TEST REPORT

Report Number. : NBK14707690A.V1

Applicant	:	Elkay MFG CO 1333 Butterfield Rd., Suite 200 Downers Grove, IL 60515, USA
Model	:	LBWD00WHC
FCC ID	:	2AC8R-NFC2
IC	:	12430A-NFC2
EUT Description	:	Water Bottle Filler
Test Standard(s)	:	47 CFR PART 15 SUBPART C RSS-210 ISSUE 10 +A1

Date Of Issue:
2023-04-21

Prepared by:
UL LLC
333 Pfingsten Road
Northbrook, IL 60062, USA
TEL: (847) 272-8800

ACCREDITED
CERT #0751.07

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2023-04-21		BM

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Elkay MFG CO
1333 Butterfield Rd., Suite 200
Downers Grove, IL 60515, USA

EUT DESCRIPTION: Water Bottle Filler

MODEL: LBWD00WHC

SERIAL NUMBER: 4302210163

SAMPLE RECEIPT DATE: 2023-03-15

DATE TESTED: 2023-03-15 to 2023-03-23

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15.225 SUBPART C	Complies
ISED RSS-210 Issue 10 + A1, Annex B	Complies
ISED RSS-GEN Issue 5 + A1 +A2	Complies

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released For
UL LLC By:

Mike Antola
Staff Engineer
UL LLC

Prepared By:

Bart Mucha
Test Engineer
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 5+A1+A2, and RSS-210 Issue 10. FCC KDB174176

3. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, Laboratory Code 0751.07, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building: 333 Pfingsten Road Northbrook, IL 60062	US0065	2180A	152210

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U_{Lab}
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance Loop, 9KHz to 30 MHz	2.52 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.66 dB
Worst Case Frequency Error with Spectrum Analyzer	141.16 Hz
Worst Case Occupied Bandwidth	0.09dB / 2.00%

Uncertainty figures are valid to a confidence level of 95%.

4.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a wall mounted drinking water fountain incorporating 13.56MHz near field transmitter. The water fountain comes in two different configurations. 1 – the filter with the NFC radio is built into the fountain, and 2 – the filter with NFC radio is connected remotely. Both configurations were tested. For Canada eut is identified as PMN: ezH2O, HVIN: NFC2

5.2. MAXIMUM ELECTRIC FIELD STRENGHT

The transmitter has a maximum peak radiated magnetic field strength as follows:

Frequency Range (MHz)	Configuration #	Quasi-Peak or Peak dBuV/m	Measurement Distance meters
13.56	1	21.81 PK	30.00
13.56	2	34.03 QP	30.00

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an loop antenna as part of the PCB.

5.4. SOFTWARE AND FIRMWARE

The device uses a chipset where there is no control over firmware of software related to the radio.

5.5. WORST-CASE CONFIGURATION AND MODE

Configuration 1 - The radio with antenna is mounted inside the fountain in specific orientation.
Configuration 2 – The radio with antenna is mounted parallel to the filter in portrait orientation.
*for both configurations only single antenna orientation is possible.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
none	-	-	-	-

I/O CABLES

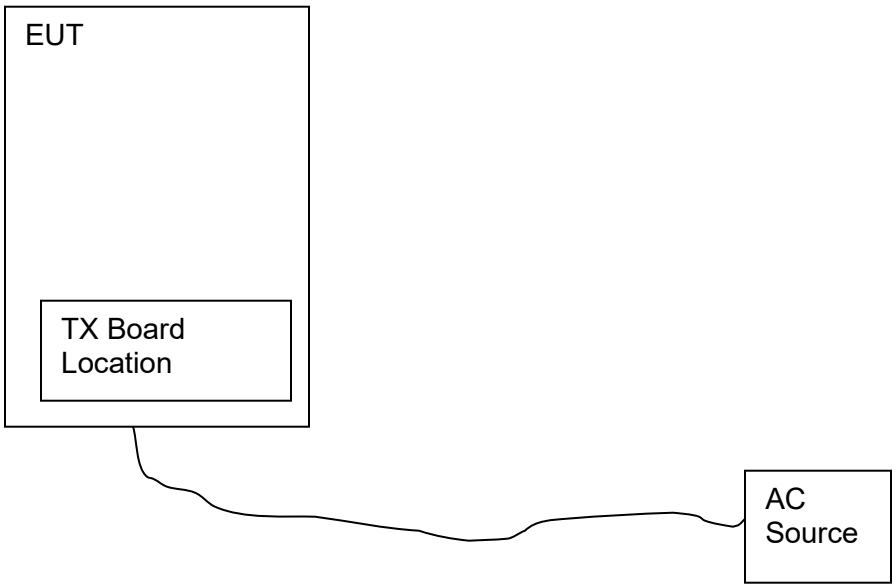
Only in Configuration 2
DC Power and Data cable connected between the main EUT controller and the TX board.

TEST SETUP

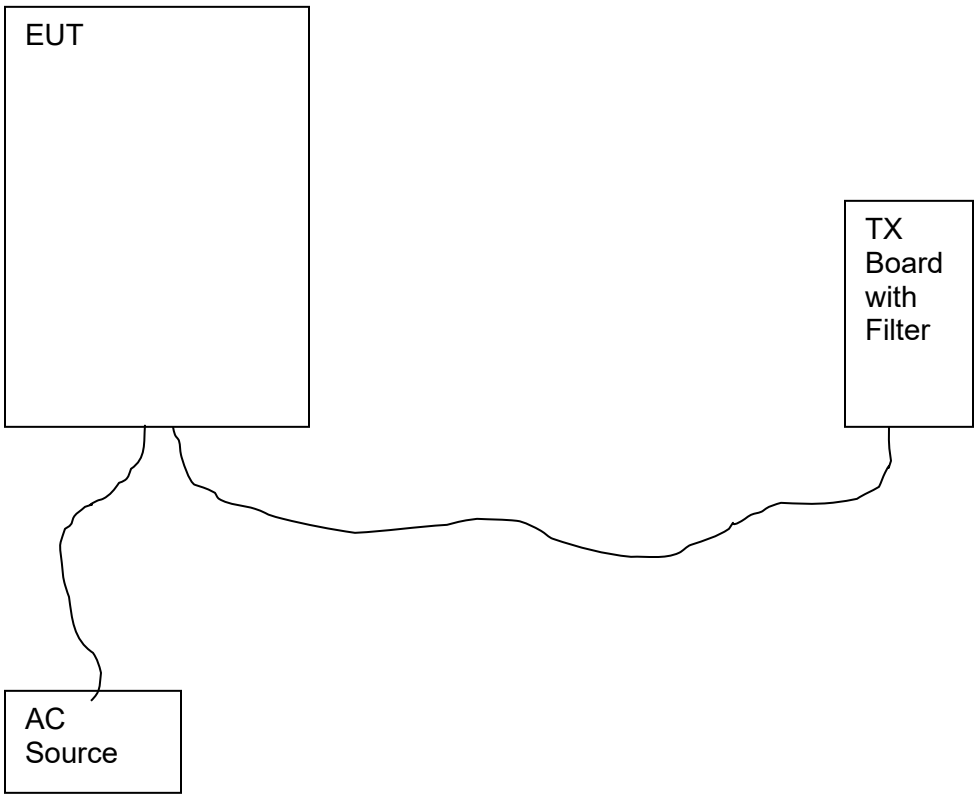
The EUT was placed on 80cm table.

SETUP DIAGRAM

CONFIGURATION 1 SETUP DIAGRAM



CONFIGURATION 2 SETUP DIAGRAM



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Line Conducted Emissions Equipment

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	Rohde & Schwarz	ESR	86711	2022-12-18	2023-12-31
Transient Limiter	Electro-Metrics	EM7600-2	19866	N/A	N/A
High-Pass Filter	Solar Electronics	2803-150	53775	N/A	N/A
Attenuator	HP	8494B	226534	N/A	N/A
LISN - L1	Solar Electronics	8602-50-TS-50-N	19808	2022-12-06	2023-12-31
LISN - L2	Solar Electronics	8602-50-TS-50-N	19806	2022-12-06	2023-12-31

Radiated Emissions Equipment

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Receiver	Rohde & Schwarz	ESCI	54598	2022-12-08	2023-12-31
Loop Antenna	EMCO	6502/1	19723	2022-12-12	2023-12-31
Hybrid Antenna	SunAR RF Motion	JB1-UN	202902	2023-02-03	2024-02-29

Frequency Stability Measurements

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Environmental Chamber	Espec	BTX-475	87492	2023-02-24	2024-02-29
Signal Analyzer	Aglient	N9030A PXA	77811	2022-12-07	2023-12-31

7. 20dB and 99% BWOCCUPIED BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 20kHz. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth and xdB BW function is utilized.

