COMPLIANCE WORLDWIDE INC.
TEST REPORT 159-23R1

In Accordance with the Requirements of

Federal Communications Commission
CFR Title 47 Part 15.247, Subpart C
Digital Transmission Systems Frequency Hopping

Issued to

PICA Product Development, LLC
4 Ash Street Extension
Derry, NH 03038

for the

Vibration/Magnet Sensor
Internal Antenna

FCC ID: UOXSKYHAWKTRPSEN2

Report Issued on April 27, 2023
Revision R1 Issued on June 14, 2023

Tested by

Sean P. Defelice

Sean P. Defelice

Reviewed by

Larry K. Stillings

Larry K. Stillings

Table of Contents

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1. Scope

This test report certifies that The PICA Product Development Vibration/Magnet Sensor, as tested, meets the FCC Part 15, Subpart C requirements. The scope of this test report is limited to the test sample provided by the client, only in as much as that sample represents other production units. If any significant changes are made to the unit, the changes shall be evaluated and a retest may be required. Revision R1 updates the upper frequency in the table on page 15.

2. Product Details

2.1. Manufacturer: PICA Product Development

2.2. Model Number: SHTRPGFH

2.3 Serial Number: TRP22480002

2.4 Description of EUT: Vibration/Magnet Sensors offer Electronic Remote Monitoring (ERM) of rodent & wildlife traps using standard AA batteries for years of uninterrupted service.

2.5 Power Source: 3 VDC (2 – AA Batteries)

2.6 Hardware Revision: Rev I

2.7 Software Revision: N/A

2.8. Modulation Type: Frequency Hopping Spread Spectrum

2.9. Operating Frequencies: 906-923.5 MHz

2.10. EMC Modifications: None

3. Product Configuration

3.1. EUT Hardware

Manufacturer	Model	Serial Number	Input Volts	Freq (Hz) Or DC	Description/Function
PICA Product Development	SHTRPGFH	TRP22480002	3	DC	Animal Trap Sensor

3.2. Support Equipment

Device	Manufacturer	Model	Serial No.	Comment
None				

3.3. Cables

Cable Type	Length	Shield	From	To
None				

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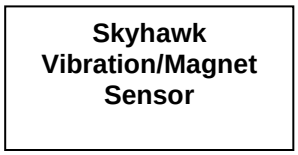
3. Product Configuration

3.4. Operational Characteristics & Software

The EUT was configured for continuous transmit operation once the batteries are installed and the button is pushed.

3.5. Block Diagram



4. Measurements Parameters

4.1. Measurement Equipment Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due	Interval
EMI Test Receiver, 9kHz - 7GHz [1]	Rohde & Schwarz	ESR7	101156	10/26/2023	2 Years
EMI Test Receiver, 10 Hz - 7GHz [1]	Rohde & Schwarz	ESR7	101770	7/23/2023	2 Years
Spectrum Analyzer, 2 Hz to 26.5 GHz[2]	Rohde & Schwarz	FSW26	102057	6/24/2023	2 Years
Spectrum Analyzer, 9 kHz to 40 GHz[3]	Rohde & Schwarz	FSV40	100899	8/12/2023	3 Years
Spectrum Analyzer 10 Hz – 40 GHz[1]	Rohde & Schwarz	FSVR40	100909	9/18/2023	3 Years
Biconilog Antenna, 30 MHz - 2 GHz	Sunol Sciences	JB1	A050913	7/1/2023	2 Years
Loop Antenna 9 kHz - 30 MHz	EMCO	6512	9309-1139	4/14/2024	2 Years
Dbl Ridged Guide Antenna 1- 18 GHz	ETS-Lindgren	3117	00143292	5/11/2024	2 Years
Dbl Ridged Guide Antenna 1- 18 GHz	ETS-Lindgren	3117	00227631	4/21/2024	2 Years
Preamplifier, 1 GHz to 26.5 GHz	Hewlett Packard	8449B	3008A01323	11/30/2023	2 Years
Preamplifier, 1 GHz to 26.5 GHz	Hewlett Packard	8449B H02	3008A00329	1/20/2024	2 Years
1.8 GHz - 9.3 GHz Passband Filter	Mini-Circuits	VHP-16	0341	3/30/2023	1 Years
Digital Barometer	Control Company	4195	ID236	1/27/2024	2 Years

[1] ESR7 Firmware revision: V3.48 SP3, Date installed: 09/30/2020 Previous V3.48 SP2, installed 07/23/2020.
[2] FSW26 Firmware revision: V4.71 SP1, Date installed: 11/16/2020 Previous V4.61, installed 08/11/2020.
[3] FSV40 Firmware revision: V2.30 SP4, Date installed: 05/04/2016 Previous V2.30 SP1, installed 10/22/2014.
[4] FSVR40 Firmware revision: V2.23 SP1, Date installed: 08/19/2016 Previous V2.23, installed 10/22/2014.

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4. Measurements Parameters (continued)

4.2. Measurement & Equipment Setup

Test Dates:	3/24/2023, 3/29/2023. 3/30/2023, 4/3/2023, 4/27/2023
Test Engineers:	Sean Defelice
Normal Site Temperature (15 - 35°C):	21.2
Relative Humidity (20 -75%RH):	33
Frequency Range:	30 kHz to 9.4 GHz
Measurement Distance:	3 & 1 Meters
EMI Receiver IF Bandwidth:	200 Hz – 30 to 150 kHz 9 kHz – 150 kHz to 30 MHz 120 kHz – 30 MHz to 1 GHz 1 MHz – Above 1 GHz
EMI Receiver Avg Bandwidth:	≥ 3 * RBW or IF(BW)
Detector Function:	Peak, Quasi-Peak & Average

4.3. Measurement Procedure

Testing was performed in accordance with the requirements detailed in ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. In addition, FCC DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems, was also referenced.

Test measurements were made in accordance with FCC Part 15.247, ANSI C63.10-2013.

The test methods used to generate the data in this test report is in accordance with ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices.

4.4. Measurement Uncertainty

The following uncertainties are expressed for an expansion/coverage factor of K=2.

RF Frequency	± $1x10^{-8}$
Radiated Emission of Transmitter	± 4.55 dB
Radiated Emission of Receiver	± 4.55 dB
Temperature	± 0.91° C
Humidity	± 5%

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5. Choice of Equipment for Test Suites

5.1 Choice of Model

This test report is based on the test samples supplied by the manufacturer and are reported by the manufacturer to be equivalent to the production units.

5.2 Presentation

This test sample was tested complete with all required ancillary equipment. Refer to Section 3 of this report for product equipment configuration.

5.3 Choice of Operating Frequencies

The product utilizes 50 channels in the 906 MHz to 923.5 MHz frequency range. In accordance with ANSI C63.10-2013, Section 5.6, three channels are detailed in this test report:

In accordance with ANSI C63.10-2013, Section 5.6, the choice of operating frequencies selected for the testing outlined in this report was based on the lowest, a middle and highest operating frequencies. The frequencies selected were:

- Low Channel – 906.00 MHz
- Middle Channel – 912.75 MHz
- High Channel – 923.50 MHz

5.4. EUT Positions for Emissions Measurements

The device under test was tested in three orthogonal positions in accordance with ANSI C63.10-2013, Section 5.10.1.

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6. Measurement Summary

Test Requirement	FCC Part 15.247 Reference	Test Report Section	Result	Comment
Antenna Requirement	15.203	7.1	Compliant	
Frequency Hopping Requirements	15.247 (a)	7.2	Compliant	
Minimum 20 dB Bandwidth				
Number of Hopping Channels	15.247 (a)			
Channel Separation				
Average Time of Occupancy per Period	15.247 (a)			
Maximum Peak Conducted Output Power	15.247 (b)	7.3	Compliant	
Operation with directional antenna gains greater than 6 dBi	15.247 (c)	7.4	N/A	Antenna gain <6 dBi
Lower and Upper Band Edge	15.247 (d), 15.209	7.5	Compliant	
Spurious Radiated Emissions		7.6	Compliant	
Spurious Radiated Emissions (> GHz) - Harmonic Measurements		7.7	Compliant	
Conducted Emissions	FCC 15.207	7.8	N/A	EUT operates on AA Batteries

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7. Measurement Data

7.1. Antenna Requirement (Section 15.203)

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section.

Status: The antenna is an internal PCB etch antenna.

7.2. Frequency Hopping Requirements (Section 15.247 (a))

Requirements: Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

7.2.1. 20 dB Bandwidth

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum 20 dB Bandwidth (kHz)	Result
Low	906.00	15.584	250	Compliant
Mid	912.75	15.485	250	Compliant
High	923.50	15.485	250	Compliant

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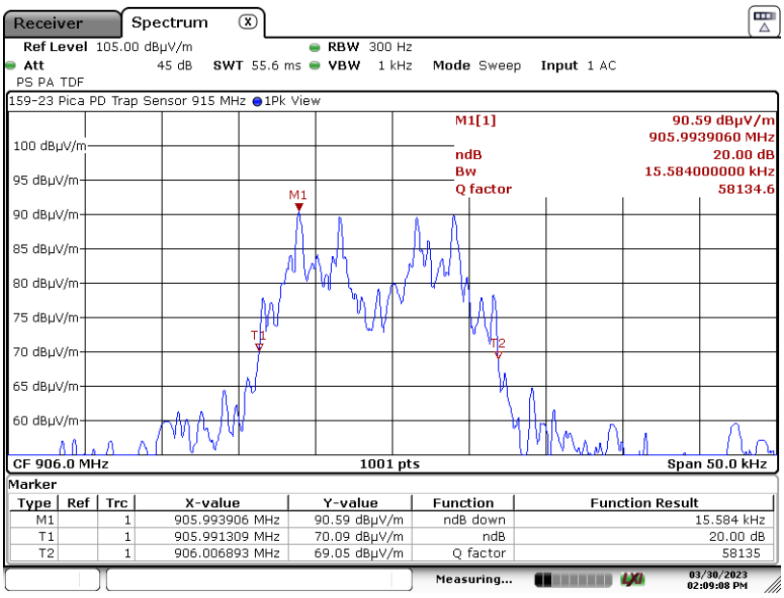
7. Measurement Data (continued)

7.2. Frequency Hopping Requirements (Section 15.247 (a) (continued)

7.2.1. 20 dB Bandwidth (continued)

7.2.1.1. 20 dB Bandwidth – Low Frequency



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7.2.1.2. 20 dB Bandwidth – Middle Frequency

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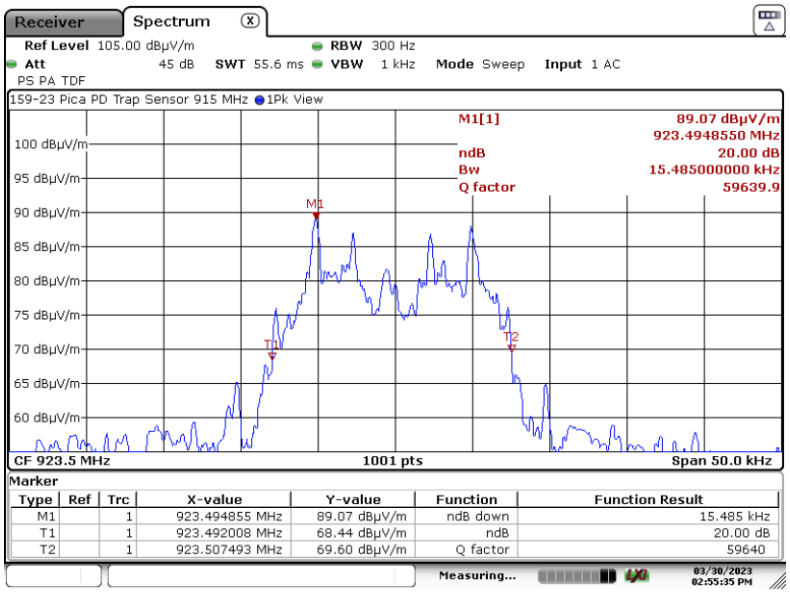
7. Measurement Data (continued)

7.2. Frequency Hopping Requirements (Section 15.247 (a) (continued)

7.2.1. 20 dB Bandwidth (continued)

7.2.1.3. 20 dB Bandwidth – High Frequency



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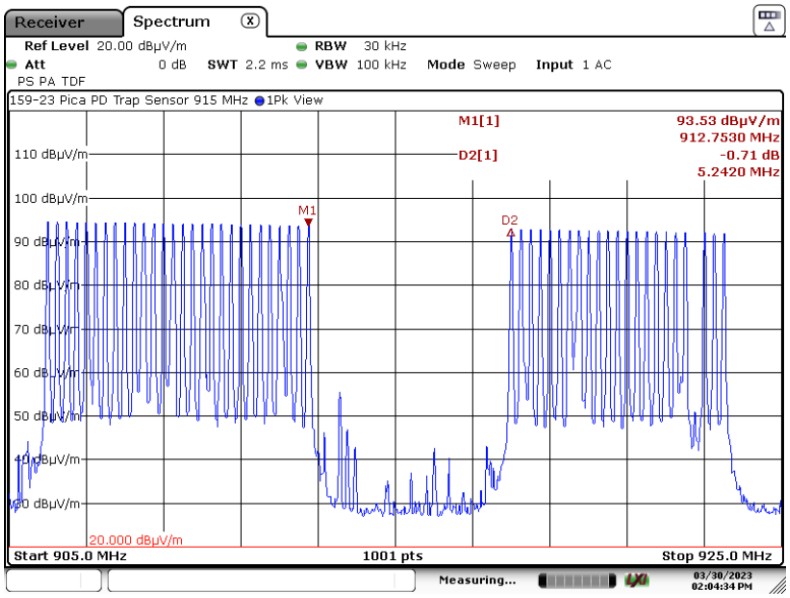
7.2.2. Number of Hopping Channels = 50 (28 on left, 22 on right)



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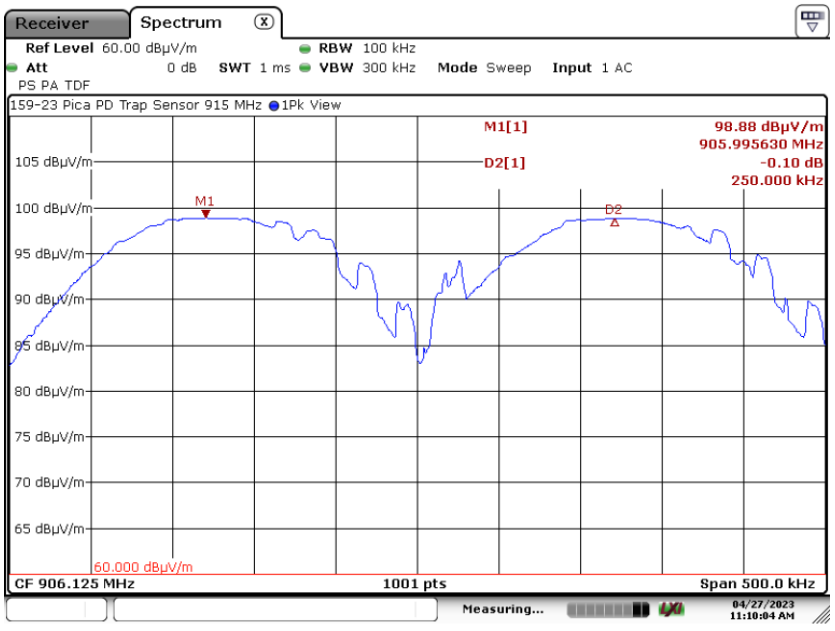
7. Measurement Data (continued)

7.2. Frequency Hopping Requirements (Section 15.247 (a) (continued)

7.2.3. Channel Separation

Channel	Channel Pair	Channel Separation (kHz)	Required Channel Separation (kHz)	Result
Low	903.00	250	25	Compliant
	903.25			
Middle	912.50	250	25	Compliant
	912.75			
High	923.25	250	25	Compliant
	923.50			

