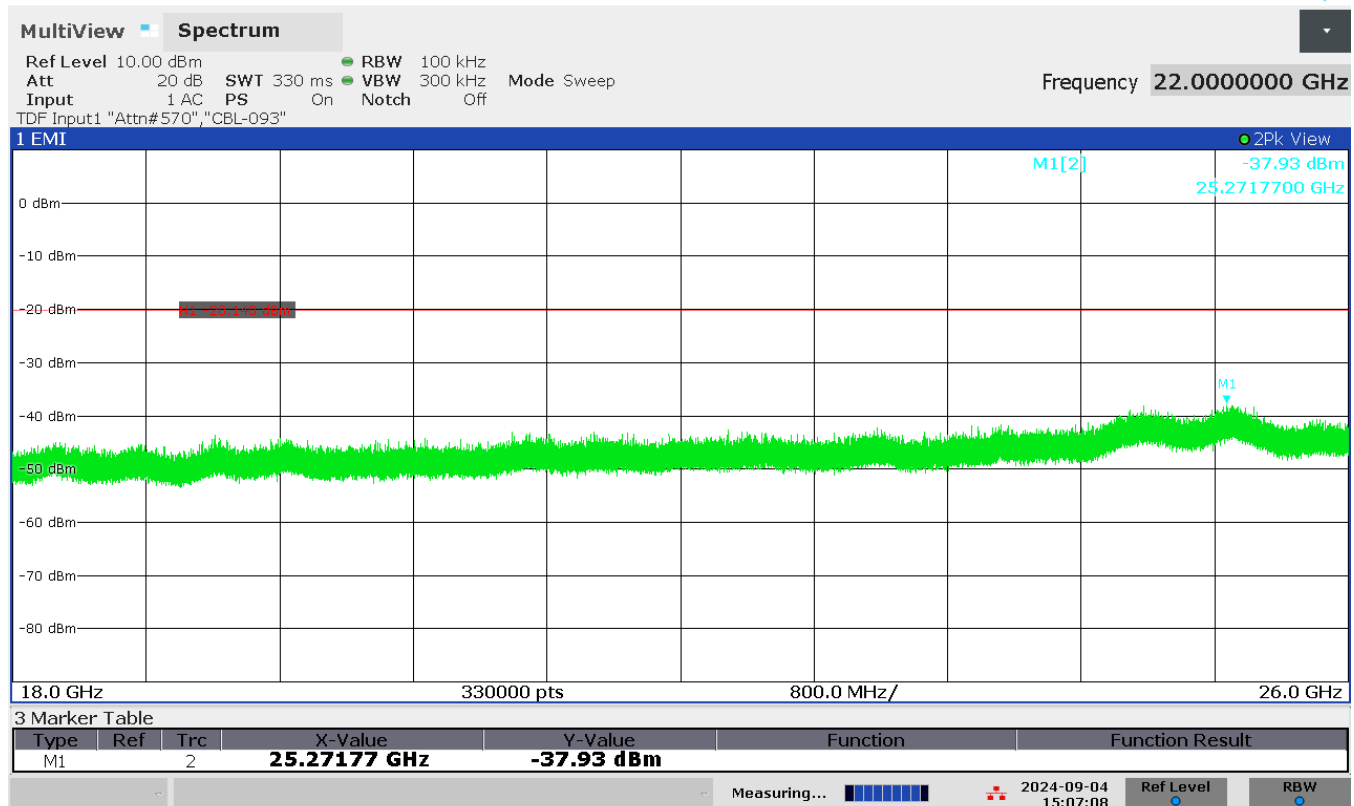
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
Low Channel: 2402 MHz

Emission Level measurement

Limit = -0.14 dBm – 20 dB = -20.14 dBm

Frequency Range 18-26 GHz



03:07:08 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

A5.1b Emissions – Non-Restricted Bands – 1 Mbps – Middle Channel

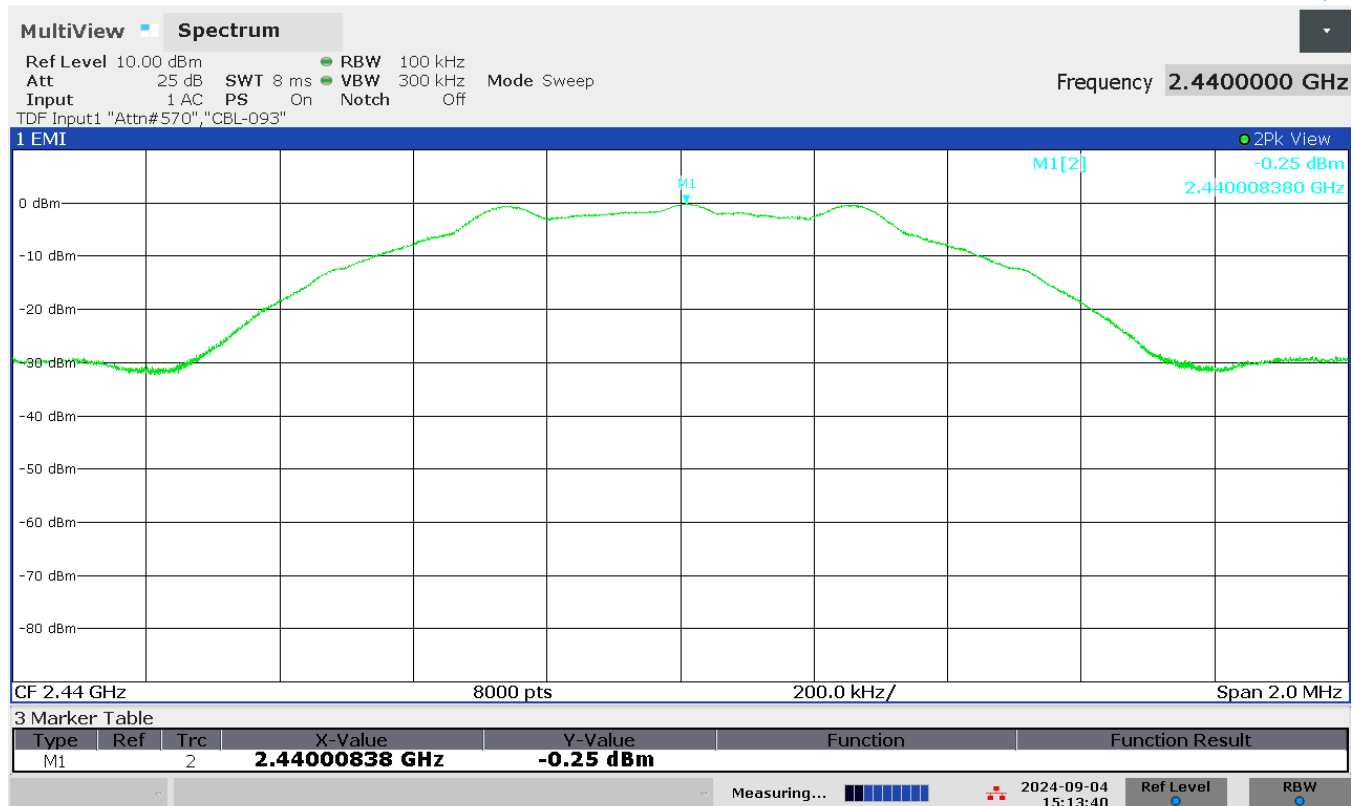
Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
Mid Channel: 2440 MHz

Reference Level measurement

Limit = -0.25 dBm – 20 dB = -20.25 dBm



03:13:41 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

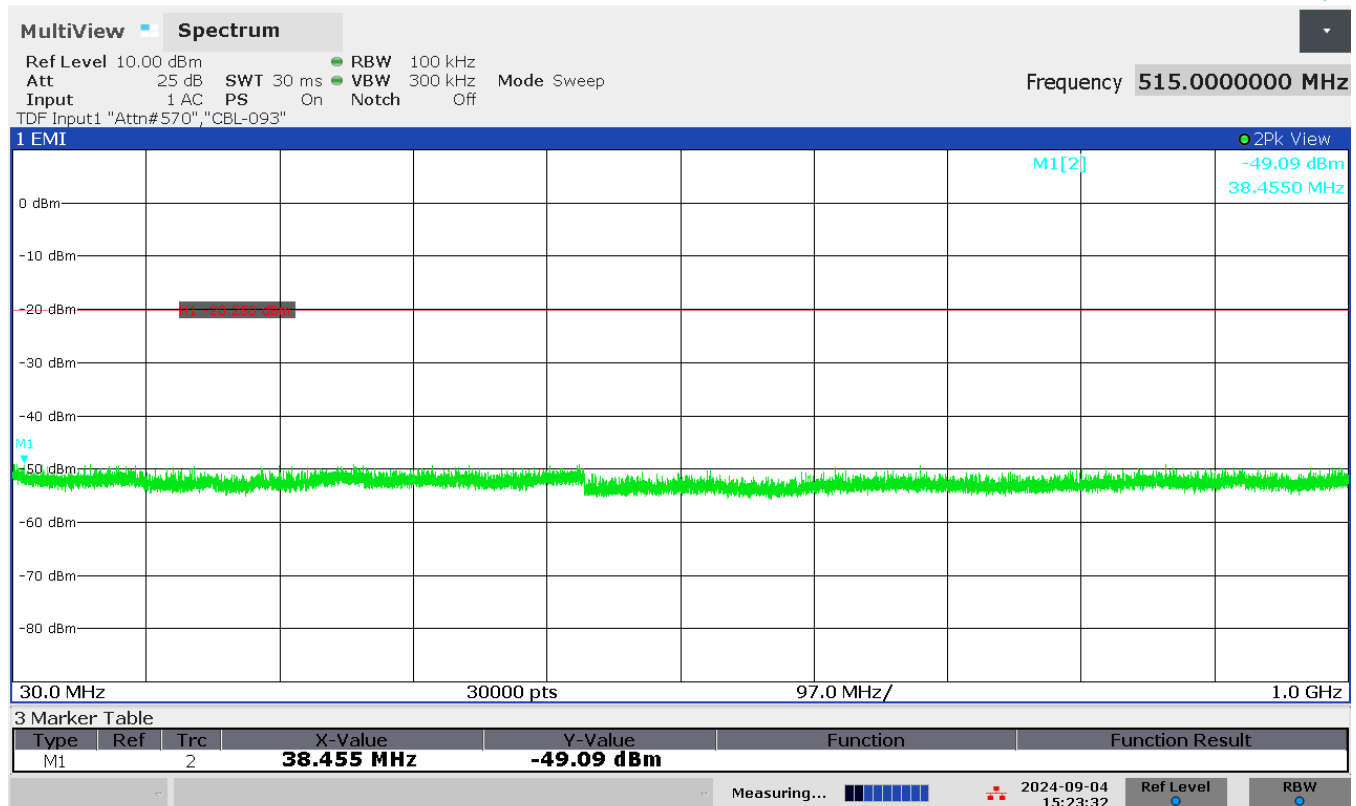
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
Mid Channel: 2440 MHz

Emission Level measurement

Limit = $-0.25 \text{ dBm} - 20 \text{ dB} = -20.25 \text{ dBm}$

Frequency Range 30-1000 MHz



03:23:33 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
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Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

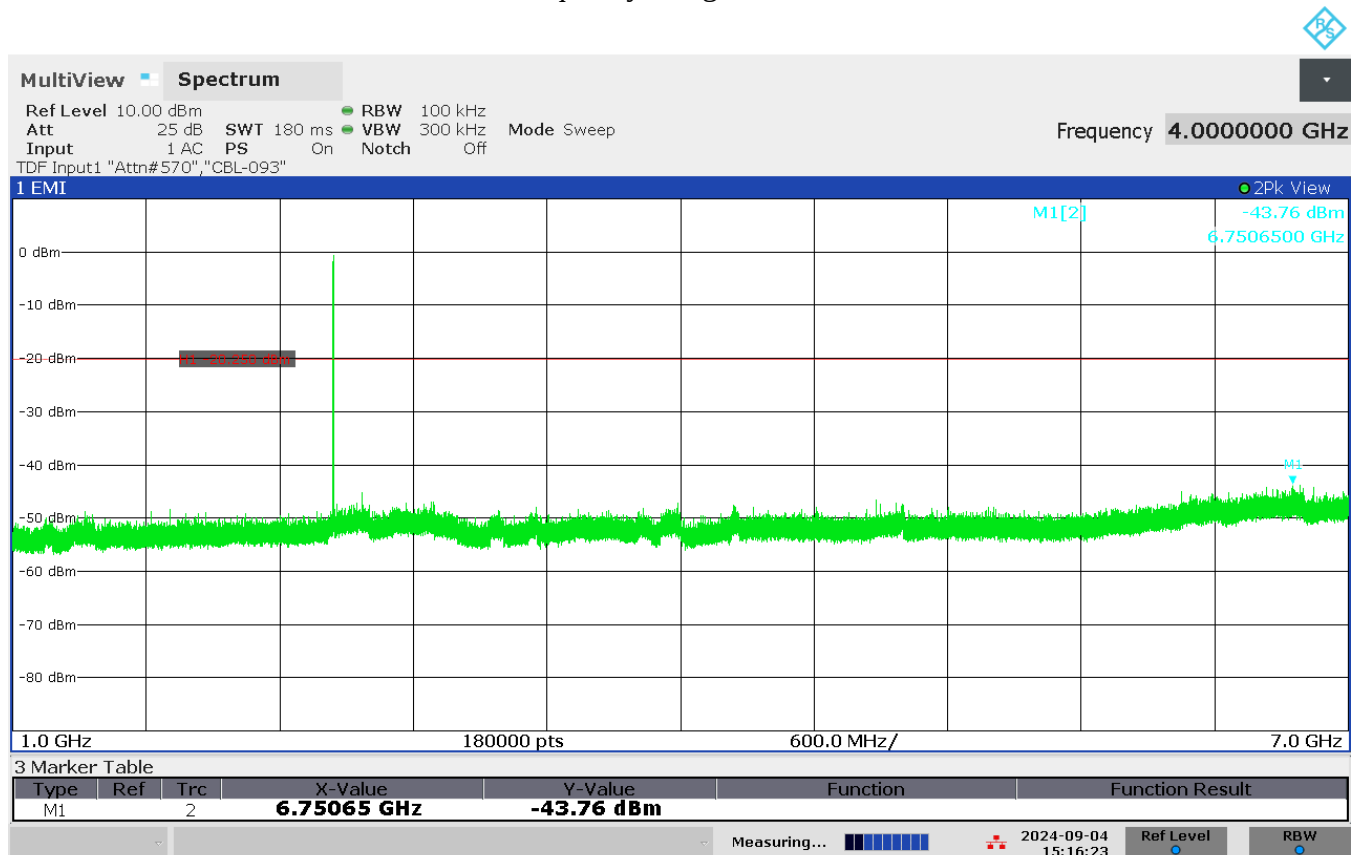
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
Mid Channel: 2440 MHz

Emission Level measurement

Limit = $-0.25 \text{ dBm} - 20 \text{ dB} = -20.25 \text{ dBm}$

Frequency Range 1-7 GHz



03:16:23 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

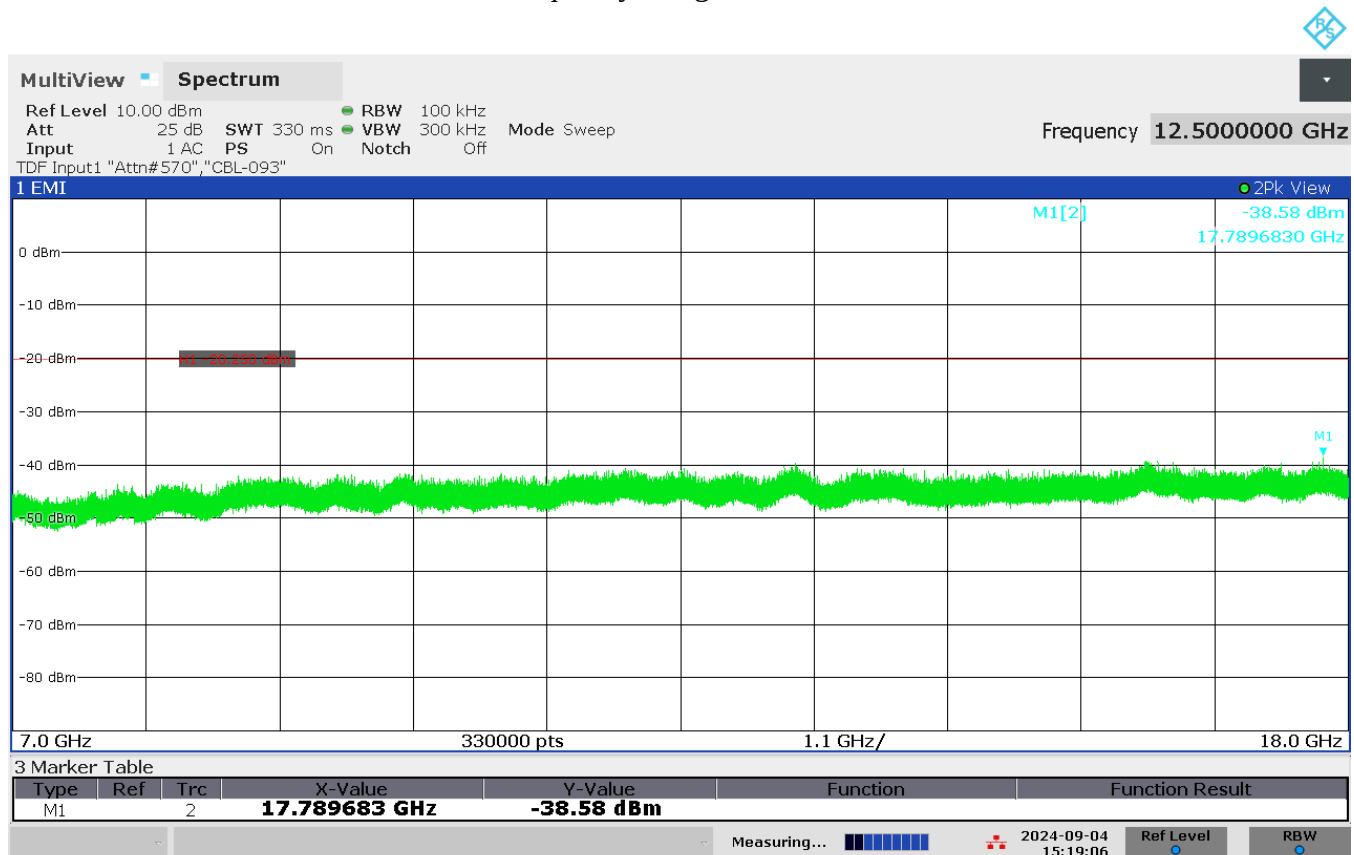
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
Mid Channel: 2440 MHz

Emission Level measurement

Limit = $-0.25 \text{ dBm} - 20 \text{ dB} = -20.25 \text{ dBm}$

Frequency Range 7-18 GHz



03:19:07 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

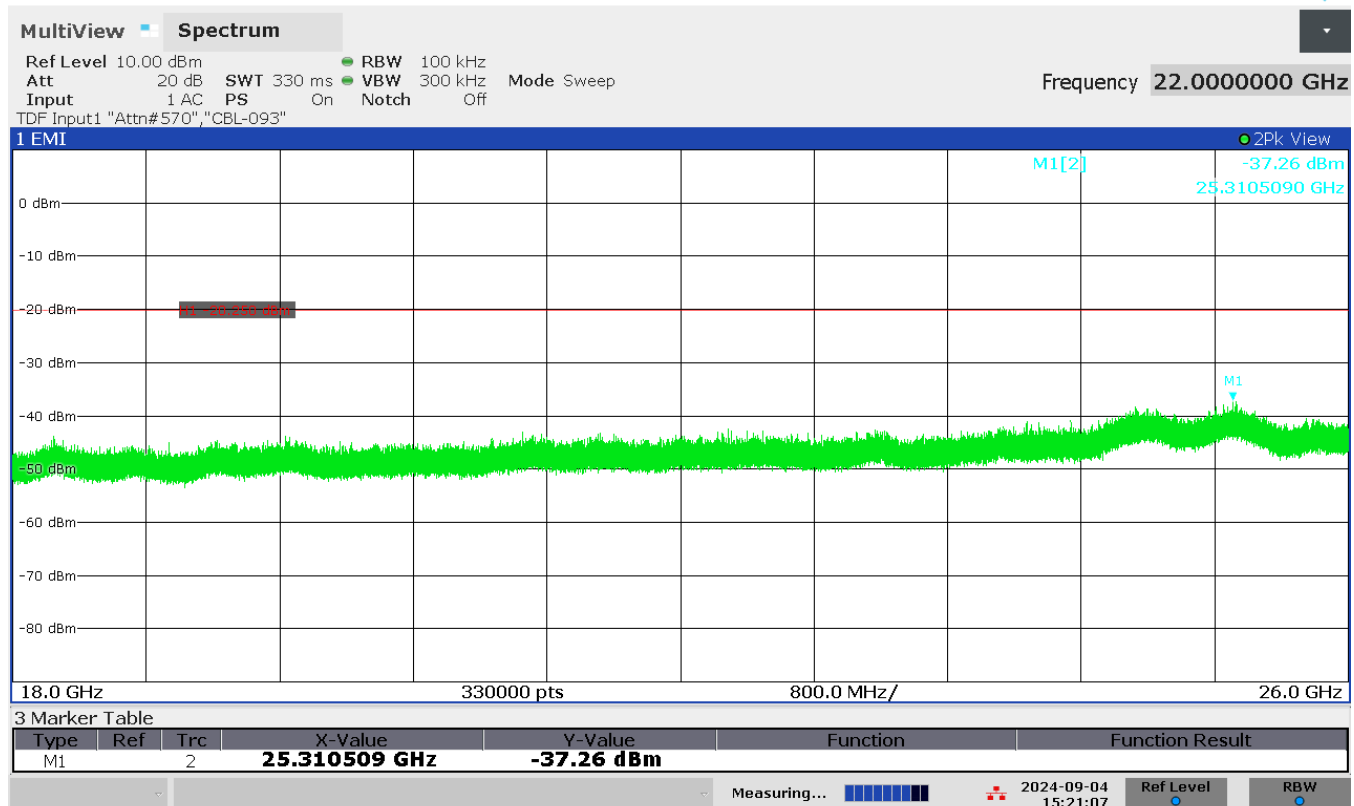
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
Mid Channel: 2440 MHz

Emission Level measurement

Limit = $-0.25 \text{ dBm} - 20 \text{ dB} = -20.25 \text{ dBm}$

Frequency Range 18-26 GHz



03:21:08 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

A5.1c Emissions – Non-Restricted Bands – 1 Mbps – High Channel

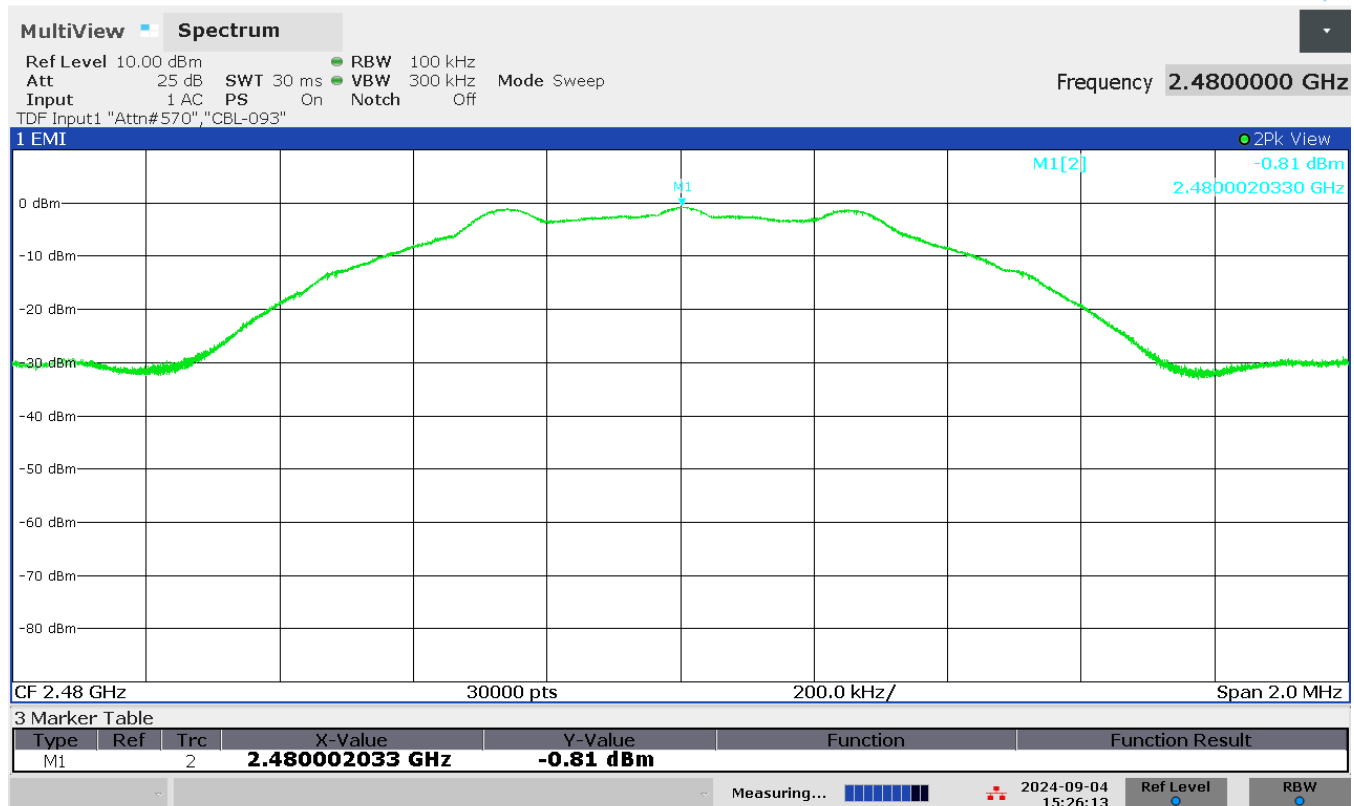
Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
High Channel: 2480 MHz