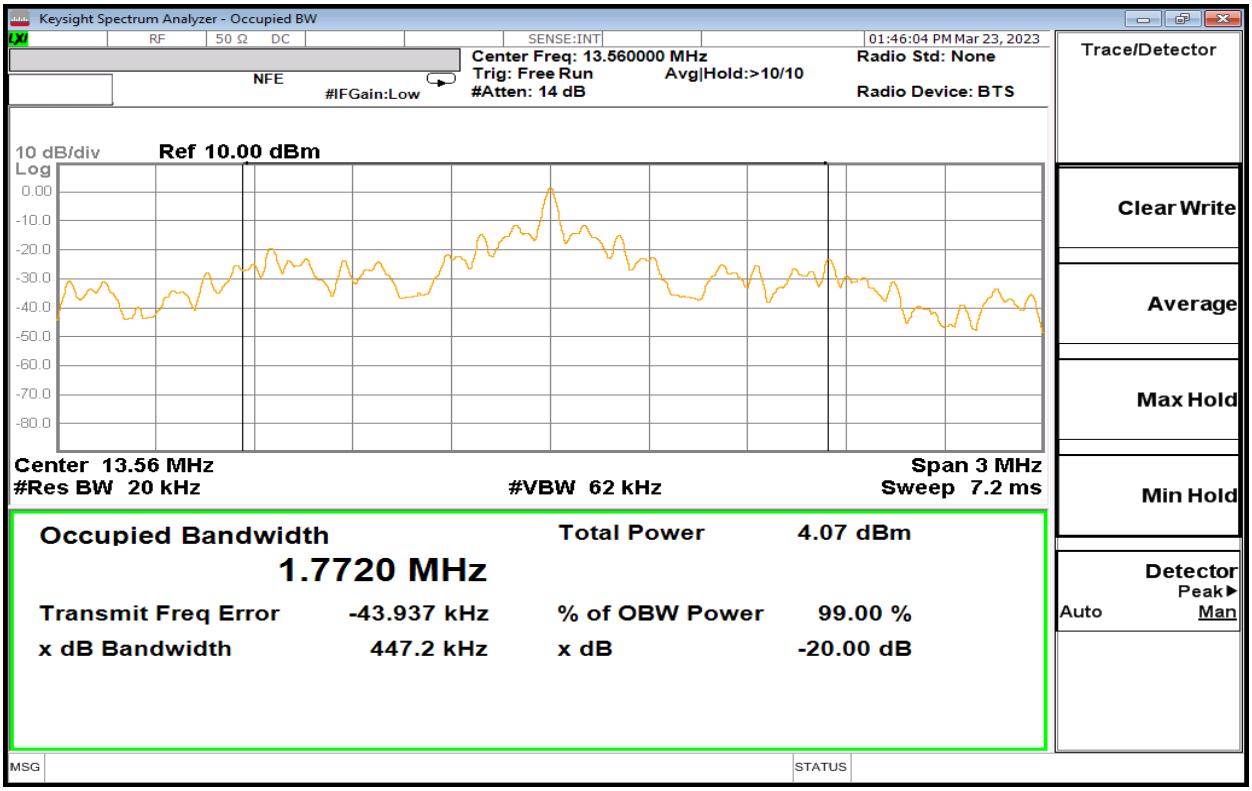
RESULTS

99% and 20dB BW

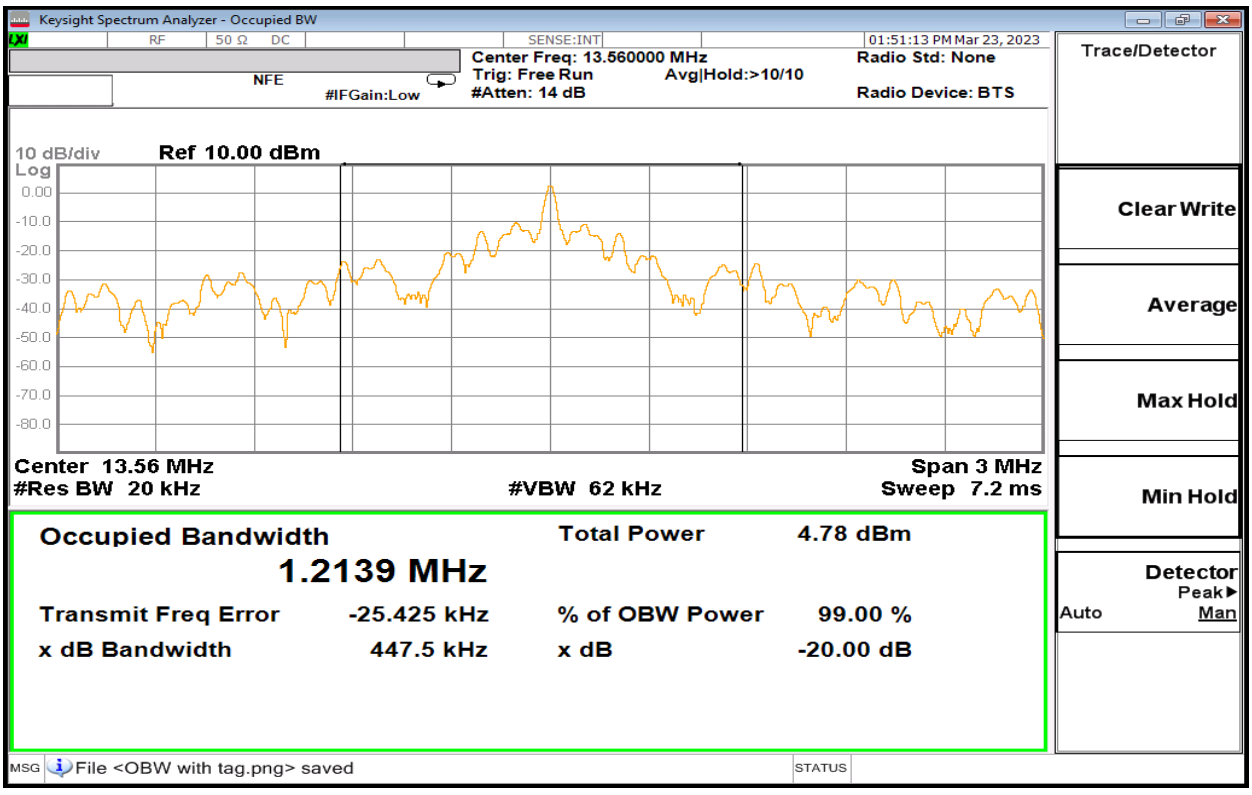
Configuration	Frequency (MHz)	99% Bandwidth (KHz)	20dB Bandwidth (KHz)
With Tag	13.56	1,772.0	447.2
Without Tag	13.56	1,213.9	447.5

7.1. Bandwidth Measurements Plots

With Tag



Without Tag



8. RADIATED EMISSION TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMIT

§15.225
IC RSS-210, Annex B.6
IC RSS-GEN, Section 8.9 (Transmitter)

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110– 14.010 MHz and shall not exceed the general radiated emission limits in § 15.209 as follows:
§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.
§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Formula for converting the filed strength from uV/m to dBuV/m is:
Limit (dBuV/m) = 20 log limit (uV/m)

Note: The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as report in the table) using free space impedance of 377 Ohms. For example, the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to Y-51.5 = Z dBuA/m, which has the same margin, W dB to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

In addition:

§15.209 (d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§15.209 (d) The provisions in §§ 15.225, measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

TEST PROCEDURE

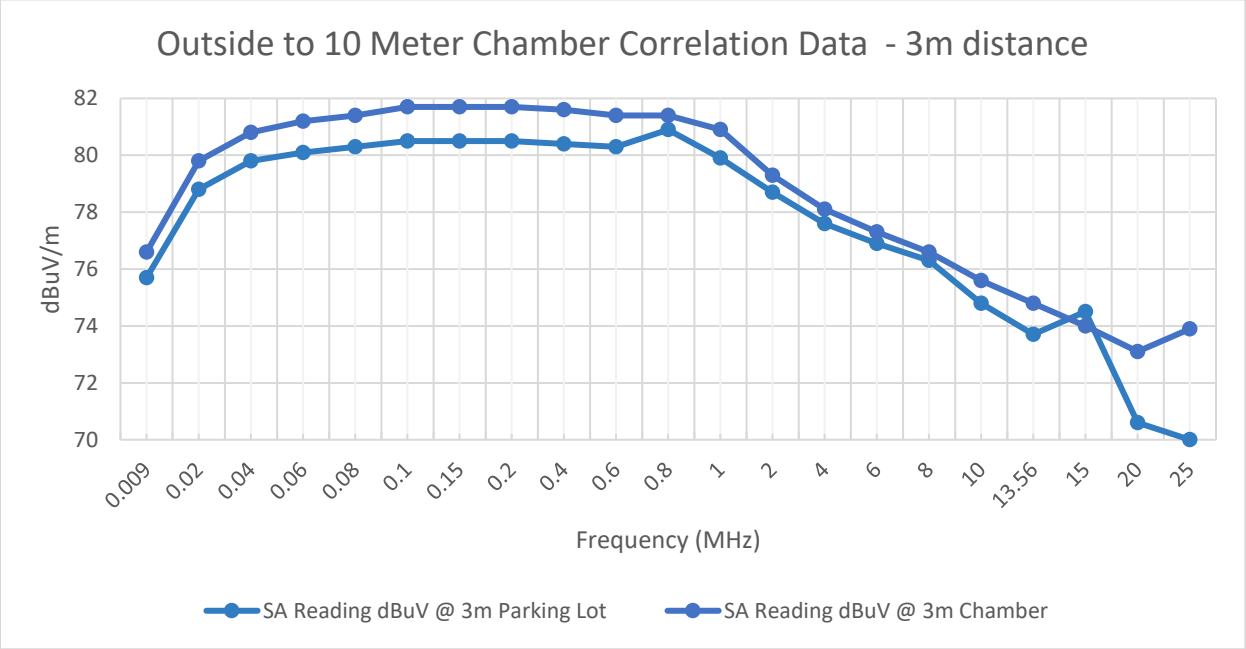
ANSI C63.10, 2013

The EUT is an intentional radiator that incorporates a digital device, the highest fundamental frequency generated or used in the device is 13.56 MHz; therefore, the frequency range was investigated from 0.009MHz to the 10^{th} harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater.

RESULTS

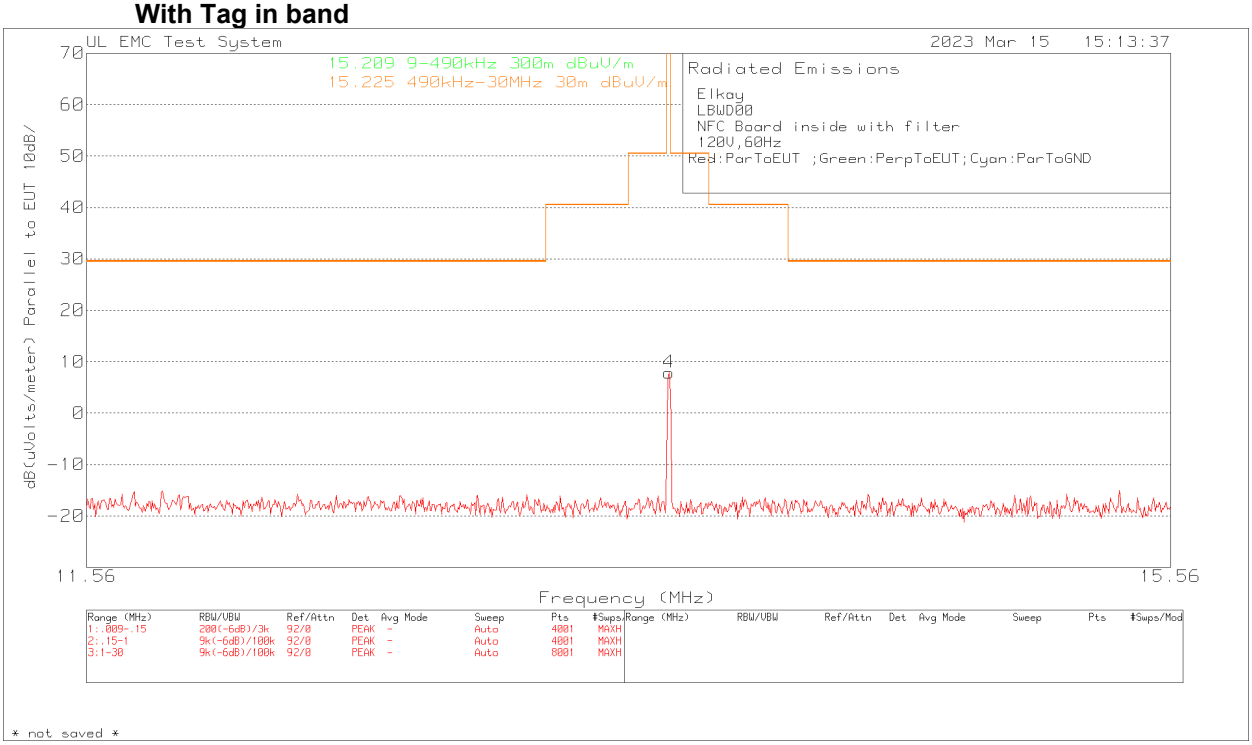
8.2. Outdoor to 10m SAC Correlation Data