7.2.3.1. Channel Separation - Low Channels



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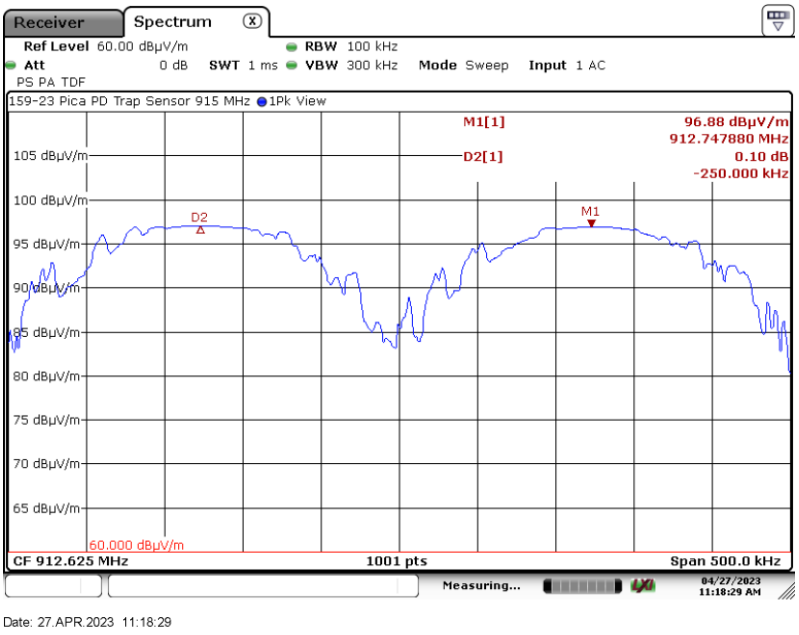
7. Measurement Data (continued)

7.2. Frequency Hopping Requirements (Section 15.247 (a) (continued)

7.2.3. Channel Separation

7.2.3.2. Channel Separation - Middle Channels



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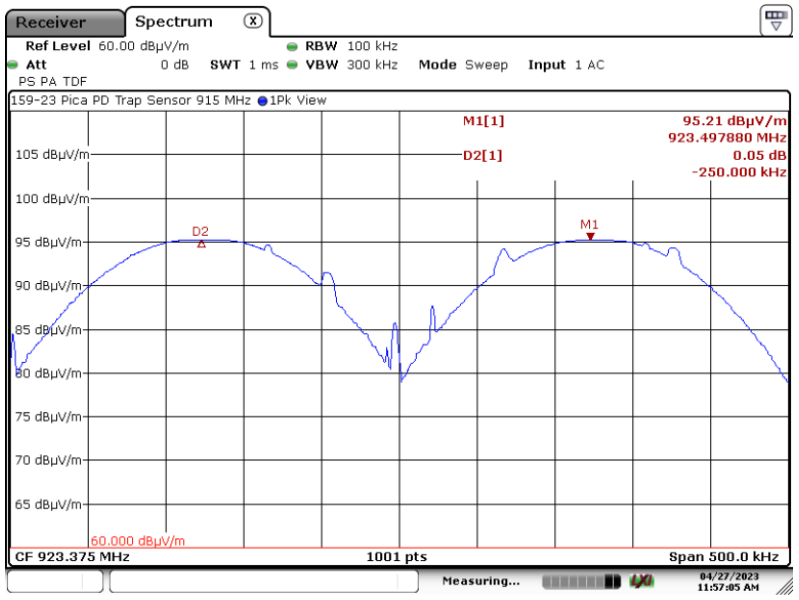
7.2.3.3. Channel Separation - High Channels



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7. Measurement Data (continued)

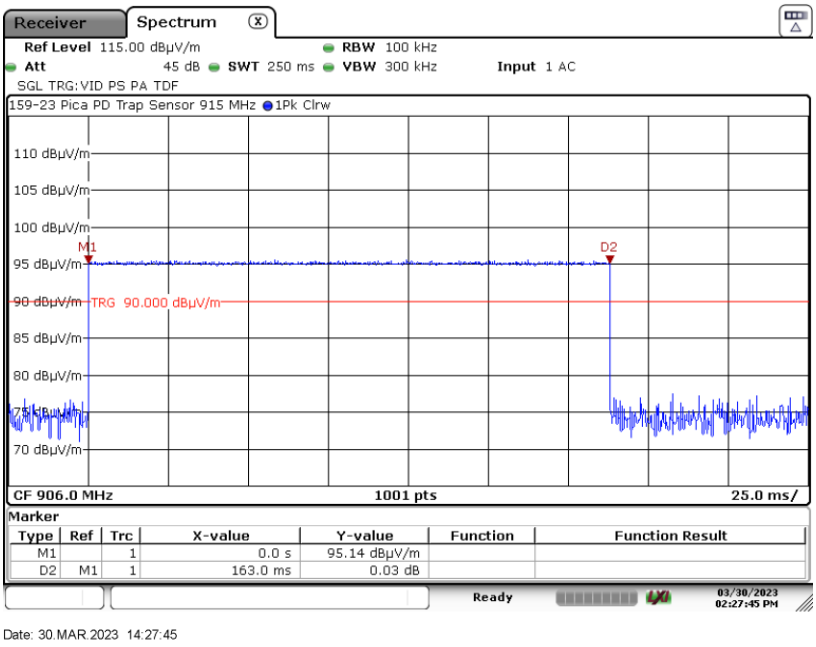
7.2. Frequency Hopping Requirements (Section 15.247 (a) (continued)

7.2.4. Average Time of Occupancy per Period (Period = 20 Seconds)

Channel	Frequency (MHz)	Pulse Width (Sec)	Avg Time per Period (20 Seconds)	Maximum Time per Period	Result
Low	906.00	0.163	0.163	0.4000	Compliant
Middle	912.75	0.163	0.163	0.4000	Compliant
High	923.50	0.163	0.163	0.4000	Compliant

Note: One Pulse occurs every 20 seconds, as it hops one cycle of 50 channels and then mutes for the remaining 20 second cycle.

7.2.4.1. Pulse Width - Low Channel



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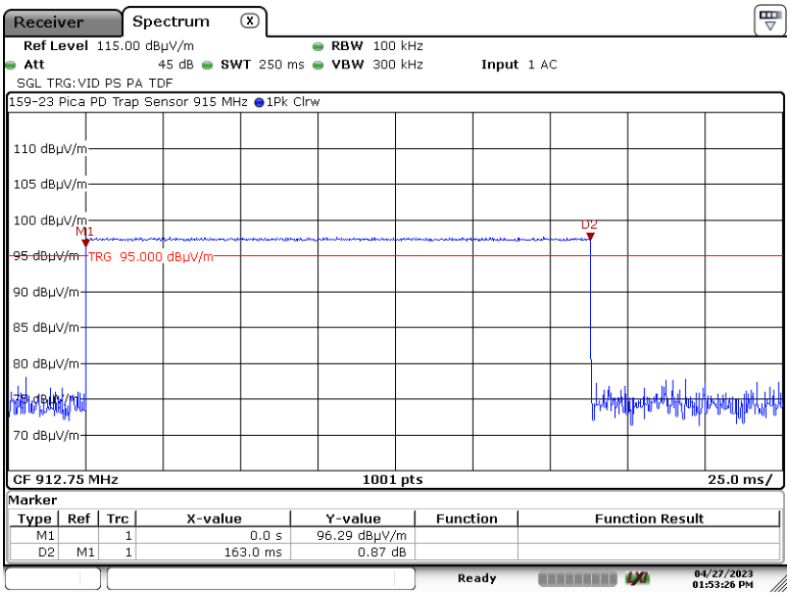
7. Measurement Data (continued)

7.2. Frequency Hopping Requirements (Section 15.247 (a) (continued)

7.2.4. Average Time of Occupancy per Period (Period = 20 Seconds)

7.2.4.2. Pulse Width - Middle Channel



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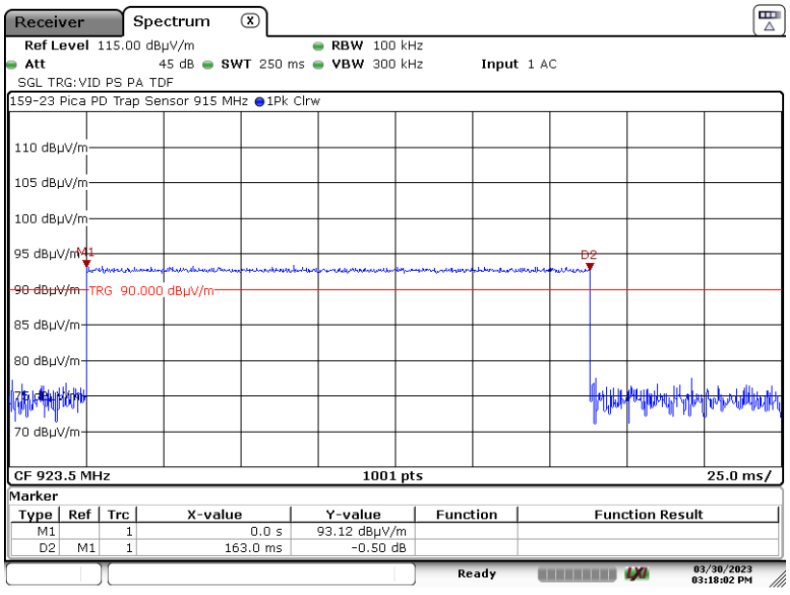
7.2.4.3. Pulse Width - High Channel



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7. Measurement Data (continued)

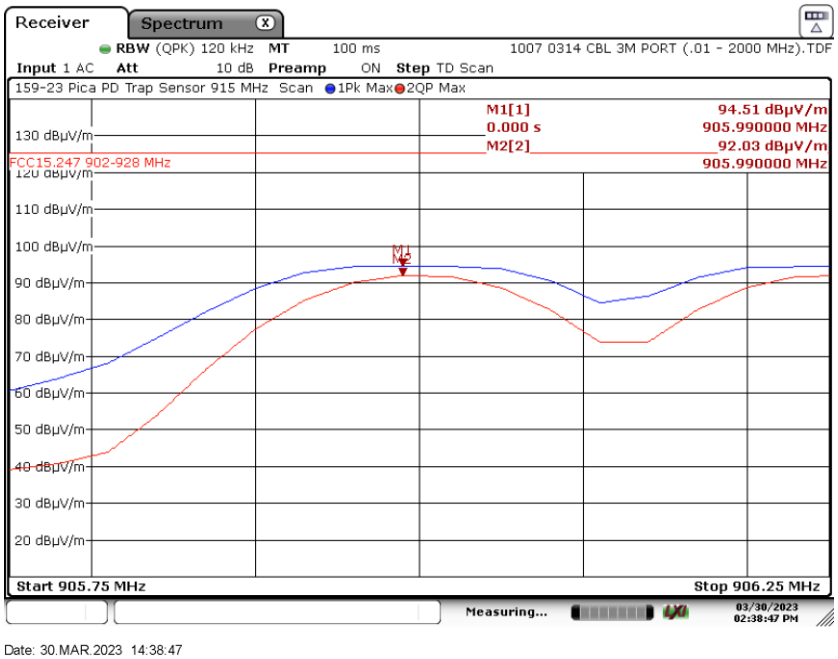
7.3. Maximum Peak Conducted Output Power (Section 15.247 (b))

Requirements: The maximum peak conducted output power of the intentional radiator shall not exceed the following: For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

Note: Field strengths at 3 meters were measured and converted to power by subtracting 95.2.

Channel	Frequency (MHz)	Max Radiated Output Power (dBµV/m)	Max Radiated Output Power (dBm)	Max Peak Radiated Output Power (Watts)	Limit (Watts)	Result
Low	906.00	94.51	-0.69	0.0009	1	Compliant
Middle	912.75	96.88	1.68	0.0015	1	Compliant
High	923.50	91.83	-3.37	0.0005	1	Compliant

7.3.1. Maximum Peak Conducted Output Power – Low Channel



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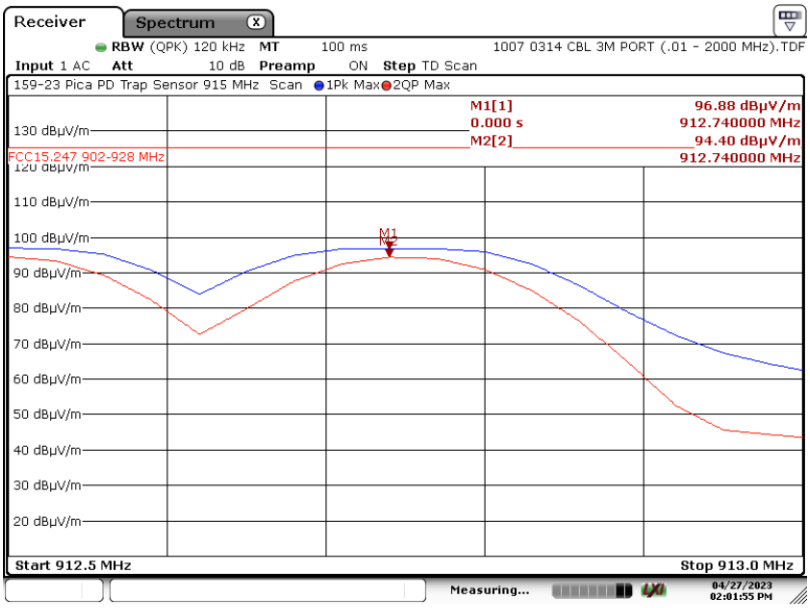
7. Measurement Data (continued)

7.3. Maximum Peak Conducted Output Power (Section 15.247 (b)) (continued)

7.3.2. Maximum Peak Conducted Output Power – Middle Channel



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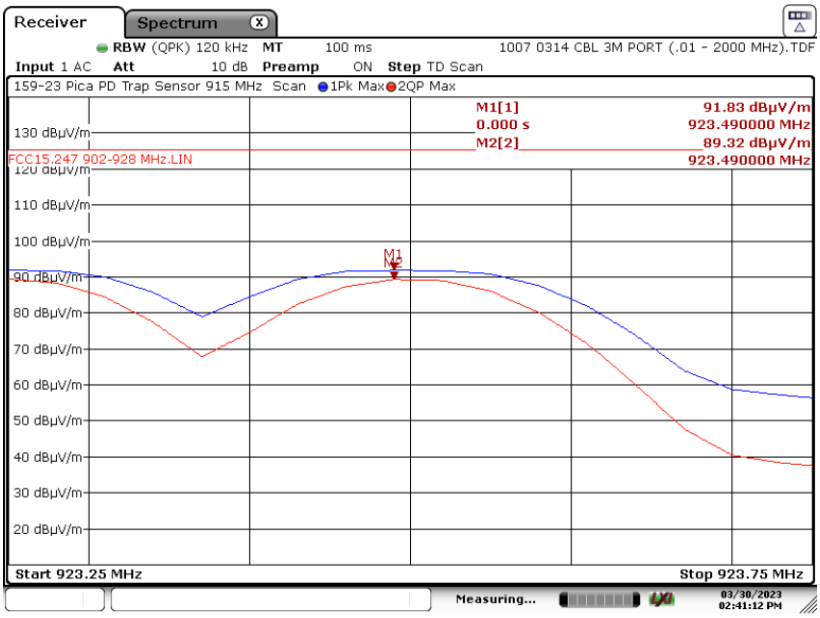
7.3.3. Maximum Peak Conducted Output Power – High Channel



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7. Measurement Data (continued)

7.4. Operation with Directional Antenna Gains Greater than 6 dBi (Section 15.247 (c))

Requirement: Fixed Point-to-Point Operation:

If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of FCC Part 15.247, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400 – 2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Procedure: Not applicable for the device under test.

EUT Status: The EUT utilizes an antenna with an approximate peak gain of 0 dBi, and therefore is exempt from this requirement.

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7. Measurement Data (continued)

7.5. Emissions Outside the Frequency Band (Section 15.247 (d))

Requirements: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Notes: Peak in-band measurements were taken using 100 kHz RBW. These values were used as the reference levels for the following measurements.

Reference Appendix A for the measurement data used for this test section.

Results: The DUT met the 20 dB requirement emission level delta requirement in the non restricted frequency bands.