Reference Level measurement

Limit = -0.81 dBm – 20 dB = -20.81 dBm



03:26:14 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

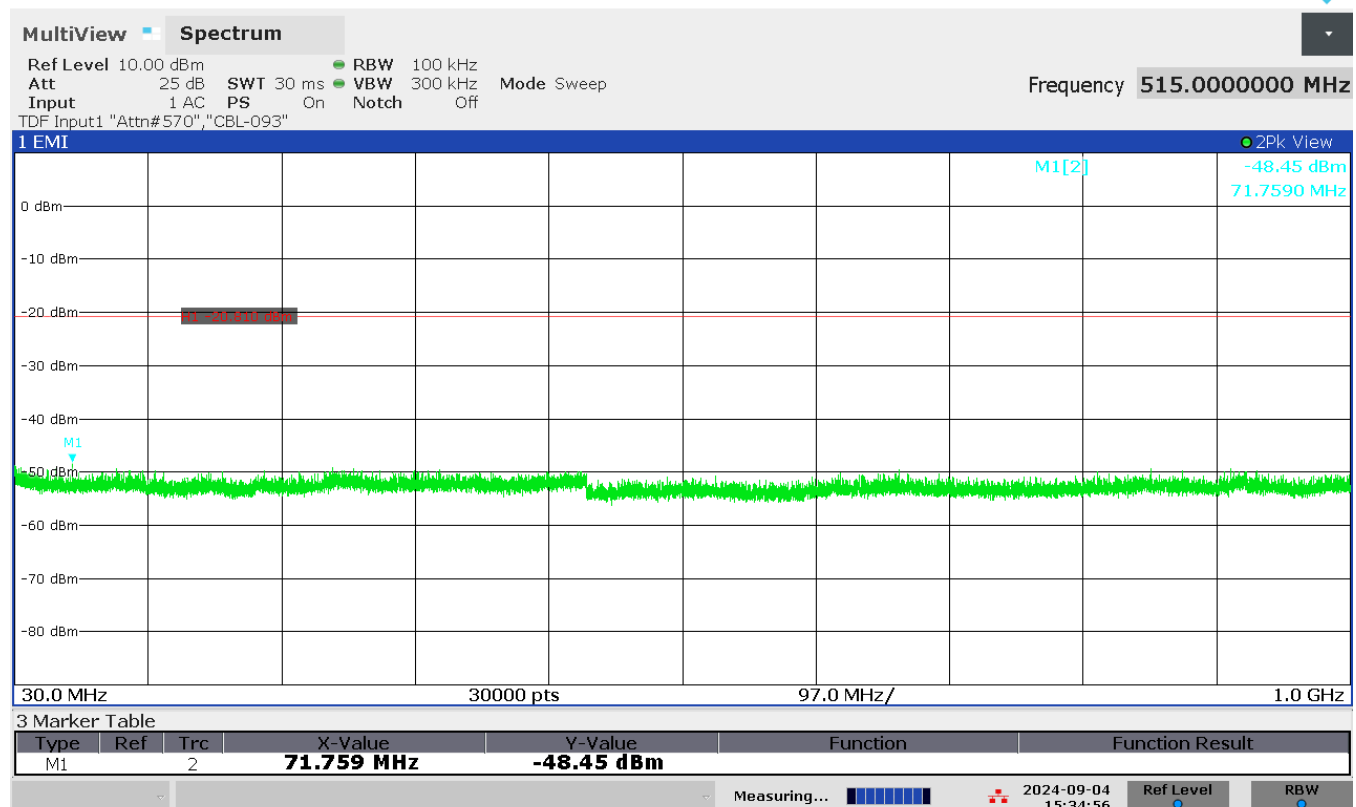
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
High Channel: 2480 MHz

Emission Level measurement

Limit = $-0.81 \text{ dBm} - 20 \text{ dB} = -20.81 \text{ dBm}$

Frequency Range 30-1000 MHz



03:34:56 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

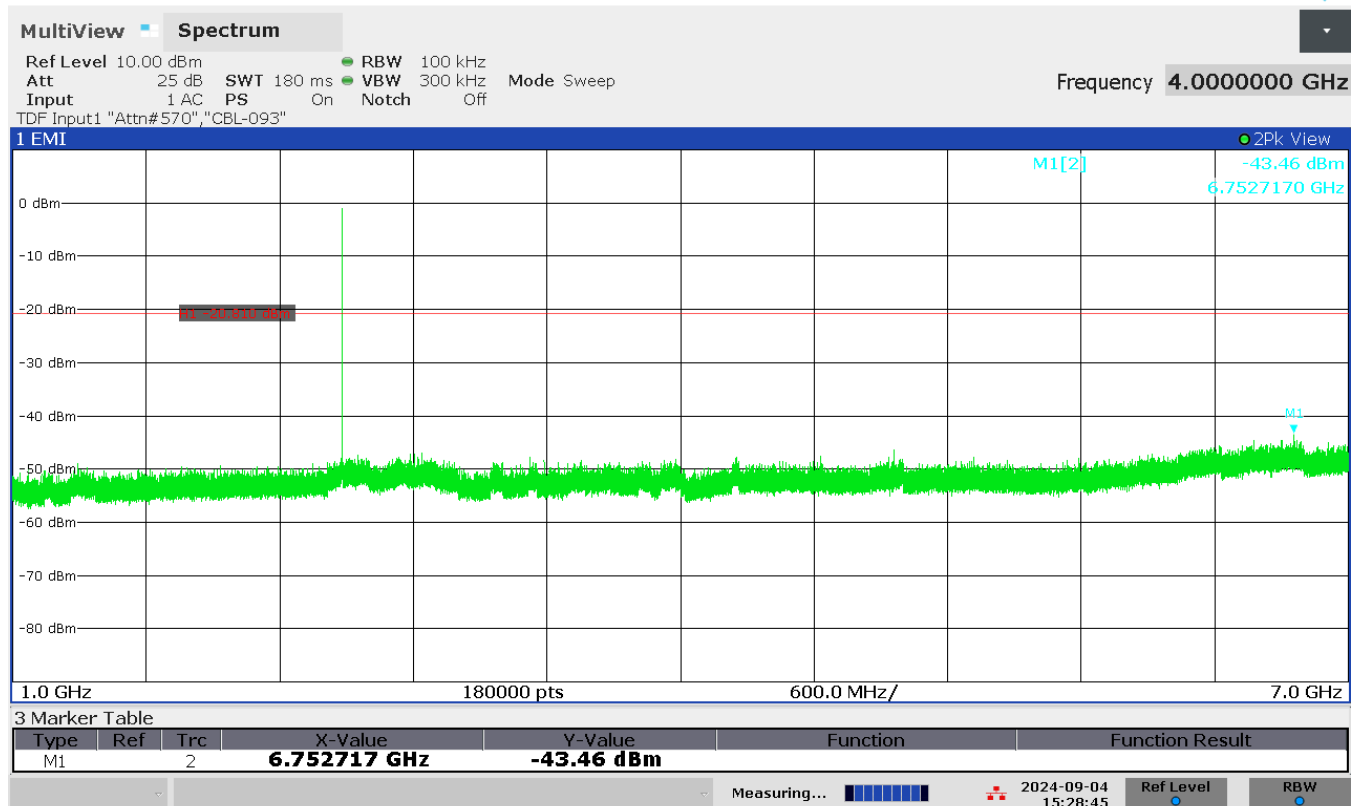
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
High Channel: 2480 MHz

Emission Level measurement

Limit = $-0.81 \text{ dBm} - 20 \text{ dB} = -20.81 \text{ dBm}$

Frequency Range 1-7 GHz



03:28:46 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

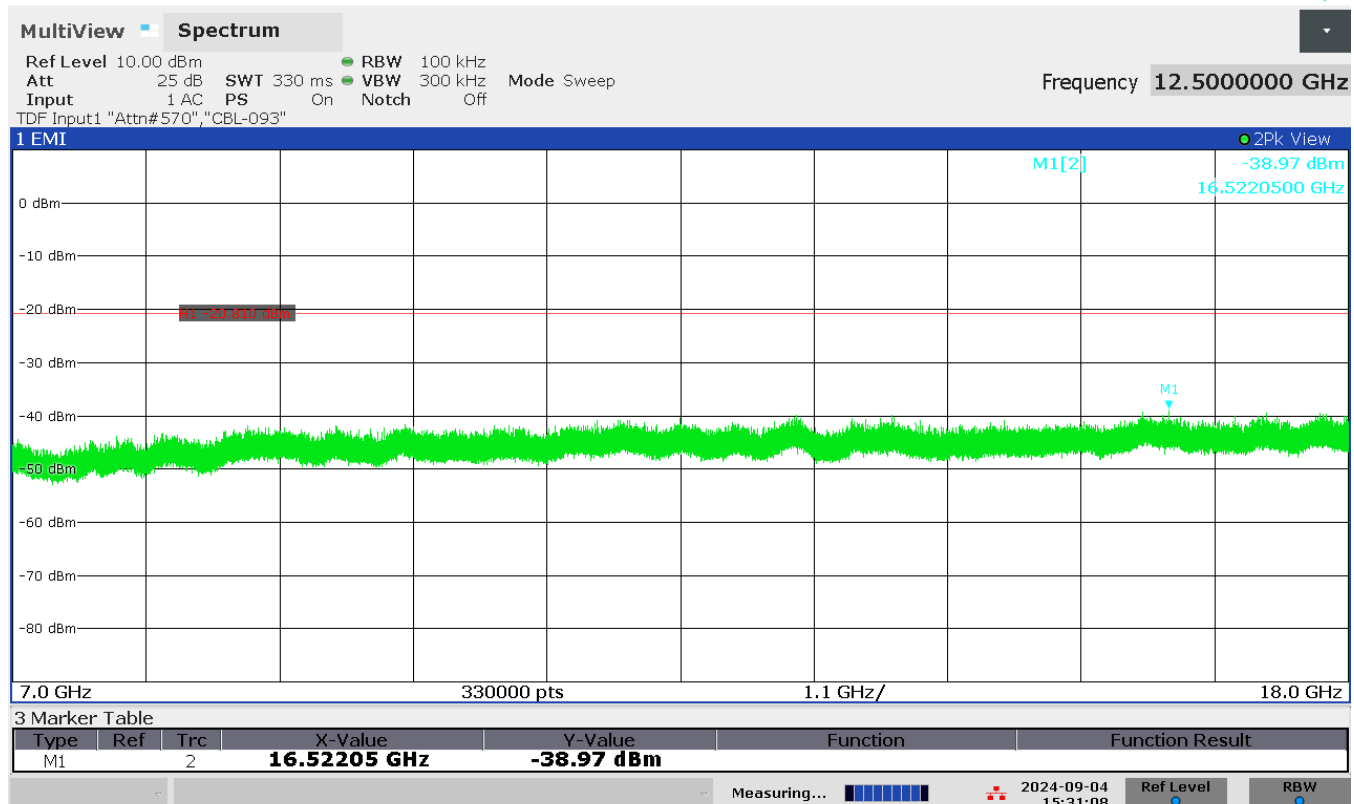
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
High Channel: 2480 MHz

Emission Level measurement

Limit = -0.81 dBm – 20 dB = -20.81 dBm

Frequency Range 7-18 GHz



03:31:09 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

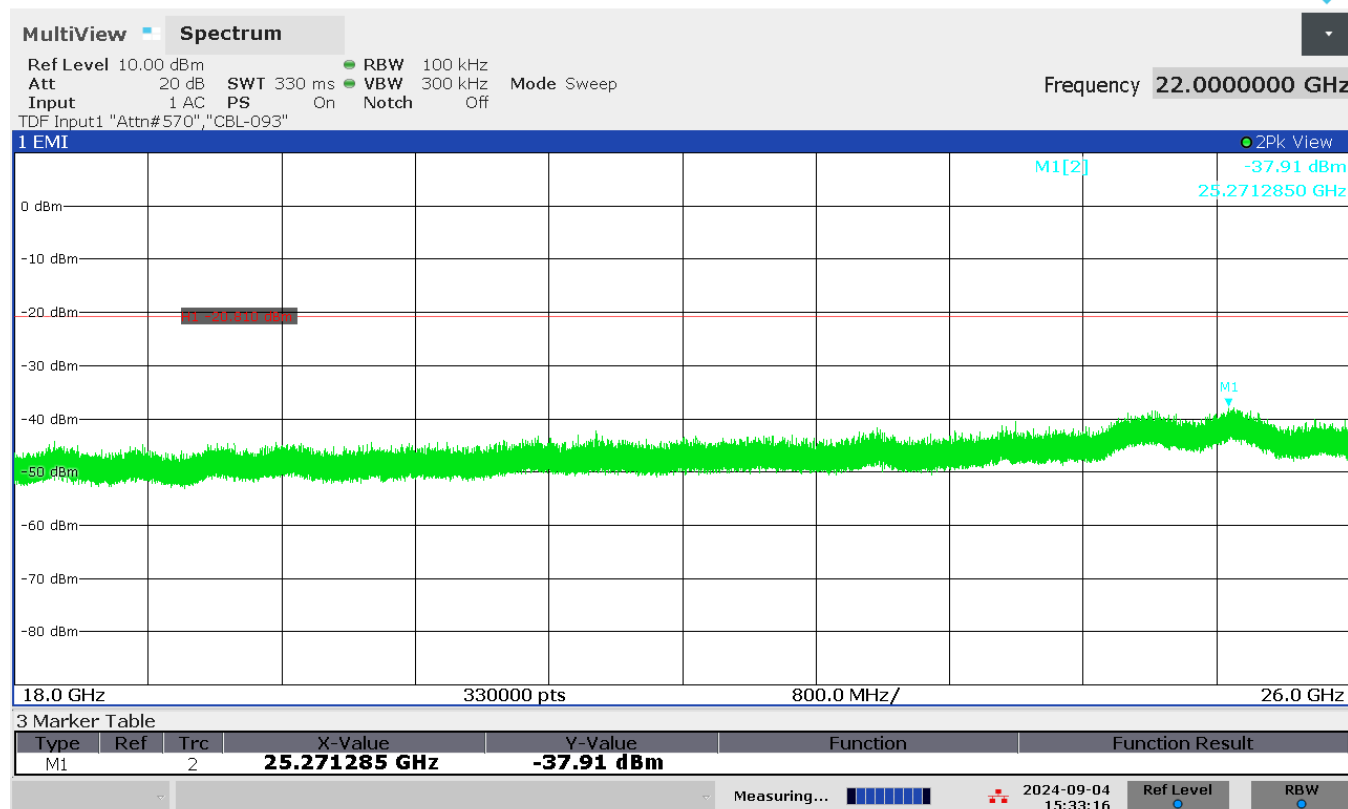
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 1 Mbps
High Channel: 2480 MHz

Emission Level measurement

Limit = $-0.81 \text{ dBm} - 20 \text{ dB} = -20.81 \text{ dBm}$

Frequency Range 18-26 GHz



03:33:17 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

A5.2a Emissions – Non-Restricted Bands – 2 Mbps – Low Channel

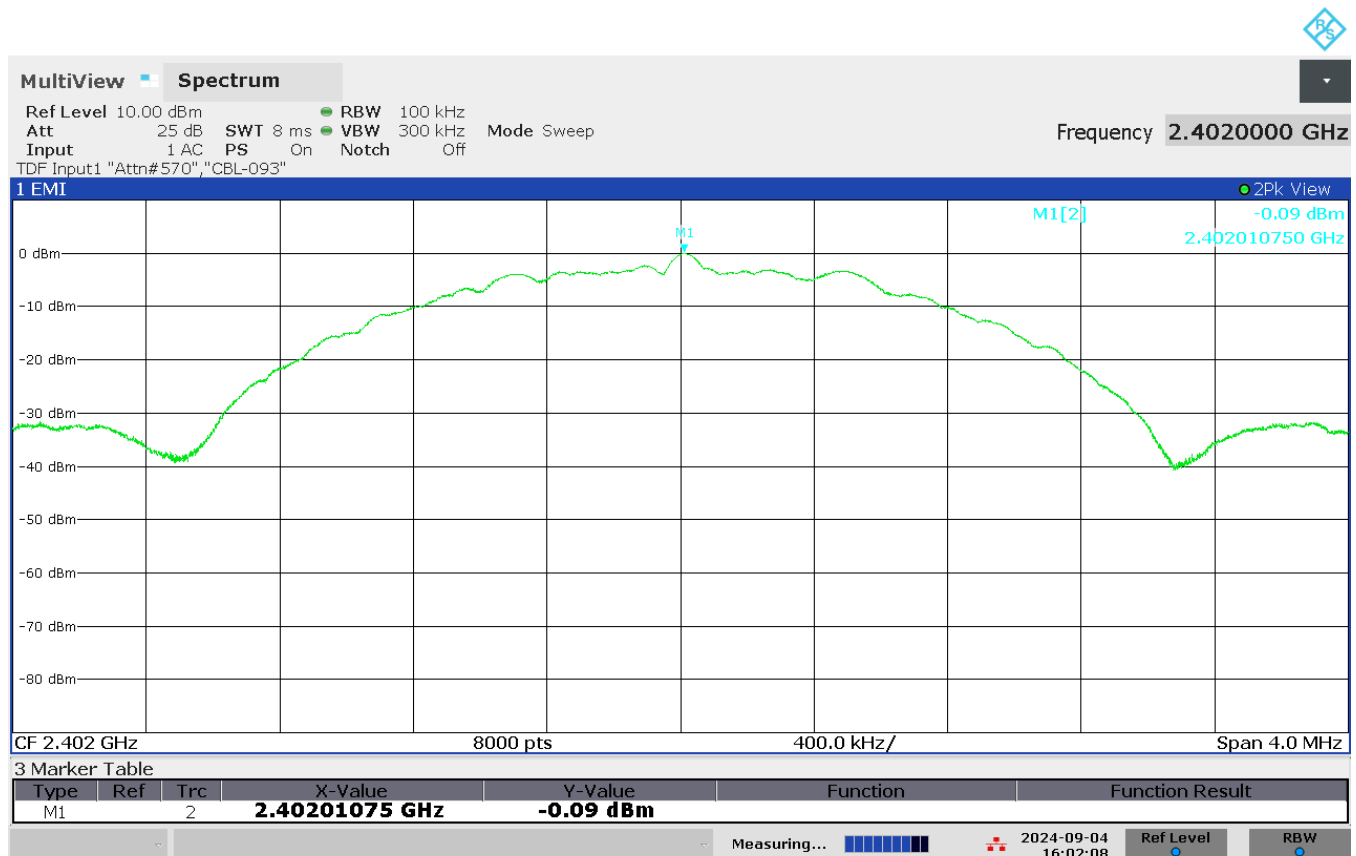
Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
Low Channel: 2402 MHz

Reference Level measurement

Limit = -0.09 dBm – 20 dB = -20.09 dBm



04:02:09 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

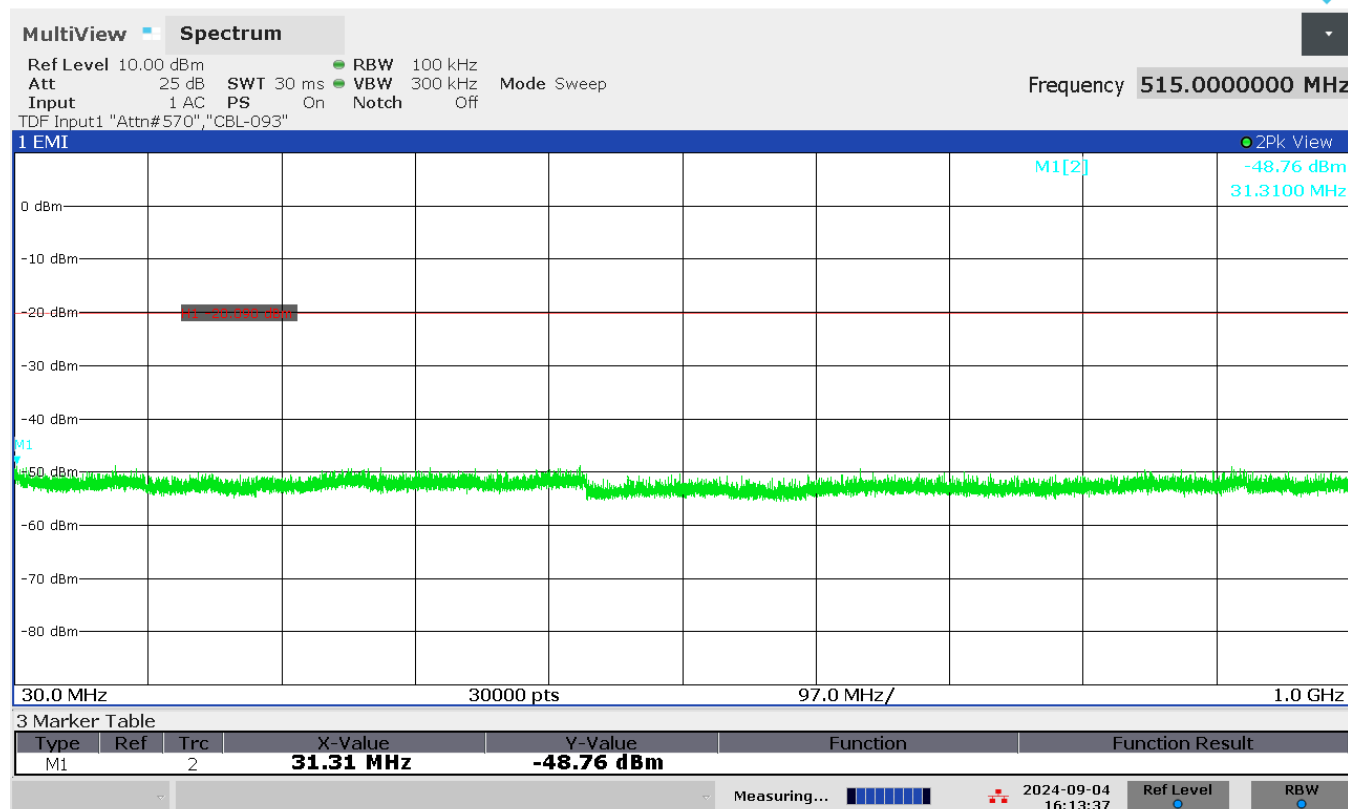
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
Low Channel: 2402 MHz

Emission Level measurement

Limit = -0.09 dBm – 20 dB = -20.09 dBm

Frequency Range 30-1000 MHz



04:13:37 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

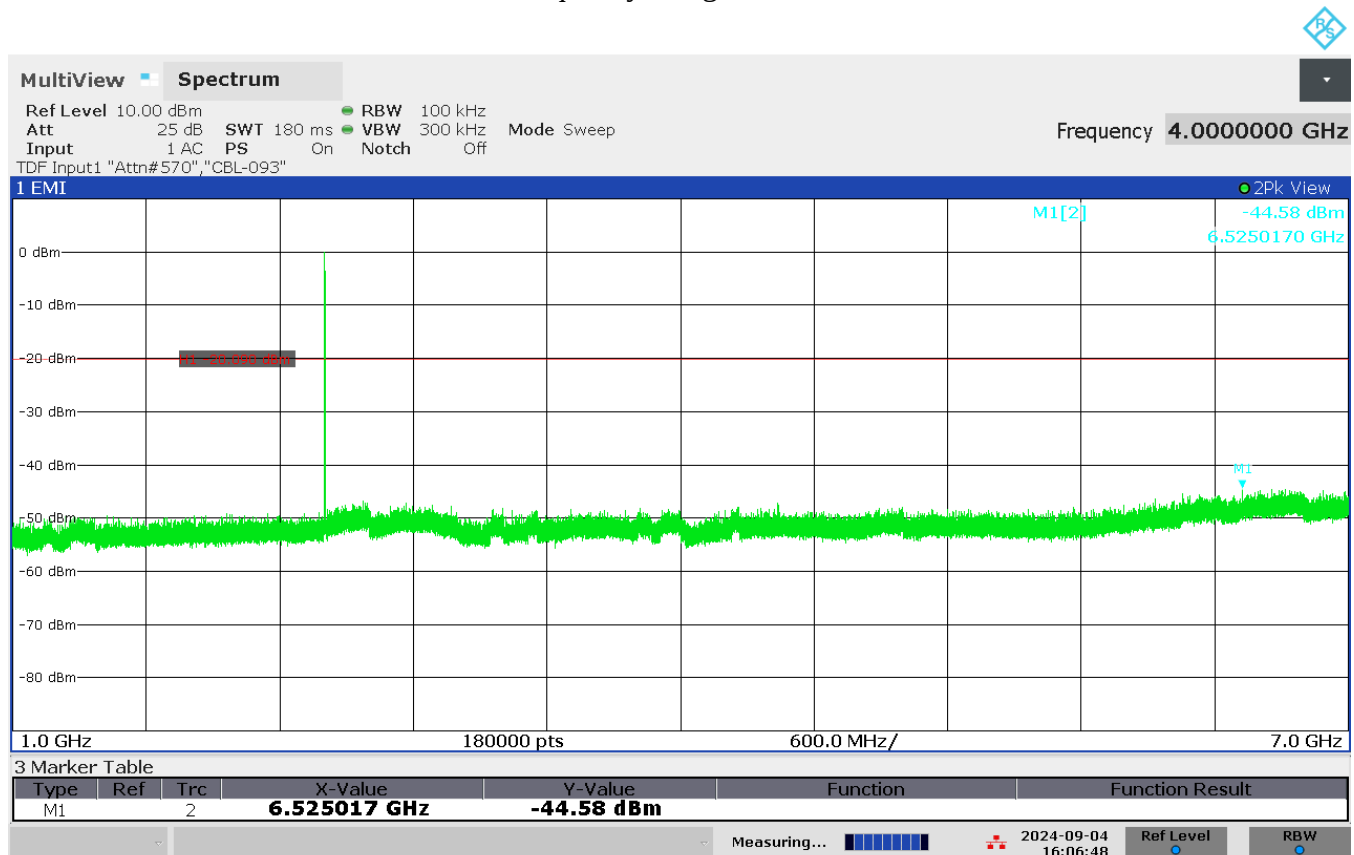
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
Low Channel: 2402 MHz

Emission Level measurement

Limit = -0.09 dBm – 20 dB = -20.09 dBm

Frequency Range 1-7 GHz



04:06:49 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

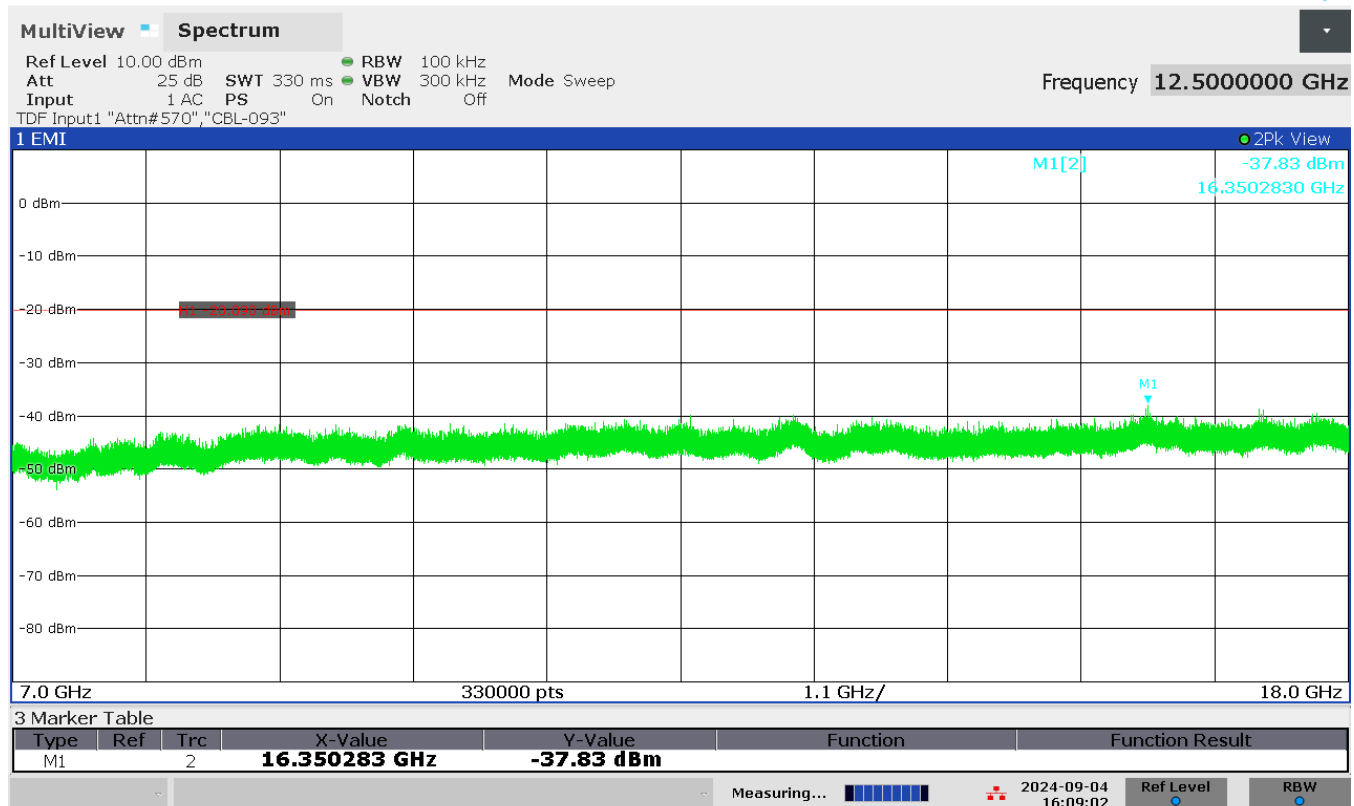
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
Low Channel: 2402 MHz