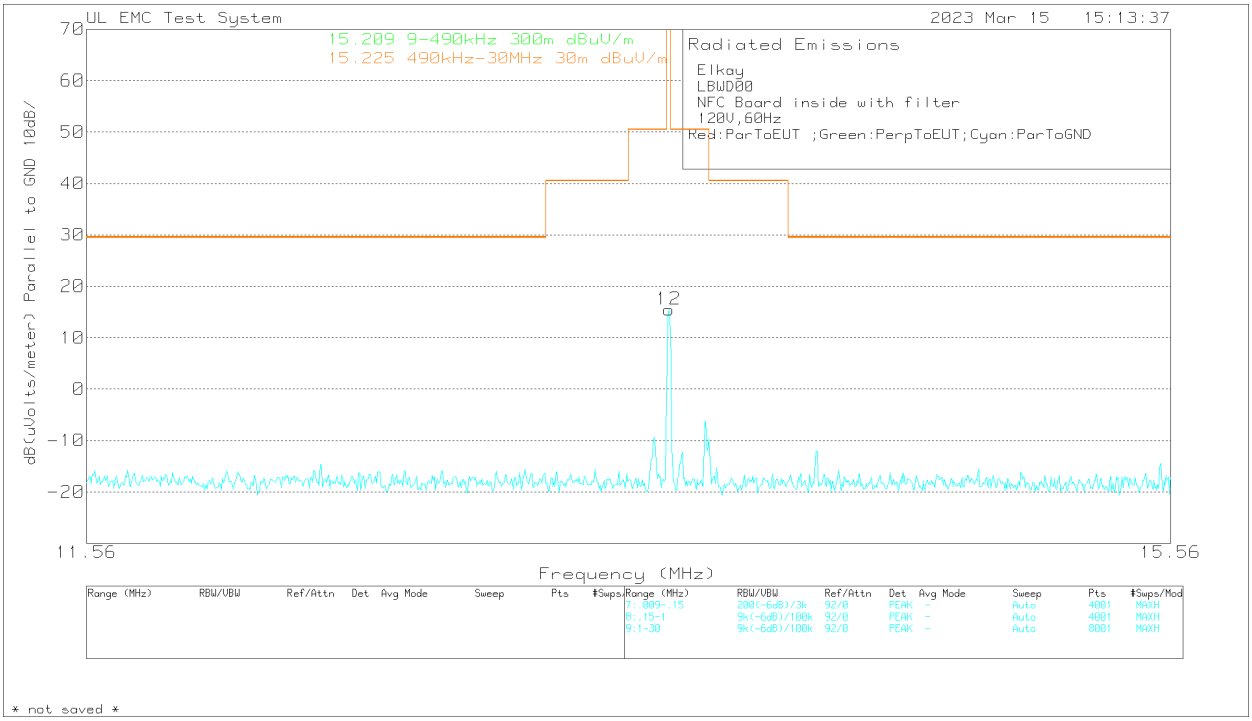
Correlation Data for measurements 9kHz-30MHz between Outside and 10m semi-anechoic chamber at Underwriter Laboratories in Northbrook, IL.



Correlation measurements were conducted using a signal source with an antenna outside in open area (parking lot). Immediately following the measurements the same setup was moved inside the 10 meter semi-anechoic chamber and the measurements were repeated. The above plot shows the difference in levels measured between outside and the 10 meter semi anechoic chamber.

8.3. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.009 - 30 MHz) – RF ID Reader Inside With Tag in band





Elkay
LBWD00
NFC Board inside with filter
120V,60Hz
Red:ParToEUT;Green:PerpToEUT;Cyan:ParToGND

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2
4	13.5606	36.04dBuV Pk	11.4	-39.6	7.84	-	84
		Azimuth:0-360			Margin (dB)	-	-76.16
8	13.5606	48.29dBuV Pk	11.4	-39.6	20.09	-	84
		Azimuth:0-360			Margin (dB)	-	-63.91
12	13.5606	43.64dBuV Pk	11.4	-39.6	15.44	-	84
		Azimuth:0-360			Margin (dB)	-	-68.56

LIMIT 1: 15.209 9-490kHz 300m dBuV/m
LIMIT 2: 15.225 490kHz-30MHz 30m dBuV/m
Pk - Peak detector

Without Tag in band

Elkay
LBWD00
NFC Board inside w/o filter
120V,60Hz
Red:ParToEUT;Green:PerpToEUT;Cyan:ParToGND

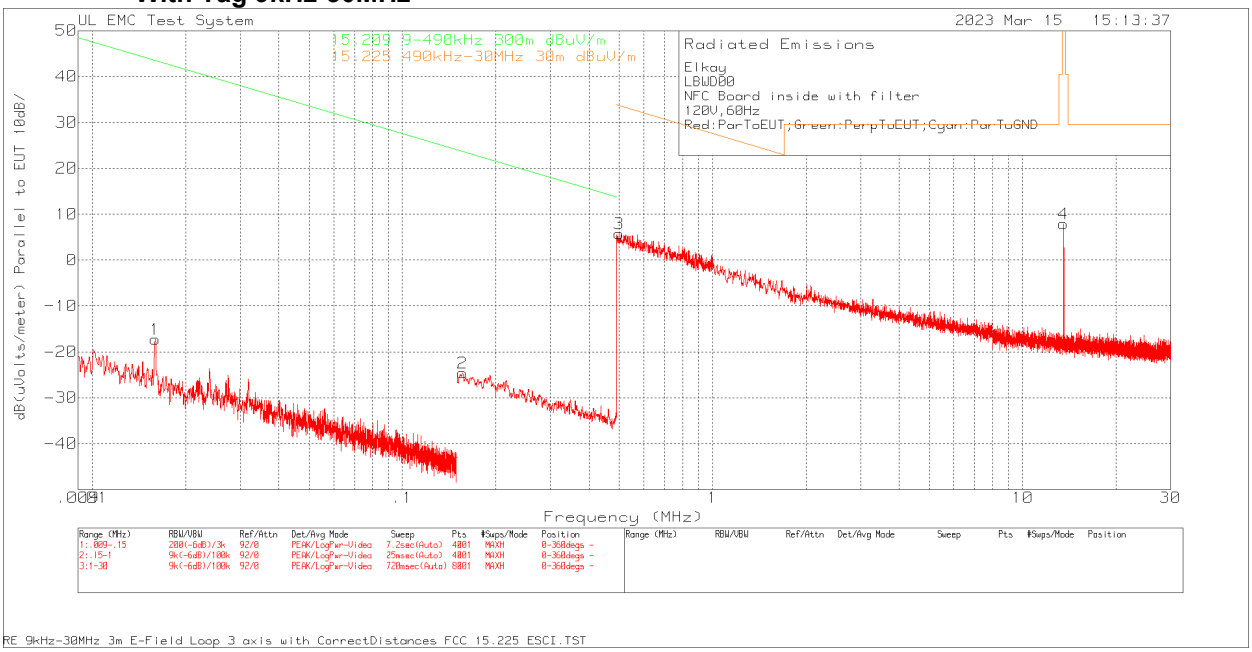
Trace Markers

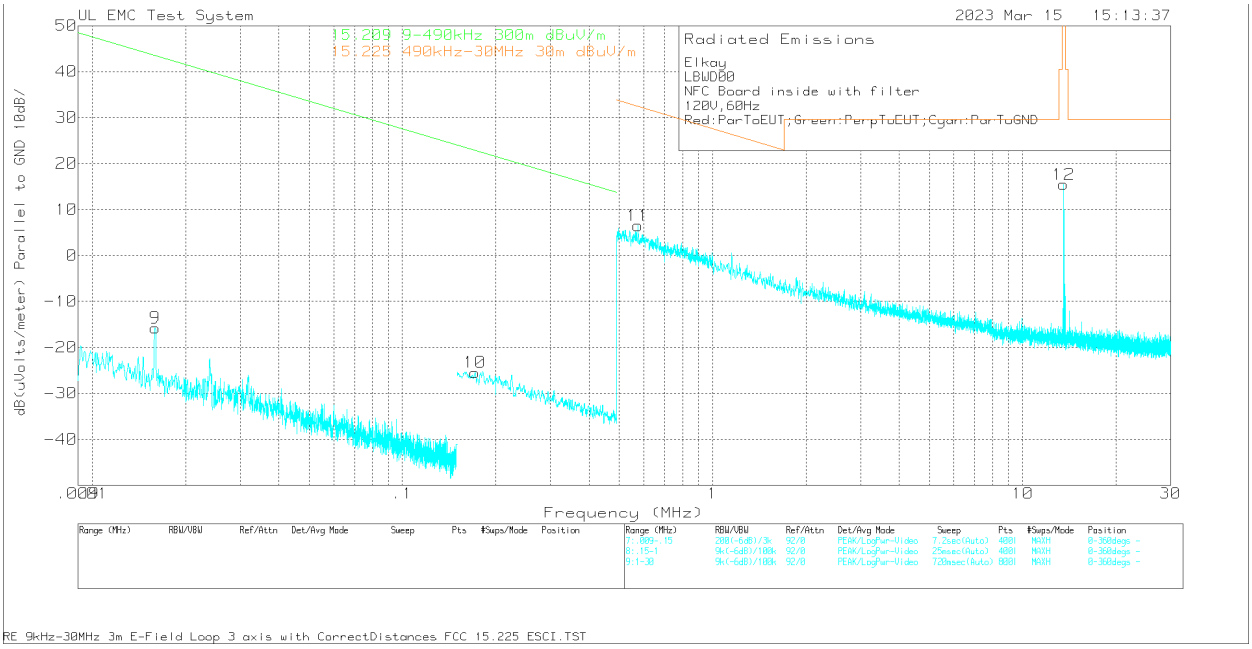
No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2
15	13.5606	39.8dBuV Pk	11.4	-39.6	11.6	-	84
		Azimuth:0-360			Margin (dB)	-	-72.4
8	13.5606	50.01dBuV Pk	11.4	-39.6	21.81	-	84
		Azimuth:0-360			Margin (dB)	-	-62.19
16	13.5606	46.43dBuV Pk	11.4	-39.6	18.23	-	84
		Azimuth:0-360			Margin (dB)	-	-65.77