Emissions in Non-restricted Frequency Bands

Maximum PSD (100 kHz) In-Band[1] (dBm)	Worst Case Out-of-Band Frequency (MHz)	Maximum PSD (100 kHz) Out-of-Band (dBµV/m)	Maximum PSD (100 kHz) Out-of-Band (dBm)	Minimum Required Delta (dBm)	Result
1.68	6341.99	52.24	-42.96	-18.32	Compliant

7.5.1. Band Edge Measurements (Frequency Hopping Mode)

Lower Band Edge

Lowest Channel (MHz)	Measured Power (dBm)	Band Edge Frequency (MHz)	Measured Power (dBµV/m)	Measured Power (dBm)	Requirement (-20 dB from Peak)	Margin (dB)	Result
	Peak		Peak	Peak	Peak		
906.00	-0.69	902	68.86	-26.34	-20.69	-5.65	Compliant

Upper Band Edge

Highest Channel (MHz)	Measured Power (dBm)	Band Edge Frequency (MHz)	Measured Power (dBµV/m)	Measured Power (dBm)	Requirement (-20 dB from Peak)	Margin (dB)	Result
	Peak		Peak	Peak	Peak		
923.50	-3.37	928	69.78	-25.42	-23.37	-2.05	Compliant

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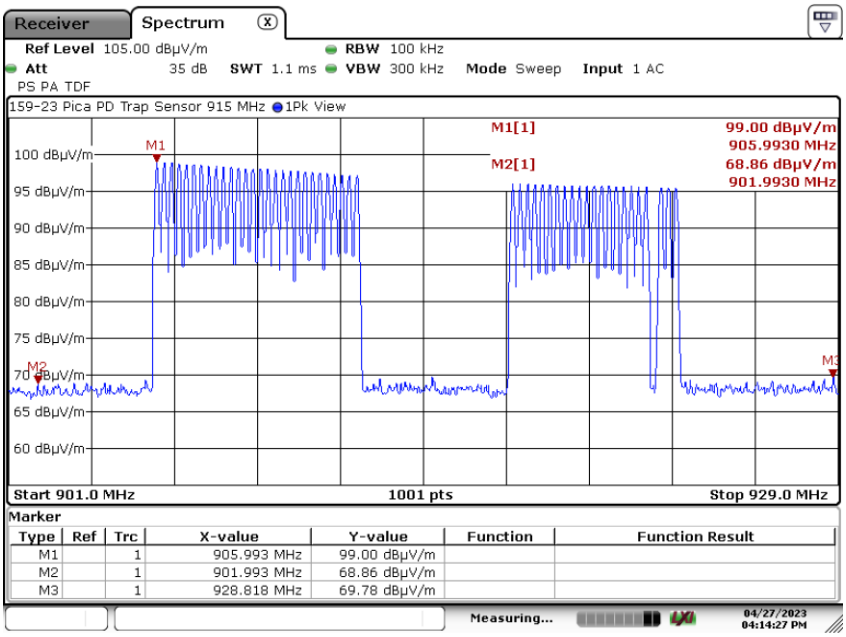
7. Measurement Data (continued)

7.5. Emissions outside the Frequency Band (15.247 (d)) (continued)

7.5.3.1. Lower and Upper Band Edges (Frequency Hopping Mode)



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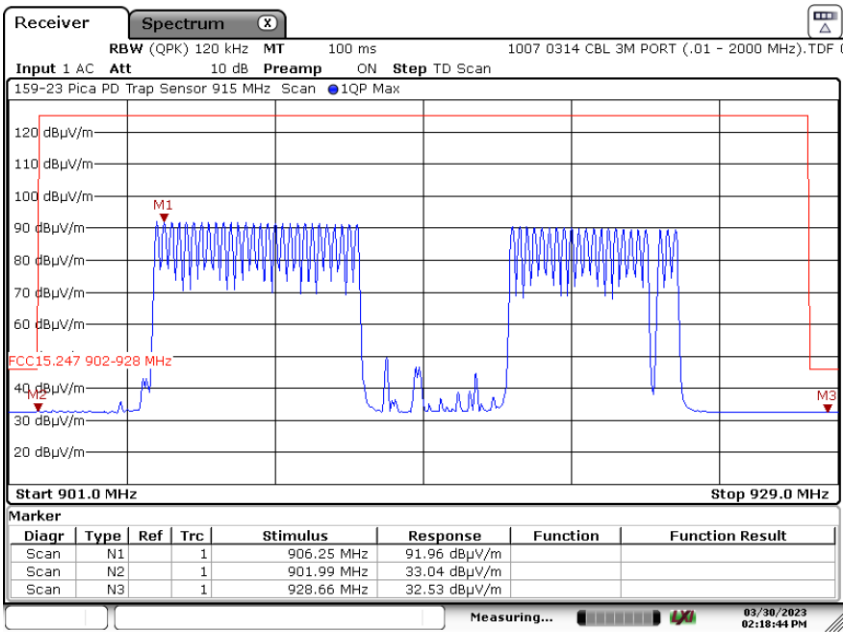

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7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (30 kHz to 9.4 GHz)

Note: The spurious emissions detailed in this section represent the combined worst-case emissions of the low, middle and high operating frequencies. Only emissions defined as restricted bands of operation in 15.205 (a) are subjected to these limits.

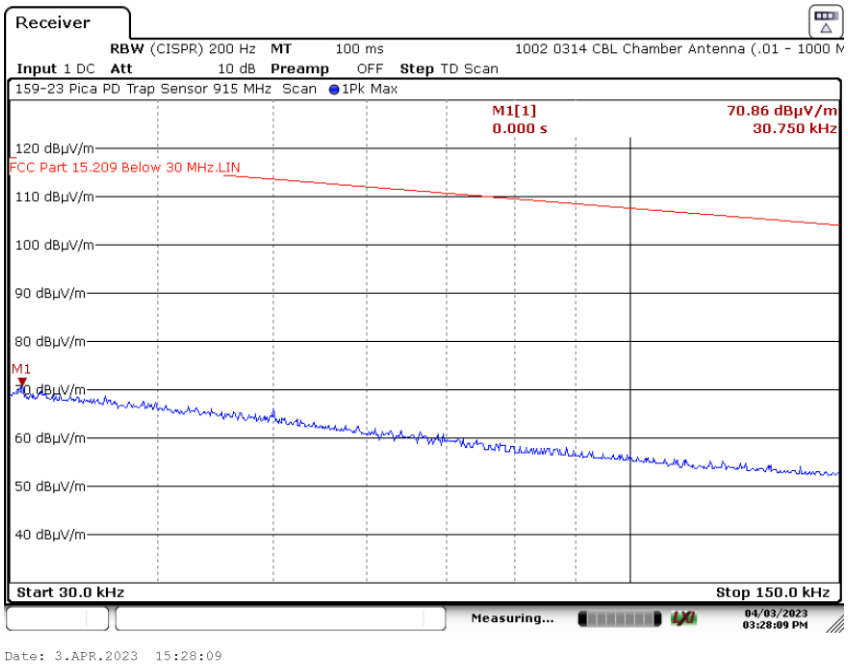
7.6.1. Regulatory Limit: FCC Part 209, Quasi-Peak

Frequency Range (MHz)	Distance (Meters)	Limit (dBµV/m)
0.490 to 1.705	3	73.8 to 63.0
1.705 to 30	3	69.5
30 to 88	3	40.0
88 to 216	3	43.5
216 to 960	3	46.0
>960	3	54.0

Note: In plots 7.6.4.1 and 7.6.4.2, the emissions identified by markers M1 and M2 are detailed in section 7.7 of this report.

7.6.2. Spurious Radiated Emissions (30 to 150 kHz) Test Results

7.6.2.1. Measurement Results – Parallel – X Axis



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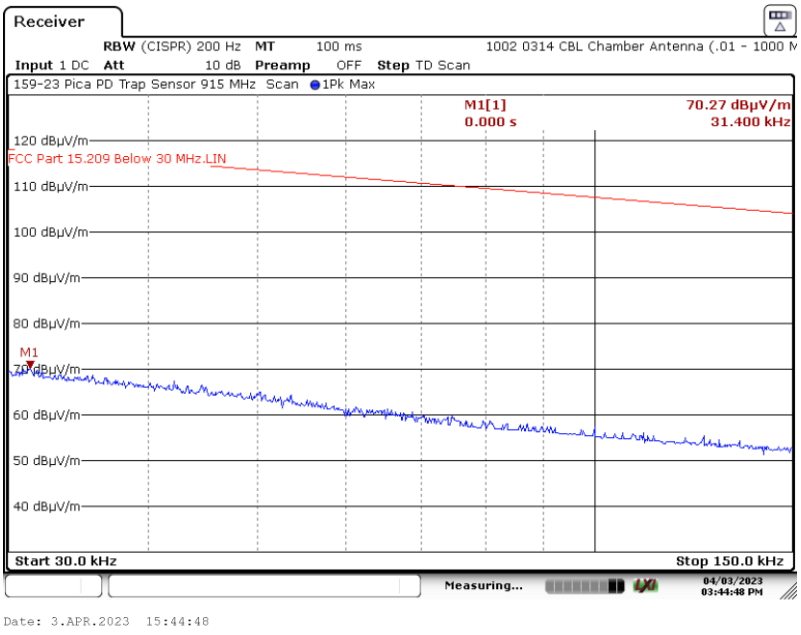
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

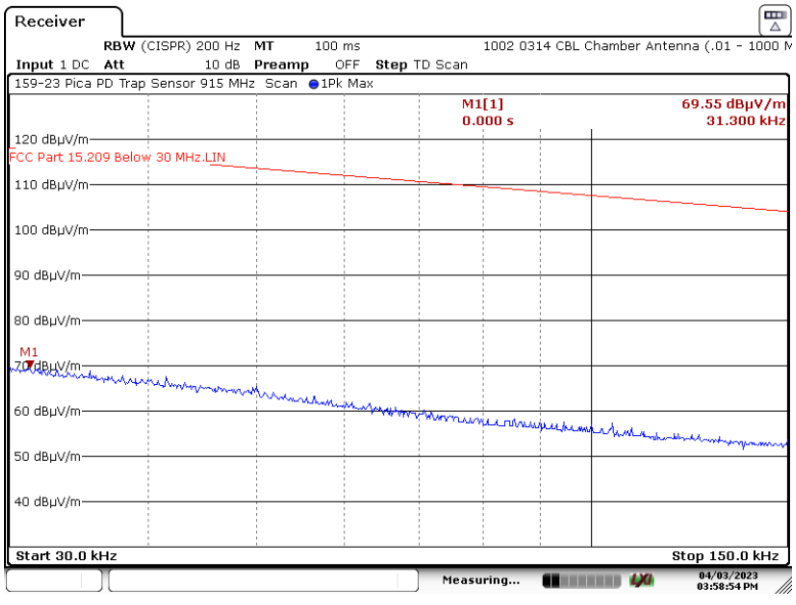
7.6.2. Spurious Radiated Emissions (30 kHz to 150 kHz) Test Results

7.6.2.2. Measurement Results – Perpendicular – X-Axis



Date: 3.APR.2023 15:44:48

7.6.2.3. Measurement Results – Ground Parallel – X-Axis



Date: 3.APR.2023 15:58:54

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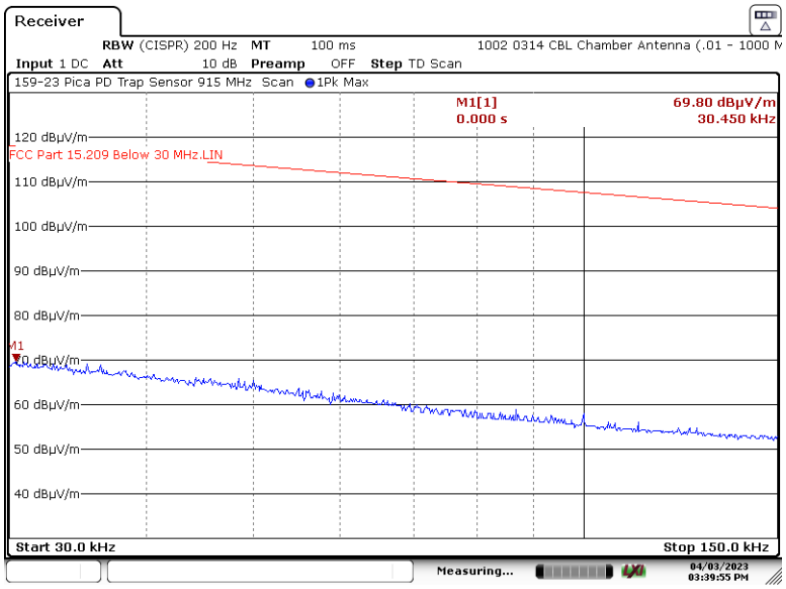
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

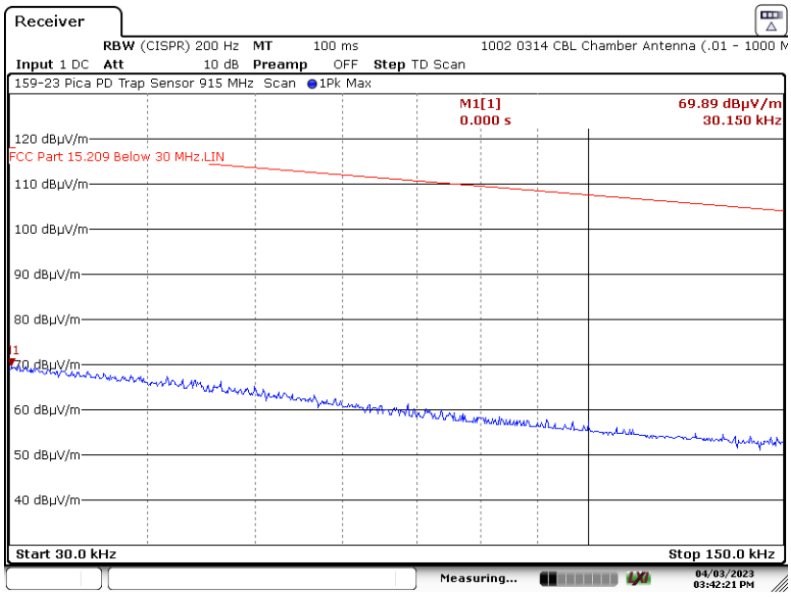
7.6.2. Spurious Radiated Emissions (30 kHz to 150 kHz) Test Results

7.6.2.4. Measurement Results – Parallel – Y-Axis



Date: 3.APR.2023 15:39:55

7.6.2.5. Measurement Results – Perpendicular – Y-Axis



Date: 3.APR.2023 15:42:20

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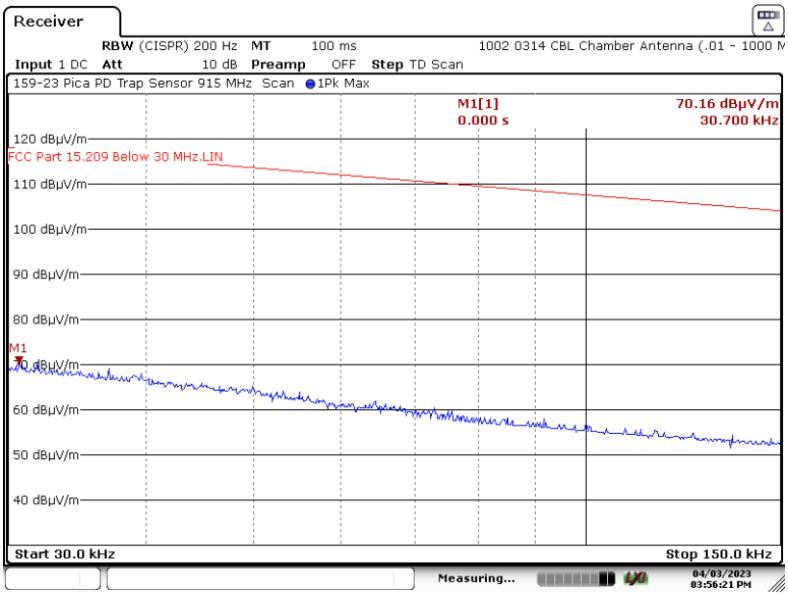
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