Emission Level measurement

Limit = -0.09 dBm – 20 dB = -20.09 dBm

Frequency Range 7-18 GHz



04:09:03 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

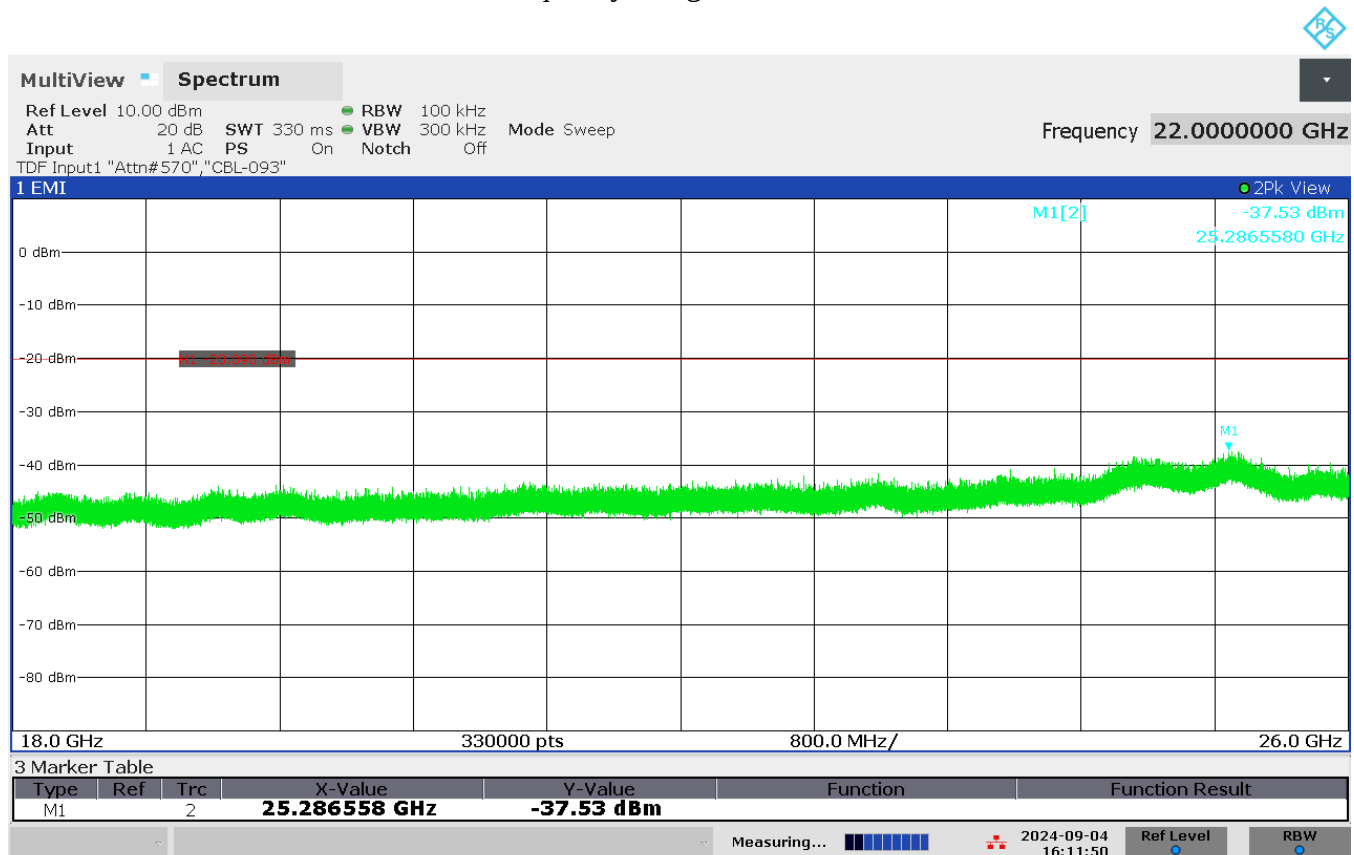
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
Low Channel: 2402 MHz

Emission Level measurement

Limit = -0.09 dBm – 20 dB = -20.09 dBm

Frequency Range 18-26 GHz



04:11:50 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

A5.2b Emissions – Non-Restricted Bands – 2 Mbps – Middle Channel

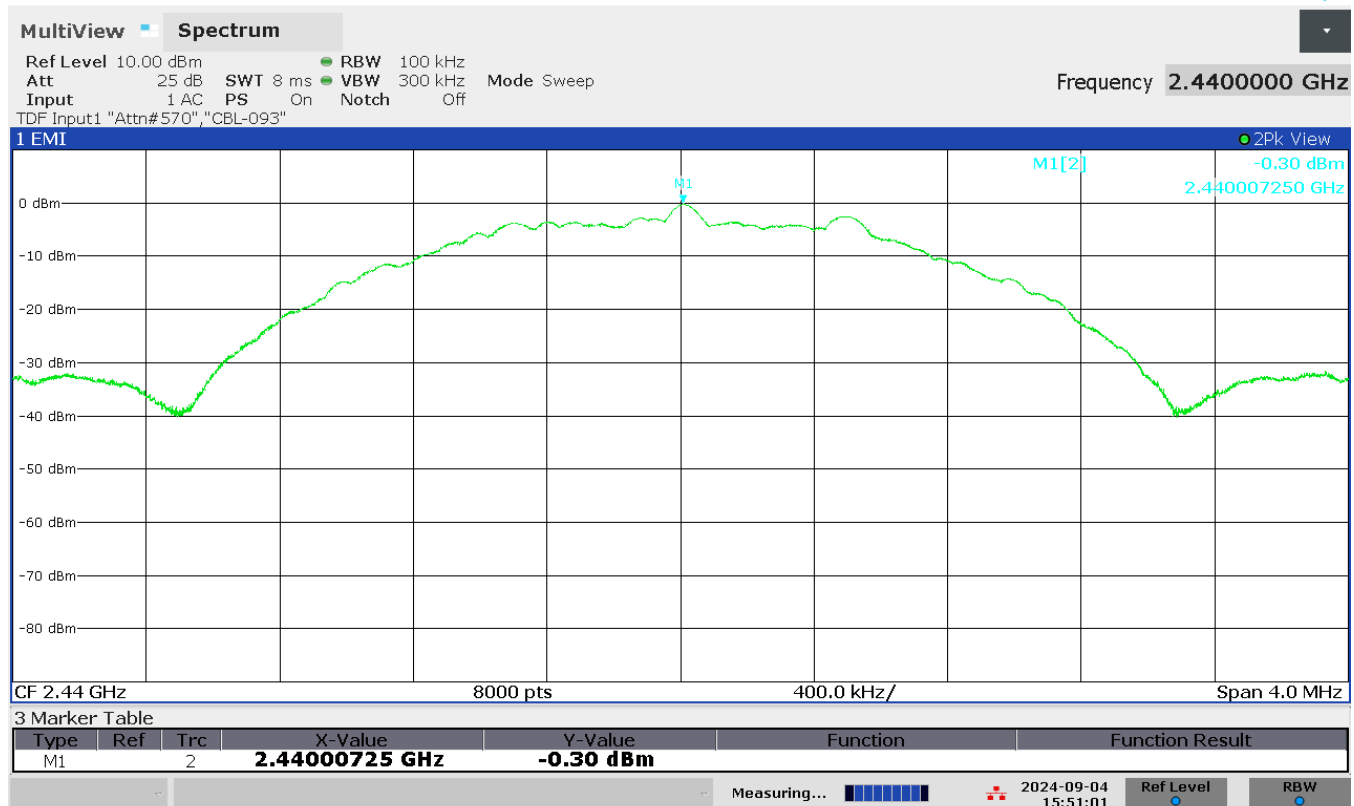
Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
Mid Channel: 2440 MHz

Reference Level measurement

Limit = -0.30 dBm – 20 dB = -20.30 dBm



03:51:02 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

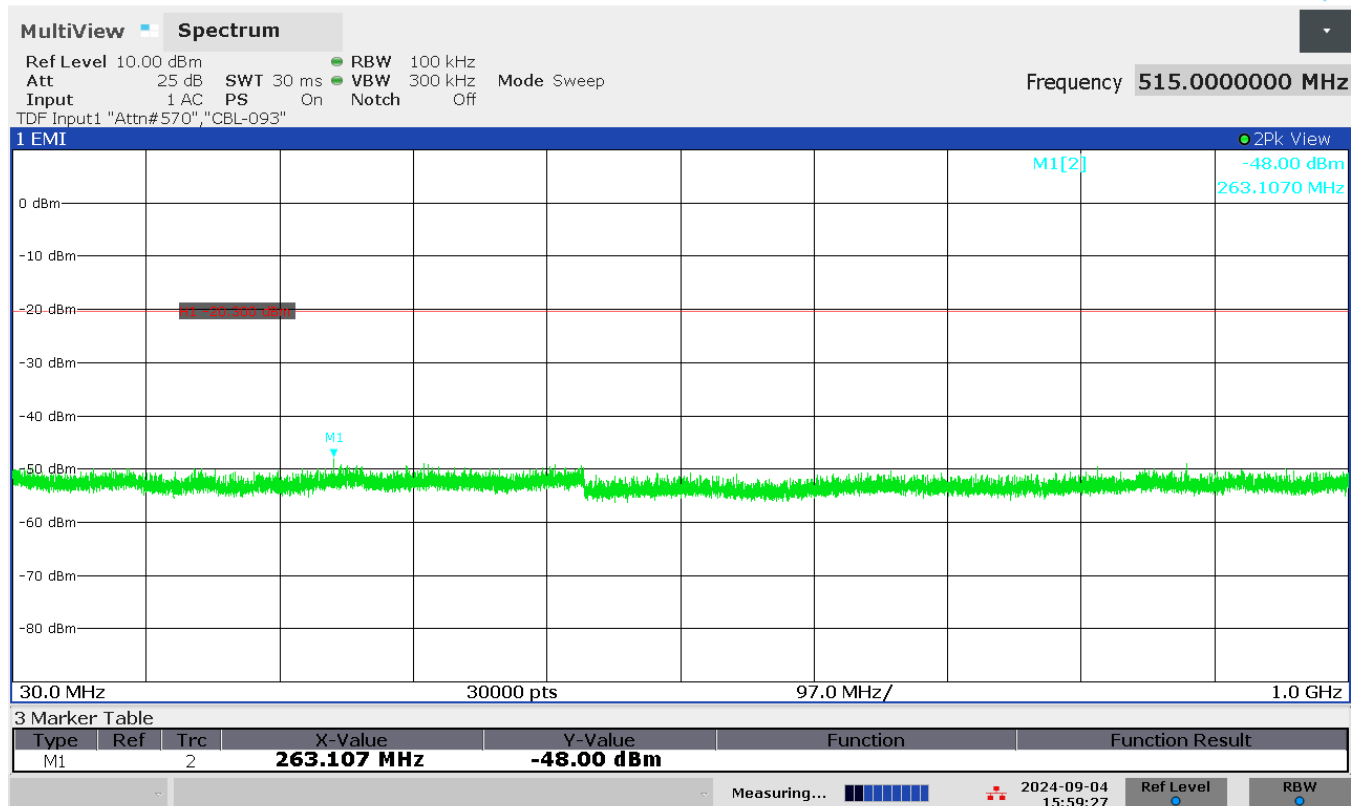
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
Mid Channel: 2440 MHz

Emission Level measurement

Limit = -0.30 dBm – 20 dB = -20.30 dBm

Frequency Range 30-1000 MHz



03:59:28 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

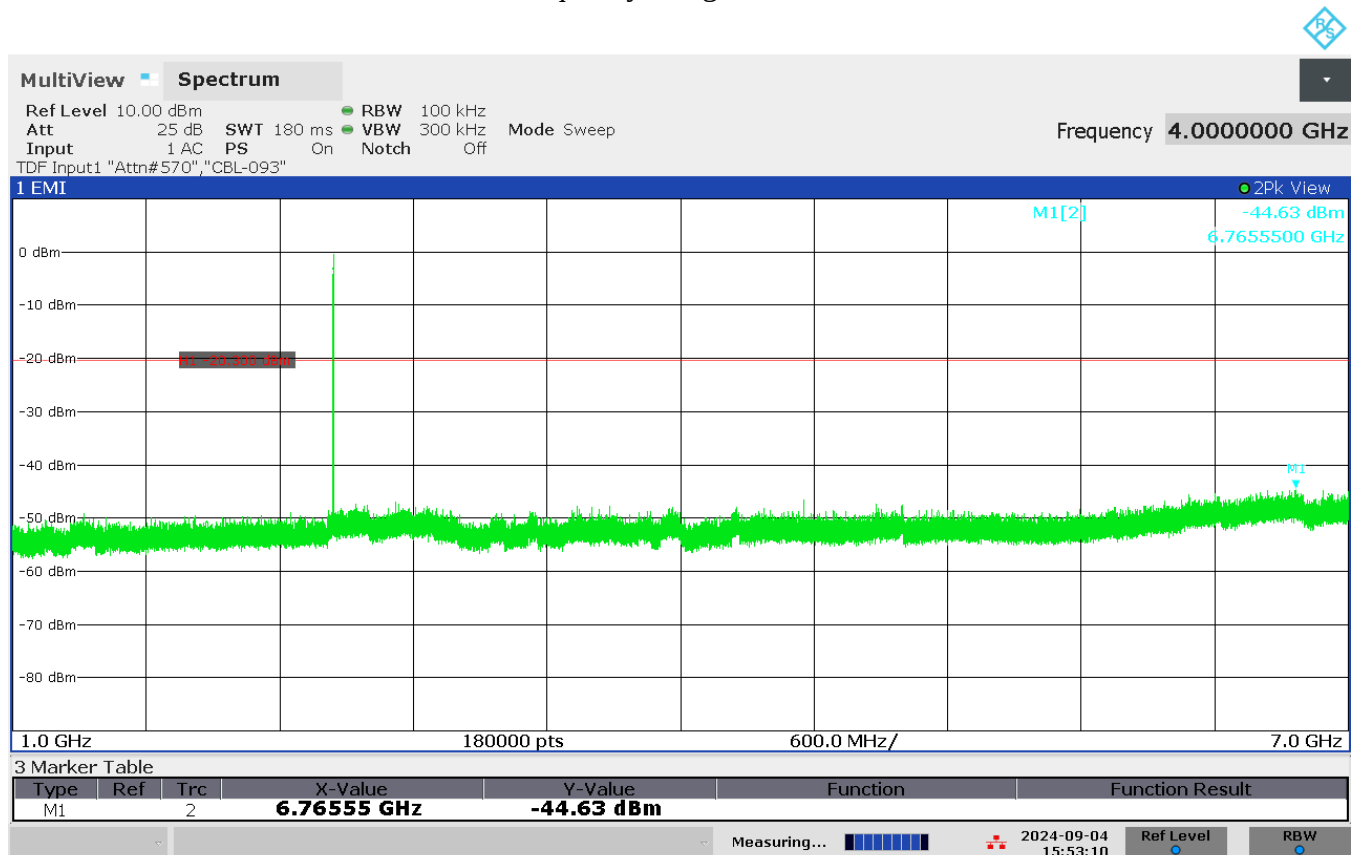
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
Mid Channel: 2440 MHz

Emission Level measurement

Limit = -0.30 dBm – 20 dB = -20.30 dBm

Frequency Range 1-7 GHz



03:53:11 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

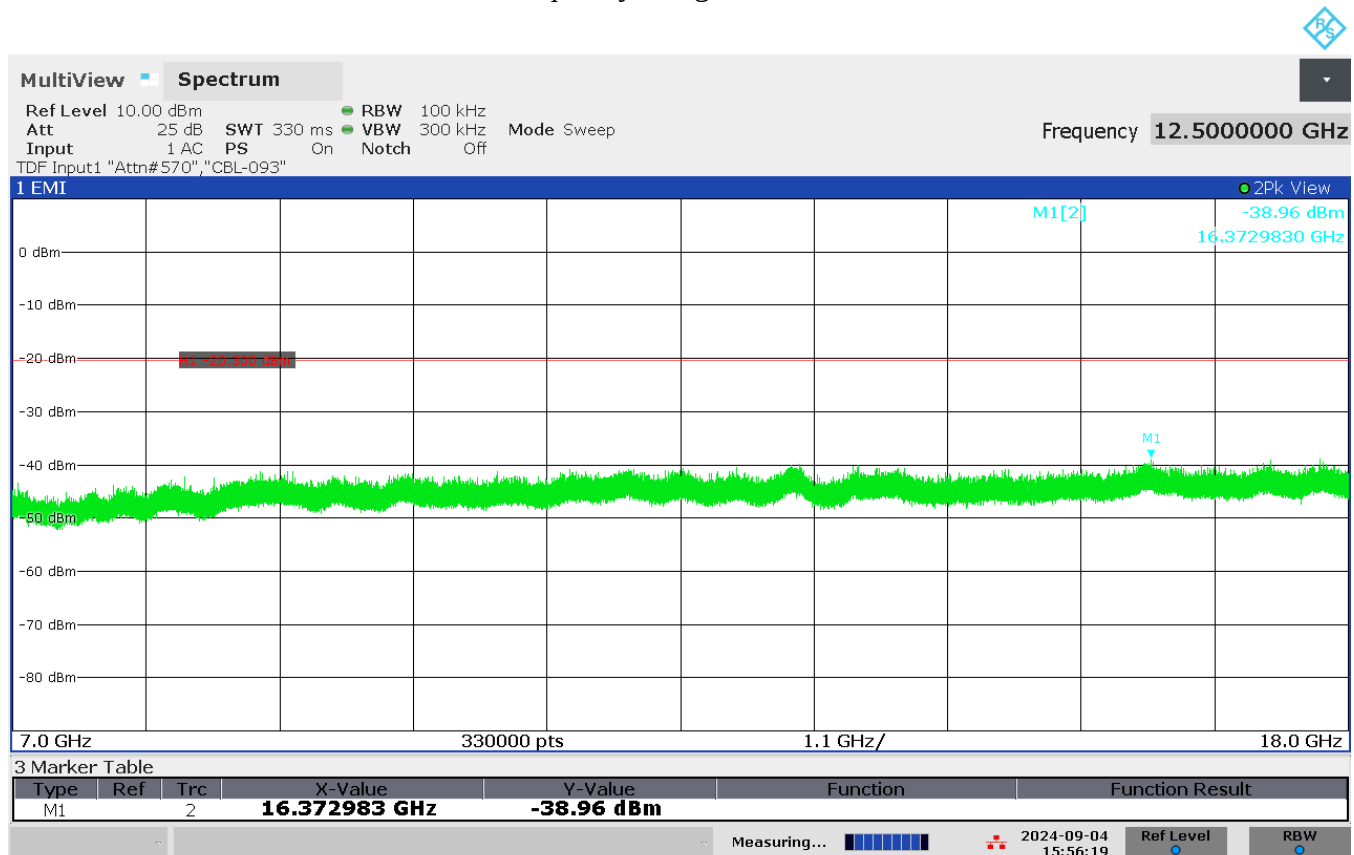
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
Mid Channel: 2440 MHz

Emission Level measurement

Limit = -0.30 dBm – 20 dB = -20.30 dBm

Frequency Range 7-18 GHz



03:56:20 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

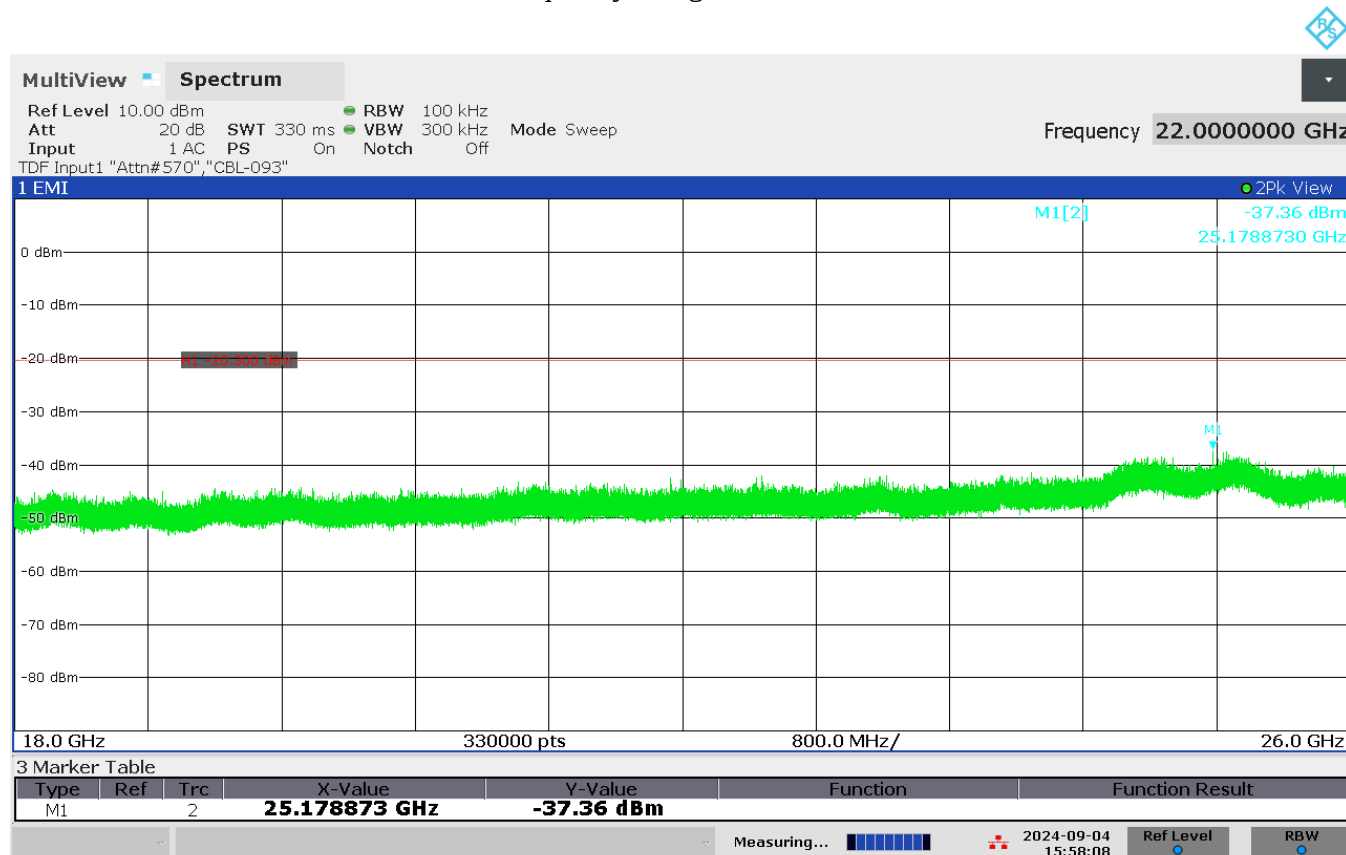
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
Mid Channel: 2440 MHz

Emission Level measurement

Limit = $-0.30 \text{ dBm} - 20 \text{ dB} = -20.30 \text{ dBm}$

Frequency Range 18-26 GHz



03:58:08 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

A5.2c Emissions – Non-Restricted Bands – 2 Mbps – High Channel

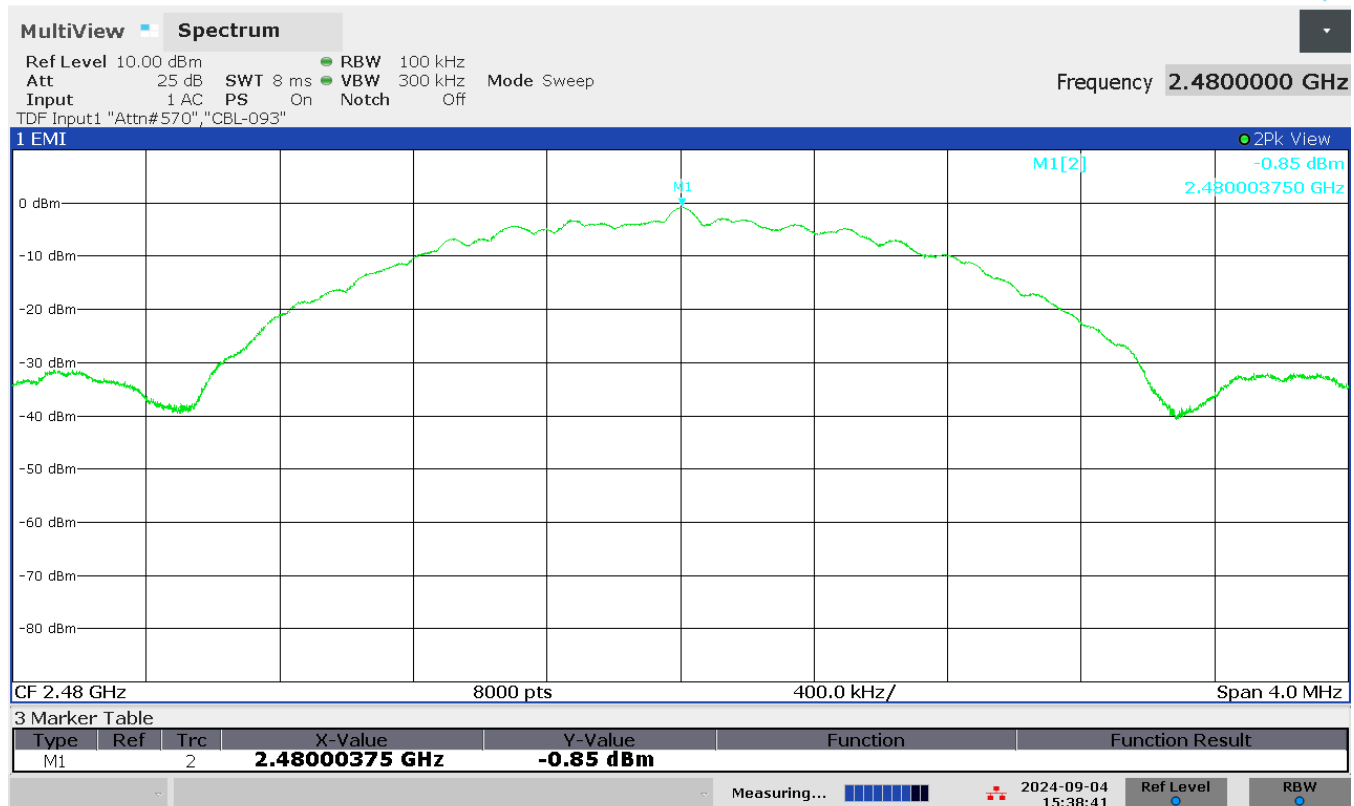
Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
High Channel: 2480 MHz