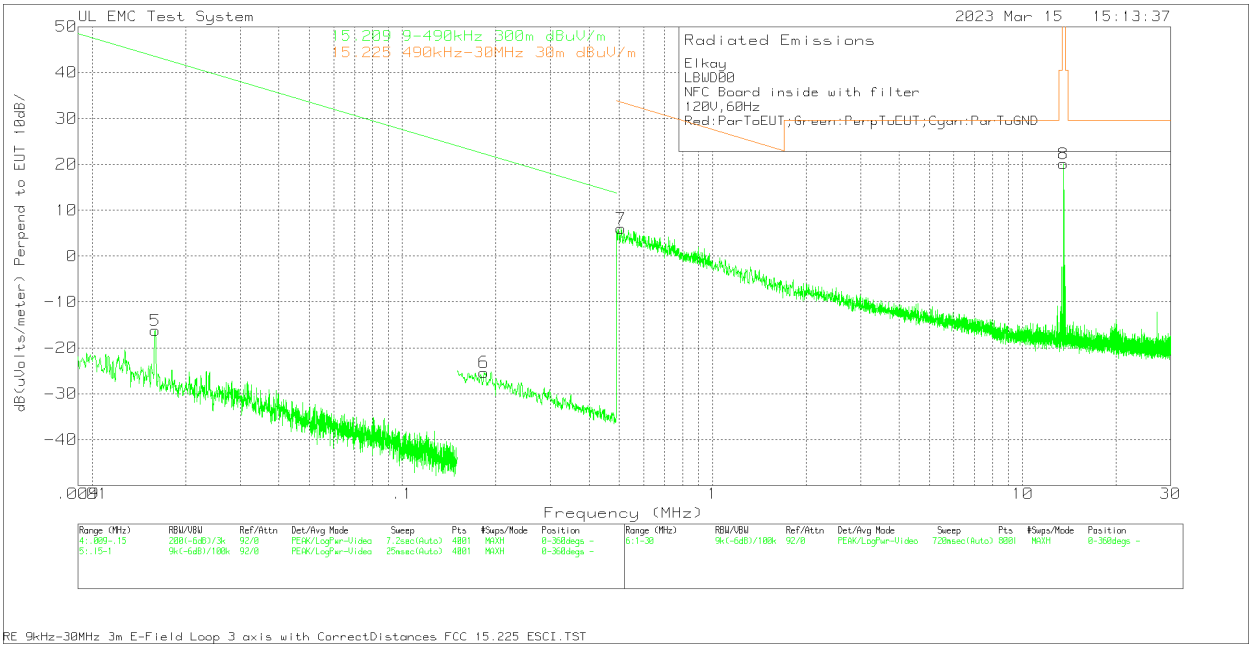
LIMIT 1: 15.209 9-490kHz 300m dBuV/m
LIMIT 2: 15.225 490kHz-30MHz 30m dBuV/m

Pk - Peak detectorPk - Peak detector

With Tag 9kHz-30MHz







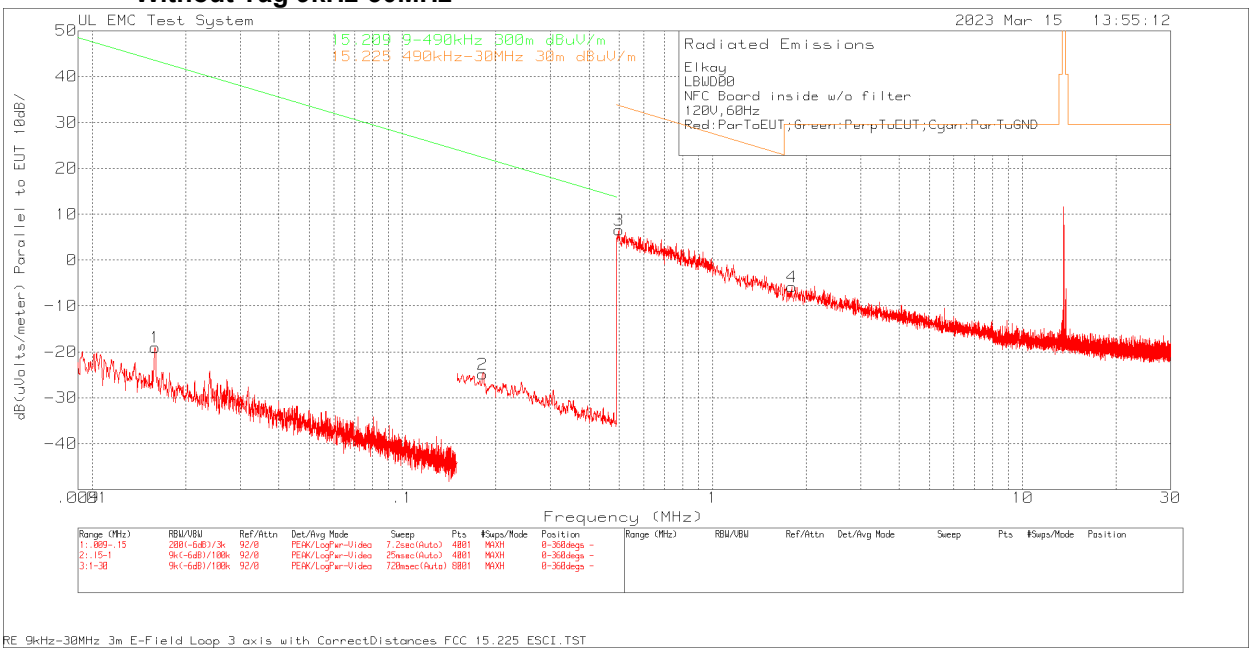
Elkay
LBWD00
NFC Board inside with filter
120V,60Hz
Red:ParToEUT;Green:PerpToEUT;Cyan:ParToGND