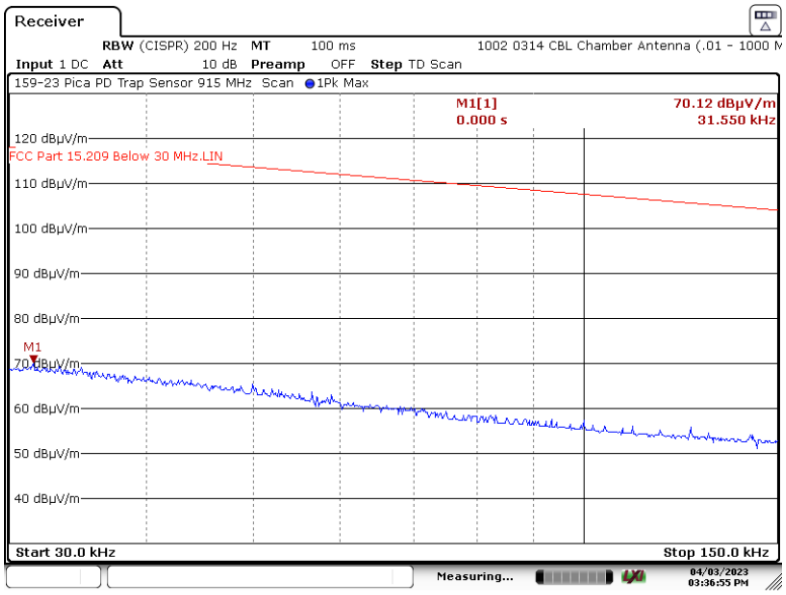
7.6.2. Spurious Radiated Emissions (30 kHz to 150 kHz) Test Results

7.6.2.6. Measurement Results – Ground Parallel – Y-Axis



Date: 3.APR.2023 15:56:20

7.6.2.7. Measurement Results – Parallel – Z-Axis



Date: 3.APR.2023 15:36:55

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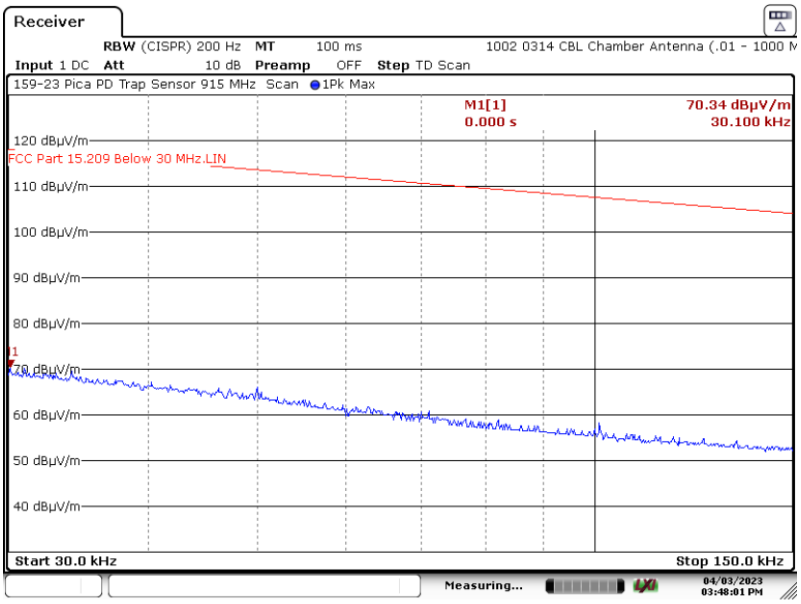
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

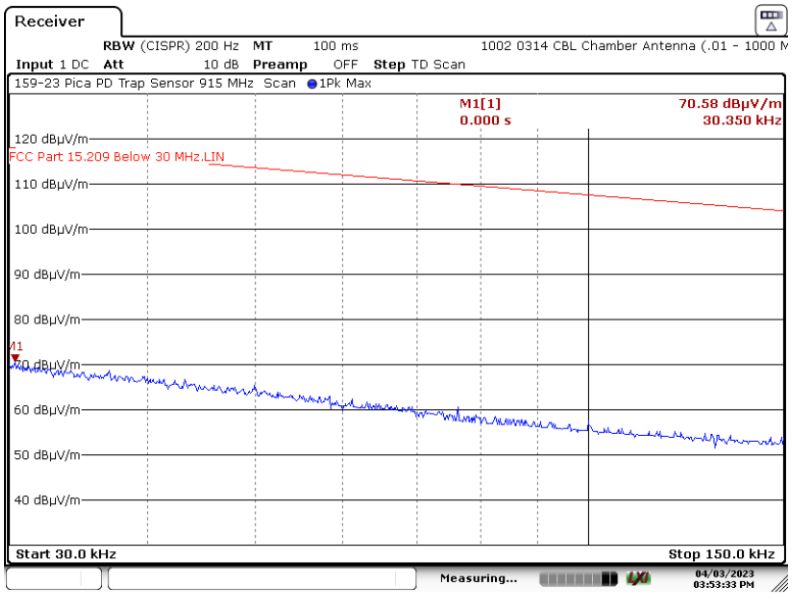
7.6.2. Spurious Radiated Emissions (30 kHz to 150 kHz) Test Results

7.6.2.8. Measurement Results – Perpendicular – Z-Axis



Date: 3.APR.2023 15:48:01

7.6.2.9. Measurement Results – Ground Parallel – Z-Axis



Date: 3.APR.2023 15:53:32

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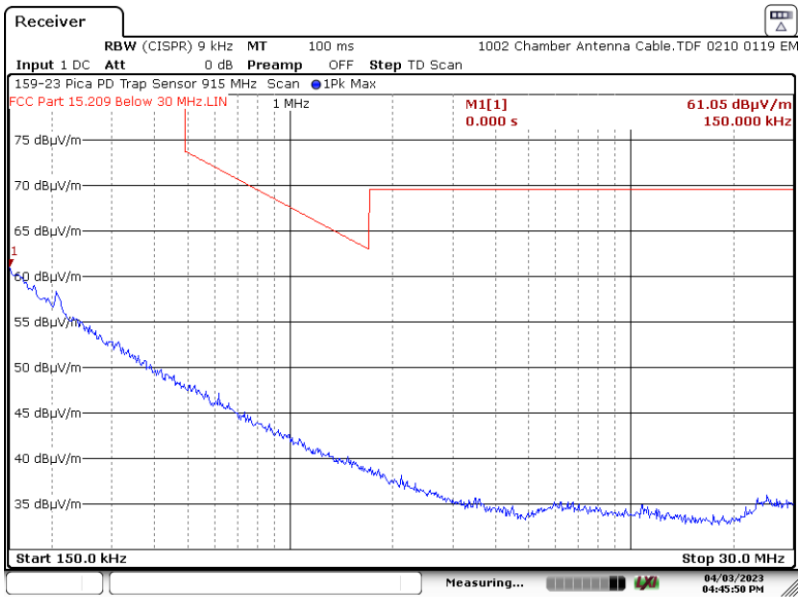
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

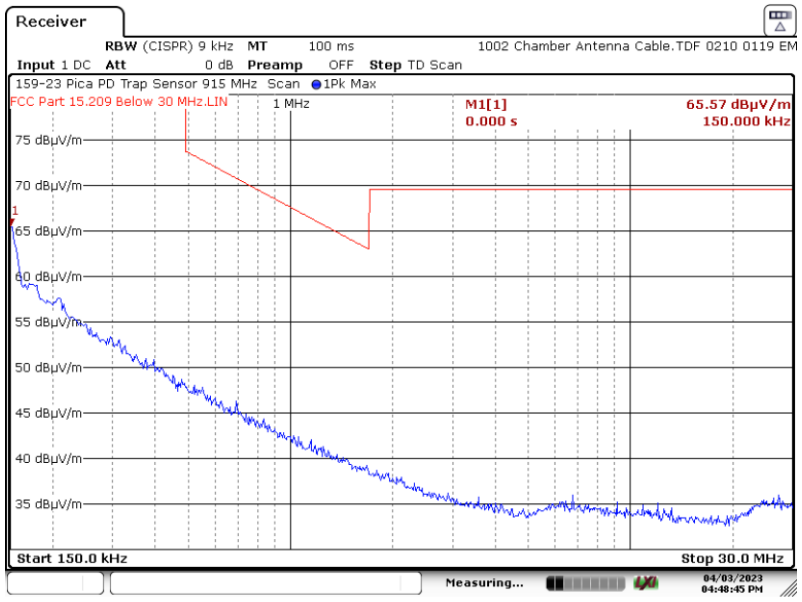
7.6.2. Spurious Radiated Emissions (150 kHz to 30 MHz) Test Results

7.6.2.10. Measurement Results – Parallel – X-Axis



Date: 3.APR.2023 16:45:49

7.6.2.11. Measurement Results – Perpendicular – X-Axis



Date: 3.APR.2023 16:48:45

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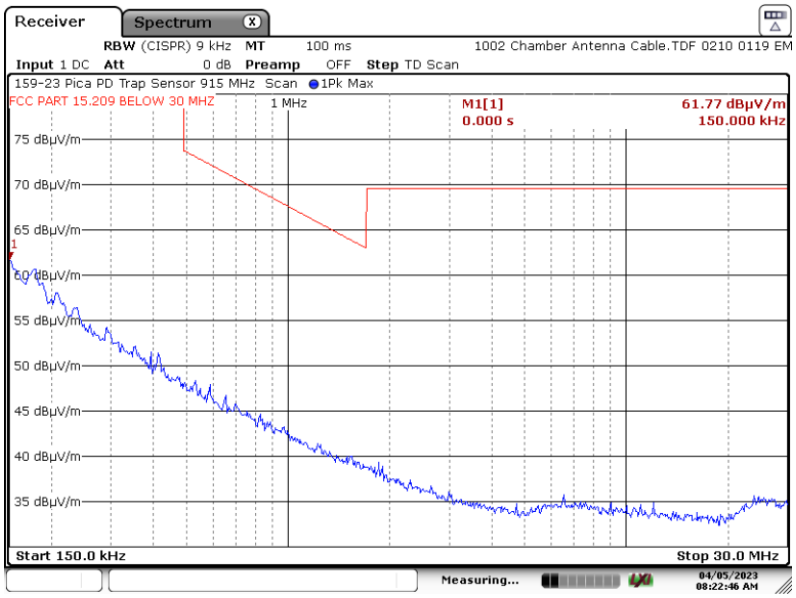
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

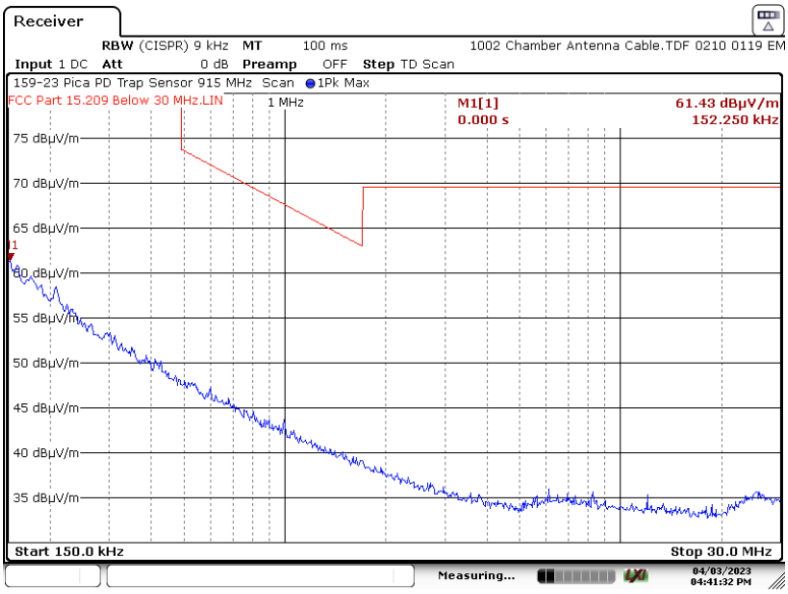
7.6.2. Spurious Radiated Emissions (150 kHz to 30 MHz) Test Results

7.6.2.12. Measurement Results – Ground Parallel – X-Axis



Date: 5.APR.2023 08:22:46

7.6.2.13. Measurement Results – Parallel – Y-Axis



Date: 3.APR.2023 16:41:32

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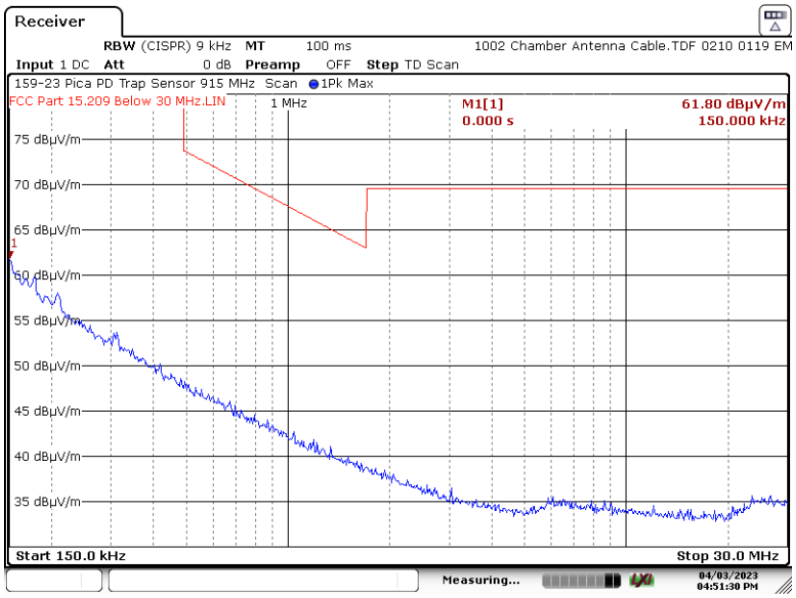
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

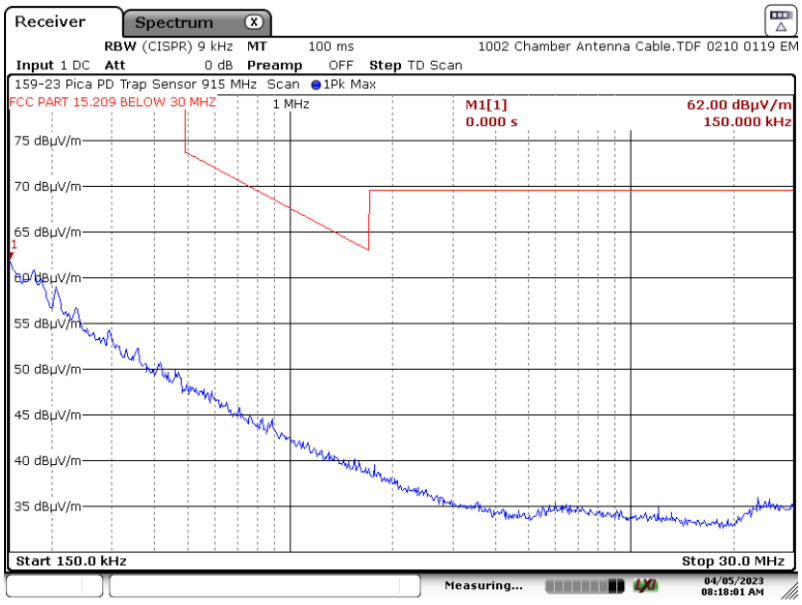
7.6.2. Spurious Radiated Emissions (150 kHz to 30 MHz) Test Results

7.6.2.14. Measurement Results – Perpendicular – Y-Axis



Date: 3.APR.2023 16:51:29

7.6.2.15. Measurement Results – Ground Parallel – Y-Axis



Date: 5.APR.2023 08:18:01

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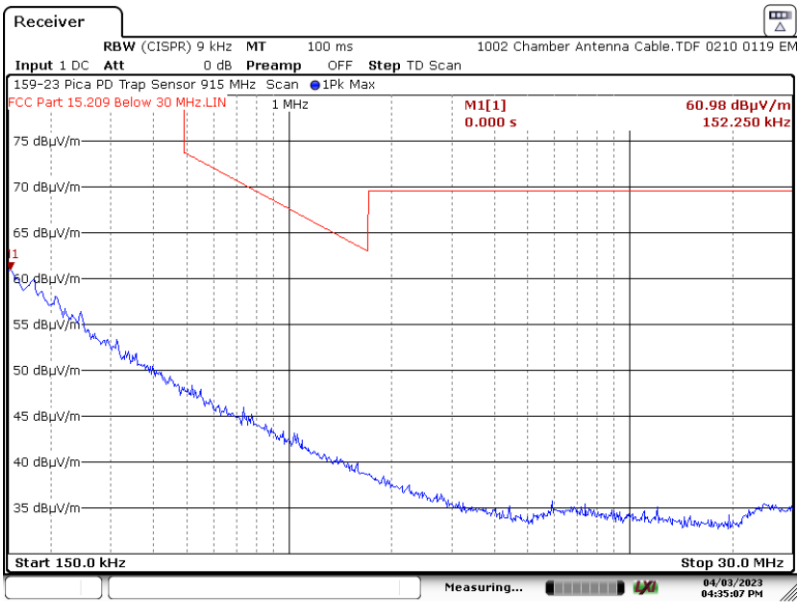
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