Reference Level measurement

Limit = -0.85 dBm – 20 dB = -20.85 dBm



03:38:42 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

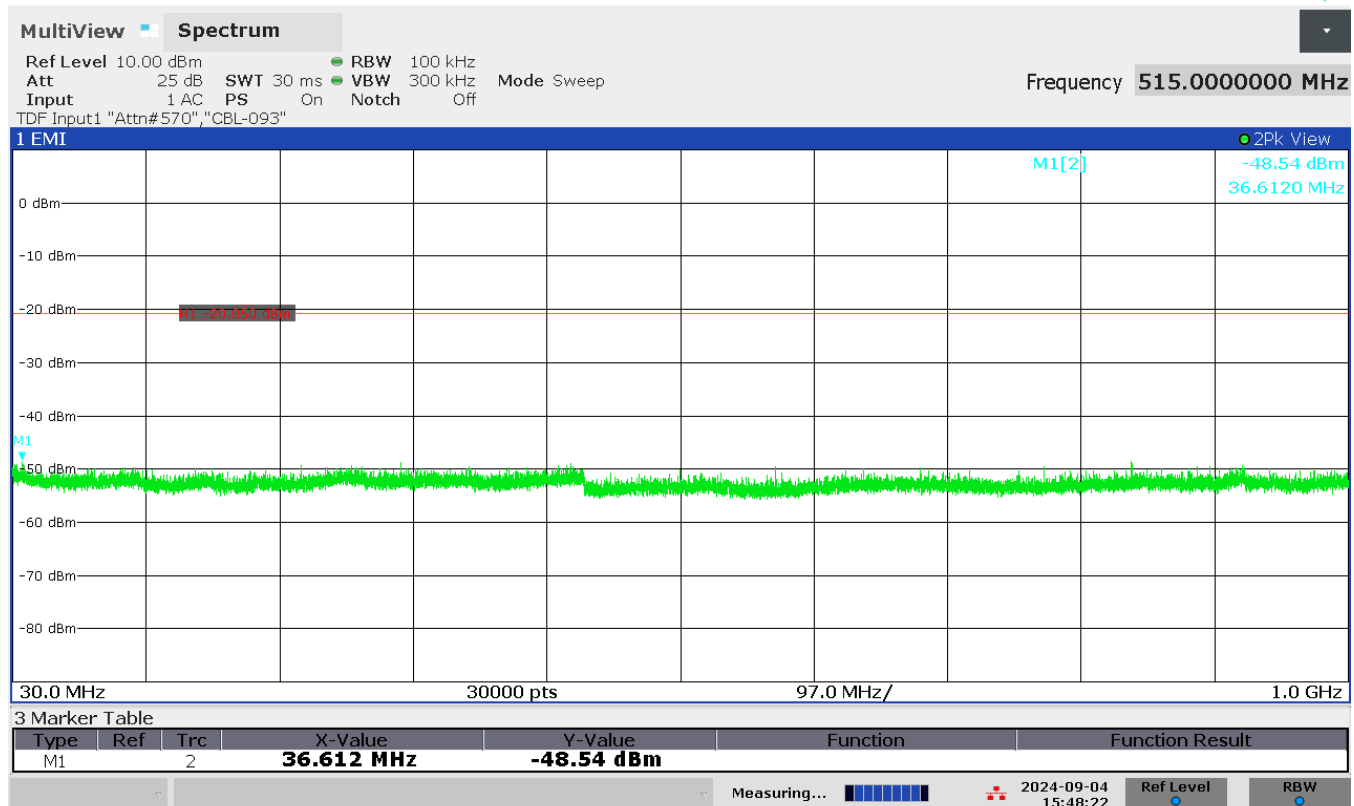
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
High Channel: 2480 MHz

Emission Level measurement

Limit = $-0.85 \text{ dBm} - 20 \text{ dB} = -20.85 \text{ dBm}$

Frequency Range 30-1000 MHz



03:48:23 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

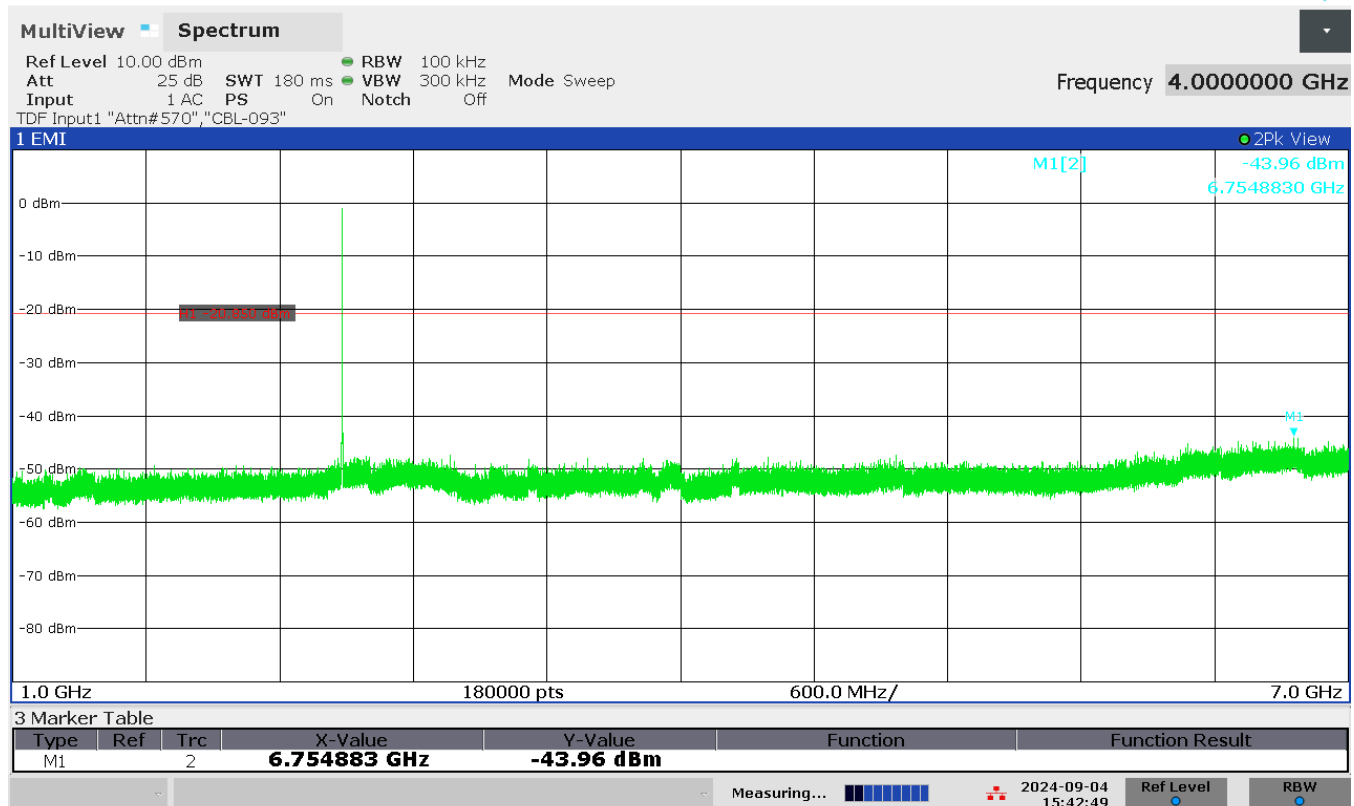
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
High Channel: 2480 MHz

Emission Level measurement

Limit = -0.85 dBm – 20 dB = -20.85 dBm

Frequency Range 1-7 GHz



03:42:50 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

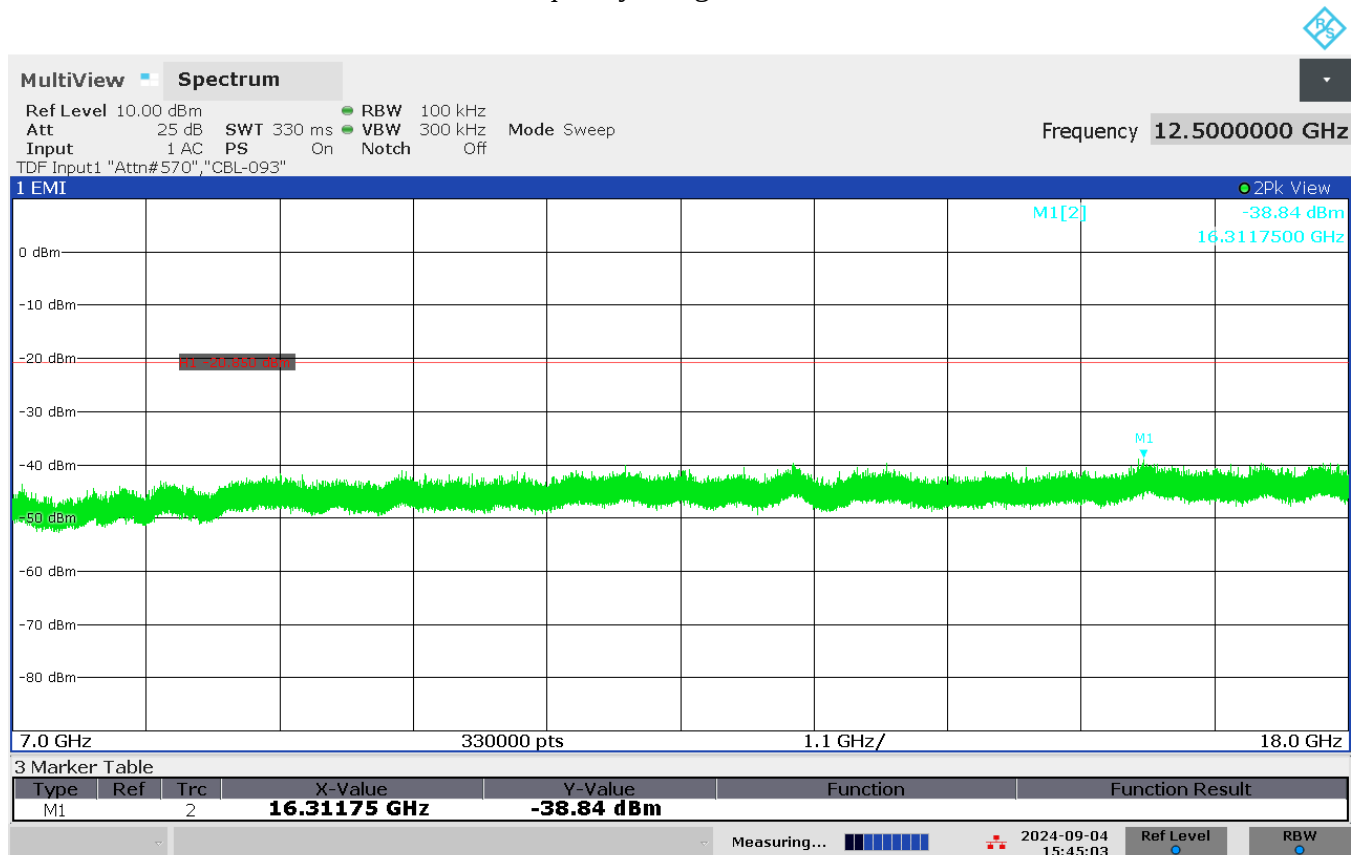
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
High Channel: 2480 MHz

Emission Level measurement

Limit = -0.85 dBm – 20 dB = -20.85 dBm

Frequency Range 7-18 GHz



03:45:04 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted
Operator: cbrandt

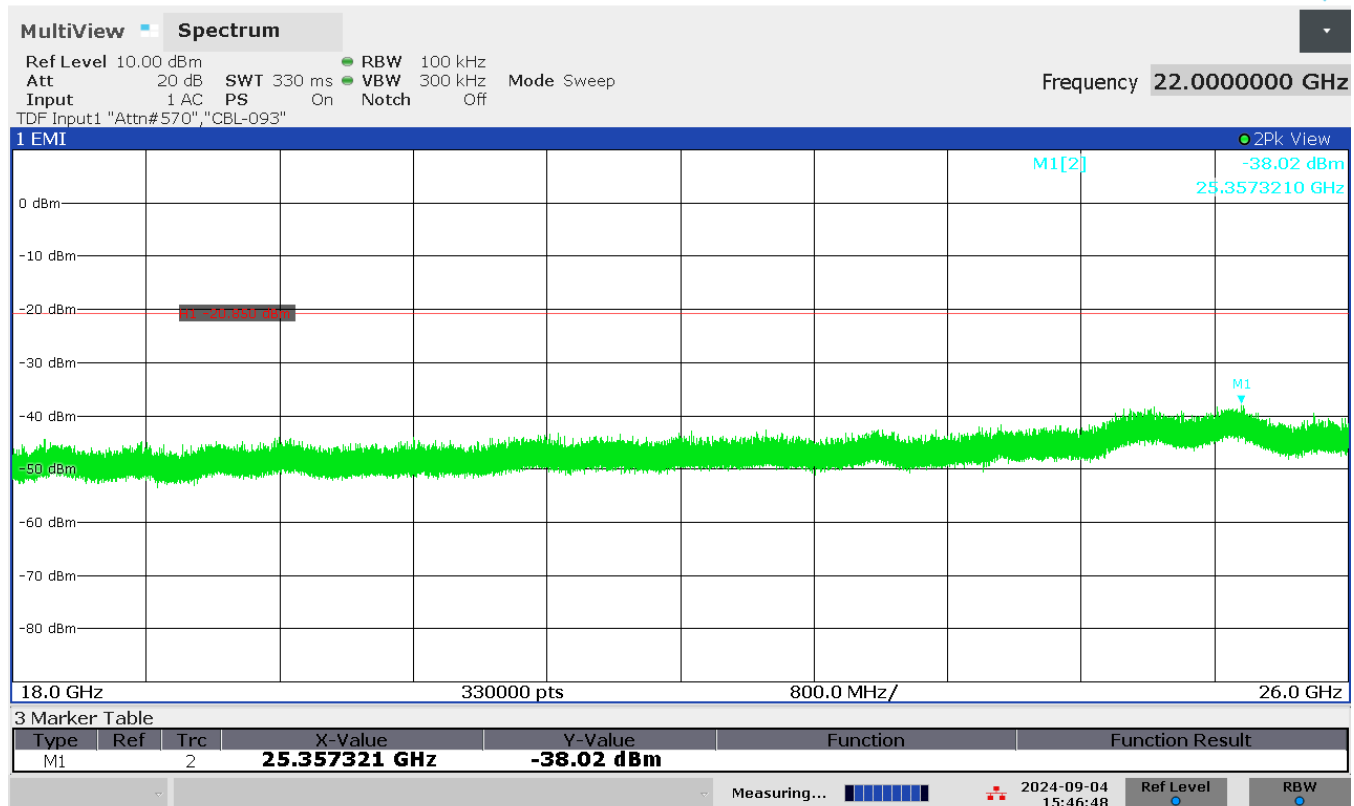
Comment: RBW = 100 kHz VBW $\geq$ 300 kHz
Span $\geq$ 1.5 x DTS bandwidth
Sweep = auto couple Trace = max hold
Detector = Peak

Data rate: 2 Mbps
High Channel: 2480 MHz

Emission Level measurement

Limit = -0.85 dBm – 20 dB = -20.85 dBm

Frequency Range 18-26 GHz



03:46:49 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

A6.0 Emissions in Restricted Frequency Bands

Rule Part:

Sections 15.247(d), 15.205(b), and 15.209(a)

Test Procedure:

ANSI C63.10-2020, Section 11.12.1
Radiated emission measurements

Limit:

Table in FCC 15.209

Results:

Compliant

Notes:

This was a Radiated Emissions test. The EUT was tested while transmitting from the on-board chip antenna. The device was set up on a non-conductive table for testing purposes.

The test software was set to transmit a modulated signal at 94.6% duty cycle in 1 Mbps mode and 89.7% duty cycle in 2 Mbps mode. The EUT was rotated through three orthogonal axes to find worst-case emission levels. The worst-case levels are recorded in this test report.

DLS Electronic Systems, Inc.

Radiated Emissions - OATS

Vertical Quasi-Peak Graph

Limit/Distance - FCC Part 15.247 / 15.205 / 15.209 / 3-meter

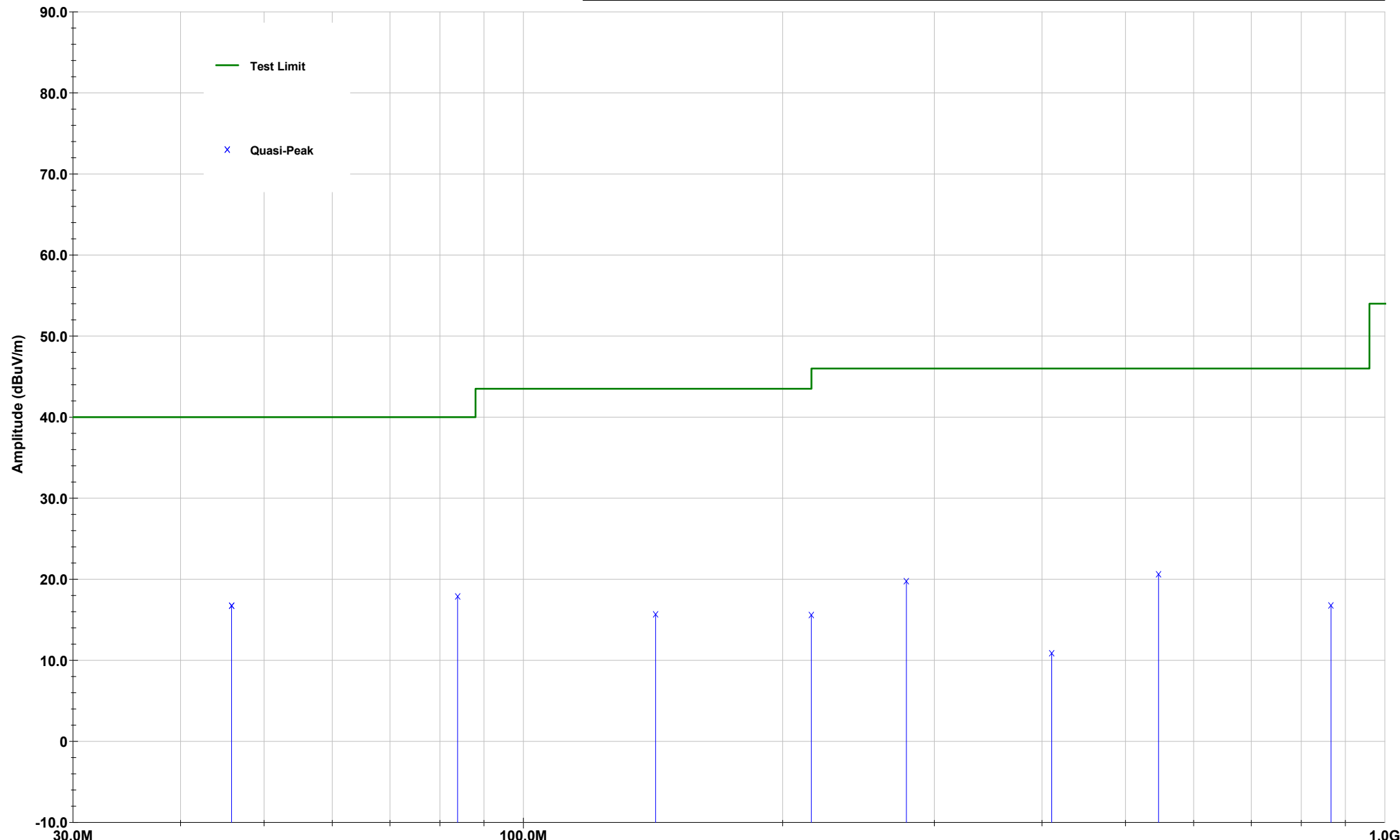
Customer - Wilson Sporting Goods

EUT Info - QBID Ball Tag; DLS Proj. #13059

Voltage/Site - On-board single use battery (fully charged) / Site 2

Engineer - cbrandt

Notes - Continuous Transmit mode; Low, Mid, High channels; 1Mbps & 2Mbps



02:45:47 PM, Thursday, September 05, 2024

Limit/Distance: FCC Part 15.247 / 15.205 / 15.209 / 3-meter

Frequency (MHz)	Limit QP (dBuV/m)	Raw QP (dBuV/m)	Correction Factor (dB)	Corrected QP (dBuV/m)	Margin QP (dB)	Tower (Meters)	Turntable (Degrees)	Notes
45.840	40.000	29.41	-12.68	16.73	23.27	1.000	0.000	noise floor
83.880	40.000	34.49	-16.63	17.86	22.14	1.000	45.000	noise floor
142.381	43.500	27.35	-11.68	15.67	27.83	1.000	225.000	noise floor
215.900	43.500	28.14	-12.57	15.58	27.92	1.000	90.000	noise floor
278.421	46.000	29.69	-9.94	19.75	26.25	1.000	0.000	noise floor
410.601	46.000	17.97	-7.10	10.87	35.13	1.000	250.000	noise floor
546.221	46.000	24.70	-4.09	20.61	25.39	1.210	225.000	noise floor
866.260	46.000	14.62	2.15	16.77	29.23	1.210	30.000	noise floor

Limit/Distance - FCC Part 15.247 / 15.205 / 15.209 / 3-meter
--

Customer - Wilson Sporting Goods

EUT Info - QBID	Ball Tag; DLS Proj. #13059
-----------------	----------------------------

Voltage/Site - On-board single use battery (fully charged) / Site 2

Engineer - cbrandt

Notes - Continuous Transmit mode; Low, Mid, High channels; 1Mbps _2Mbps

DLS Electronic Systems, Inc.

Radiated Emissions - OATS

Horizontal Quasi-Peak Graph

Limit/Distance - FCC Part 15.247 / 15.205 / 15.209 / 3-meter

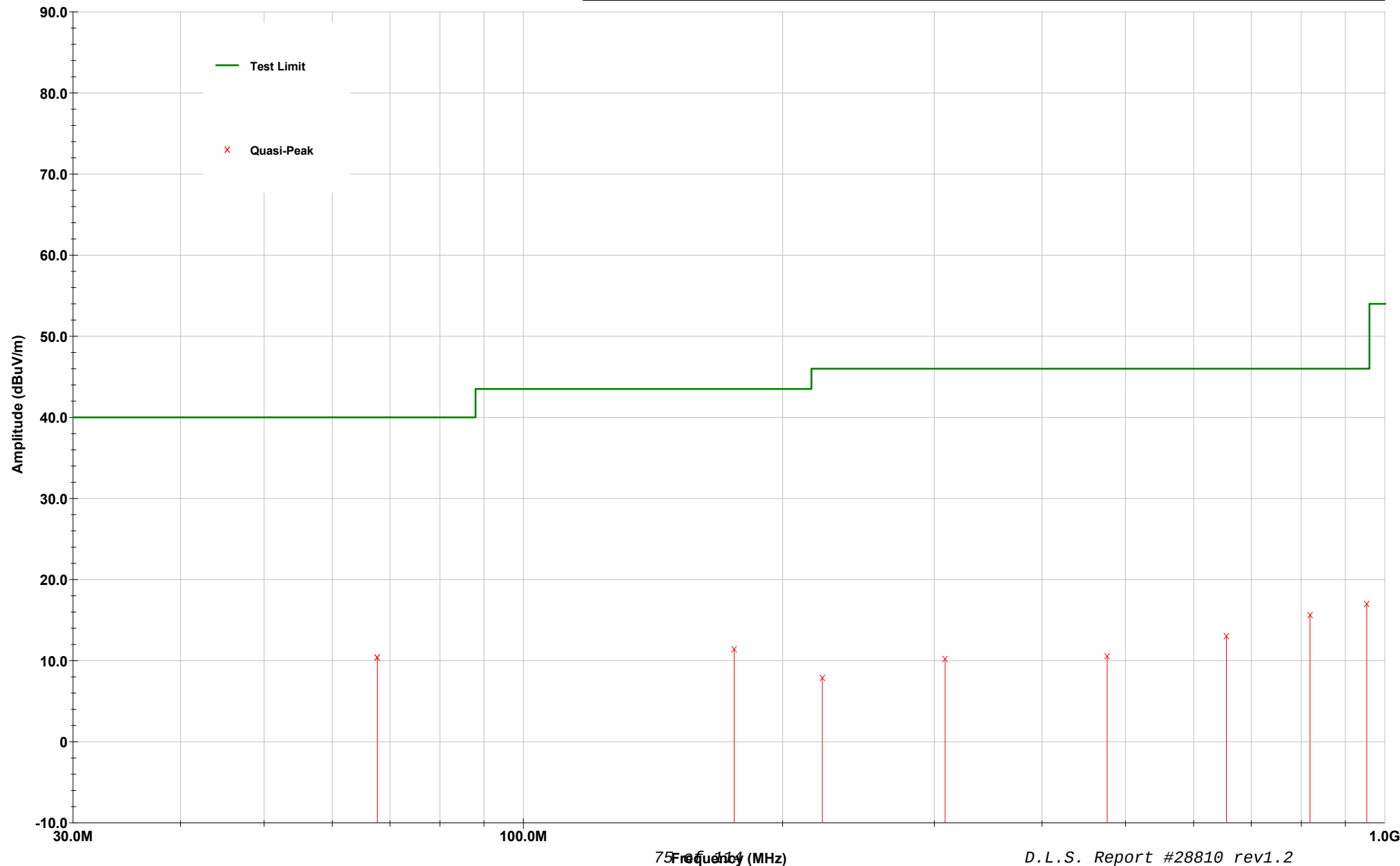
Customer - Wilson Sporting Goods

EUT Info - QBID Ball Tag; DLS Proj. #13059

Voltage/Site - On-board single use battery (fully charged) / Site 2

Engineer - cbrandt

Notes - Continuous Transmit mode; Low, Mid, High channels; 1Mbps & 2Mbps



Limit/Distance: FCC Part 15.247 / 15.205 / 15.209 / 3-meter

[illegible]

Radiated Harmonic and Spurious Emissions – 1 to 18 GHz

Tested at a 3 Meter Distance

EUT: QBID Ball Tag
Manufacturer: Wilson Sporting Goods Co.
Operating Condition: 70 deg F; 44% R.H.
Test Site: DLS Genoa Site W1
Operator: cbrandt; DLS Proj. #13059
Test Specification: Emissions in Restricted Frequency Bands
Comment: Transmit on Low channel (2402 MHz), **1 Mbps**, 94.6% duty cycle, power setting: 0
Date: 10-05-2024
Notes: All other emissions at least 20 dB under the limit.