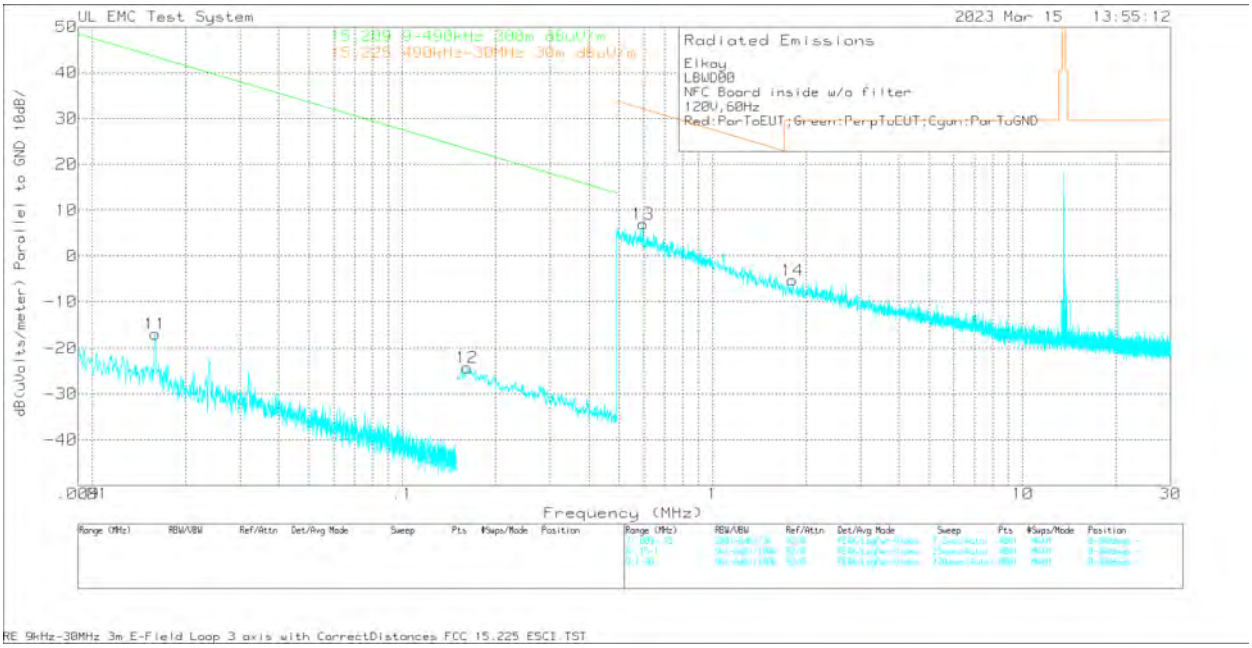
Trace Markers

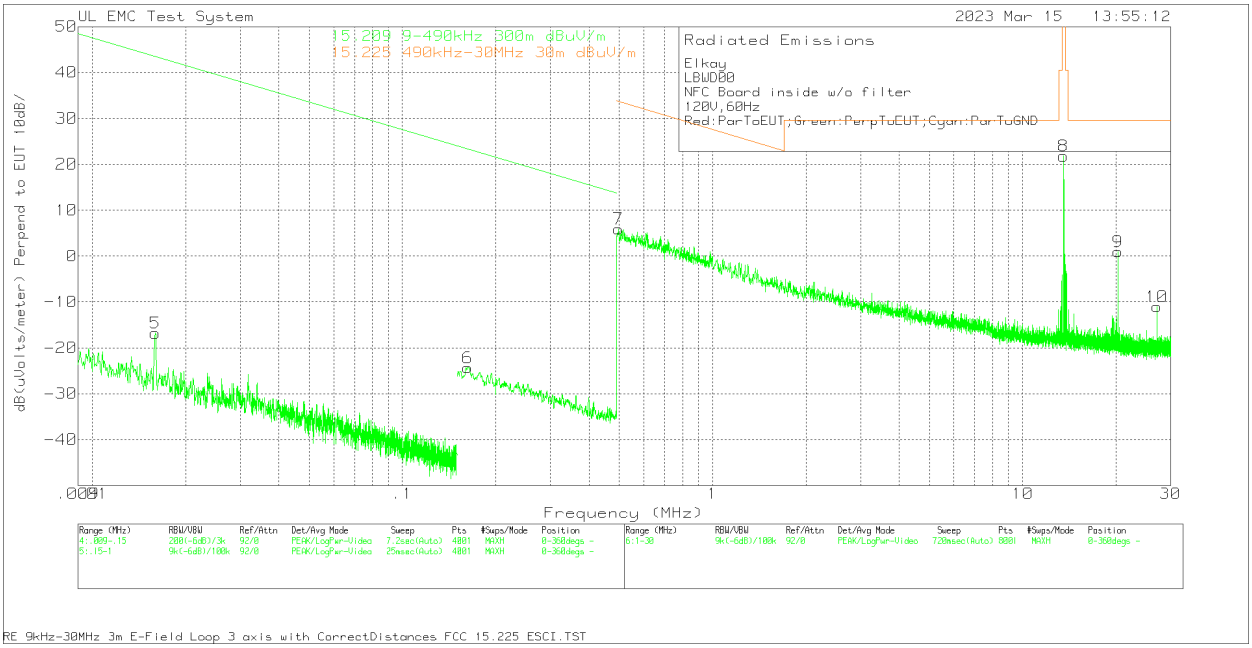
No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2
1	.0159	40.96dBuV Pk	21.8	-80	-17.24	43.55	-
		Azimuth:0-360			Margin (dB)	-60.79	-
2	.1563	43.09dBuV Pk	12.2	-79.9	-24.61	23.72	-
		Azimuth:0-360			Margin (dB)	-48.33	-
3	.5	33.86dBuV Pk	11.8	-39.9	5.76	-	33.63
		Azimuth:0-360			Margin (dB)	-	-27.87
4	13.5606	36.04dBuV Pk	11.4	-39.6	7.84	-	84
		Azimuth:0-360			Margin (dB)	-	-76.16
5	.0159	41.96dBuV Pk	21.8	-80	-16.24	43.55	-
		Azimuth:0-360			Margin (dB)	-59.79	-
6	.1834	42.56dBuV Pk	12	-79.9	-25.34	22.33	-
		Azimuth:0-360			Margin (dB)	-47.67	-
7	.5076	34.08dBuV Pk	11.8	-39.9	5.98	-	33.49
		Azimuth:0-360			Margin (dB)	-	-27.51
8	13.5606	48.29dBuV Pk	11.4	-39.6	20.09	-	84
		Azimuth:0-360			Margin (dB)	-	-63.91
9	.016	42.55dBuV Pk	21.7	-80	-15.75	43.53	-
		Azimuth:0-360			Margin (dB)	-59.28	-
10	.1713	42.34dBuV Pk	12.1	-79.9	-25.46	22.93	-
		Azimuth:0-360			Margin (dB)	-48.39	-
11	.5749	34.5dBuV Pk	11.9	-39.9	6.5	-	32.41
		Azimuth:0-360			Margin (dB)	-	-25.91
12	13.5606	43.64dBuV Pk	11.4	-39.6	15.44	-	84
		Azimuth:0-360			Margin (dB)	-	-68.56

LIMIT 1: 15.209 9-490kHz 300m dBuV/m
LIMIT 2: 15.225 490kHz-30MHz 30m dBuV/m
Pk - Peak detector

Without Tag 9kHz-30MHz







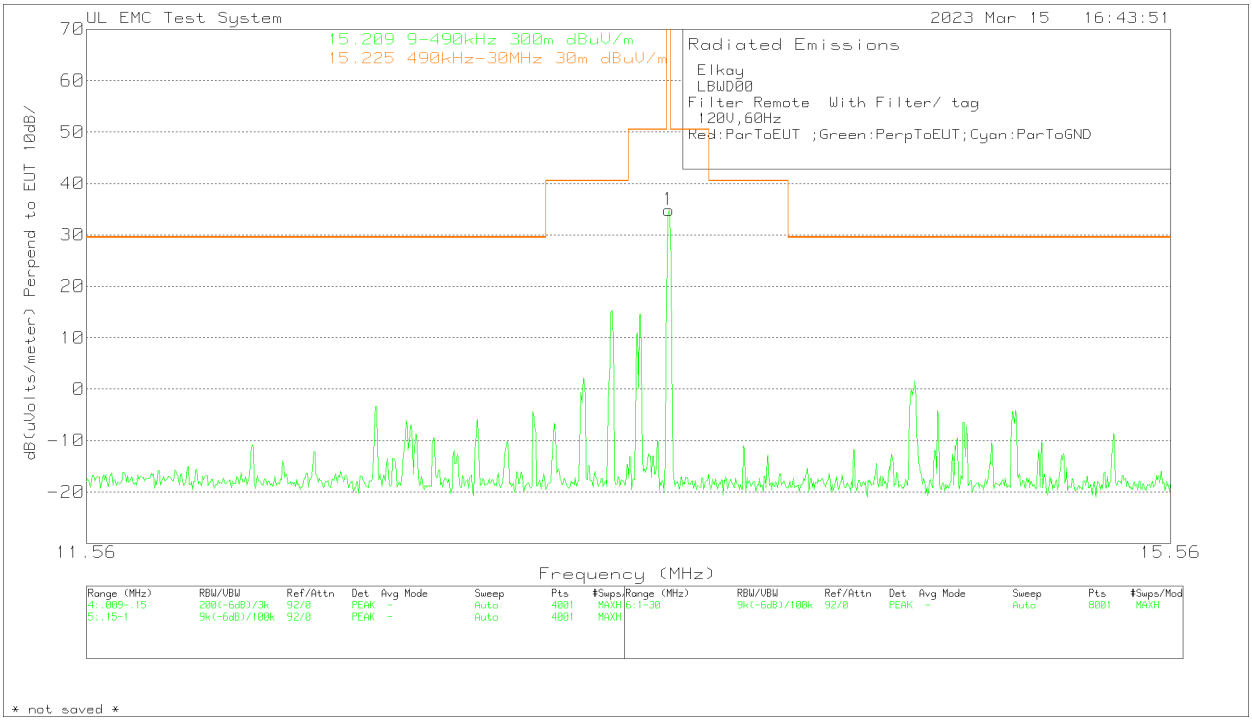
Elkay
LBWD00
NFC Board inside w/o filter
120V,60Hz
Red:ParToEUT;Green:PerpToEUT;Cyan:ParToGND

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2
1	.0159	39.14dBuV Pk	21.8	-80	-19.06	43.55	-
		Azimuth:0-360			Margin (dB)	-62.61	-
2	.1813	43.01dBuV Pk	12	-79.9	-24.89	22.43	-
		Azimuth:0-360			Margin (dB)	-47.32	-
3	.4991	34.68dBuV Pk	11.8	-39.9	6.58	-	33.64
		Azimuth:0-360			Margin (dB)	-	-27.06
4	1.8011	21.9dBuV Pk	12.2	-39.9	-5.8	-	29.54
		Azimuth:0-360			Margin (dB)	-	-35.34
5	.016	41.51dBuV Pk	21.7	-80	-16.79	43.53	-
		Azimuth:0-360			Margin (dB)	-60.32	-
6	.1627	43.48dBuV Pk	12.1	-79.9	-24.32	23.38	-
		Azimuth:0-360			Margin (dB)	-47.7	-
7	.4968	34.05dBuV Pk	11.8	-39.9	5.95	-	33.68
		Azimuth:0-360			Margin (dB)	-	-27.73
8	13.5606	50.01dBuV Pk	11.4	-39.6	21.81	-	84
		Azimuth:0-360			Margin (dB)	-	-62.19
9	20.3068	29.93dBuV Pk	10.5	-39.5	.93	-	29.54
		Azimuth:0-360			Margin (dB)	-	-28.61
10	27.1218	19dBuV Pk	9.4	-39.4	-11	-	29.54
		Azimuth:0-360			Margin (dB)	-	-40.54
11	.016	41.16dBuV Pk	21.8	-80	-17.04	43.54	-
		Azimuth:0-360			Margin (dB)	-60.58	-
12	.1617	43.55dBuV Pk	12.1	-79.9	-24.25	23.43	-
		Azimuth:0-360			Margin (dB)	-47.68	-
13	.5967	34.99dBuV Pk	11.9	-39.9	6.99	-	32.09
		Azimuth:0-360			Margin (dB)	-	-25.1
14	1.812	22.4dBuV Pk	12.2	-39.9	-5.3	-	29.54
		Azimuth:0-360			Margin (dB)	-	-34.84

LIMIT 1: 15.209 9-490kHz 300m dBuV/m
LIMIT 2: 15.225 490kHz-30MHz 30m dBuV/m
Pk - Peak detector

8.4. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.009 - 30 MHz) – RF ID Reader Remote With Tag in band



Elkay
LBWD00
Filter Remote With Filter/ tag
120V,60Hz
Red:ParToEUT;Green:PerpToEUT;Cyan:ParToGND