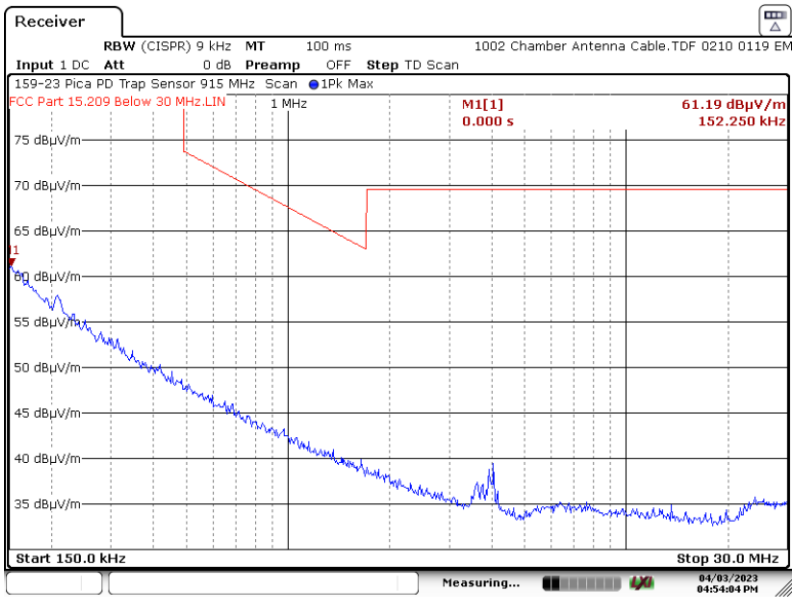
7.6.2. Spurious Radiated Emissions (150 kHz to 30 MHz) Test Results

7.6.2.16. Measurement Results – Parallel – Z-Axis



Date: 3.APR.2023 16:35:07

7.6.2.17. Measurement Results – Perpendicular – Z-Axis



Date: 3.APR.2023 16:54:04

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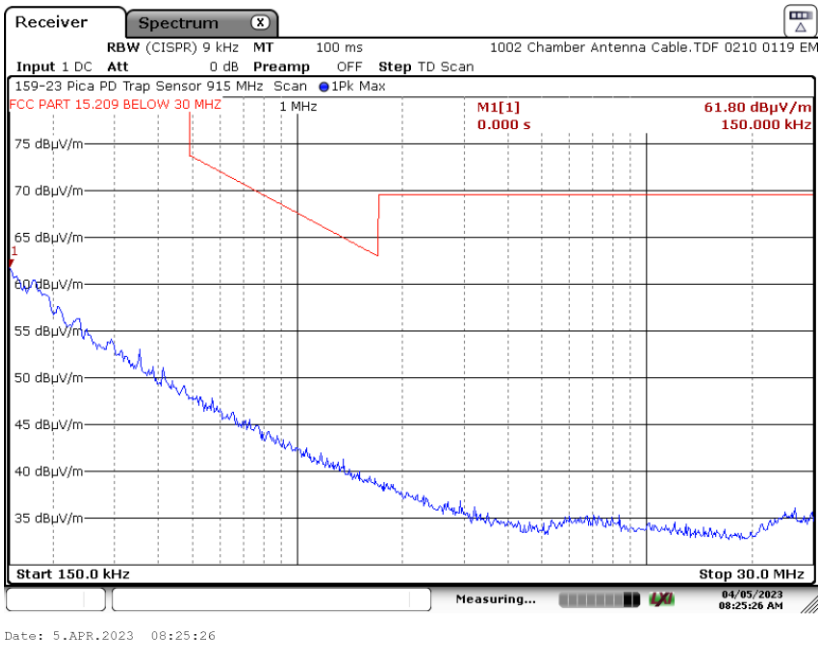
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

7.6.2. Spurious Radiated Emissions (150 kHz to 30 MHz) Test Results

7.6.2.18. Measurement Results – Ground Parallel – Z-Axis



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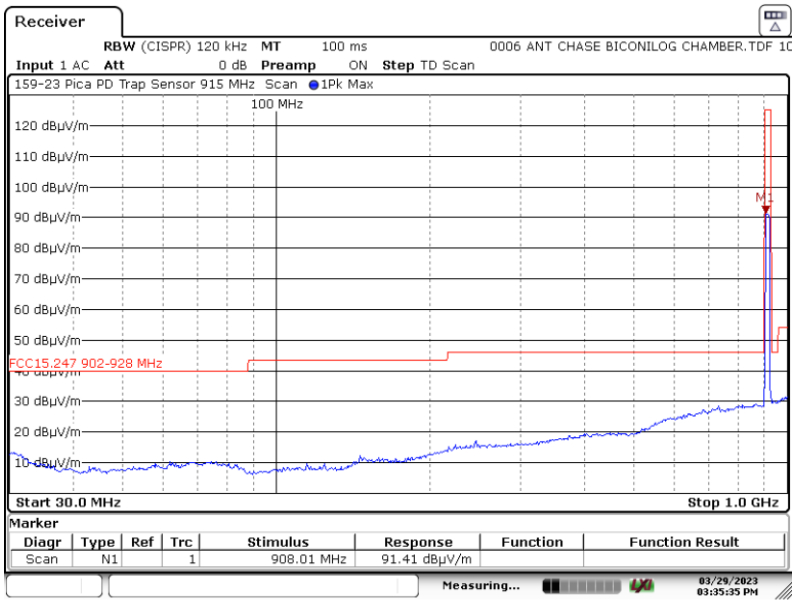
7. Measurement Data (continued)

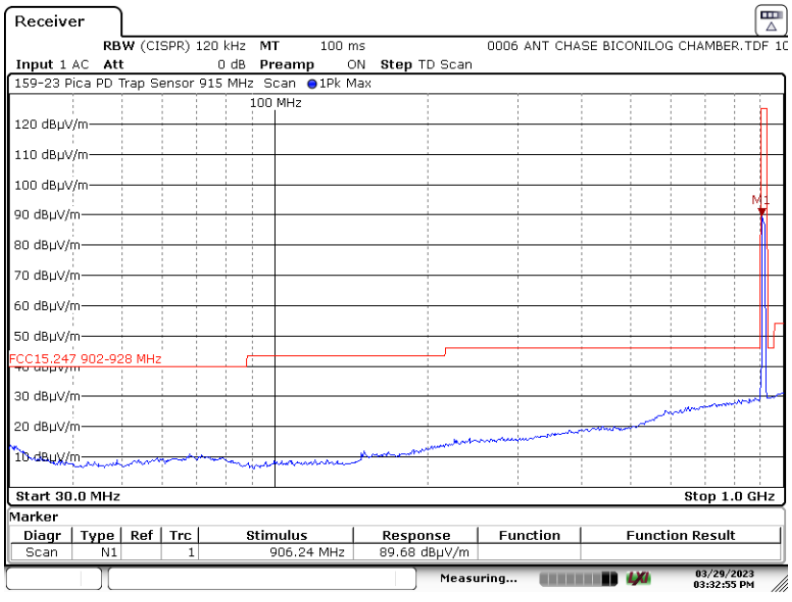
7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

7.6.3. Spurious Radiated Emissions (30 MHz to 1 GHz) Test Results

7.6.3.1. Measurement Results – Horizontal – X-Axis



7.6.3.2. Measurement Results – Vertical – X-Axis



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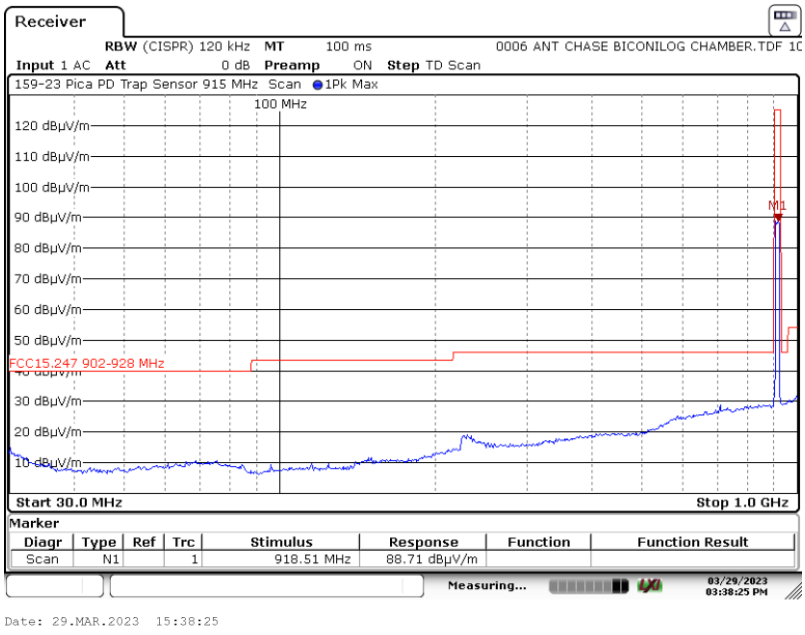
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

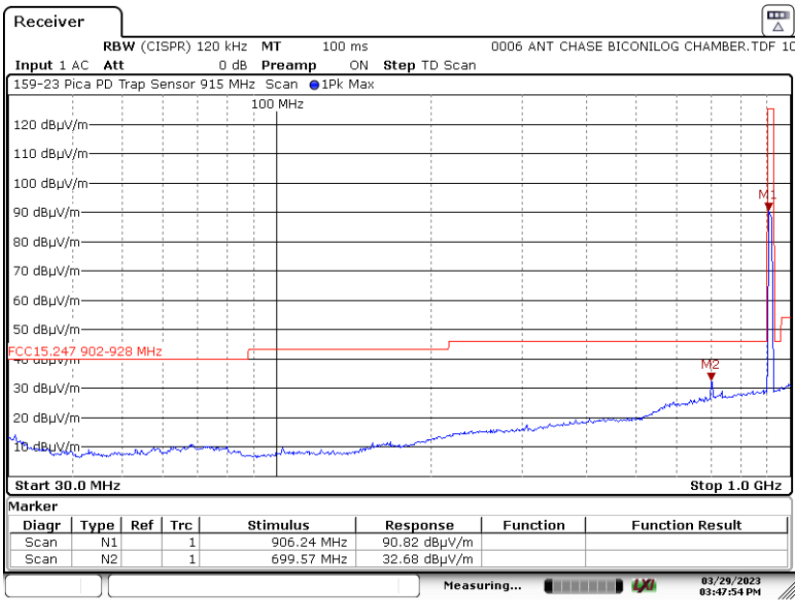
7.6.3. Spurious Radiated Emissions (30 MHz to 1 GHz) Test Results

7.6.3.3. Measurement Results – Horizontal – Y-Axis



Date: 29.MAR.2023 15:38:25

7.6.3.4. Measurement Results – Vertical – Y-Axis



Date: 29.MAR.2023 15:47:54

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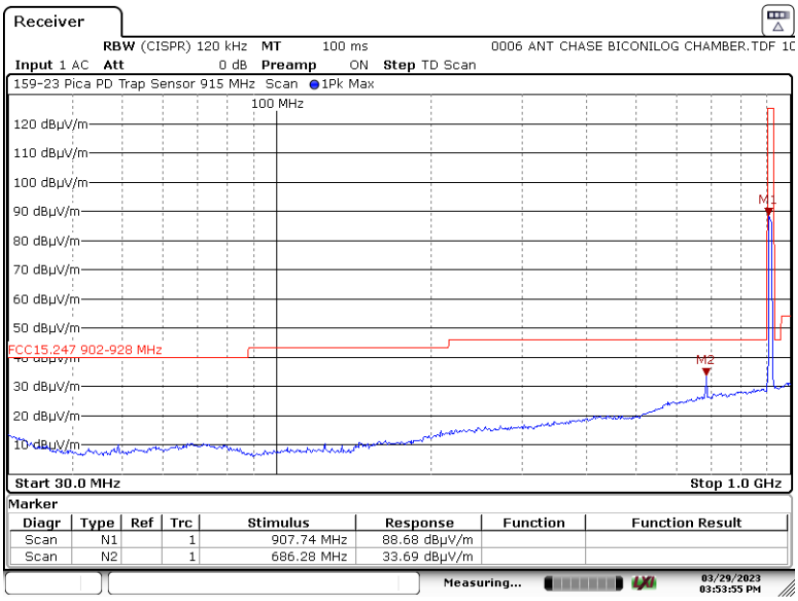
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

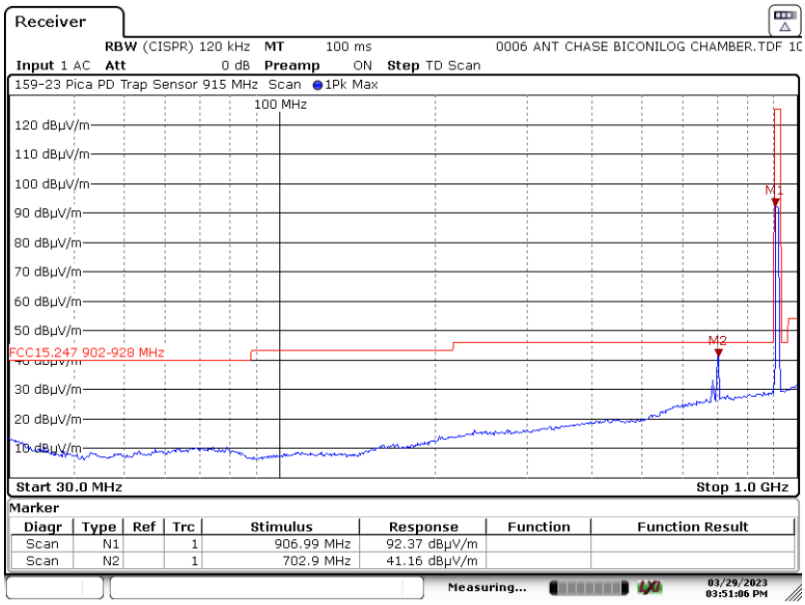
7.6.3. Spurious Radiated Emissions (30 MHz to 1 GHz) Test Results

7.6.3.5. Measurement Results – Horizontal – Z-Axis



Date: 29.MAR.2023 15:53:55

7.6.3.6. Measurement Results – Vertical – Z-Axis



Date: 29.MAR.2023 15:51:06

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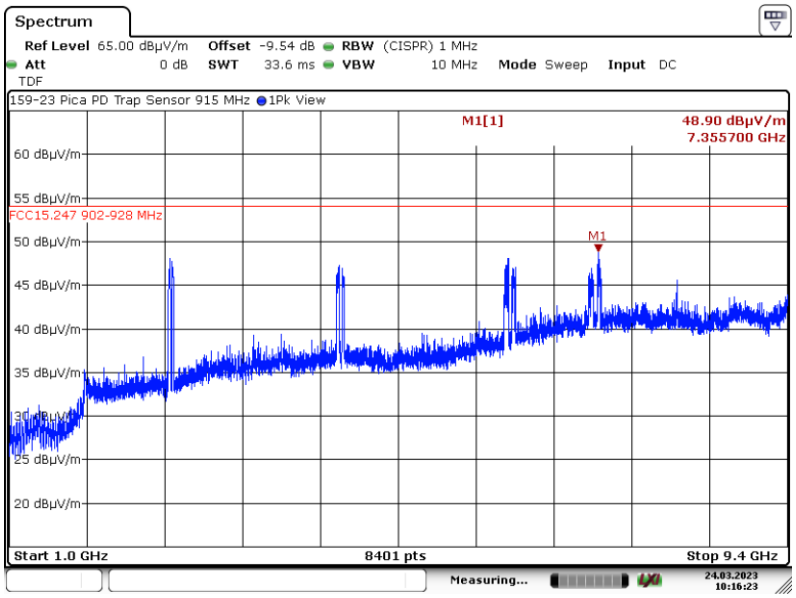
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