Low channel (2402 MHz)

Frequency (MHz)	Measurement Type	Antenna Polarization	Level (dBμV/m)	Antenna Factor (dB/m)	System Loss (dB)	Duty Cycle Correction* (dB)	Total Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna Height (m)	EUT Angle (deg)
4804.02	Max Peak	Vert	62.85	32.95	-37.7	0	58.1	74	15.9	1.85	183
4804.02	Average	Vert	57.03	32.95	-37.7	0.48	52.8	54	1.2	1.85	183
4803.98	Max Peak	Horz	62.85	32.95	-37.7	0	58.1	74	15.9	1.78	188
4803.98	Average	Horz	56.99	32.95	-37.7	0.48	52.7	54	1.3	1.78	188

*Correction factor **added** to the maximum Average (linear voltage) detector measurement to show that, even with a 100% duty cycle, the EUT would comply with the Average limit.

Radiated Harmonic and Spurious Emissions – 1 to 18 GHz

Tested at a 3 Meter Distance

EUT: QBID Ball Tag
Manufacturer: Wilson Sporting Goods Co.
Operating Condition: 70 deg F; 44% R.H.
Test Site: DLS Genoa Site W1
Operator: cbrandt; DLS Proj. #13059
Test Specification: Emissions in Restricted Frequency Bands
Comment: Transmit on Mid channel (2440 MHz), **1 Mbps**, 94.6% duty cycle, power setting: 0
Date: 10-05-2024
Notes: All other emissions at least 20 dB under the limit.

Mid channel (2440 MHz)

Frequency (MHz)	Measurement Type	Antenna Polarization	Level (dBμV/m)	Antenna Factor (dB/m)	System Loss (dB)	Duty Cycle Correction* (dB)	Total Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna Height (m)	EUT Angle (deg)
4879.94	Max Peak	Vert	63.40	33.18	-38.0	0	58.6	74	15.4	1.89	183
4879.94	Average	Vert	57.95	33.18	-38.0	0.48	53.6	54	0.4	1.89	183
4803.98	Max Peak	Horz	63.68	33.18	-38.0	0	58.9	74	15.1	1.75	188
4803.98	Average	Horz	58.02	33.18	-38.0	0.48	53.7	54	0.3	1.75	188
7320.62	Max Peak	Vert	51.38	36.63	-35.7	0	52.3	74	21.7	1.00	0
7320.62	Average	Vert	40.10	36.63	-35.7	0.48	41.5	54	12.5	1.00	0
7320.62	Max Peak	Horz	51.13	36.63	-35.7	0	52.1	74	21.9	1.44	17
7320.62	Average	Horz	40.32	36.63	-35.7	0.48	41.7	54	12.3	1.44	17

*Correction factor **added** to the maximum Average (linear voltage) detector measurement to show that, even with a 100% duty cycle, the EUT would comply with the Average limit.

Radiated Harmonic and Spurious Emissions – 1 to 18 GHz

Tested at a 3 Meter Distance

EUT: QBID Ball Tag
Manufacturer: Wilson Sporting Goods Co.
Operating Condition: 70 deg F; 44% R.H.
Test Site: DLS Genoa Site W1
Operator: cbrandt; DLS Proj. #13059
Test Specification: Emissions in Restricted Frequency Bands
Comment: Transmit on High channel (2480 MHz), **1 Mbps**, 94.6% duty cycle, power setting: 0
Date: 10-05-2024
Notes: All other emissions at least 20 dB under the limit.

High channel (2480 MHz)

Frequency (MHz)	Measurement Type	Antenna Polarization	Level (dBμV/m)	Antenna Factor (dB/m)	System Loss (dB)	Duty Cycle Correction* (dB)	Total Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna Height (m)	EUT Angle (deg)
4960.12	Max Peak	Vert	62.99	33.21	-37.9	0	58.3	74	15.7	1.95	186
4960.12	Average	Vert	57.55	33.21	-37.9	0.48	53.3	54	0.7	1.95	186
4960.06	Max Peak	Horz	63.68	33.21	-37.9	0	59.0	74	15.0	1.69	190
4960.06	Average	Horz	57.89	33.21	-37.9	0.48	53.7	54	0.3	1.69	190
7440.64	Max Peak	Vert	49.39	36.79	-35.4	0	50.8	74	23.2	1.00	2
7440.64	Average	Vert	37.90	36.79	-35.4	0.48	39.8	54	14.2	1.00	2
7440.64	Max Peak	Horz	49.99	36.79	-35.4	0	51.4	74	22.6	1.69	352
7440.64	Average	Horz	38.30	36.79	-35.4	0.48	40.2	54	13.8	1.69	352

*Correction factor **added** to the maximum Average (linear voltage) detector measurement to show that, even with a 100% duty cycle, the EUT would comply with the Average limit.

Radiated Harmonic and Spurious Emissions – 1 to 18 GHz

Tested at a 3 Meter Distance

EUT: QBID Ball Tag
Manufacturer: Wilson Sporting Goods Co.
Operating Condition: 70 deg F; 44% R.H.
Test Site: DLS Genoa Site W1
Operator: cbrandt; DLS Proj. #13059
Test Specification: Emissions in Restricted Frequency Bands
Comment: Transmit on Low channel (2402 MHz), 2 Mbps, 89.7% duty cycle, power setting: 0
Date: 10-05-2024
Notes: All other emissions at least 20 dB under the limit.

Low channel (2402 MHz)

Frequency (MHz)	Measurement Type	Antenna Polarization	Level (dBμV/m)	Antenna Factor (dB/m)	System Loss (dB)	Duty Cycle Correction* (dB)	Total Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna Height (m)	EUT Angle (deg)
4803.04	Max Peak	Vert	62.85	32.95	-37.7	0	58.1	74	15.9	1.78	182
4803.04	Average	Vert	54.46	32.95	-37.7	0.94	50.7	54	3.4	1.78	182
4803.04	Max Peak	Horz	63.12	32.95	-37.7	0	58.4	74	15.6	1.83	182
4803.04	Average	Horz	54.56	32.95	-37.7	0.94	50.8	54	3.3	1.83	182

*Correction factor **added** to the maximum Average (linear voltage) detector measurement to show that, even with a 100% duty cycle, the EUT would comply with the Average limit.

Radiated Harmonic and Spurious Emissions – 1 to 18 GHz

Tested at a 3 Meter Distance

EUT: QBID Ball Tag
Manufacturer: Wilson Sporting Goods Co.
Operating Condition: 70 deg F; 44% R.H.
Test Site: DLS Genoa Site W1
Operator: cbrandt; DLS Proj. #13059
Test Specification: Emissions in Restricted Frequency Bands
Comment: Transmit on Mid channel (2440 MHz), **2 Mbps**, 89.7% duty cycle, power setting: 0
Date: 10-05-2024
Notes: All other emissions at least 20 dB under the limit.

Mid channel (2440 MHz)

Frequency (MHz)	Measurement Type	Antenna Polarization	Level (dBμV/m)	Antenna Factor (dB/m)	System Loss (dB)	Duty Cycle Correction* (dB)	Total Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna Height (m)	EUT Angle (deg)
4879.04	Max Peak	Vert	63.82	33.18	-38.0	0	59.0	74	15.0	1.63	183
4879.04	Average	Vert	55.33	33.18	-38.0	0.94	51.5	54	2.6	1.63	183
4879.04	Max Peak	Horz	63.96	33.18	-38.0	0	59.1	74	14.9	1.76	182
4879.04	Average	Horz	55.32	33.18	-38.0	0.94	51.4	54	2.6	1.76	182
7321.27	Max Peak	Vert	50.12	36.63	-35.7	0	51.1	74	23.0	1.06	5
7321.27	Average	Vert	38.57	36.63	-35.7	0.94	40.4	54	13.6	1.06	5
7318.78	Max Peak	Horz	50.24	36.62	-35.7	0	51.2	74	22.8	1.53	18
7318.78	Average	Horz	38.89	36.62	-35.7	0.94	40.8	54	13.3	1.53	18

*Correction factor **added** to the maximum Average (linear voltage) detector measurement to show that, even with a 100% duty cycle, the EUT would comply with the Average limit.

Radiated Harmonic and Spurious Emissions – 1 to 18 GHz

Tested at a 3 Meter Distance

EUT: QBID Ball Tag
Manufacturer: Wilson Sporting Goods Co.
Operating Condition: 70 deg F; 44% R.H.
Test Site: DLS Genoa Site W1
Operator: cbrandt; DLS Proj. #13059
Test Specification: Emissions in Restricted Frequency Bands
Comment: Transmit on High channel (2480 MHz), 2 Mbps, 89.7% duty cycle, power setting: 0
Date: 10-05-2024
Notes: All other emissions at least 20 dB under the limit.

High channel (2480 MHz)

Frequency (MHz)	Measurement Type	Antenna Polarization	Level (dBμV/m)	Antenna Factor (dB/m)	System Loss (dB)	Duty Cycle Correction* (dB)	Total Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna Height (m)	EUT Angle (deg)
4960.98	Max Peak	Vert	63.40	33.21	-37.9	0	58.7	74	15.3	1.96	186
4960.98	Average	Vert	55.05	33.21	-37.9	0.94	51.3	54	2.7	1.96	186
4960.94	Max Peak	Horz	63.54	33.21	-37.9	0	58.9	74	15.2	1.82	181
4960.94	Average	Horz	55.50	33.21	-37.9	0.94	51.8	54	2.2	1.82	181
7441.21	Max Peak	Vert	49.87	36.79	-35.4	0	51.3	74	22.7	1.00	3
7441.21	Average	Vert	37.29	36.79	-35.4	0.94	39.6	54	14.4	1.00	3
7441.24	Max Peak	Horz	49.51	36.79	-35.4	0	50.9	74	23.1	1.47	27
7441.24	Average	Horz	37.48	36.79	-35.4	0.94	39.8	54	14.2	1.47	27

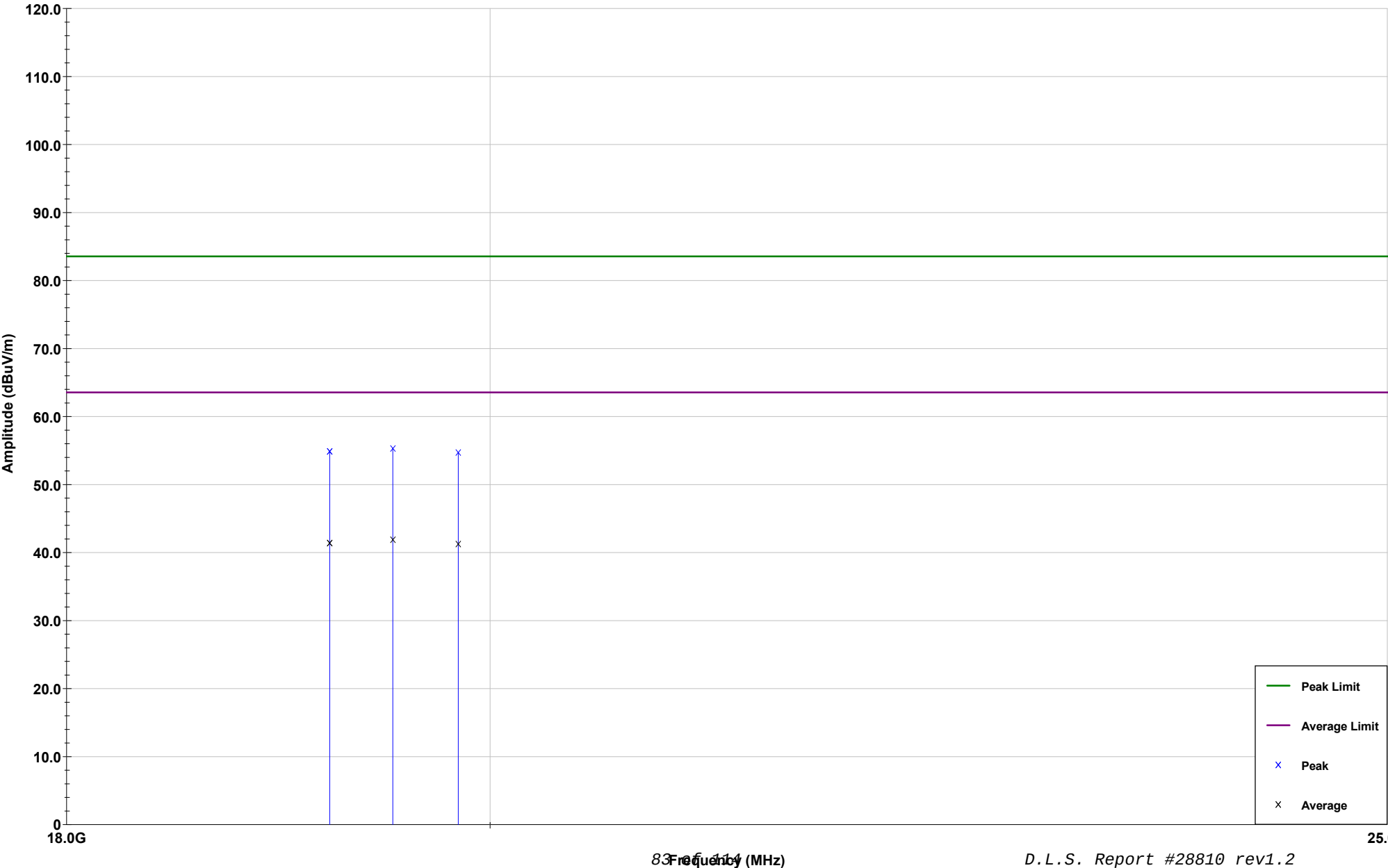
*Correction factor **added** to the maximum Average (linear voltage) detector measurement to show that, even with a 100% duty cycle, the EUT would comply with the Average limit.

DLS Electronic Systems, Inc.

Radiated Emissions - OATS

Vertical Graph

Limit/Distance - FCC Part 15.247 / 15.205 / 15.209 / 1-meter distance
Customer - Wilson Sporting Goods
EUT Info - QBID Ball Tag; DLS Proj. #13059
Voltage/Site - On-board single use battery (fully charged) / Site 2
Engineer - cbrandt
Notes - Restricted Band Emissions; Tx (94.5% duty cycle) L, M, H ch's; 1Mbps; pwr setting 0



Limit/Distance: FCC Part 15.247 / 15.205 / 15.209 / 1-meter distance

[illegible]

DLS Electronic Systems, Inc.

Radiated Emissions - OATS

Horizontal Graph

Limit/Distance - FCC Part 15.247 / 15.205 / 15.209 / 1-meter distance

Customer - Wilson Sporting Goods

EUT Info - QBID Ball Tag; DLS Proj. #13059

Voltage/Site - On-board single use battery (fully charged) / Site 2

Engineer - cbrandt

Notes - Restricted Band Emissions; Tx (94.5% duty cycle) L, M, H ch's; 1Mbps; pwr setting 0



12:02:23 PM, Friday, September 06, 2024

Limit/Distance: FCC Part 15.247 / 15.205 / 15.209 / 1-meter distance

Frequency (MHz)	Pk Limit (dBuV)	Raw Pk (dBuV)	Correction Factor	Corrected Pk (dBuV)	Margin Pk (dB)	Avg Limit (dBuV)	Raw Avg (dBuV)	Correctd Avg*(dBuV)	Margin Avg (dB)	Tower (M)	Turntable (D)	Notes
19217.940	83.540	52.998	2.77	55.76	27.78	63.540	40.50	43.745	19.795	1.490	335.000	Low ch
19521.980	83.540	53.724	2.89	56.62	26.92	63.540	40.36	43.735	19.805	1.490	330.000	Mid ch
19842.000	83.540	51.743	3.38	55.13	28.41	63.540	39.41	43.275	20.265	1.500	295.000	High ch

* Values also corrected by adding Duty Cycle Correction Factor of 0.48 dB

Limit/Distance - FCC Part 15.247 / 15.205 / 15.209 / 1-meter distance

Customer - Wilson Sporting Goods

EUT Info - QBID Ball Tag; DLS Proj. #13059

Voltage/Site - On-board single use battery (fully charged) / Site 2	12.6V / 12.6V
---	---------------

Engineer - cbrandt

Notes - Restricted Band Emissions; Tx (94.5% duty cycle) L, M, H ch's; 1Mbps; pwr setting 0

DLS Electronic Systems, Inc.

Radiated Emissions - OATS

Vertical Graph

Limit/Distance - FCC Part 15.247 / 15.205 / 15.209 / 1-meter distance

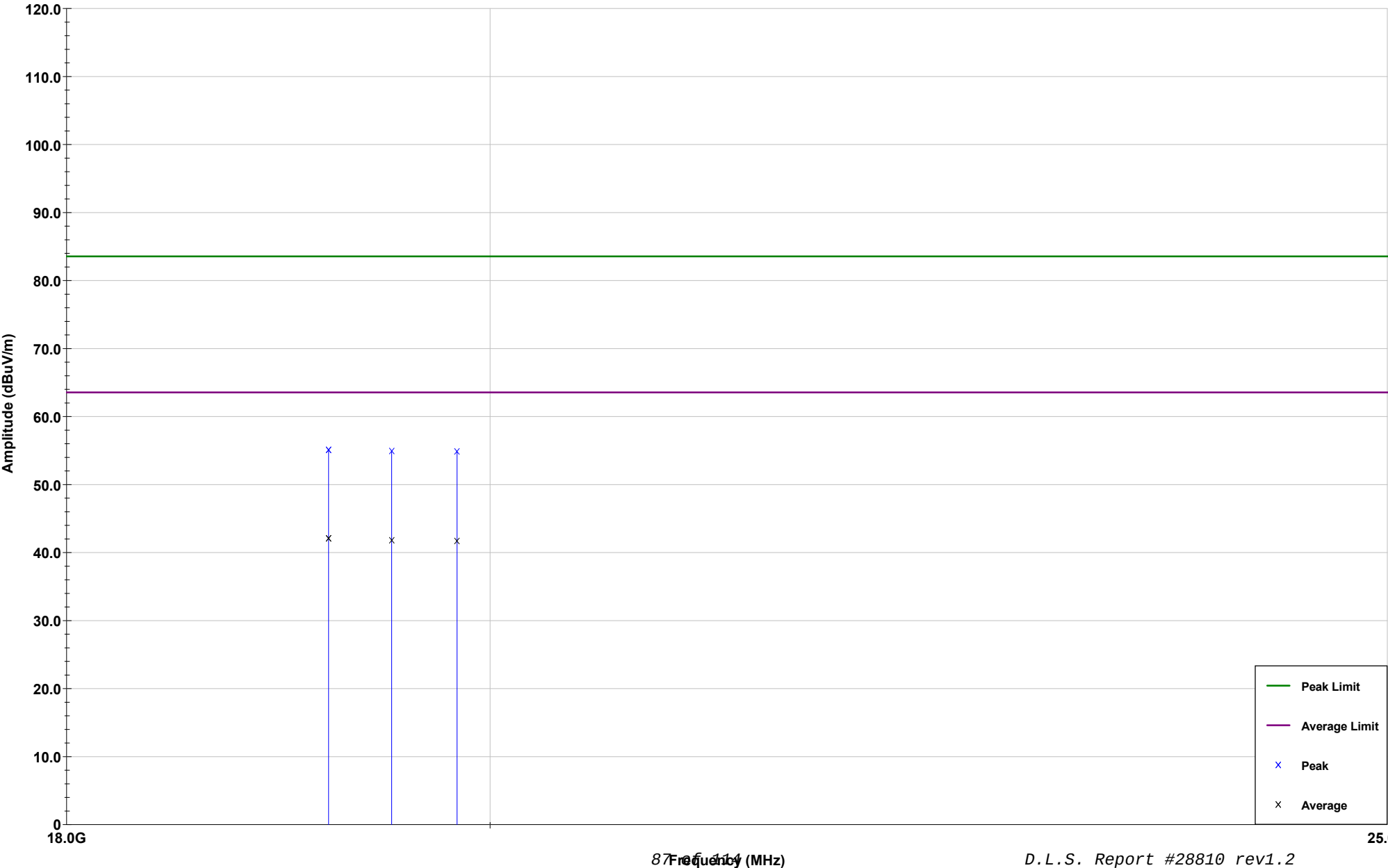
Customer - Wilson Sporting Goods

EUT Info - QBID Ball Tag; DLS Proj. #13059

Voltage/Site - On-board single use battery (fully charged) / Site 2

Engineer - cbrandt

Notes - Restricted Band Emissions; Tx (89.7% duty cycle) L, M, H ch's; 2Mbps; pwr setting 0



Limit/Distance: FCC Part 15.247 / 15.205 / 15.209 / 1-meter distance

[illegible]

DLS Electronic Systems, Inc.

Radiated Emissions - OATS

Horizontal Graph

Limit/Distance - FCC Part 15.247 / 15.205 / 15.209 / 1-meter distance

Customer - Wilson Sporting Goods

EUT Info - QBID Ball Tag; DLS Proj. #13059

Voltage/Site - On-board single use battery (fully charged) / Site 2

Engineer - cbrandt

Notes - Restricted Band Emissions; Tx (89.7% duty cycle) L, M, H ch's; 2Mbps; pwr setting 0



03:25:49 PM, Friday, September 06, 2024

Limit/Distance: FCC Part 15.247 / 15.205 / 15.209 / 1-meter distance

Frequency (MHz)	Pk Limit (dBuV)	Raw Pk (dBuV)	Correction Factor	Corrected Pk (dBuV)	Margin Pk (dB)	Avg Limit (dBuV)	Raw Avg (dBuV)	Corrected Avg*(dBuV)	Margin Avg (dB)	Tower (M)	Turntable (D)	Notes
19212.400	83.540	52.091	2.77	54.86	28.68	63.540	38.98	42.690	20.850	1.500	330.000	Low ch
19516.400	83.540	51.982	2.88	54.86	28.68	63.540	38.76	42.584	20.956	1.510	335.000	Mid ch
19836.400	83.540	50.831	3.37	54.20	29.34	63.540	37.91	42.221	21.319	1.450	300.000	High ch

* Values also corrected by adding Duty Cycle Correction Factor of 0.94 dB

Limit/Distance	FCC Part 15.247 / 15.205 / 15.209 / 1-meter distance
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Customer - Wilson Sporting Goods		
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EUT Info - QBID Ball Tag; DLS Proj. #13059

Voltage/Site - On-board single use battery (fully charged) / Site 2

Engineer - cbrandt	
--------------------	--

Notes - Restricted Band Emissions; Tx (89.7% duty cycle) L, M, H ch's; 2Mbps; pwr setting 0



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

A7.0 Authorized Band Edge – RF Conducted

Rule Part:

Section 15.247(d)

Test Procedure:

ANSI C63.10-2020, Section 6.10.4

Authorized-band band-edge measurements (relative method).

Limit:

20 dB down from the highest emission level within the authorized band as measured with a 100 kHz resolution bandwidth (RBW).

Results:

Compliant

Notes:

The test software was set to transmit a modulated signal at 94.6% duty cycle in 1 Mbps mode and 89.7% duty cycle in 2 Mbps mode. This test was performed using the RF Conducted test configuration. The EUT was tested at the low and high channels of operation. The maximum level of the fundamental emission was measured with a span wide enough to capture the peak level of the emission as well as any modulation products that fell outside of the operating band. The marker-delta function of the spectrum analyzer was used to show that the level at the band-edge (including all modulation product outside of the authorized band) are greater than 20 dB below the peak level of the fundamental emission.



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

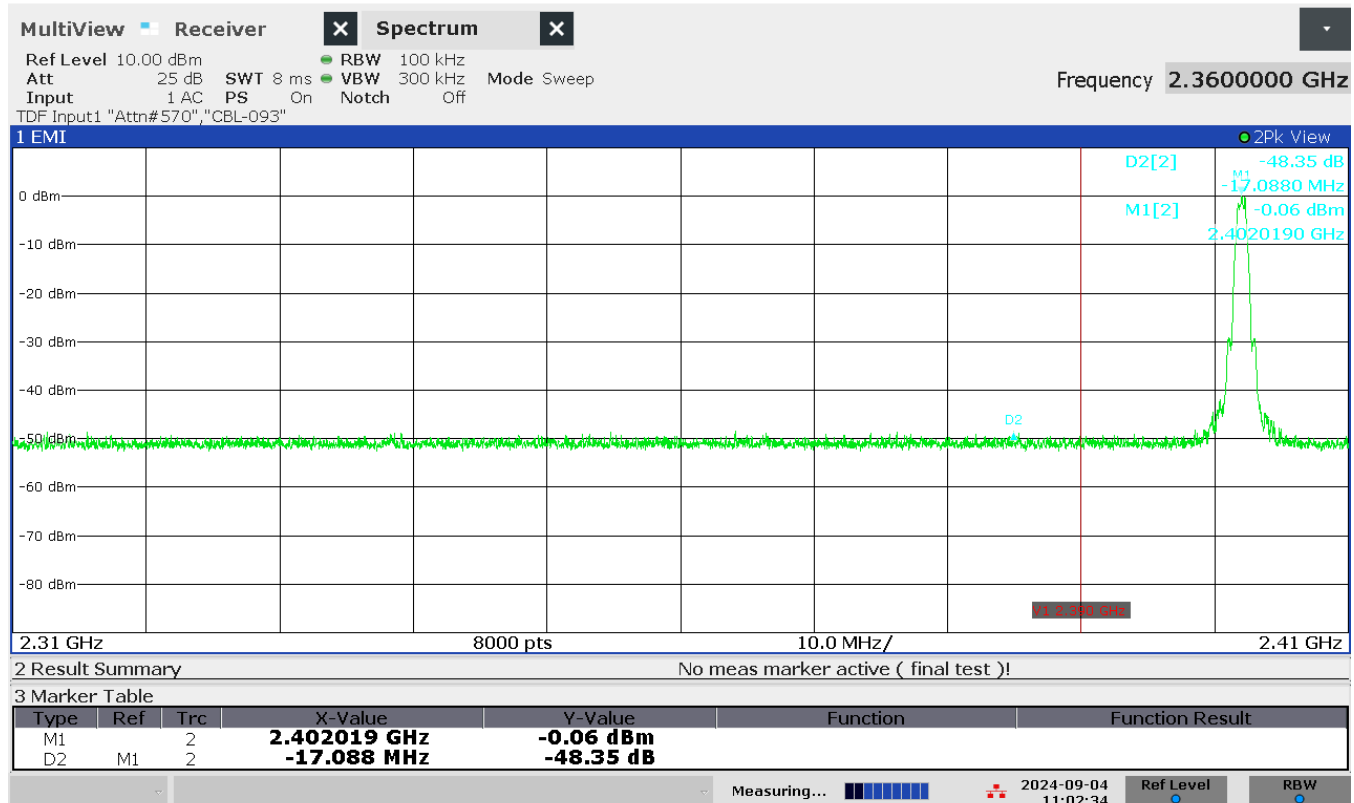
A7.1 Authorized Band Edge – RF Conducted – 1 Mbps

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Lower Bandedge Compliance – RF Conducted
Operator: cbrandt
Detector: Peak; max hold
Comment: Data rate: 1 Mbps
Low Channel: 2402 MHz

Bandedge Frequency = 2.4 GHz

Limit at Bandedge > 20 dB below Peak In-Band Emission

Emission at Bandedge is **48.35 dB** below the Peak in-band emission.