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2
2	.0159	40.77dBuV Pk	21.8	-80	-17.43	43.55	-
		Azimuth:0-360			Margin (dB)	-60.98	-
3	.4944	36.3dBuV Pk	11.8	-39.9	8.2	-	33.72
		Azimuth:0-360			Margin (dB)	-	-25.52
4	13.5606	51.54dBuV Pk	11.4	-39.6	23.34	-	84
		Azimuth:0-360			Margin (dB)	-	-60.66
5	.0159	41.33dBuV Pk	21.8	-80	-16.87	43.55	-
		Azimuth:0-360			Margin (dB)	-60.42	-
6	.4929	34.98dBuV Pk	11.8	-39.9	6.88	-	33.75
		Azimuth:0-360			Margin (dB)	-	-26.87
1	13.5606	63.03dBuV Pk	11.4	-39.6	34.83	-	84
		Azimuth:0-360			Margin (dB)	-	-49.17
7	.0159	41.35dBuV Pk	21.8	-80	-16.85	43.57	-
		Azimuth:0-360			Margin (dB)	-60.42	-
8	.4934	33.5dBuV Pk	11.8	-39.9	5.4	-	33.74
		Azimuth:0-360			Margin (dB)	-	-28.34
9	13.5606	55.07dBuV Pk	11.4	-39.6	26.87	-	84
		Azimuth:0-360			Margin (dB)	-	-57.13

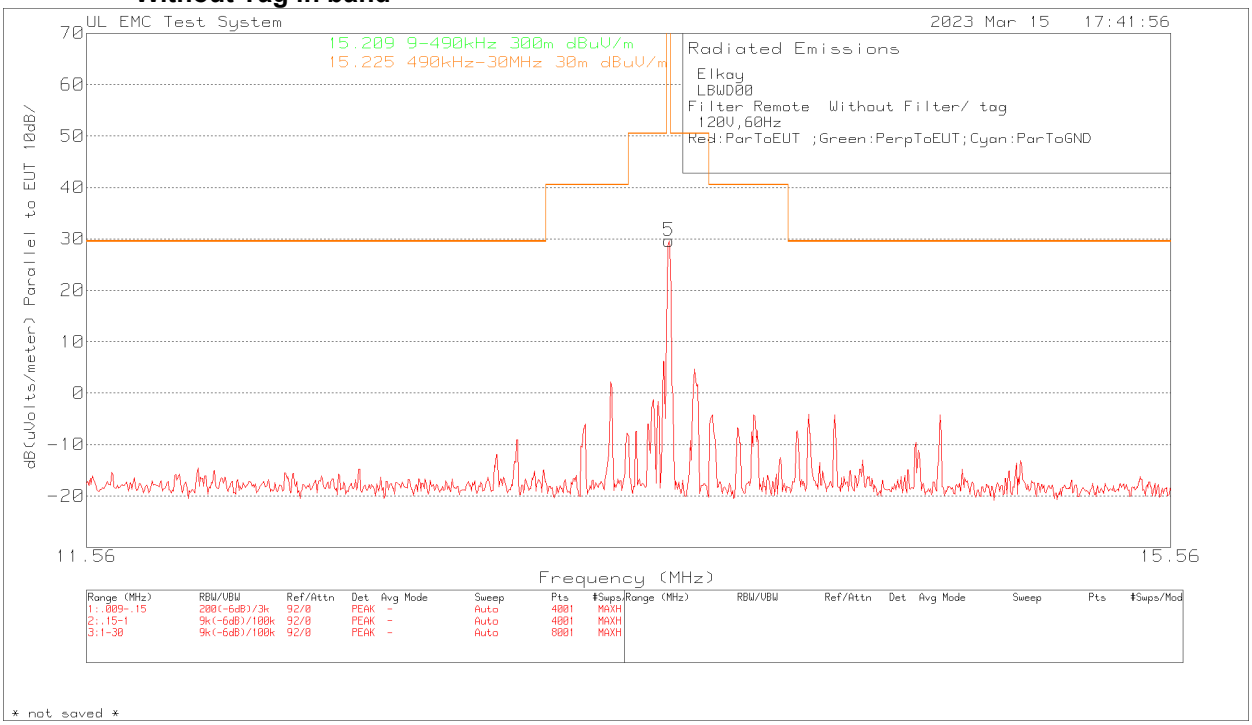
Radiated Emission Data

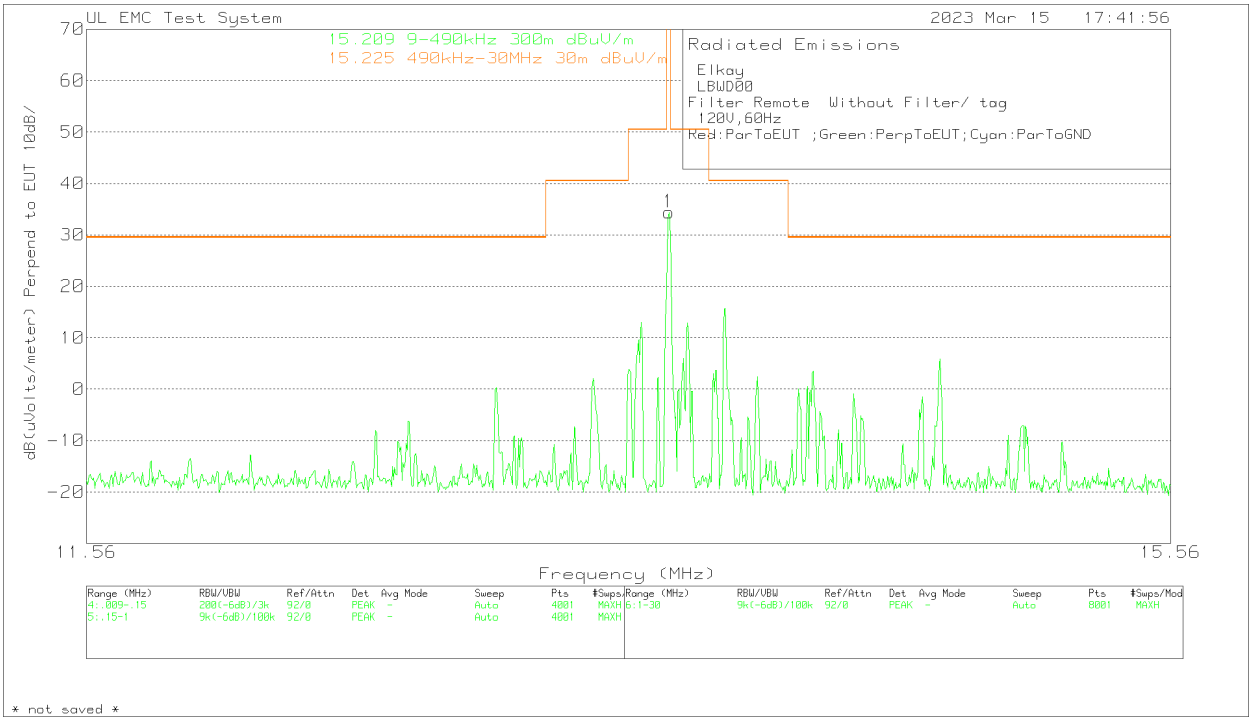
Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2
13.56	60.99dBuV Qp	11.4	-39.6	32.79	-	84
Azimuth: 53				Margin (dB):	-	-51.21

LIMIT 1: 15.209 9-490kHz 300m dBuV/m
LIMIT 2: 15.225 490kHz-30MHz 30m dBuV/m

Pk - Peak detector
Qp - Quasi-Peak detector

Without Tag in band





Elkay
LBWD00
Filter Remote Without Filter/ tag
120V,60Hz
Red:ParToEUT;Green:PerpToEUT;Cyan:ParToGND

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 dB(uVolts/meter)	2
2	.016	40.69dBuV Pk	21.7	-80	-17.61	43.53	-
		Azimuth:0-360			Margin (dB)	-61.14	-
3	.4902	33.24dBuV Pk	11.8	-39.9	5.14	-	33.8
		Azimuth:0-360			Margin (dB)	-	-28.66
4	6.7783	24.43dBuV Pk	11.9	-39.7	-3.37	-	29.54
		Azimuth:0-360			Margin (dB)	-	-32.91
5	13.5606	57.85dBuV Pk	11.4	-39.6	29.65	-	84
		Azimuth:0-360			Margin (dB)	-	-54.35
6	20.3394	40.67dBuV Pk	10.5	-39.5	11.67	-	29.54
		Azimuth:0-360			Margin (dB)	-	-17.87
7	.0159	41.06dBuV Pk	21.8	-80	-17.14	43.57	-
		Azimuth:0-360			Margin (dB)	-60.71	-
8	.4923	33.69dBuV Pk	11.8	-39.9	5.59	-	33.76
		Azimuth:0-360			Margin (dB)	-	-28.17
1	13.5606	62.62dBuV Pk	11.4	-39.6	34.42	-	84
		Azimuth:0-360			Margin (dB)	-	-49.58
9	6.7819	23.12dBuV Pk	11.9	-39.7	-4.68	-	29.54
		Azimuth:0-360			Margin (dB)	-	-34.22
10	20.2778	22.08dBuV Pk	10.5	-39.5	-6.92	-	29.54
		Azimuth:0-360			Margin (dB)	-	-36.46
11	.0159	42.93dBuV Pk	21.8	-80	-15.27	43.55	-
		Azimuth:0-360			Margin (dB)	-58.82	-
12	.0239	42.07dBuV Pk	18.9	-80	-19.03	40.03	-
		Azimuth:0-360			Margin (dB)	-59.06	-
13	.4902	33.62dBuV Pk	11.8	-39.9	5.52	-	33.8
		Azimuth:0-360			Margin (dB)	-	-28.28
14	13.5606	58.35dBuV Pk	11.4	-39.6	30.15	-	84
		Azimuth:0-360			Margin (dB)	-	-53.85
15	20.3648	19.62dBuV Pk	10.5	-39.5	-9.38	-	29.54
		Azimuth:0-360			Margin (dB)	-	-38.92