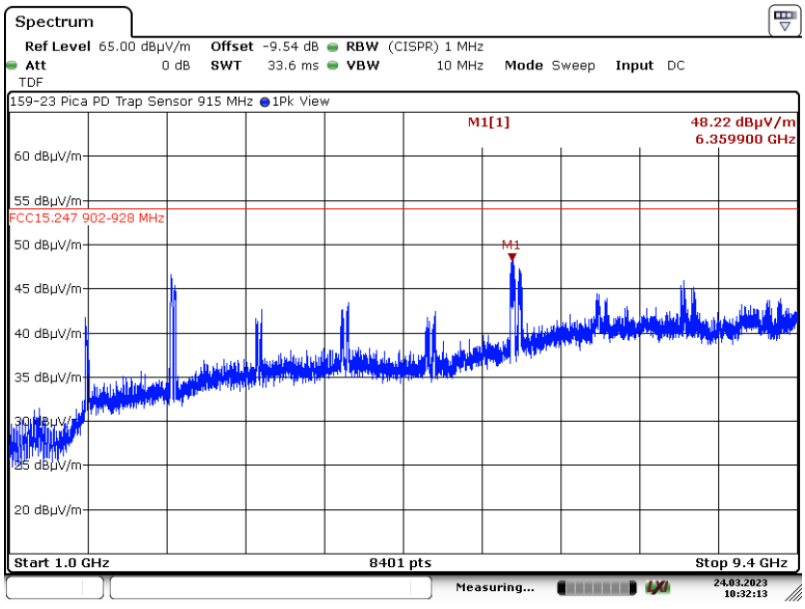
7.6.4. Spurious Radiated Emissions (1 to 9.4 GHz) Test Results

7.6.4.1. Measurement Results – Horizontal – X-Axis



Date: 24.MAR.2023 10:16:23

7.6.4.2. Measurement Results – Vertical – X-Axis



Date: 24.MAR.2023 10:32:13

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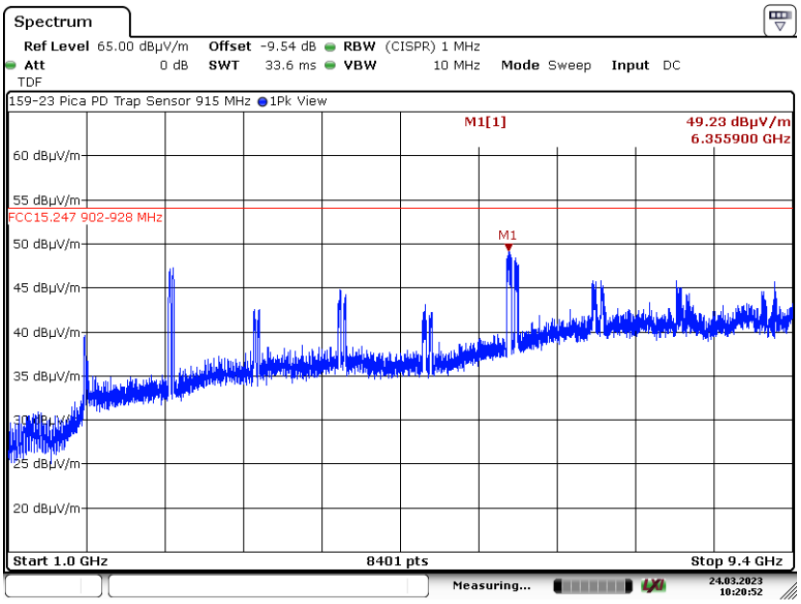
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

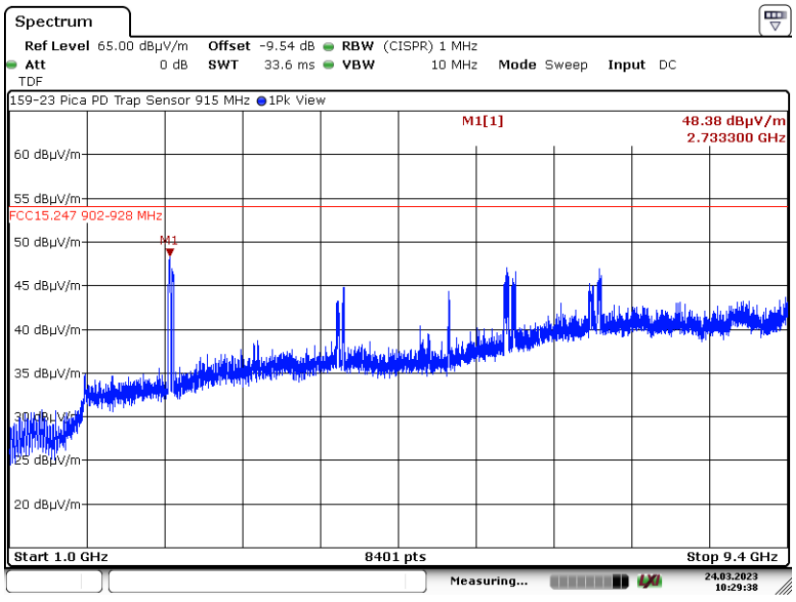
7.6.4. Spurious Radiated Emissions (1 to 9.4 GHz) Test Results

7.6.4.3. Measurement Results – Horizontal – Y-Axis



Date: 24.MAR.2023 10:20:52

7.6.4.4. Measurement Results – Vertical – Y-Axis



Date: 24.MAR.2023 10:29:39

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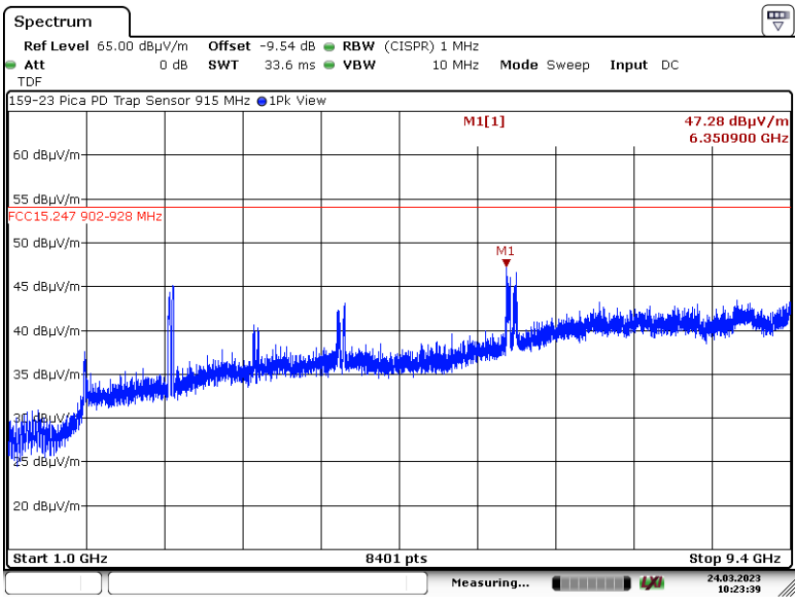
7. Measurement Data (continued)

7.6. Spurious Radiated Emissions (30 kHz to 9.4 GHz) (continued)

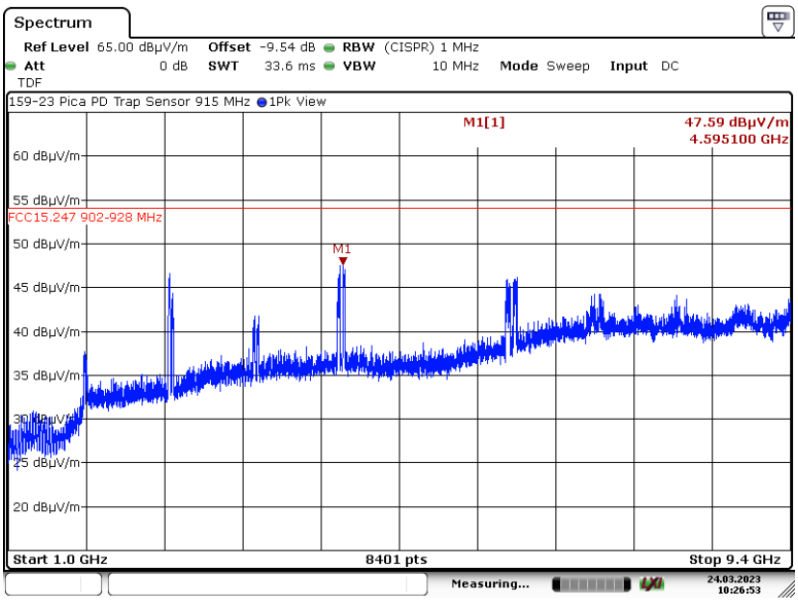
7.6.4. Spurious Radiated Emissions (1 to 9.4 GHz) Test Results

7.6.4.5. Measurement Results – Horizontal – Z-Axis



Date: 24.MAR.2023 10:23:39

7.6.4.6. Measurement Results – Vertical – Z-Axis



Date: 24.MAR.2023 10:26:53

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7. Measurement Data (continued)

7.7. Spurious Radiated Emissions – Harmonic Emissions

Notes: 1. Harmonic emissions detailed in the following tables represent the frequencies that fall within the restricted bands of operation per FCC Part 15.205.

2. For each emission, the worst-case polarity is tabled.

7.7.1. Spurious Radiated Emissions (Harmonic Measurements) Test Results

7.7.1.1. Lowest Frequency (906.00 MHz)

Freq. (MHz)	Field Strength (dBµV/m)		Limit (dBµV/m)		Margin (dBµV/m)		Antenna Polarity (H/V)	Result
	Peak	Average	Peak	Average	Peak	Average		
2718.00	53.67	44.94	74.00	54.00	-20.33	-9.06	V	Compliant
3624.00	49.10	37.95	74.00	54.00	-24.90	-16.05	H	Compliant
4530.00	51.92	41.30	74.00	54.00	-22.08	-12.70	H	Compliant
5436.00	50.54	39.40	74.00	54.00	-23.46	-14.60	V	Compliant
8154.00	55.63	42.34	74.00	54.00	-18.37	-11.66	V	Compliant
9060.00	52.51	40.83	74.00	54.00	-21.49	-13.17	H	Compliant

7.7.1.2. Middle Frequency (912.75 MHz)

Freq. (MHz)	Field Strength (dBµV/m)		Limit (dBµV/m)		Margin (dBµV/m)		Antenna Polarity (H/V)	Result
	Peak	Average	Peak	Average	Peak	Average		
2738.25	52.22	44.37	74.00	54.00	-21.78	-9.63	H	Compliant
3651.00	49.64	38.08	74.00	54.00	-24.36	-15.92	H	Compliant
4563.75	52.65	43.40	74.00	54.00	-21.35	-10.60	V	Compliant
7302.00	53.48	42.50	74.00	54.00	-20.52	-11.50	V	Compliant
8214.75	54.89	43.00	74.00	54.00	-19.11	-11.00	H	Compliant
9127.50	52.67	40.38	74.00	54.00	-21.33	-13.62	V	Compliant

7.7.1.3. Highest Frequency (923.50 MHz)

Freq. (MHz)	Field Strength (dBµV/m)		Limit (dBµV/m)		Margin (dBµV/m)		Antenna Polarity (H/V)	Result
	Peak	Average	Peak	Average	Peak	Average		
2770.50	51.66	43.12	74.00	54.00	-22.34	-10.88	V	Compliant
3694.00	49.00	38.67	74.00	54.00	-25.00	-15.33	V	Compliant
4617.50	53.35	44.06	74.00	54.00	-20.65	-9.94	V	Compliant
7388.00	53.97	43.07	74.00	54.00	-20.03	-10.93	V	Compliant
8311.50	55.90	42.55	74.00	54.00	-18.10	-11.45	V	Compliant

[1] The tabled frequencies are those listed in the restricted bands of operation.
[2] All correction factors are stored in the spectrum analyzer and applied to this column entry.

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7. Measurement Data (continued)

7.8. Conducted Emissions

Requirement: 15.207 With certain exceptions, an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dBµV)	
	Quasi-Peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5.0	56	46
5.0 to 30.0	60	50
* Decreases with the logarithm of the frequency.		

Procedure: This test was performed in accordance with the procedure detailed in ANSI C63.10-2013, Section 6.2: Standard test method for ac power-line conducted emissions from unlicensed wireless devices.

Test Notes: The device was tested using the support equipment laptop.

Results: The device under test meets the FCC Part 15.207 test requirements.

Measurement & Equipment Setup

Test Date:	N/A
Test Engineer:	N/A
Site Temperature (°C):	N/A
Relative Humidity (%RH):	N/A
Frequency Range:	0.15 MHz to 30 MHz
EMI Receiver IF Bandwidth:	9 kHz
EMI Receiver Avg Bandwidth:	>= 3 * IF BW (RBW)
Detector Functions:	Peak, Quasi-Peak & Average

Note: EUT is powered via AA Batteries which are not rechargeable

Sample Calculation: Final Result (dBµV) = Measurement Value (dBµV) + LISN Insertion Loss (dB) + Cable Loss (dB).

Note: All correction factors are loaded into the measurement instrument prior to testing to determine the final result.

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8. Test Site Description

Compliance Worldwide is located at 357 Main Street in Sandown, New Hampshire. The test sites at Compliance Worldwide are used for conducted and radiated emissions testing in accordance with the Federal Communications Commission (FCC) and Industry Canada standards. Through our American Association for Laboratory Accreditation (A2LA) ISO Guide 17025 Accreditation our test sites are designated with the FCC (designation number **US1091**), Industry Canada (file number **IC 3023A-1)** and VCCI (Member number 3168) under registration number A-0274.

Compliance Worldwide is also designated as a Phase 1 CAB under APEC-MRA (US0132) for Australia/New Zealand AS/NZS CISPR 32, Chinese-Taipei (Taiwan) BSMI CNS 13438 and Korea (RRA) KN 11, KN 13, KN 14-1, KN 22, KN 32, KN 61000-6-3, KN 61000-6-4.

The radiated emissions test site is a 3 and 10 meter enclosed open area test site (OATS). Personnel, support equipment and test equipment are located in the basement beneath the OATS ground plane.

The conducted emissions site is part of a 16' x 20' x 12' ferrite tile chamber and uses one of the walls for the vertical ground plane. A second conducted emissions site is also located in the basement of the OATS site with a 2.3 x 2.5 meter ground plane and a 2.4 x 2.4 meter vertical wall.

The radiated emissions test site for measurements above 1GHz is a 3 Meter open area test site (OATS) with a 3.6 by 3.6 meter anechoic absorber floor patch to achieve a quasi-free space measurement environment per ANSI C63.4/C63.10 and CISPR 16-1-4 standards.

The sites are designed to test products or systems 1.5 meters W x 1.5 meters L x 2.0 meters H, floor standing or table top.