11:02:34 AM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

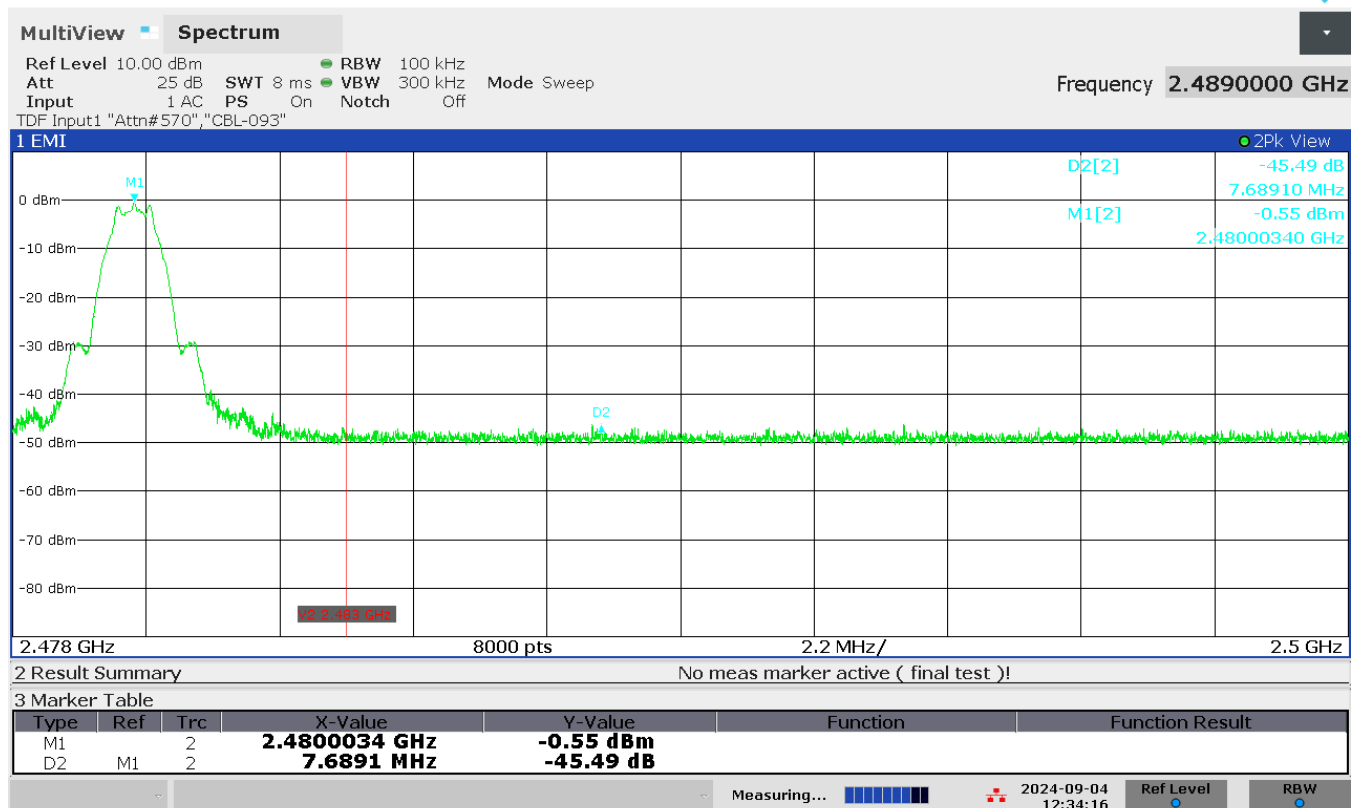
Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Upper Bandedge Compliance – RF Conducted
Operator: cbrandt
Detector: Peak; max hold
Comment: Data rate: 1 Mbps
High Channel: 2480 MHz

Bandedge Frequency = 2.4835 GHz

Limit at Bandedge > 20 dB below Peak In-Band Emission

Emission at Bandedge is **45.49 dB** below the Peak in-band emission.



12:34:16 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

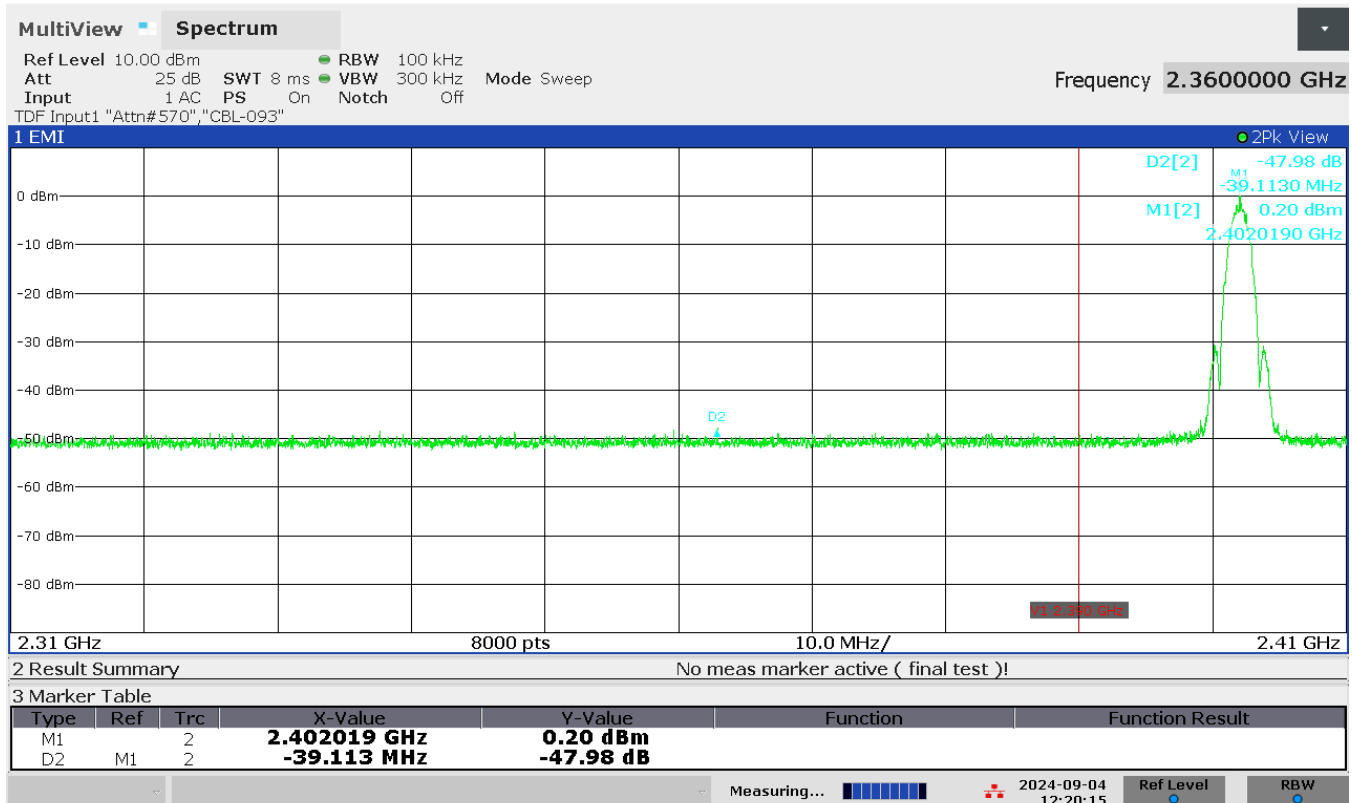
A7.2 Authorized Band Edge – RF Conducted – 2 Mbps

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Lower Bandedge Compliance – RF Conducted
Operator: cbrandt
Detector: Peak; max hold
Comment: Data rate: 2 Mbps
Low Channel: 2402 MHz

Bandedge Frequency = 2.4 GHz

Limit at Bandedge > 20 dB below Peak In-Band Emission

Emission at Bandedge is **47.98 dB** below the Peak in-band emission.



12:20:15 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

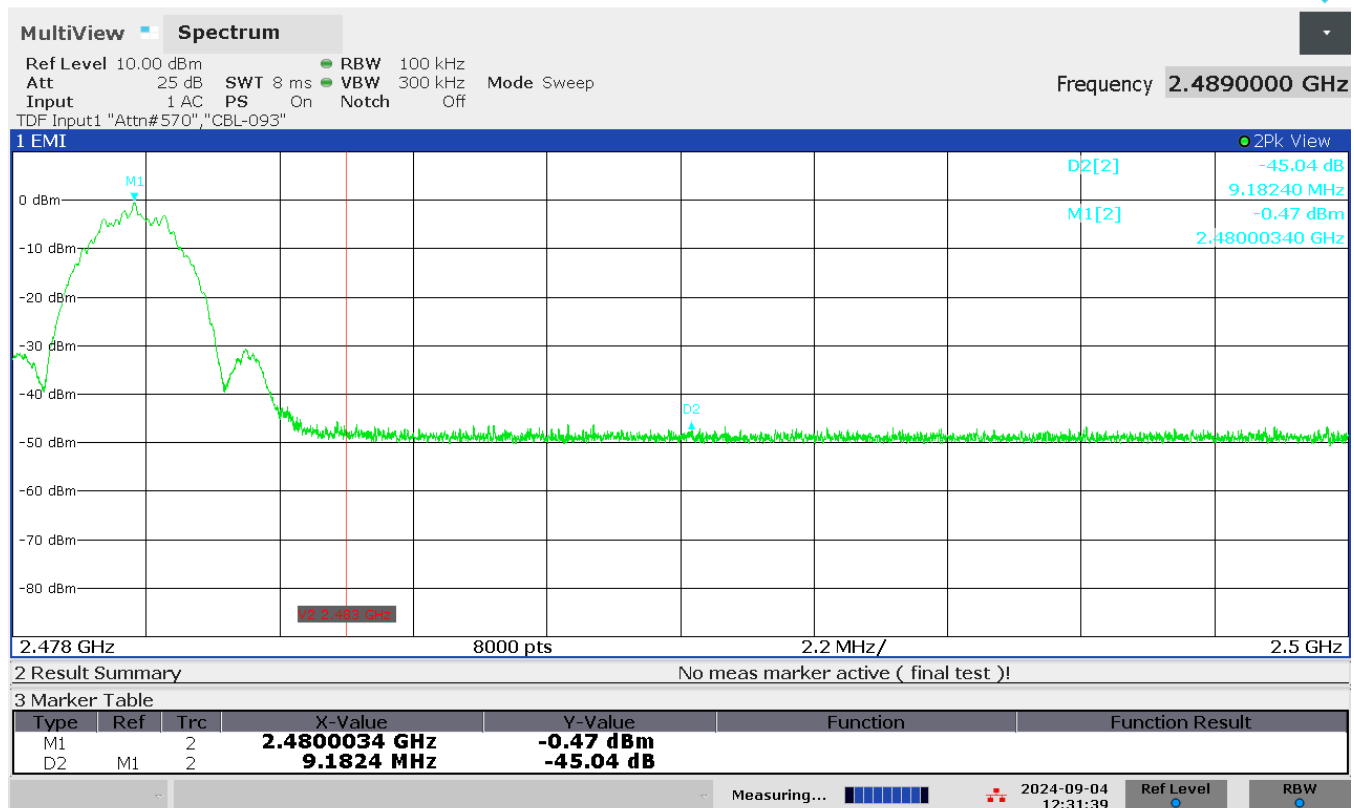
Section A

Test Date: 09-04-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Upper Bandedge Compliance – RF Conducted
Operator: cbrandt
Detector: Peak; max hold
Comment: Data rate: 2 Mbps
High Channel: 2480 MHz

Bandedge Frequency = 2.4835 GHz

Limit at Bandedge > 20 dB below Peak In-Band Emission

Emission at Bandedge is **45.04 dB** below the Peak in-band emission.



12:31:39 PM 09/04/2024



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

A8.0 Restricted Band Edge – Radiated

Rule Part:

Sections 15.247(d), 15.205(b), and 15.209(a)

Test Procedure:

ANSI C63.10-2020, Section 6.10.5
Restricted-band band-edge measurements.

Limit:

Table in FCC 15.209

Results:

Compliant

Notes:

This was a Radiated Emissions test. The EUT was tested while transmitting from the on-board chip antenna. The device was set up on a non-conductive table for testing purposes.

The test software was set to transmit a modulated signal at 94.6% duty cycle in 1 Mbps mode and 89.7% duty cycle in 2 Mbps mode. The EUT was tested at the low and high channels of operation and was rotated through three orthogonal axes to find worst-case emission levels. The worst-case maximum field strength levels at the band edges (including all modulation products outside of the authorized band) were measured and recorded.



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

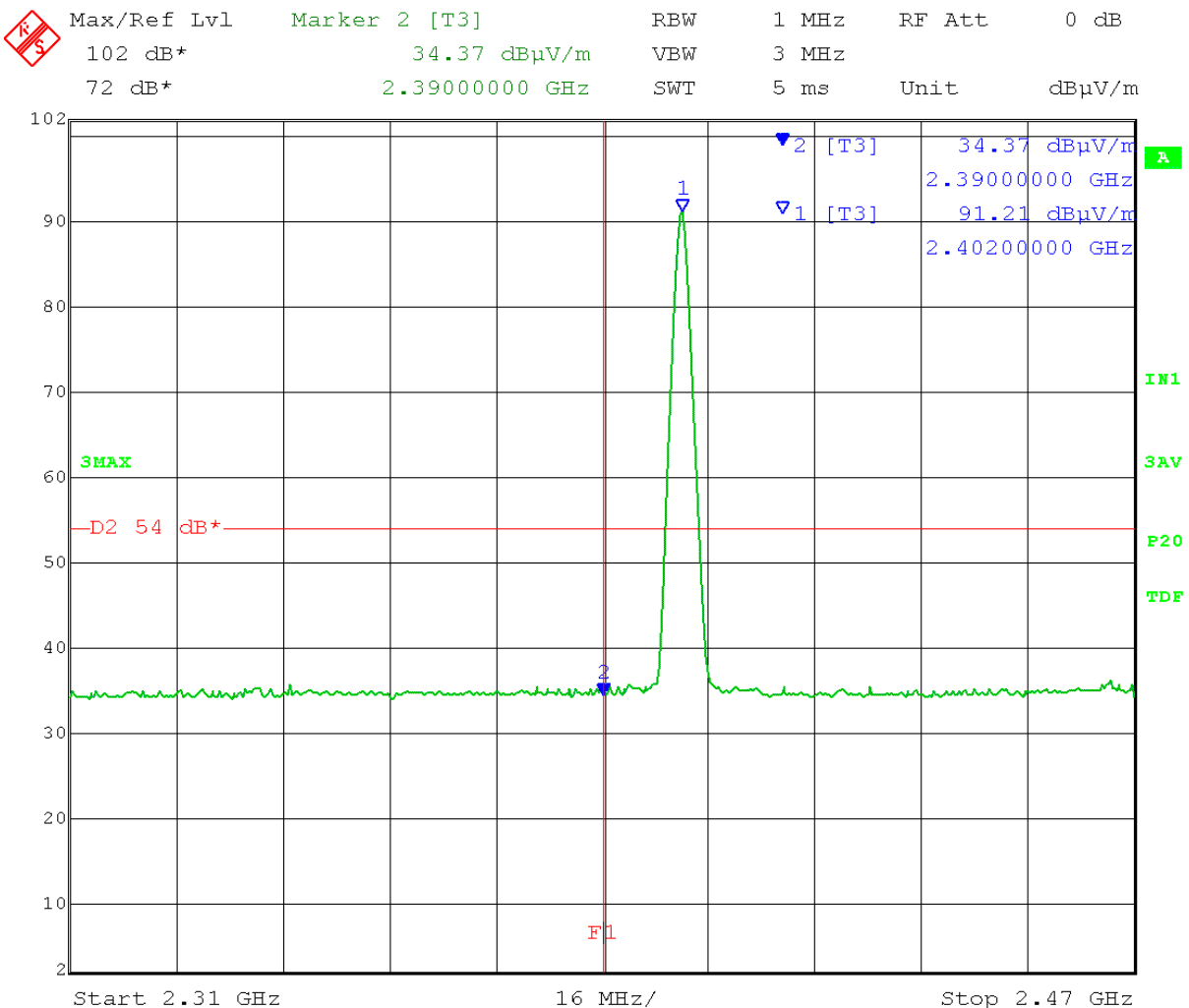
A8.1 Restricted Band Edge – Radiated – 1 Mbps

Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Lower Restricted Bandedge (2390 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 1 Mbps
Low Channel: 2402 MHz

Test Distance: 3 meters

Detector: Linear Average; Duty Cycle Correction = 0.48 dB

VERTICAL: Average = $34.37 \text{ dB}\mu\text{V/m} + 0.48 \text{ dB (duty cycle cor.)} = 34.85 \text{ dB}\mu\text{V/m}$
AVERAGE: Limit: $54 \text{ dB}\mu\text{V/m}$ at 3 meters



Date: 5.OCT.2024 13:49:59



166 South Carter, Genoa City, WI 53128

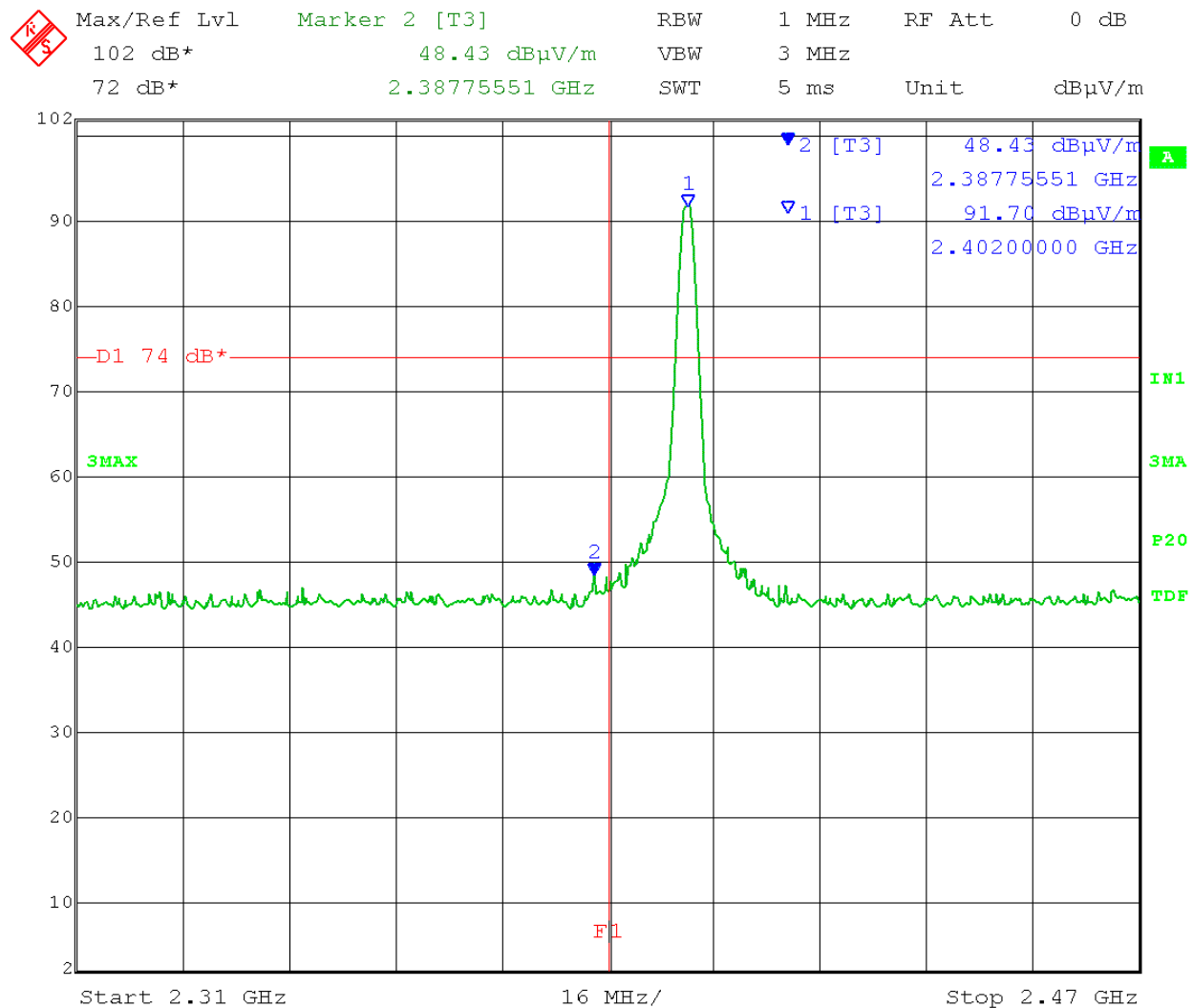
Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Lower Restricted Bandedge (2390 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 1 Mbps
Low Channel: 2402 MHz
Test Distance: 3 meters
Detector: Max-Peak

VERTICAL: Peak = **48.43 dB μ V/m**
PEAK: Limit: 74 dB μ V/m at 3 meters



Date: 5.OCT.2024 13:51:49



166 South Carter, Genoa City, WI 53128

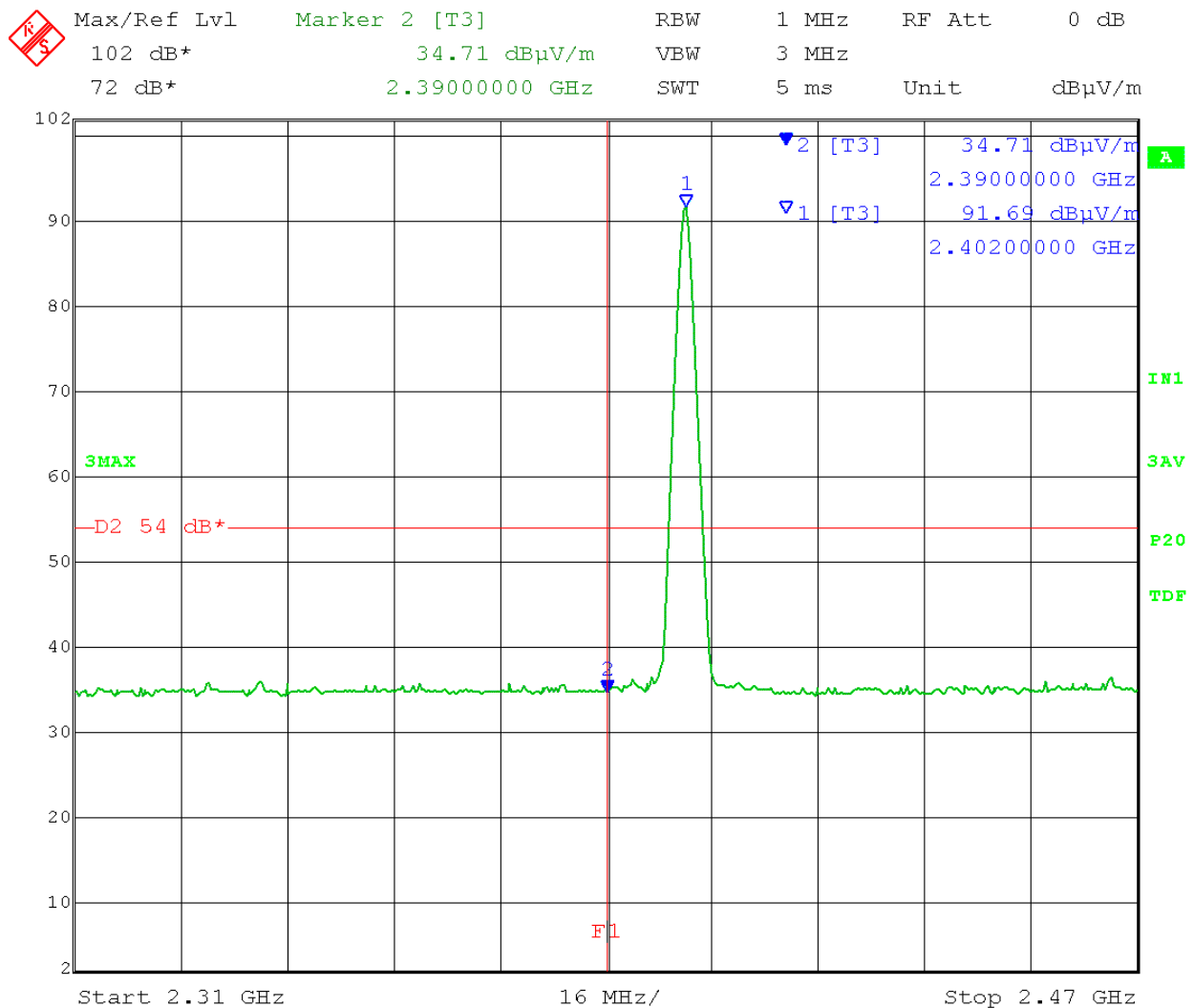
Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Lower Restricted Bandedge (2390 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 1 Mbps
Low Channel: 2402 MHz
Test Distance: 3 meters
Detector: Linear Average; Duty Cycle Correction = 0.48 dB

HORIZONTAL: Average = 34.71 dBμV/m + 0.48 dB (duty cycle cor.) = **35.19 dBμV/m**
AVERAGE: Limit: 54 dBμV/m at 3 meters