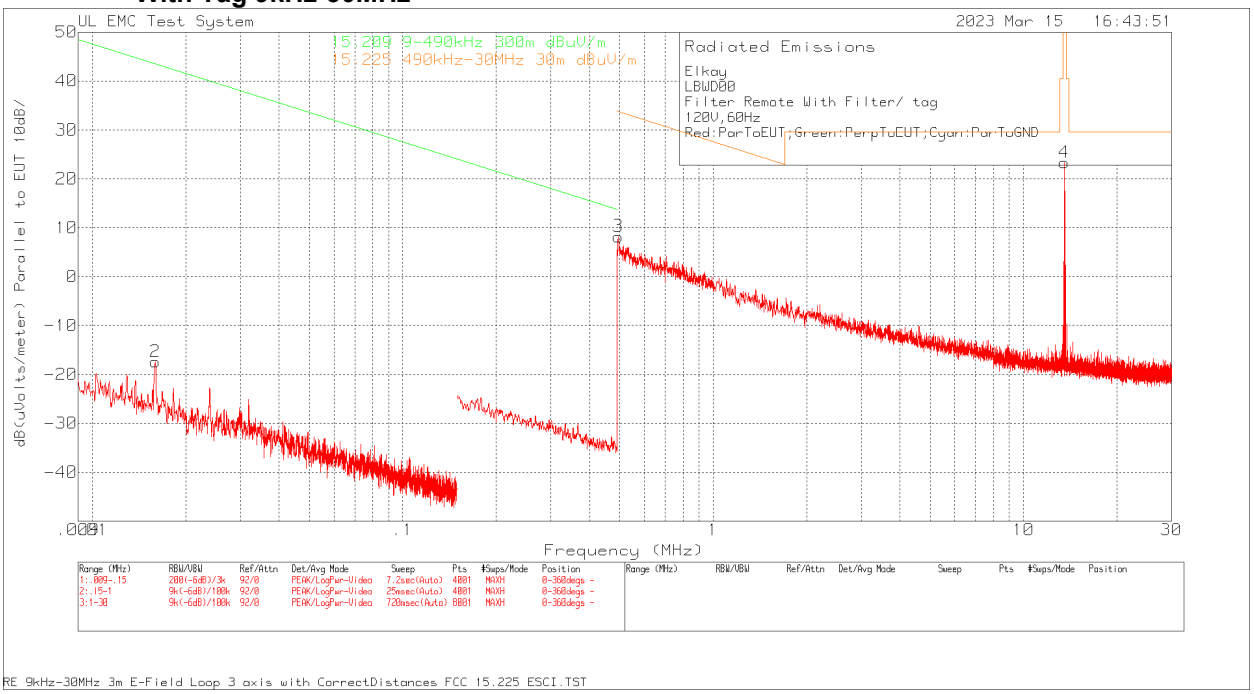
Radiated Emission Data

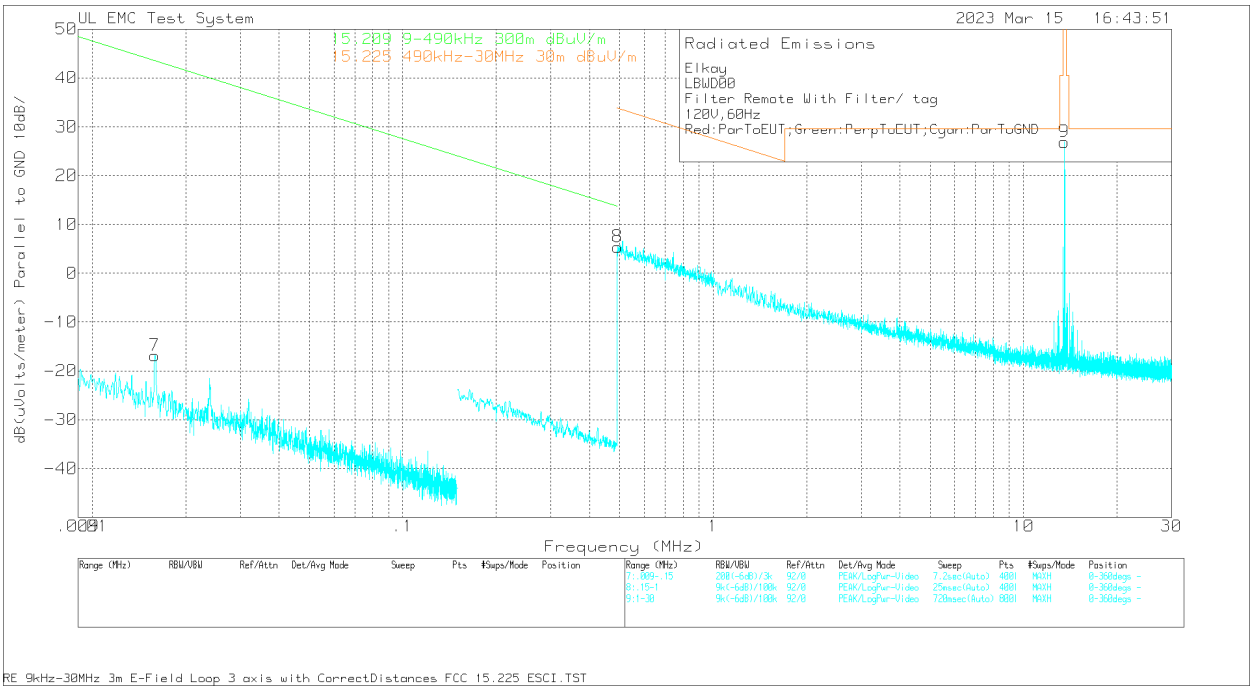
Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 dB(uVolts/meter)	2
13.561	62.23dBuV Qp	11.4	-39.6	34.03	-	84
Azimuth: 33				Margin (dB):	-	-49.97

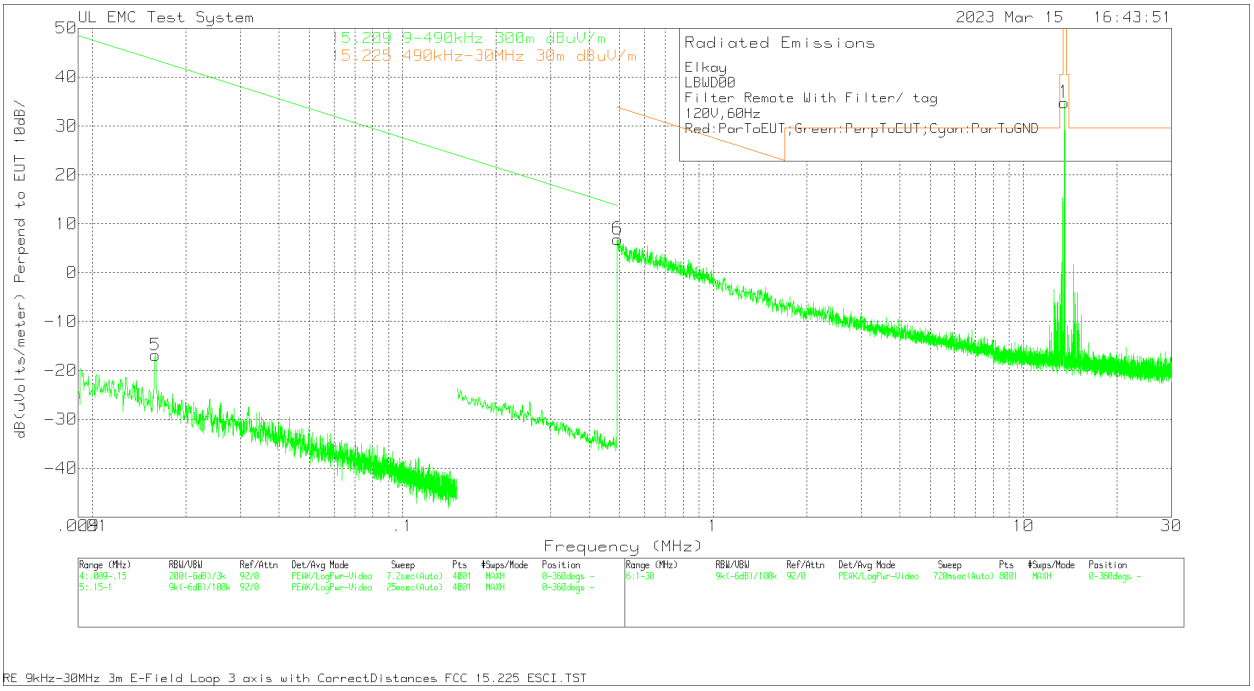
LIMIT 1: 15.209 9-490kHz 300m dBuV/m
LIMIT 2: 15.225 490kHz-30MHz 30m dBuV/m

Pk - Peak detector
Qp - Quasi-Peak detector

With Tag 9kHz-30MHz







Elkay
LBWD00
Filter Remote With Filter/ tag
120V,60Hz
Red:ParToEUT;Green:PerpToEUT;Cyan:ParToGND

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2
2	.0159	40.77dBuV Pk	21.8	-80	-17.43	43.55	-
		Azimuth:0-360			Margin (dB)	-60.98	-
3	.4944	36.3dBuV Pk	11.8	-39.9	8.2	-	33.72
		Azimuth:0-360			Margin (dB)	-	-25.52
4	13.5606	51.54dBuV Pk	11.4	-39.6	23.34	-	84
		Azimuth:0-360			Margin (dB)	-	-60.66
5	.0159	41.33dBuV Pk	21.8	-80	-16.87	43.55	-
		Azimuth:0-360			Margin (dB)	-60.42	-
6	.4929	34.98dBuV Pk	11.8	-39.9	6.88	-	33.75
		Azimuth:0-360			Margin (dB)	-	-26.87
1	13.5606	63.03dBuV Pk	11.4	-39.6	34.83	-	84
		Azimuth:0-360			Margin (dB)	-	-49.17
7	.0159	41.35dBuV Pk	21.8	-80	-16.85	43.57	-
		Azimuth:0-360			Margin (dB)	-60.42	-
8	.4934	33.5dBuV Pk	11.8	-39.9	5.4	-	33.74
		Azimuth:0-360			Margin (dB)	-	-28.34
9	13.5606	55.07dBuV Pk	11.4	-39.6	26.87	-	84
		Azimuth:0-360			Margin (dB)	-	-57.13