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9. Test Setup Photographs (continued)

9.1 Radiated Emissions Front 30 kHz to 30 MHz

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9. Test Setup Photographs (continued)

9.2. Radiated Emissions Rear 30 kHz to 30 MHz

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9. Test Setup Photographs

9.3 Radiated Emissions Front 30 to 1000 MHz

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9. Test Setup Photographs

9.4 Radiated Emissions Rear 30 to 1000 MHz

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9. Test Setup Photographs (continued)

9.5 Radiated Emissions Front 1 GHz to 9.4 GHz

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9. Test Setup Photographs (continued)

9.6 Radiated Emissions Rear 1 GHz to 9.4 GHz

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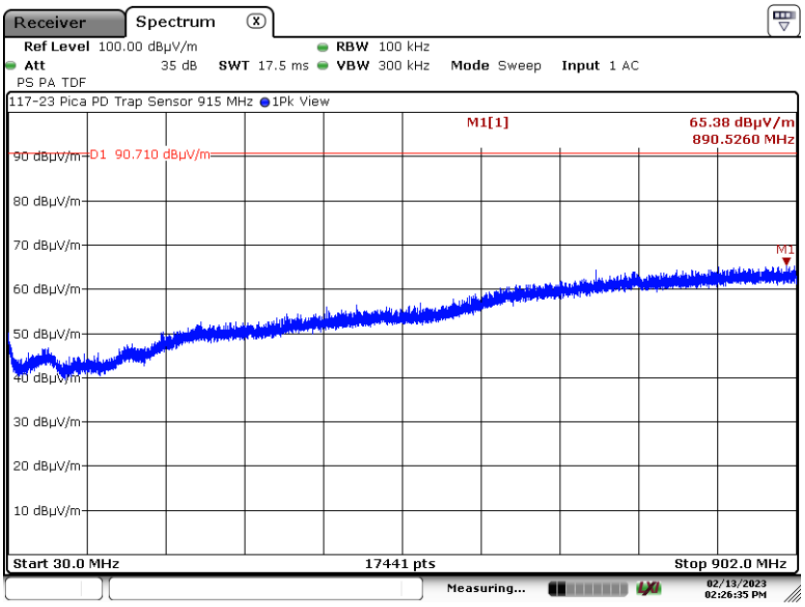
Appendix A

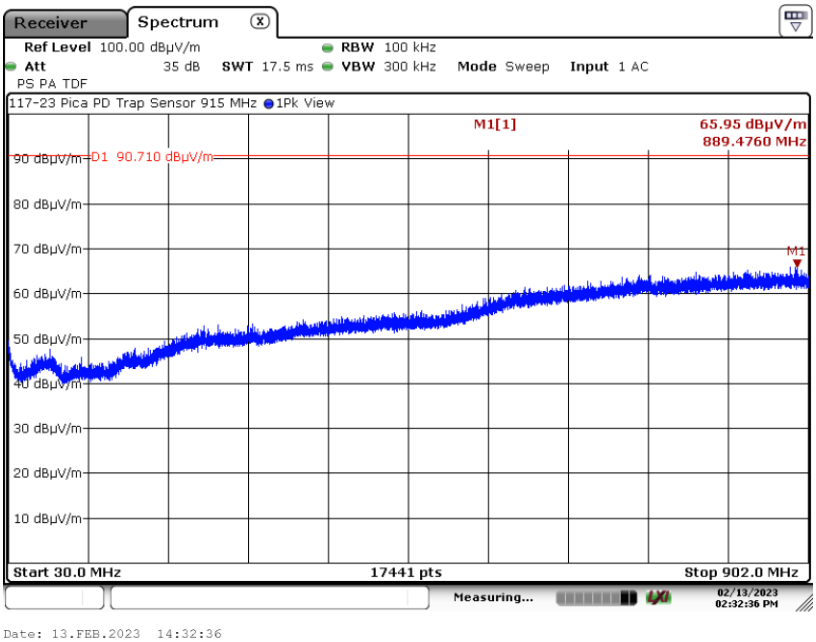
A1. Emissions in Non-restricted Frequency Bands (30 MHz to 9.28 GHz)

A1.1. Emissions in Non-restricted Frequency Bands (30 MHz – 9.28 GHz) Test Results

A1.1.1. Measurement Results, 30 MHz – 902 MHz – X-Axis Horizontal



A1.1.2. Measurement Results, 30 MHz – 902 MHz – X-Axis Vertical



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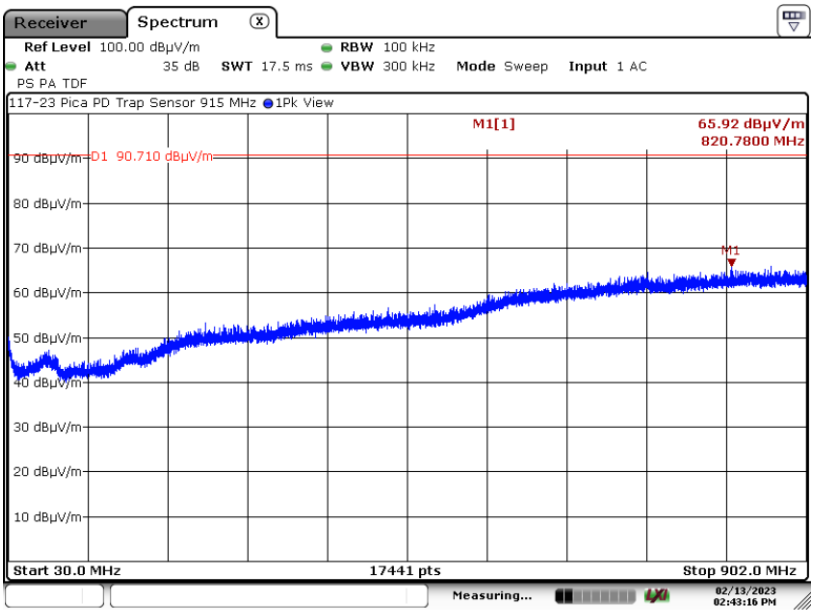
Appendix A

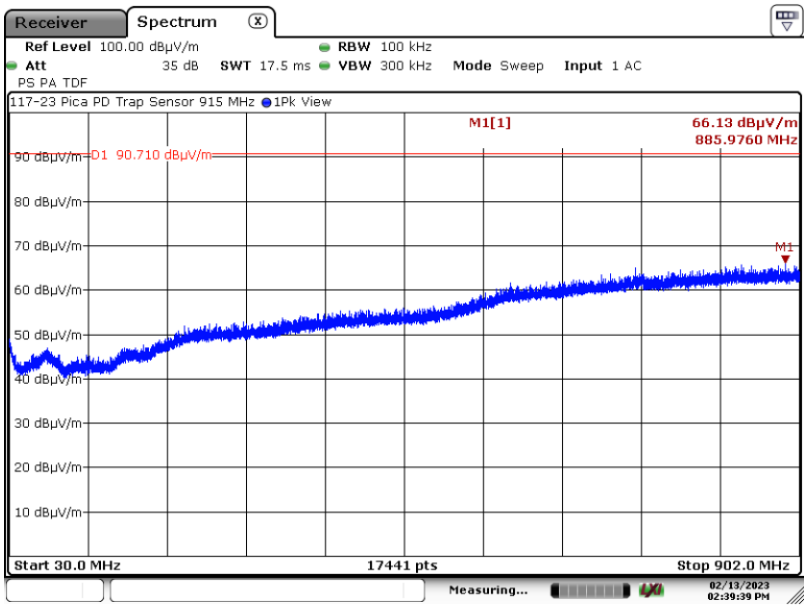
A1. Emissions in Non-restricted Frequency Bands (30 MHz to 9.28 GHz)

A1.1. Emissions in Non-restricted Frequency Bands (30 MHz – 9.28 GHz) Test Results

A1.1.3. Measurement Results, 30 MHz – 902 MHz – Y-Axis Horizontal



A1.1.4. Measurement Results, 30 MHz – 902 MHz – Y-Axis Vertical



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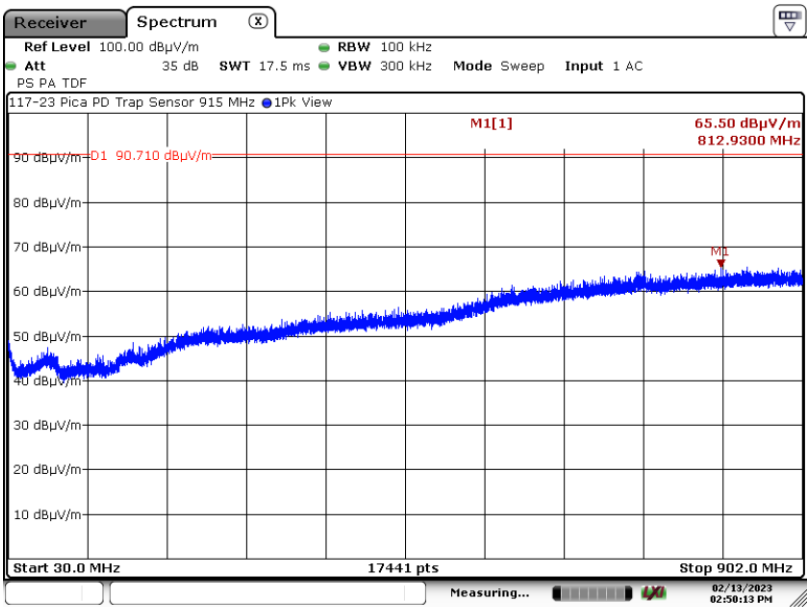
Appendix A

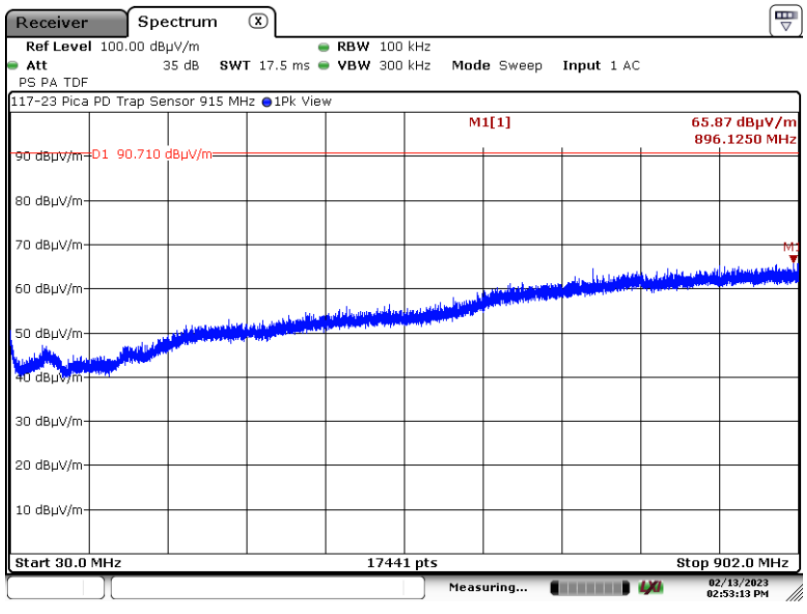
A1. Emissions in Non-restricted Frequency Bands (30 MHz to 9.28 GHz)

A1.1. Emissions in Non-restricted Frequency Bands (30 MHz – 9.28 GHz) Test Results

A1.1.5. Measurement Results, 30 MHz – 902 MHz – Z-Axis Horizontal



A1.1.6. Measurement Results, 30 MHz – 902 MHz – Z-Axis Vertical



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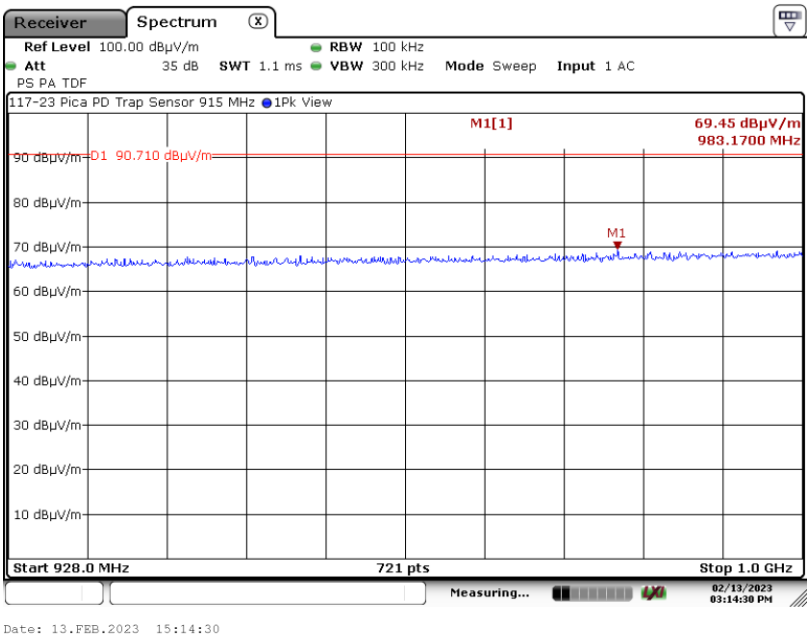
Appendix A

A1. Emissions in Non-restricted Frequency Bands (30 MHz to 9.28 GHz)

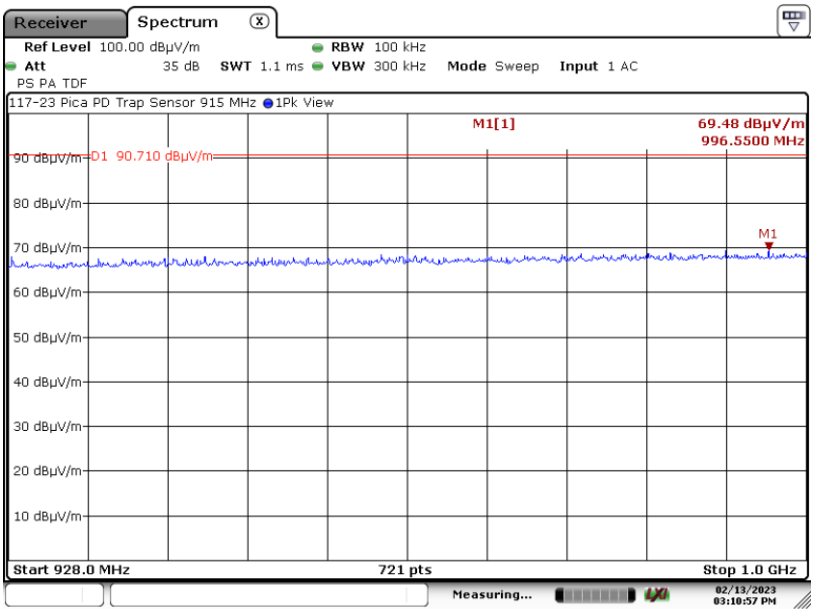
A1.1. Emissions in Non-restricted Frequency Bands (30 MHz – 9.28 GHz) Test Results

A1.1.7. Measurement Results, 928 MHz – 1000 MHz – X-Axis Horizontal



Date: 13.FEB.2023 15:14:30

A1.1.8. Measurement Results, 928 MHz – 1000 MHz – X-Axis Vertical



Date: 13.FEB.2023 15:10:58

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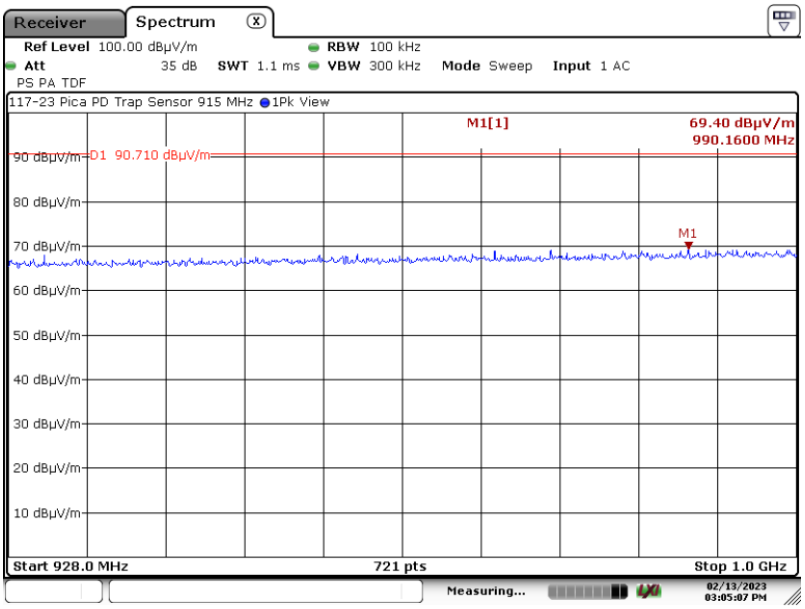
Appendix A