Date: 5.OCT.2024 14:21:29



166 South Carter, Genoa City, WI 53128

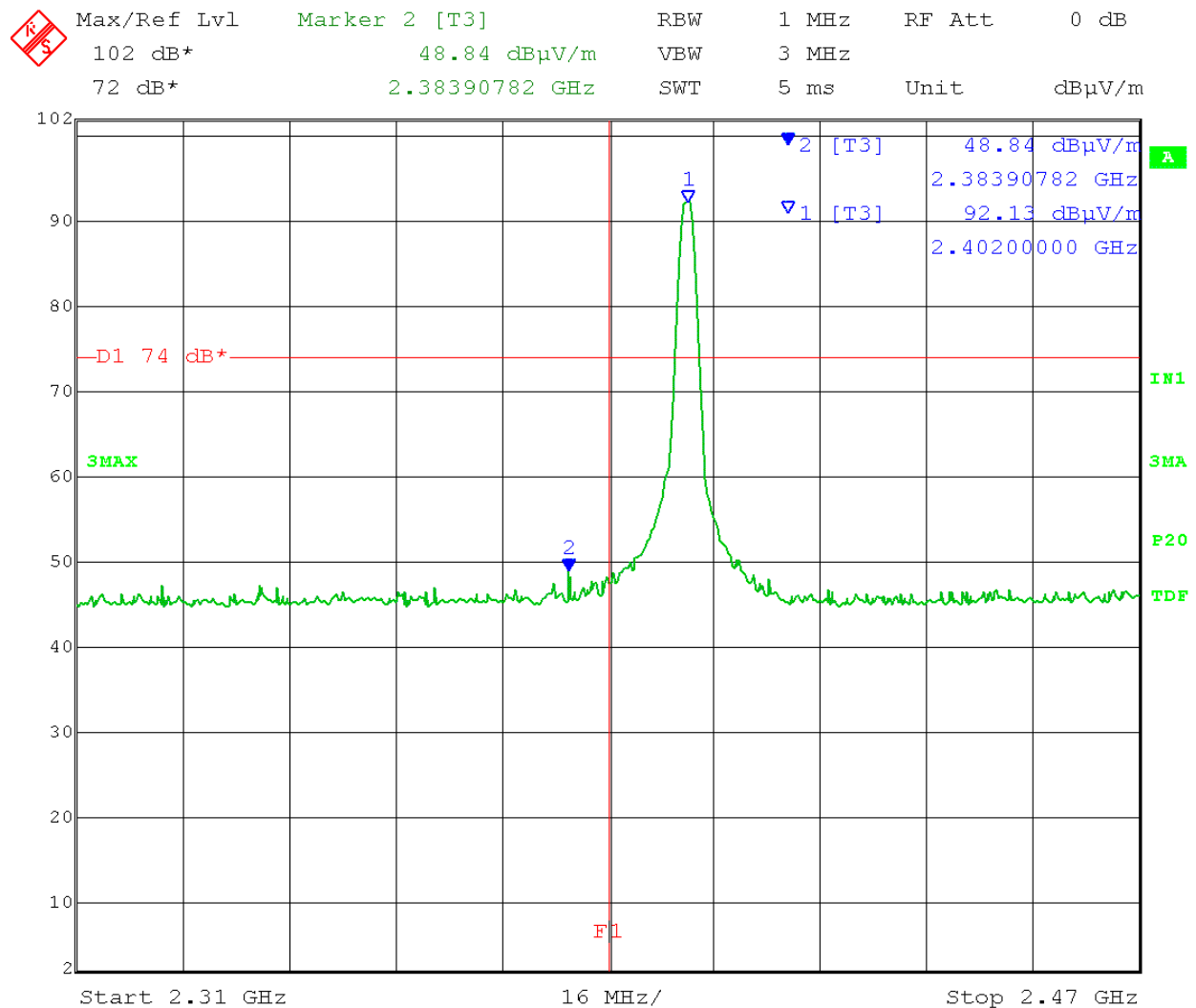
Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Lower Restricted Bandedge (2390 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 2 Mbps
Low Channel: 2402 MHz
Test Distance: 3 meters
Detector: Max-Peak

HORIZONTAL: Peak = **48.84 dB μ V/m**
PEAK: Limit: 74 dB μ V/m at 3 meters



Date: 5.OCT.2024 14:23:58



166 South Carter, Genoa City, WI 53128

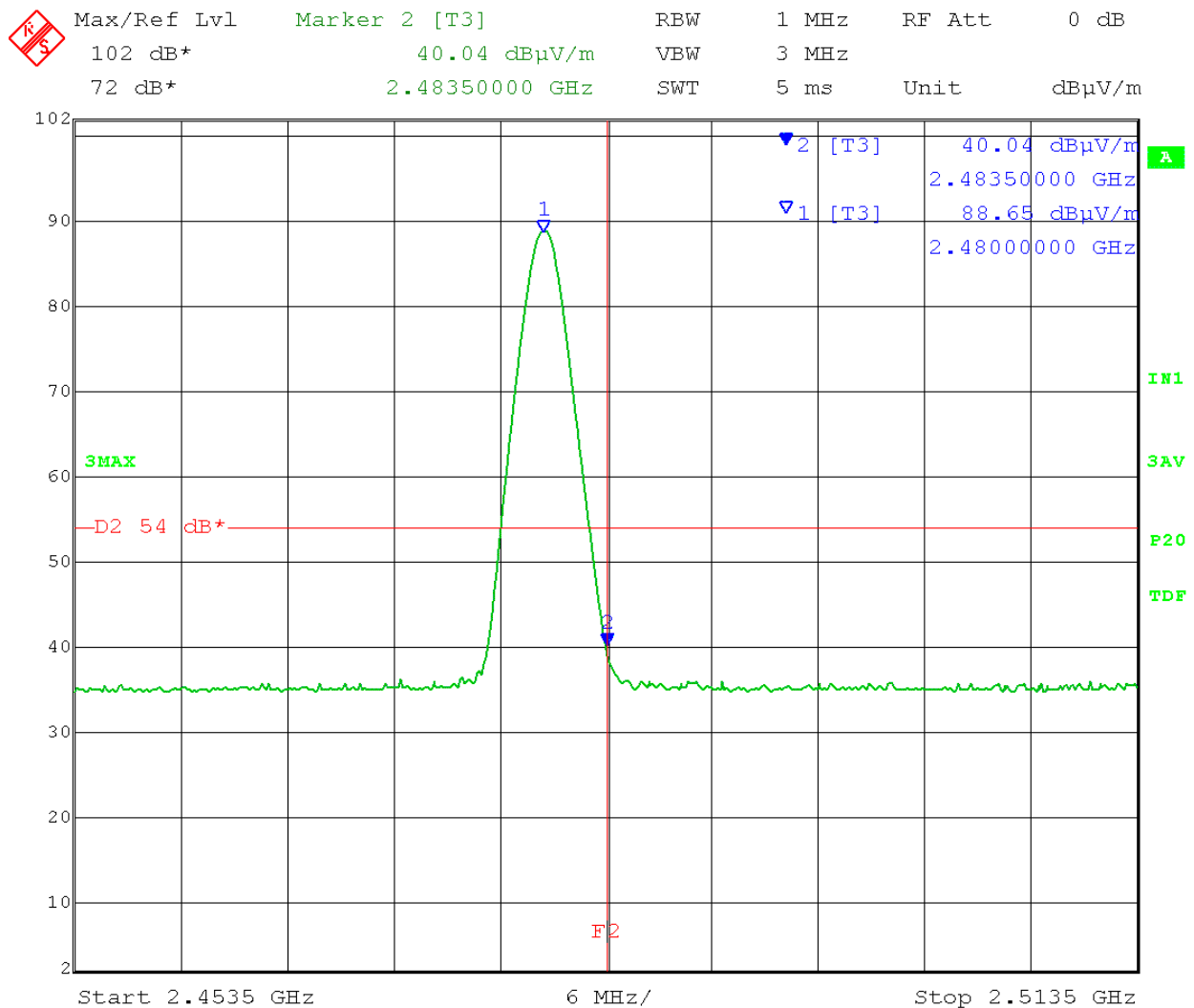
Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
MSC1392_ASSY Rev B
13059
28810 rev1.2

Section A

Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Upper Restricted Bandedge (2483.5 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 1 Mbps
High Channel: 2480 MHz
Test Distance: 3 meters
Detector: Linear Average; Duty Cycle Correction = 0.48 dB

VERTICAL: Average = 40.04 dBμV/m + 0.48 dB (duty cycle cor.) = **40.52 dBμV/m**
AVERAGE: Limit: 54 dBμV/m at 3 meters



Date: 5.OCT.2024 12:56:57



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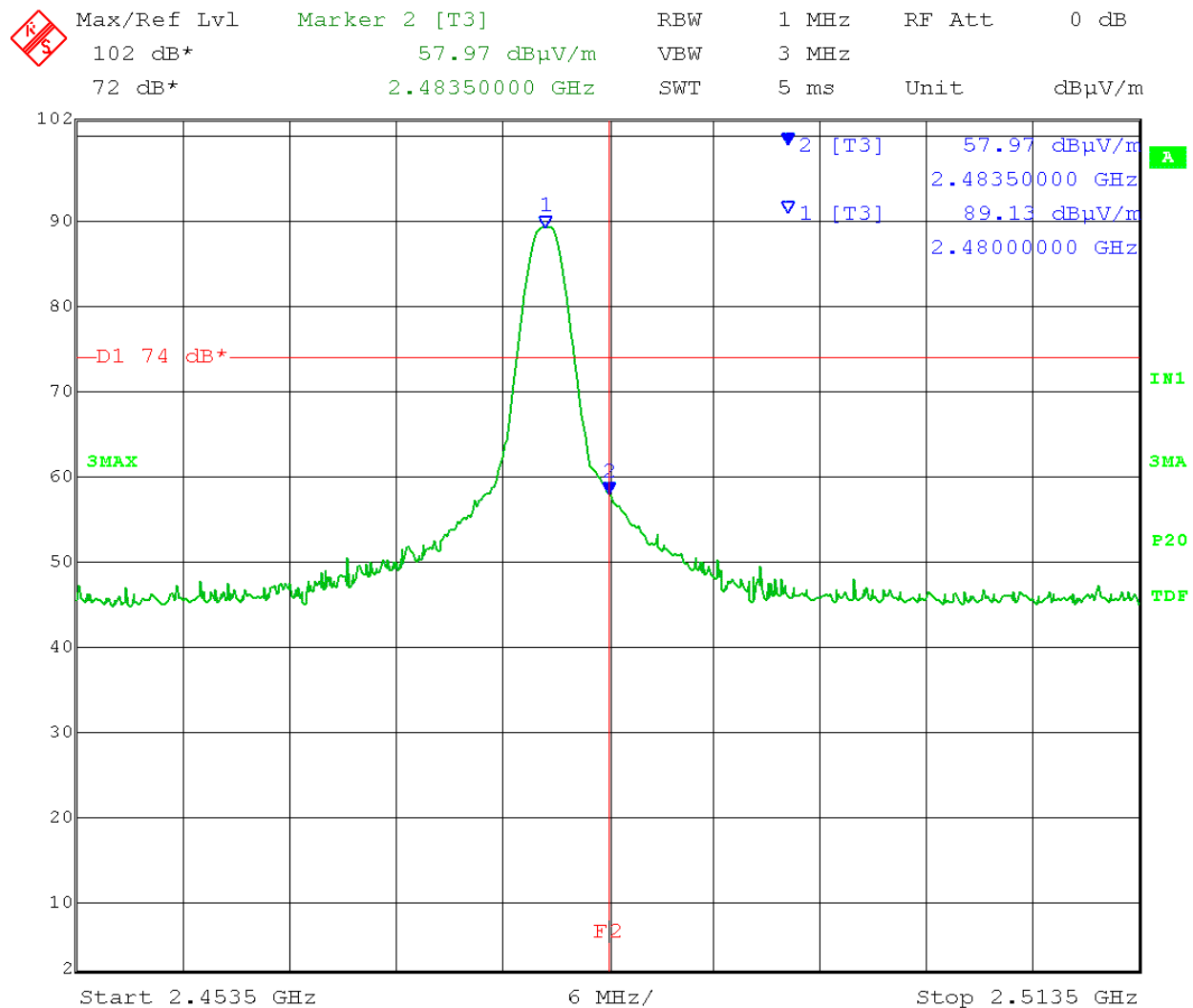
Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
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28810 rev1.2

Section A

Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Upper Restricted Bandedge (2483.5 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 1 Mbps
High Channel: 2480 MHz
Test Distance: 3 meters
Detector: Max-Peak

VERTICAL: Peak = 57.97 dB μ V/m
PEAK: Limit: 74 dB μ V/m at 3 meters



Date: 5.OCT.2024 12:59:08



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Company:
Model Tested:
Project Number:
Report Number:

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Section A

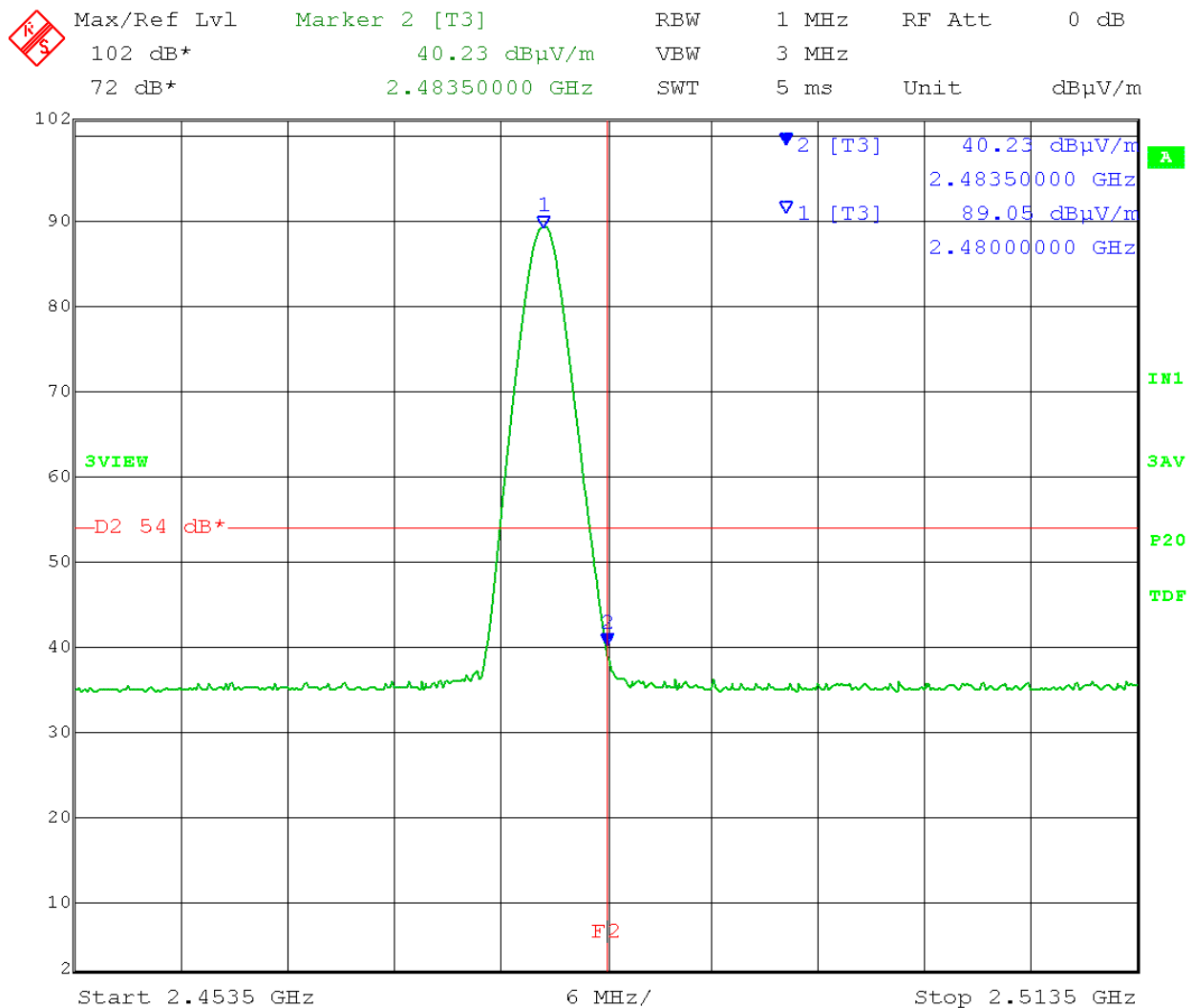
Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Upper Restricted Bandedge (2483.5 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 1 Mbps
High Channel: 2480 MHz

Test Distance: 3 meters

Detector: Linear Average; Duty Cycle Correction = 0.48 dB

HORIZONTAL: Average = 40.23 dB μ V/m + 0.48 dB (duty cycle cor.) = **40.71 dB μ V/m**

AVERAGE: Limit: 54 dB μ V/m at 3 meters



Date: 5.OCT.2024 12:16:27



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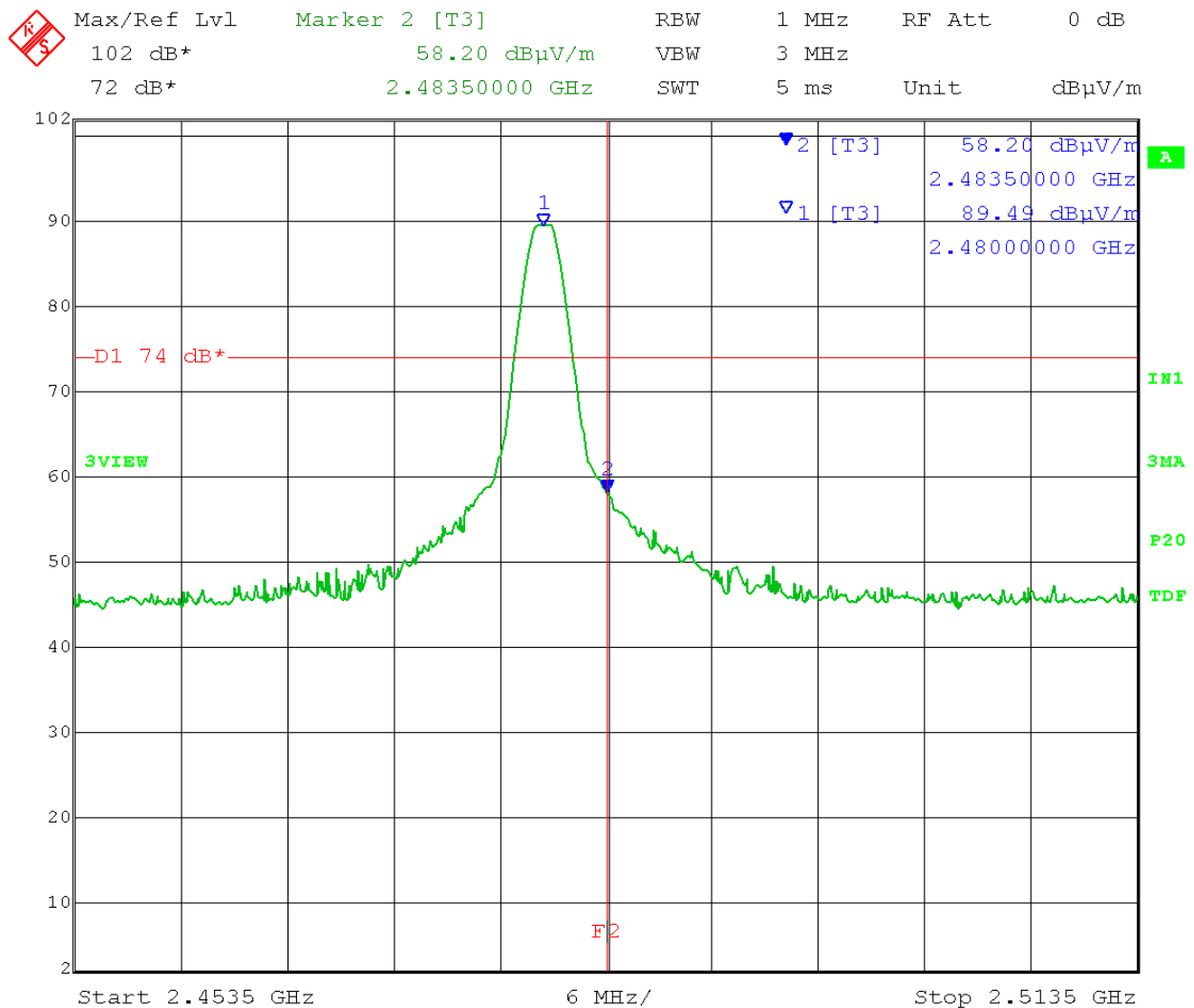
Company:
Model Tested:
Project Number:
Report Number:

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Section A

Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Upper Restricted Bandedge (2483.5 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 1 Mbps
High Channel: 2480 MHz
Test Distance: 3 meters
Detector: Max-Peak

HORIZONTAL: Peak = **58.20** dB μ V/m
PEAK: Limit: 74 dB μ V/m at 3 meters



Date: 5.OCT.2024 12:15:30



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Company:
Model Tested:
Project Number:
Report Number:

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Section A

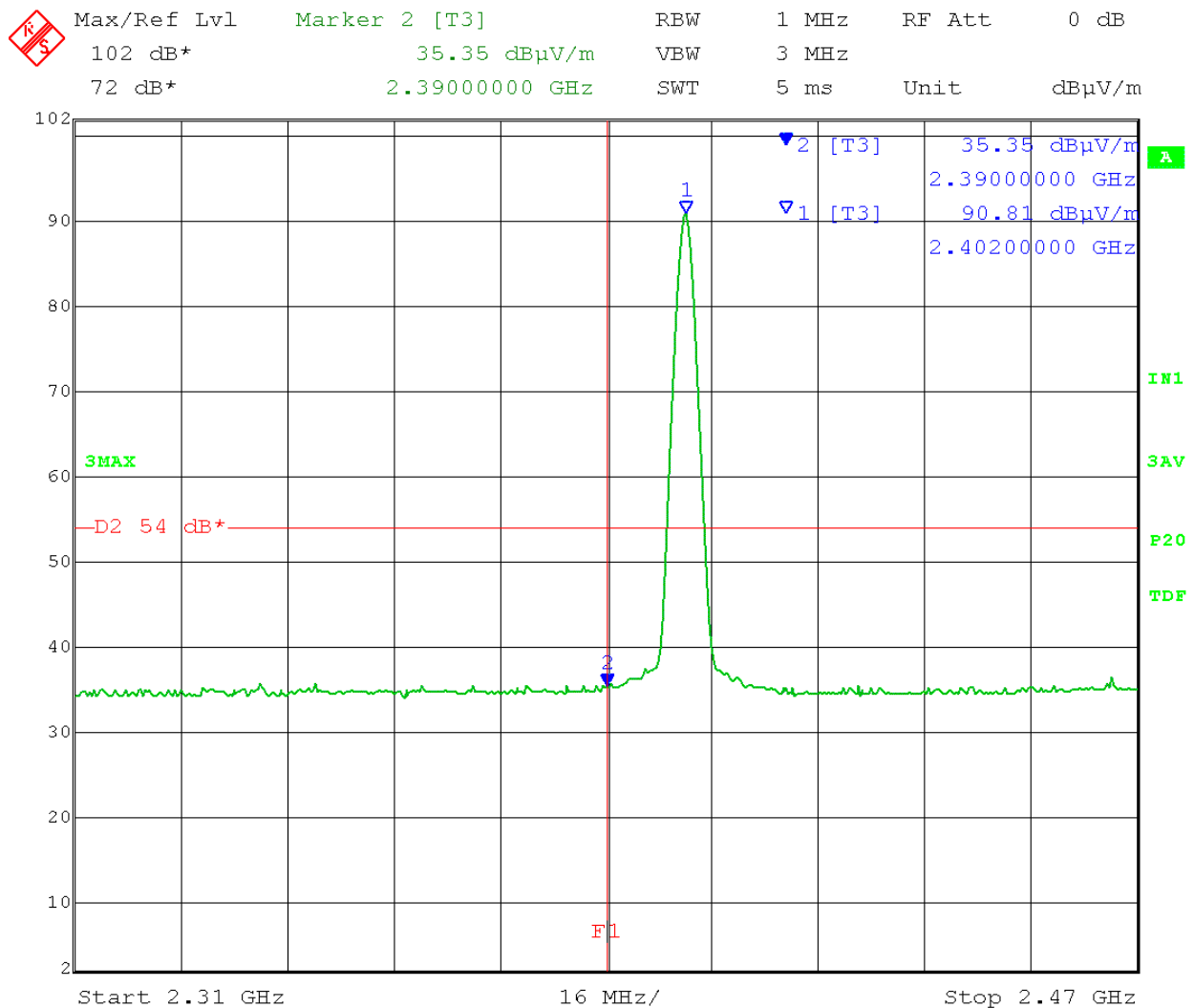
A8.2 Restricted Band Edge – Radiated – 2 Mbps

Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Lower Restricted Bandedge (2390 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 2 Mbps
Low Channel: 2402 MHz

Test Distance: 3 meters

Detector: Linear Average; Duty Cycle Correction = 0.94dB

VERTICAL: Average = $35.35 \text{ dB}\mu\text{V/m} + 0.94 \text{ dB (duty cycle cor.)} = 36.29 \text{ dB}\mu\text{V/m}$
AVERAGE: Limit: $54 \text{ dB}\mu\text{V/m}$ at 3 meters



Date: 5.OCT.2024 13:58:58



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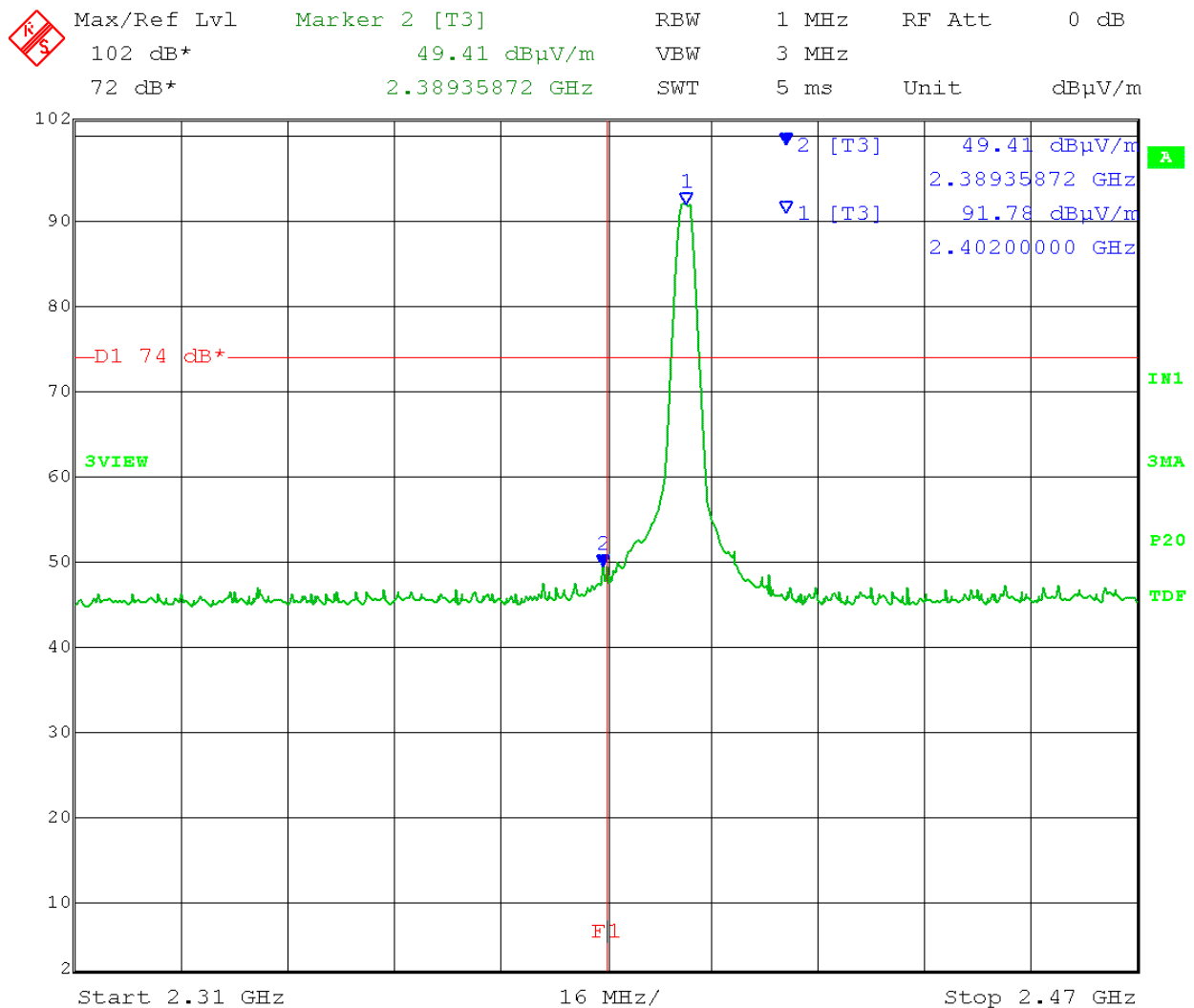
Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
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Section A

Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Lower Restricted Bandedge (2390 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 2 Mbps
Low Channel: 2402 MHz
Test Distance: 3 meters
Detector: Max-Peak

VERTICAL: Peak = **49.41 dB μ V/m**
PEAK: Limit: 74 dB μ V/m at 3 meters



Date: 5.OCT.2024 14:02:16



166 South Carter, Genoa City, WI 53128

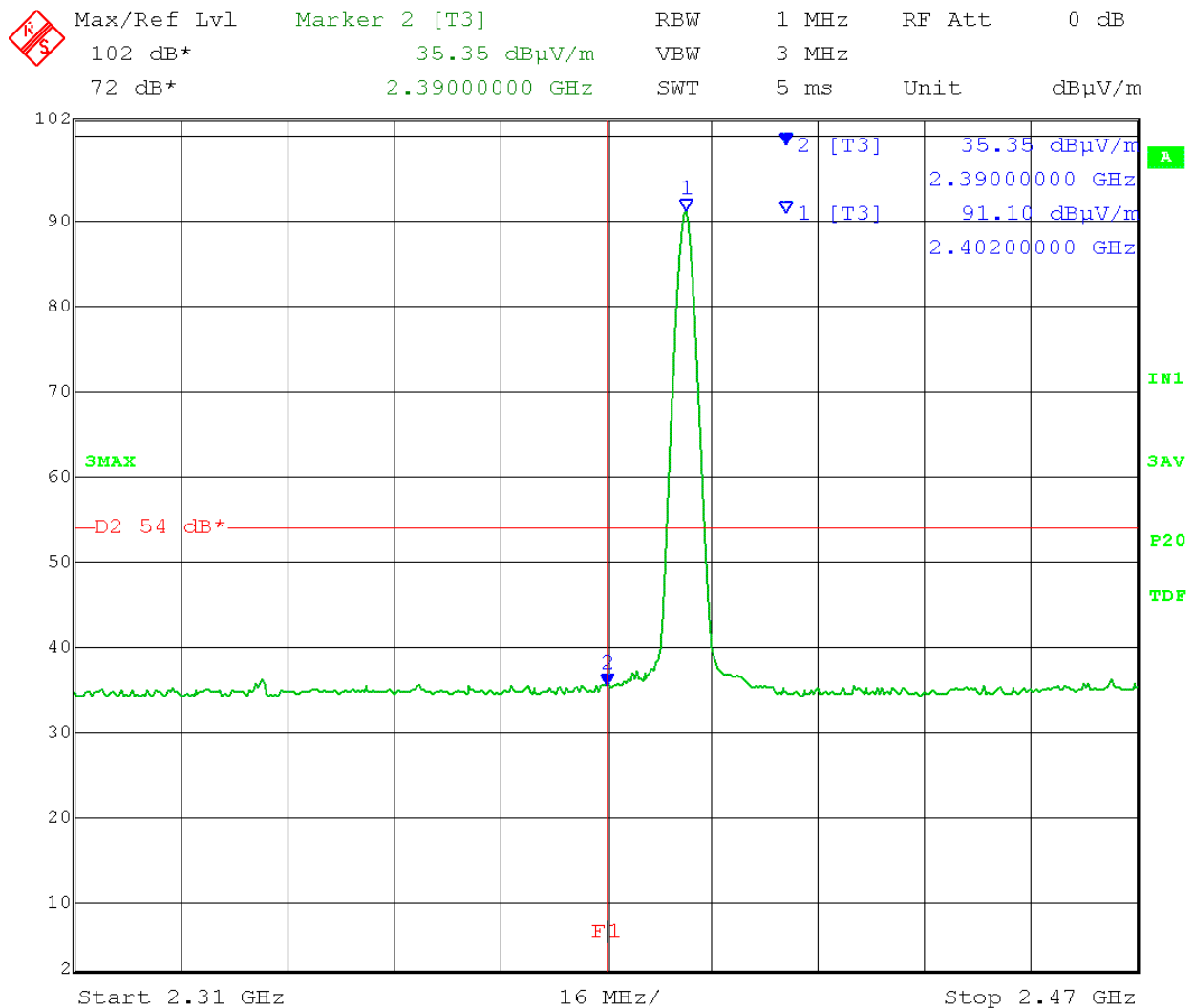
Company:
Model Tested:
Project Number:
Report Number:

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Section A

Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Lower Restricted Bandedge (2390 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 2 Mbps
Low Channel: 2402 MHz
Test Distance: 3 meters
Detector: Linear Average; Duty Cycle Correction = 0.94dB

HORIZONTAL: Average = 35.35 dBμV/m + 0.94 dB (duty cycle cor.) = **36.29 dBμV/m**
AVERAGE: Limit: 54 dBμV/m at 3 meters



Date: 5.OCT.2024 14:12:29



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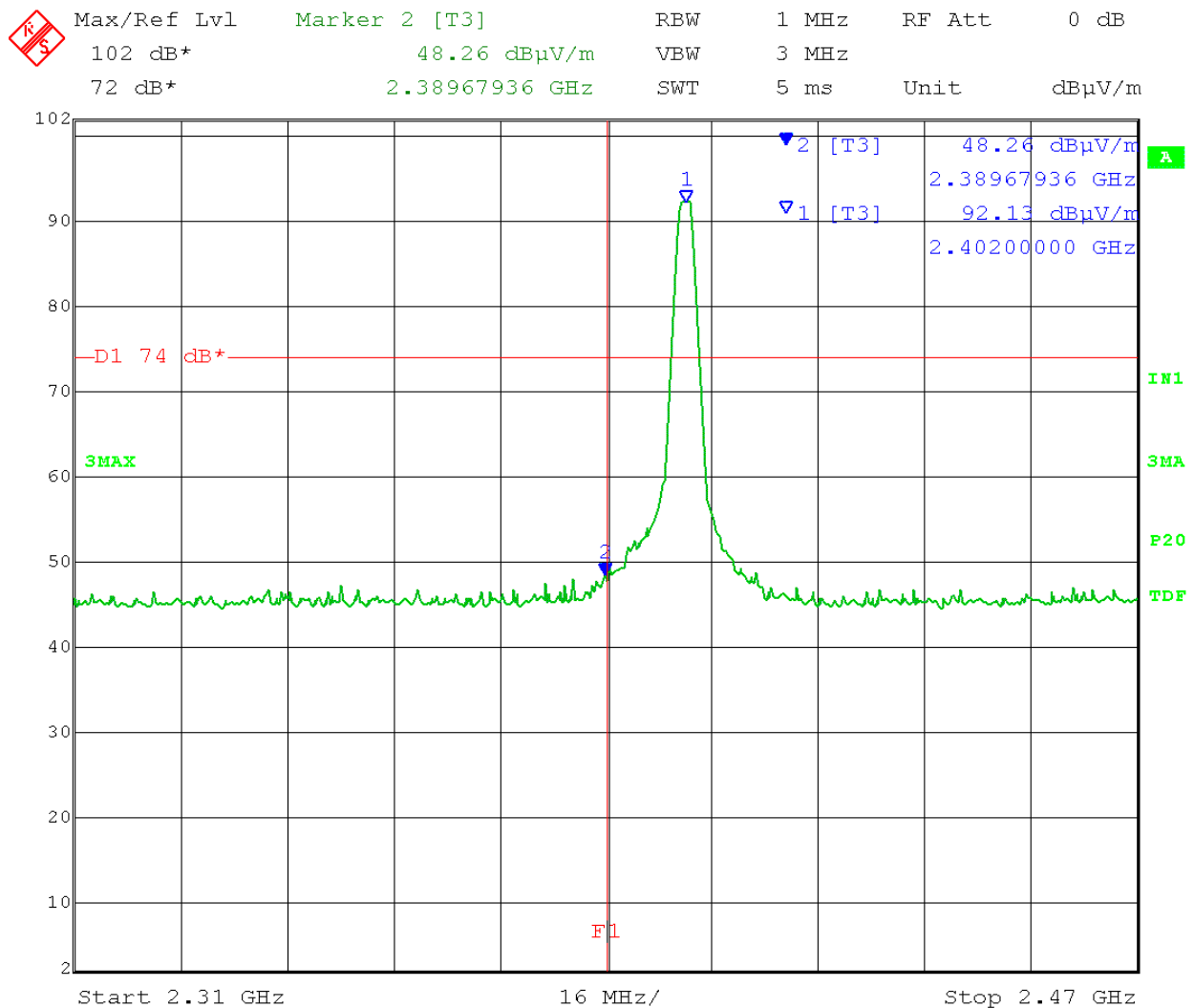
Company:
Model Tested:
Project Number:
Report Number:

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Section A

Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Lower Restricted Bandedge (2390 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 2 Mbps
Low Channel: 2402 MHz
Test Distance: 3 meters
Detector: Max-Peak

HORIZONTAL: Peak = **48.26 dB μ V/m**
PEAK: Limit: 74 dB μ V/m at 3 meters



Date: 5.OCT.2024 14:14:00



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Company:
Model Tested:
Project Number:
Report Number:

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Section A

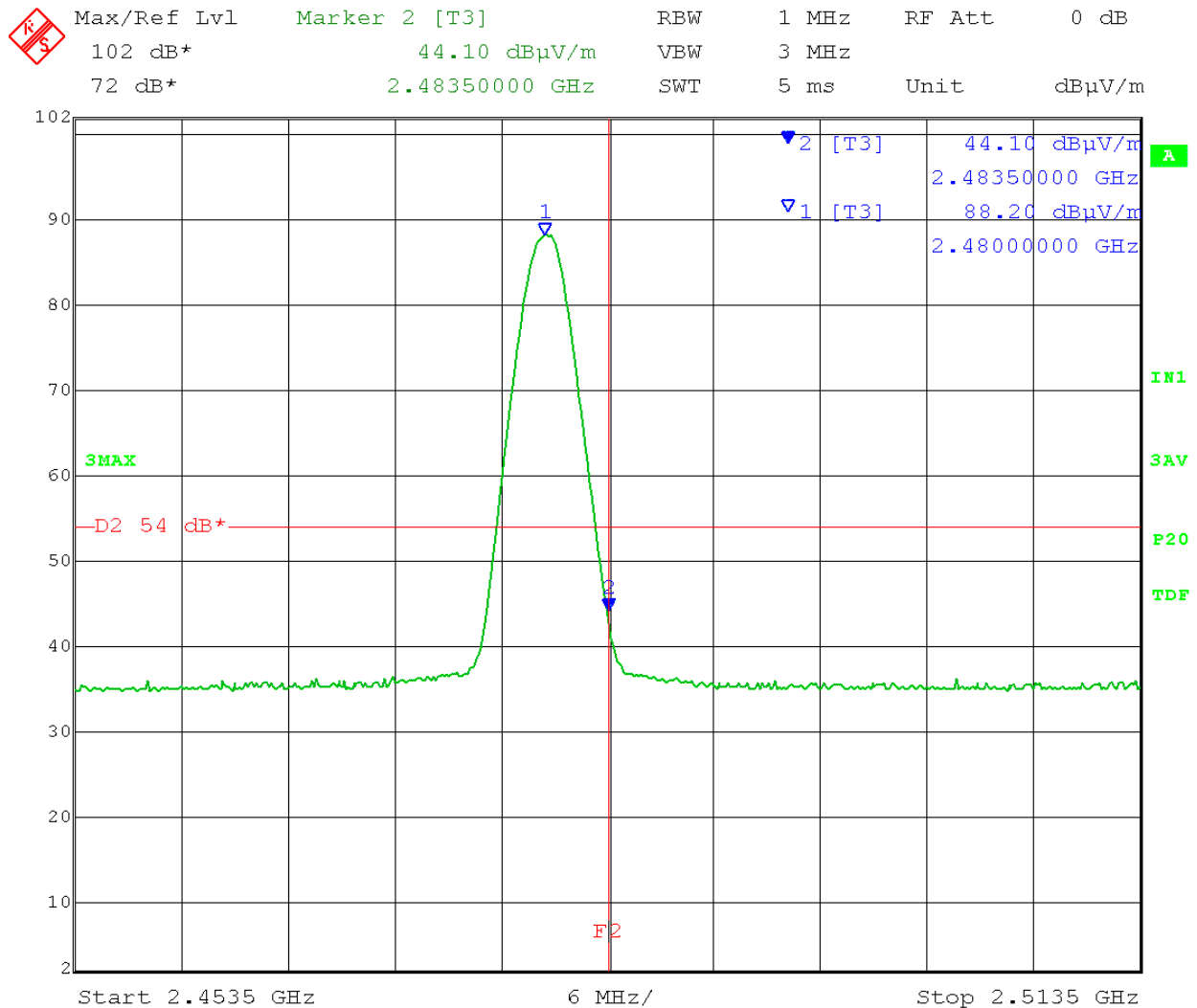
Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Upper Restricted Bandedge (2483.5 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 2 Mbps
High Channel: 2480 MHz

Test Distance: 3 meters

Detector: Linear Average; Duty Cycle Correction = 0.94 dB

VERTICAL: Average = $44.10 \text{ dB}\mu\text{V/m} + 0.94 \text{ dB (duty cycle cor.)} = 45.04 \text{ dB}\mu\text{V/m}$

AVERAGE: Limit: 54 dB $\mu\text{V/m}$ at 3 meters



Date: 5.OCT.2024 12:47:43



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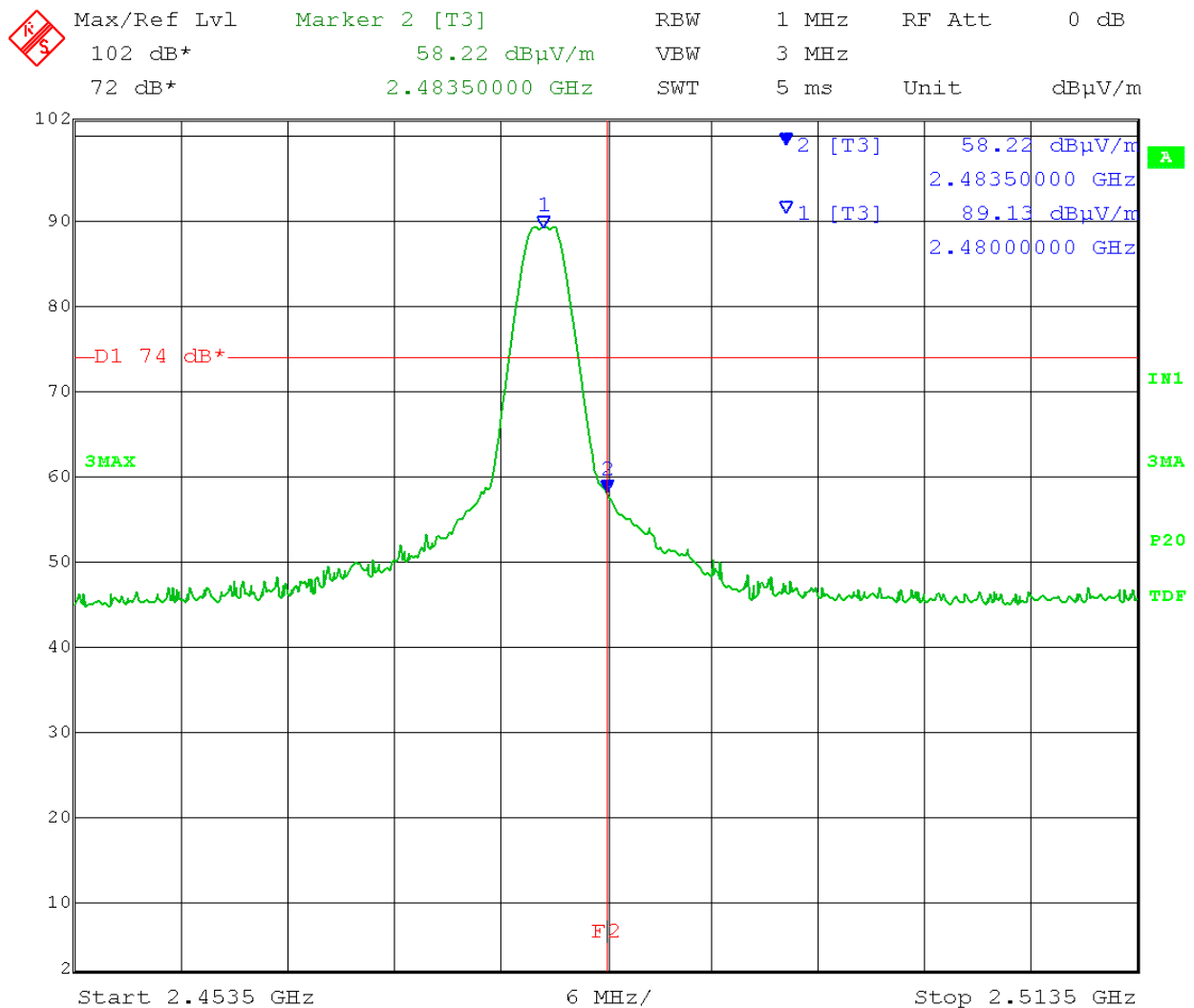
Company:
Model Tested:
Project Number:
Report Number:

Wilson Sporting Goods Co.
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Section A

Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Upper Restricted Bandedge (2483.5 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 2 Mbps
High Channel: 2480 MHz
Test Distance: 3 meters
Detector: Max-Peak

VERTICAL: Peak = **58.22 dB μ V/m**
PEAK: Limit: 74 dB μ V/m at 3 meters



Date: 5.OCT.2024 12:49:17



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Company:
Model Tested:
Project Number:
Report Number:

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Section A

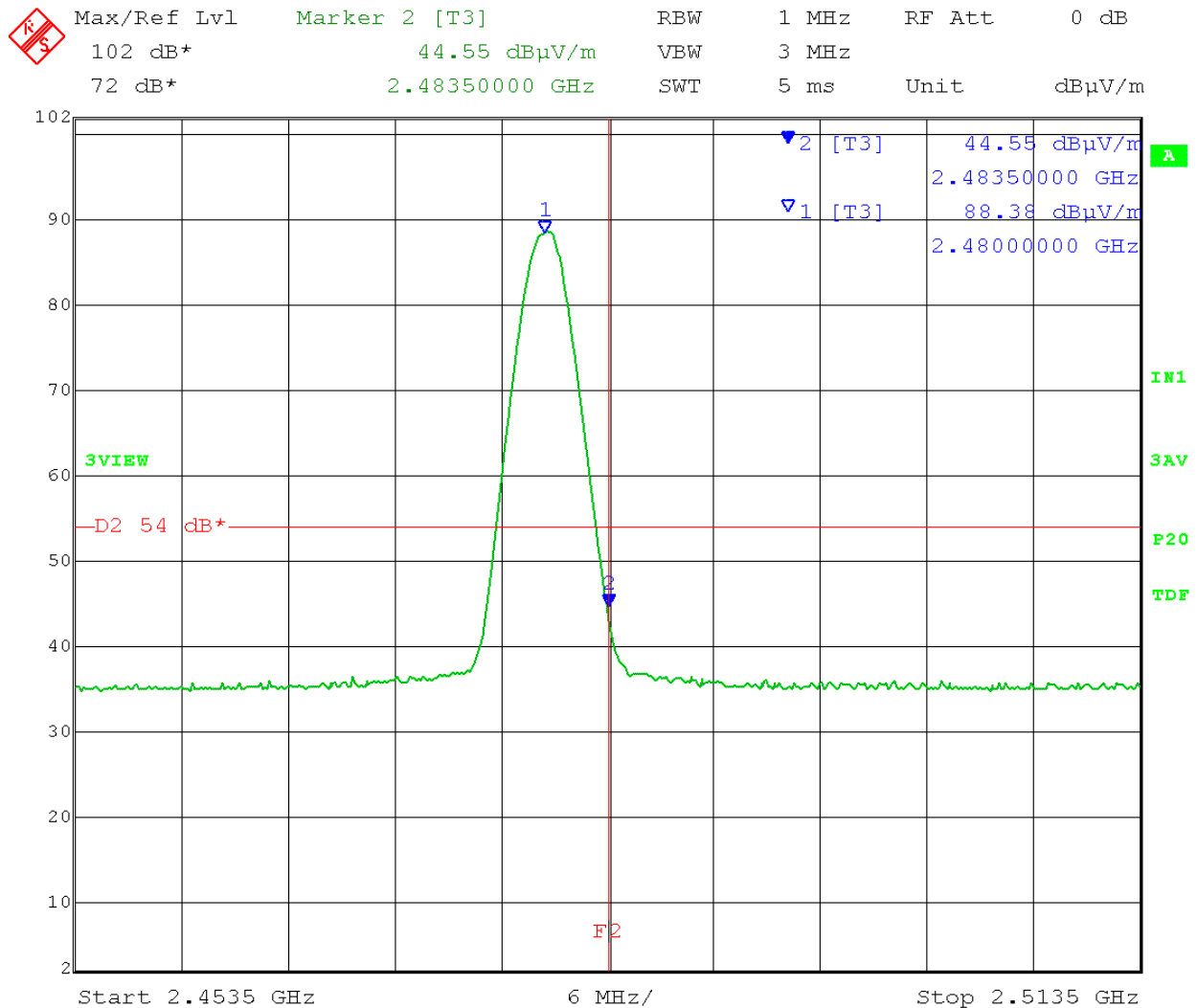
Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Upper Restricted Bandedge (2483.5 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 2 Mbps
High Channel: 2480 MHz

Test Distance: 3 meters

Detector: Linear Average; Duty Cycle Correction = 0.94 dB

HORIZONTAL: Average = 44.55 dB μ V/m + 0.94 dB (duty cycle cor.) = **45.49 dB μ V/m**

AVERAGE: Limit: 54 dB μ V/m at 3 meters



Date: 5.OCT.2024 12:27:36



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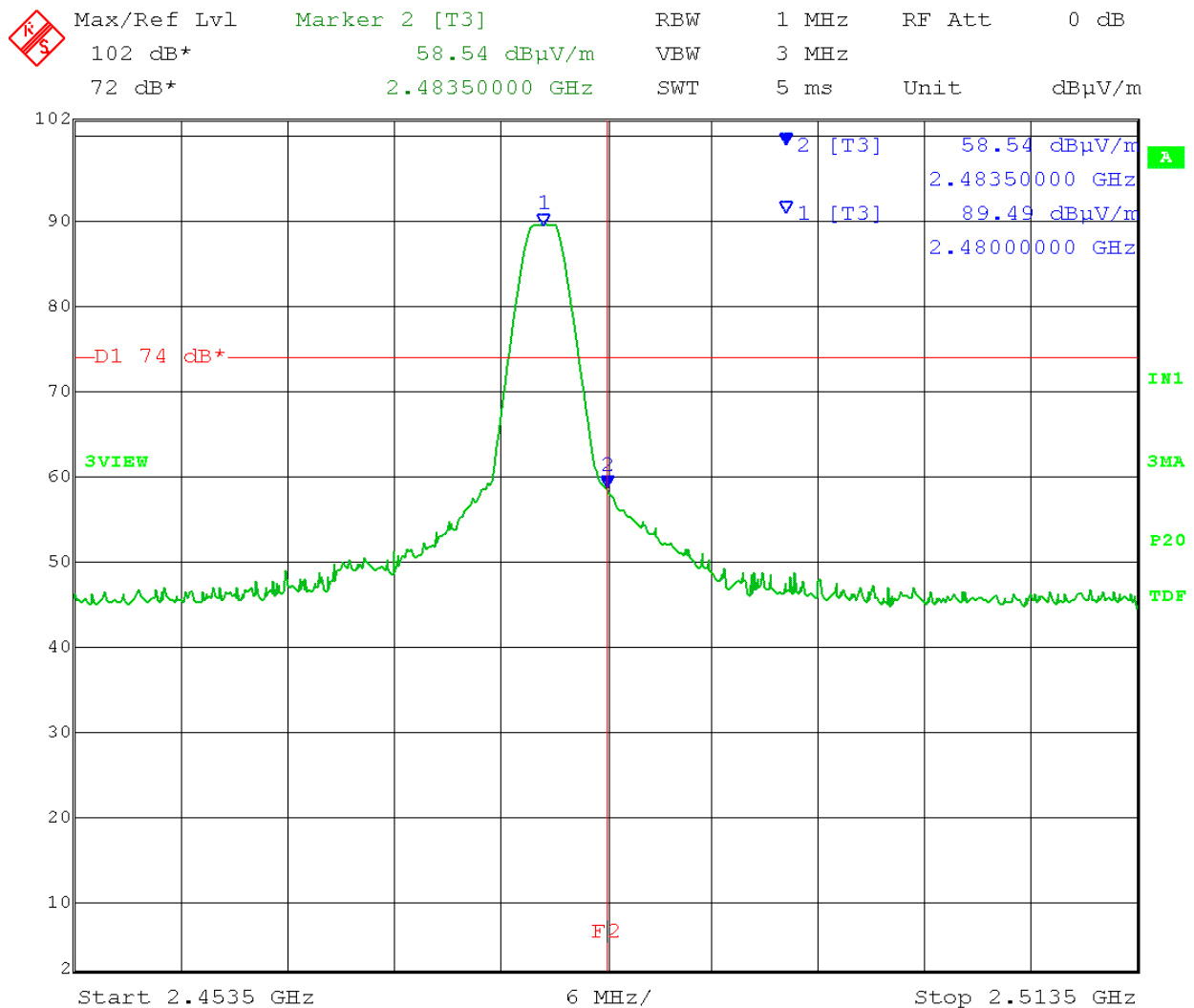
Company:
Model Tested:
Project Number:
Report Number:

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Section A

Test Date: 10-05-2024
Company: Wilson Sporting Goods Co.
EUT: QBID Ball Tag
Test: Upper Restricted Bandedge (2483.5 MHz) – Radiated
Operator: cbrandt
Comment: Data rate: 2 Mbps
High Channel: 2480 MHz
Test Distance: 3 meters
Detector: Max-Peak

HORIZONTAL: Peak = **58.54 dB μ V/m**
PEAK: Limit: 74 dB μ V/m at 3 meters



Date: 5.OCT.2024 12:30:28



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Company:
Model Tested:
Project Number:
Report Number:

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Section B – Measurement Uncertainty

Compliance with the limits in this standard are based on the results of the compliance measurement. Our calculated measurement uncertainty including the measurement instrumentation, associated connections between the various instruments in the measurement chain, and other contributions, are provided in this section of the test report.

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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Company:
Model Tested:
Project Number:
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END OF REPORT

Revision #	Date	Comments	By
1.0	03-07-2025	Initial Release	CB
1.2	06-01-2026	Removed reference to Modular Approval	CB