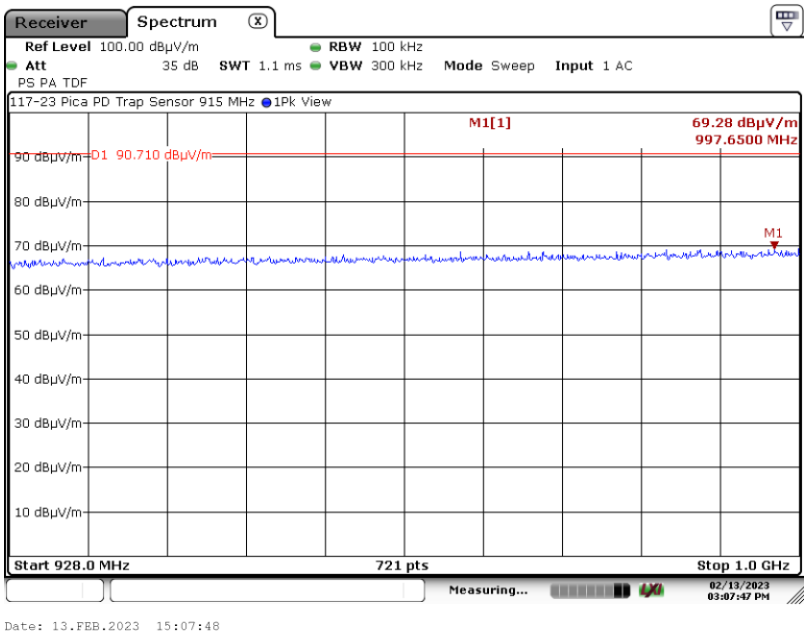
A1. Emissions in Non-restricted Frequency Bands (30 MHz to 9.28 GHz)

A1.1. Emissions in Non-restricted Frequency Bands (30 MHz – 9.28 GHz) Test Results

A1.1.9. Measurement Results, 928 MHz – 1000 MHz – Y-Axis Horizontal



A1.1.10. Measurement Results, 928 MHz – 1000 MHz – Y-Axis Vertical



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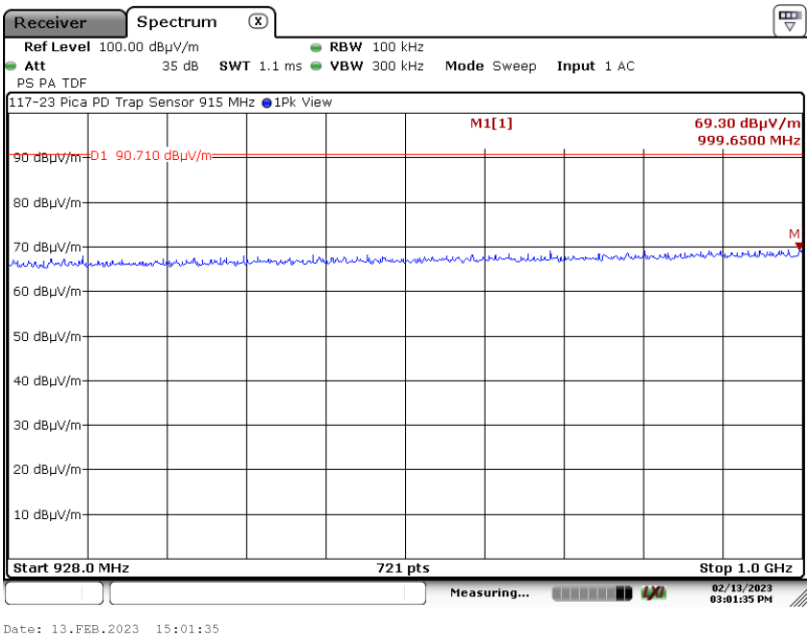
Appendix A

A1. Emissions in Non-restricted Frequency Bands (30 MHz to 9.28 GHz)

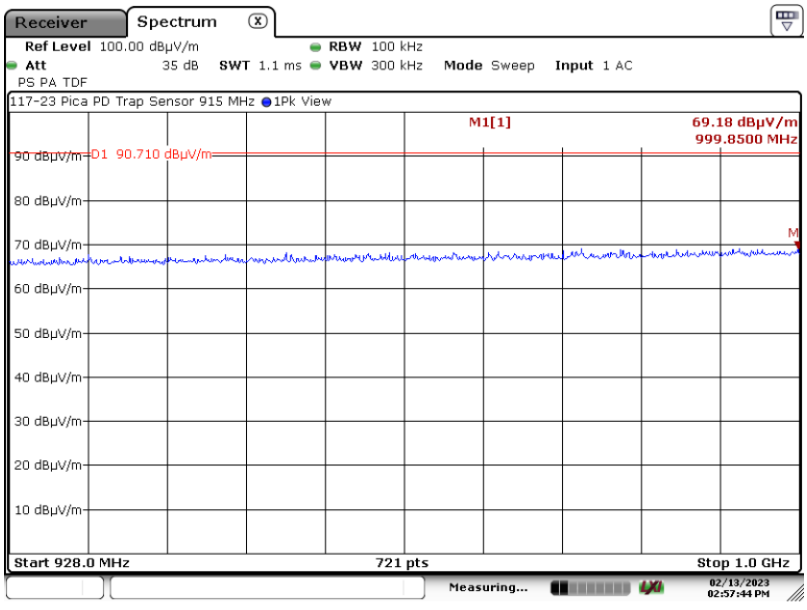
A1.1. Emissions in Non-restricted Frequency Bands (30 MHz – 9.28 GHz) Test Results

A1.1.11. Measurement Results, 928 MHz – 1000 MHz – Z-Axis Horizontal



Date: 13.FEB.2023 15:01:35

A1.1.12. Measurement Results, 928 MHz – 1000 MHz – Z-Axis Vertical



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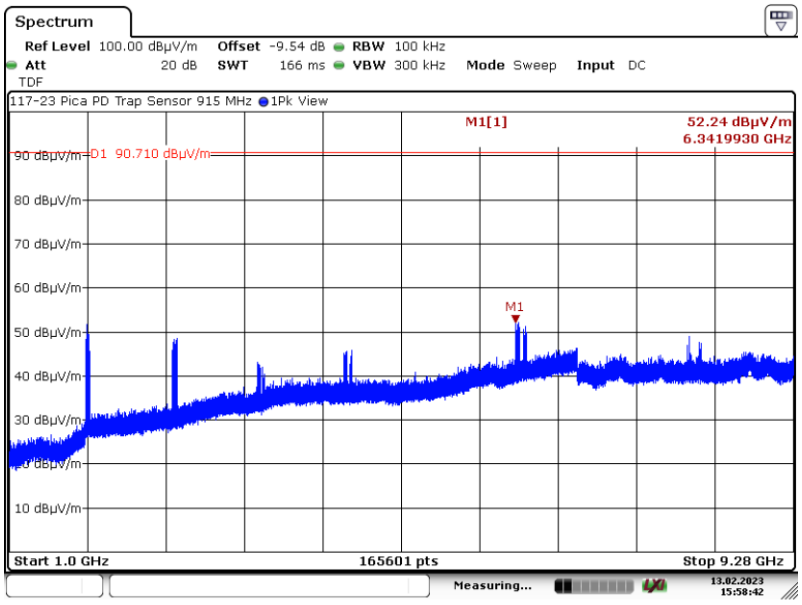
Appendix A

A1. Emissions in Non-restricted Frequency Bands (30 MHz to 9.28 GHz) (continued)

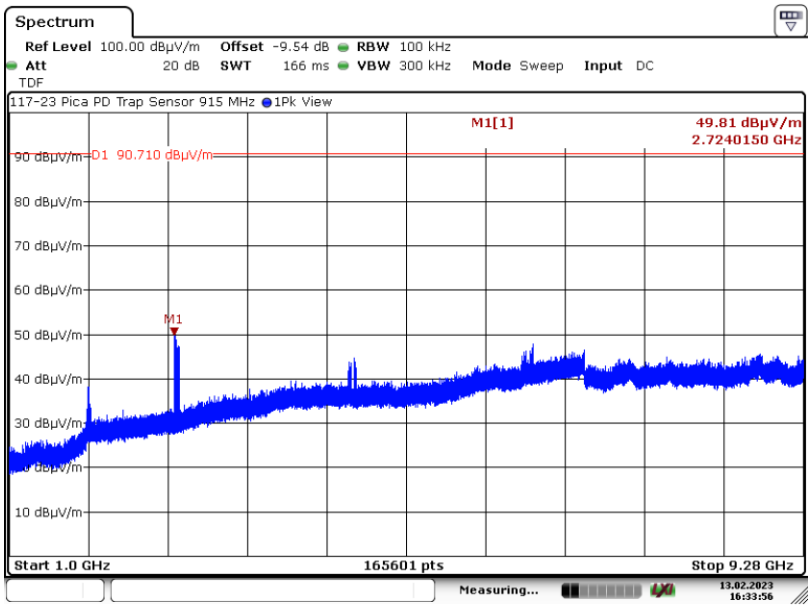
A1.1. Emissions in Non-restricted Frequency Bands (30 MHz – 9.28 GHz) Test Results

A1.1.13. Measurement Results, 1 to 9.28 GHz – X-Axis Horizontal



Date: 13.FEB.2023 15:58:41

A1.1.14. Measurement Results, 1 – 9.28 GHz – X-Axis Vertical



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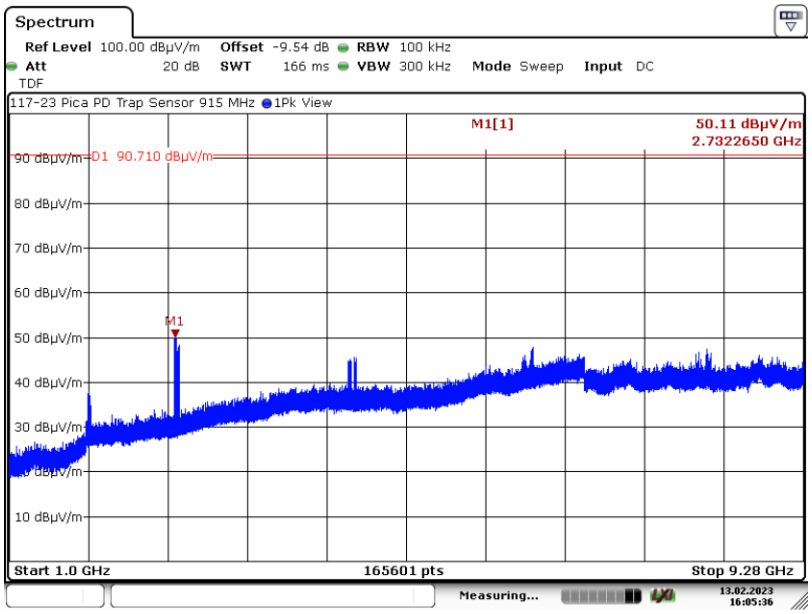
Appendix A

A1. Emissions in Non-restricted Frequency Bands (30 MHz to 9.28 GHz) (continued)

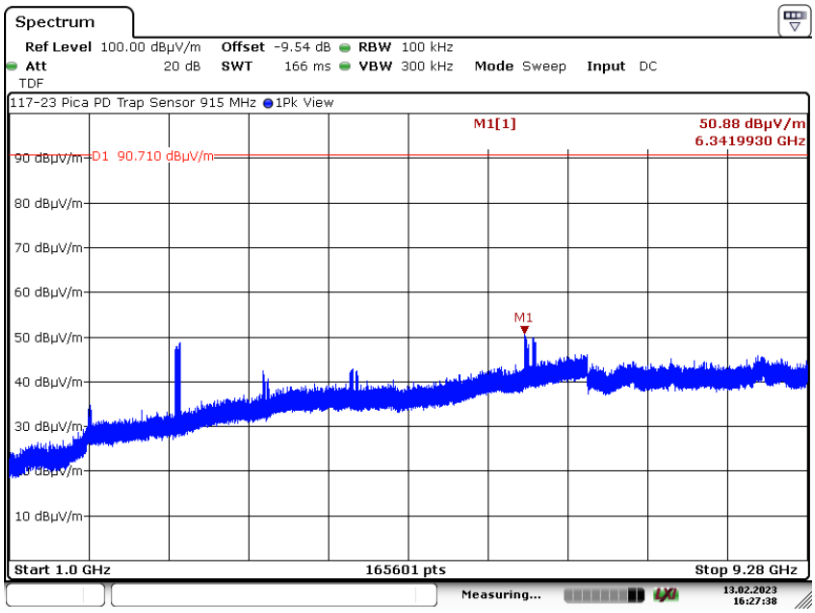
A1.1. Emissions in Non-restricted Frequency Bands (30 MHz – 9.28 GHz) Test Results

A1.1.15. Measurement Results, 1 to 9.28 GHz – Y-Axis Horizontal



Date: 13.FEB.2023 16:05:36

A1.1.16. Measurement Results, 1 – 9.28 GHz – Y-Axis Vertical



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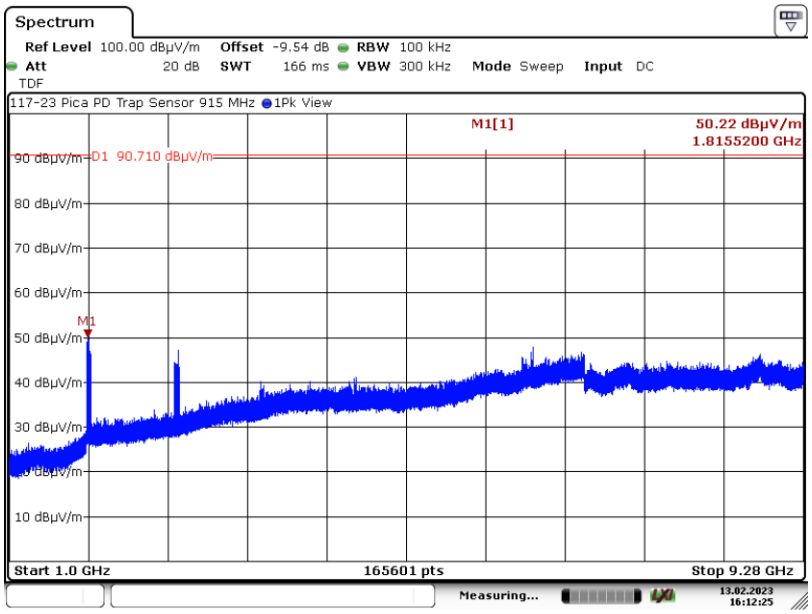
Appendix A

A1. Emissions in Non-restricted Frequency Bands (30 MHz to 9.28 GHz) (continued)

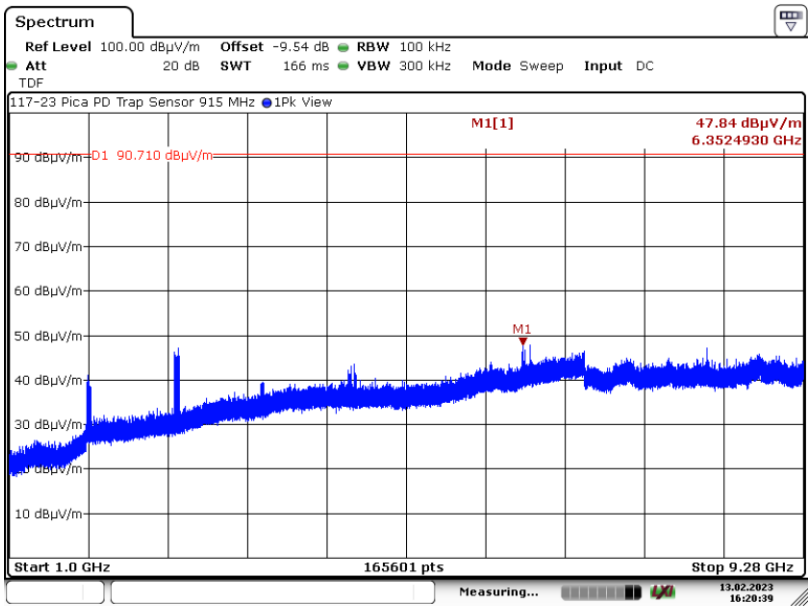
A1.1. Emissions in Non-restricted Frequency Bands (30 MHz – 9.28 GHz) Test Results

A1.1.17. Measurement Results, 1 to 9.28 GHz – Z-Axis Horizontal



Date: 13.FEB.2023 16:12:24

A1.1.18. Measurement Results, 1 – 9.28 GHz – Z-Axis Vertical



Date: 13.FEB.2023 16:20:39

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