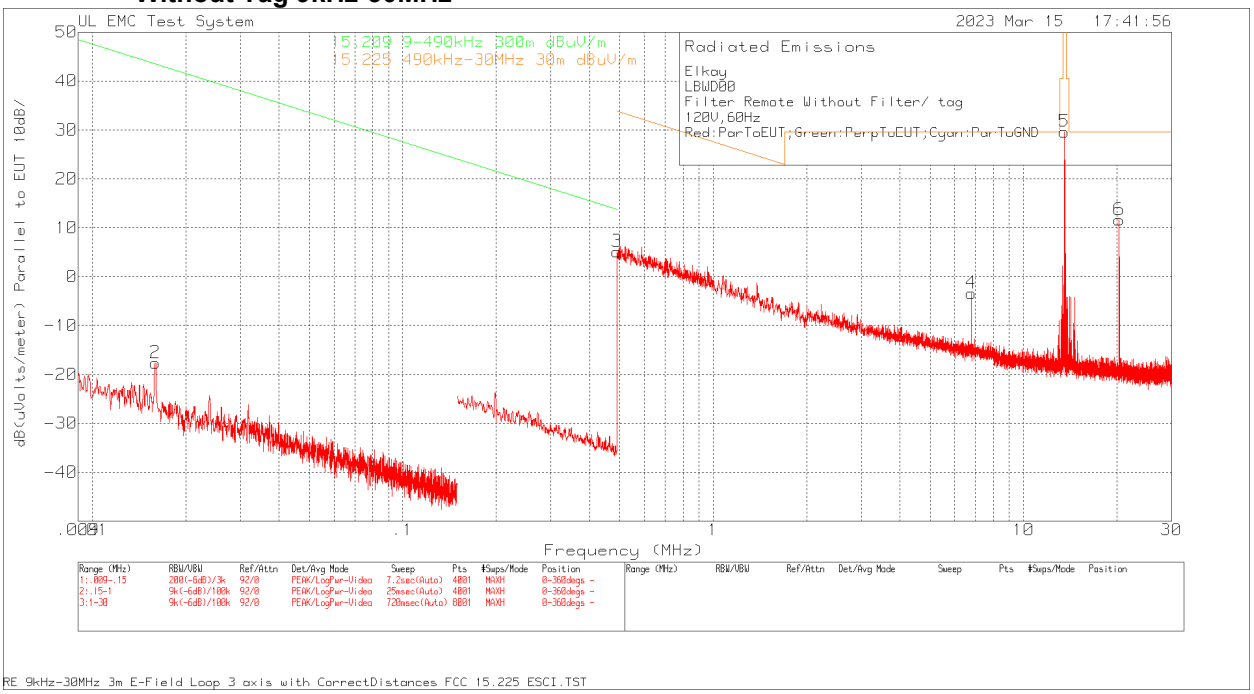
Radiated Emission Data

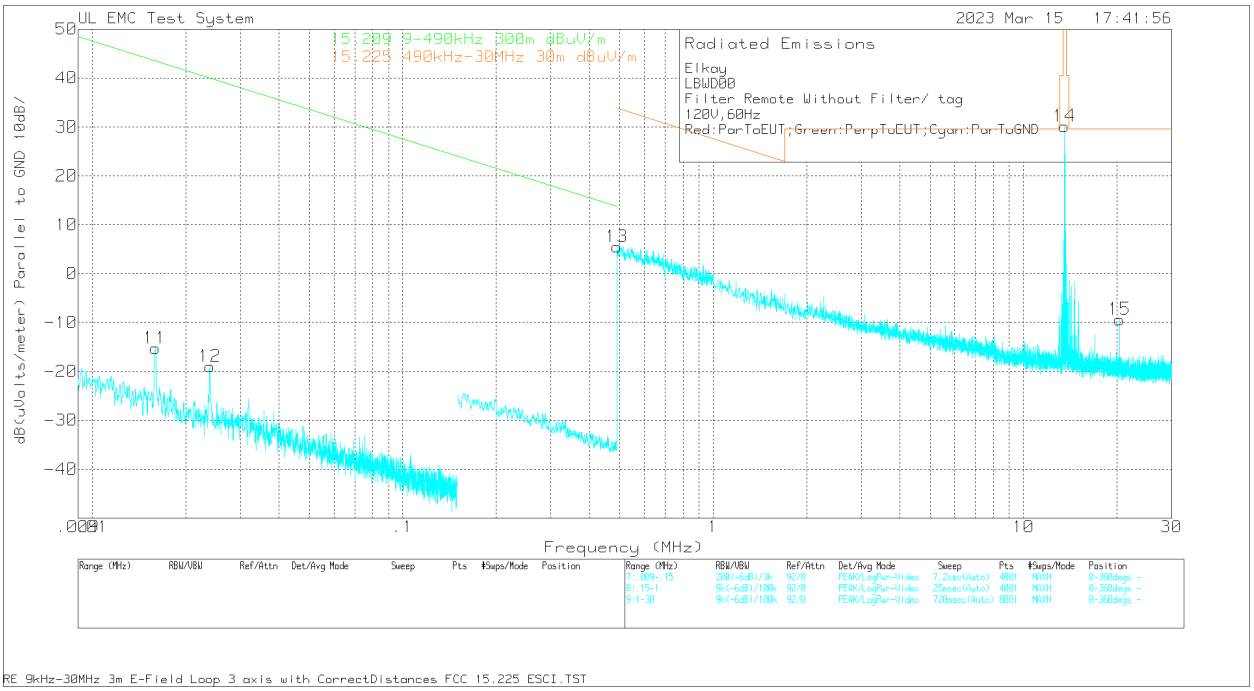
Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2
13.56	60.99dBuV Qp	11.4	-39.6	32.79	-	84
Azimuth: 53				Margin (dB):	-	-51.21

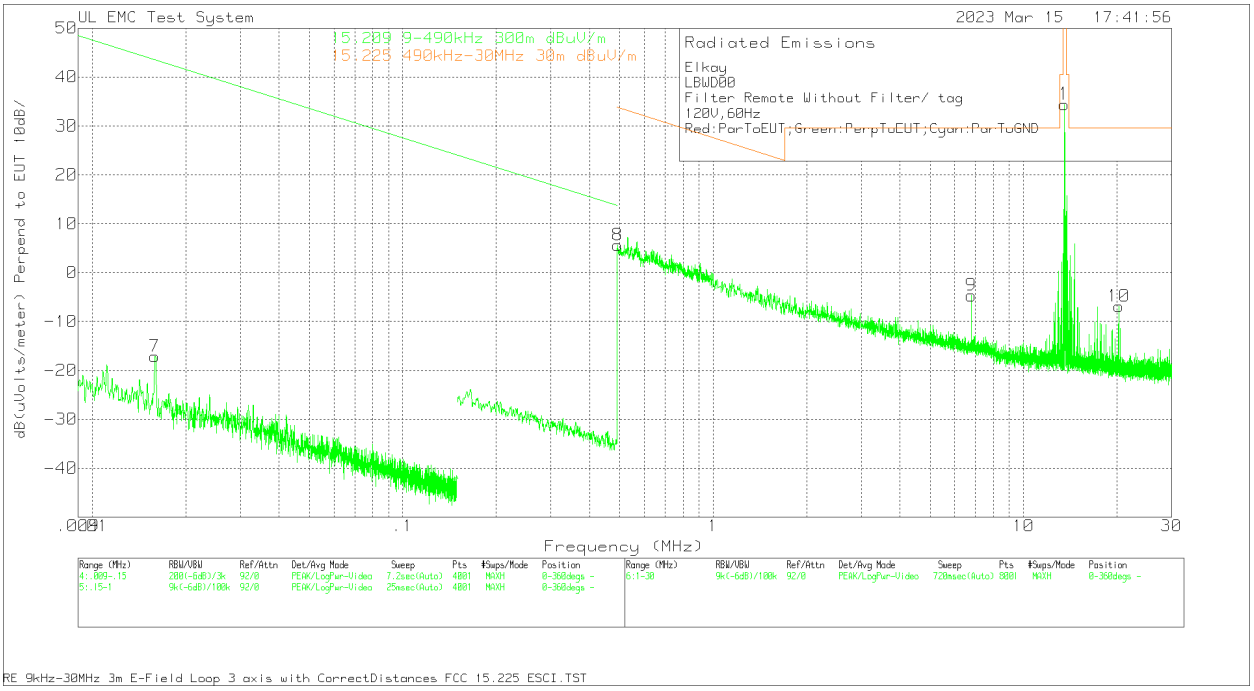
LIMIT 1: 15.209 9-490kHz 300m dBuV/m
LIMIT 2: 15.225 490kHz-30MHz 30m dBuV/m

Pk - Peak detector
Qp - Quasi-Peak detector

Without Tag 9kHz-30MHz







Elkay
LBWD00
Filter Remote Without Filter/ tag
120V,60Hz
Red:ParToEUT;Green:PerpToEUT;Cyan:ParToGND

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 dB(uVolts/meter)	2
2	.016	40.69dBuV Pk	21.7	-80	-17.61	43.53	-
		Azimuth:0-360			Margin (dB)	-61.14	-
3	.4902	33.24dBuV Pk	11.8	-39.9	5.14	-	33.8
		Azimuth:0-360			Margin (dB)	-	-28.66
4	6.7783	24.43dBuV Pk	11.9	-39.7	-3.37	-	29.54
		Azimuth:0-360			Margin (dB)	-	-32.91
5	13.5606	57.85dBuV Pk	11.4	-39.6	29.65	-	84
		Azimuth:0-360			Margin (dB)	-	-54.35
6	20.3394	40.67dBuV Pk	10.5	-39.5	11.67	-	29.54
		Azimuth:0-360			Margin (dB)	-	-17.87
7	.0159	41.06dBuV Pk	21.8	-80	-17.14	43.57	-
		Azimuth:0-360			Margin (dB)	-60.71	-
8	.4923	33.69dBuV Pk	11.8	-39.9	5.59	-	33.76
		Azimuth:0-360			Margin (dB)	-	-28.17
1	13.5606	62.62dBuV Pk	11.4	-39.6	34.42	-	84
		Azimuth:0-360			Margin (dB)	-	-49.58
9	6.7819	23.12dBuV Pk	11.9	-39.7	-4.68	-	29.54
		Azimuth:0-360			Margin (dB)	-	-34.22
10	20.2778	22.08dBuV Pk	10.5	-39.5	-6.92	-	29.54
		Azimuth:0-360			Margin (dB)	-	-36.46
11	.0159	42.93dBuV Pk	21.8	-80	-15.27	43.55	-
		Azimuth:0-360			Margin (dB)	-58.82	-
12	.0239	42.07dBuV Pk	18.9	-80	-19.03	40.03	-
		Azimuth:0-360			Margin (dB)	-59.06	-
13	.4902	33.62dBuV Pk	11.8	-39.9	5.52	-	33.8
		Azimuth:0-360			Margin (dB)	-	-28.28
14	13.5606	58.35dBuV Pk	11.4	-39.6	30.15	-	84
		Azimuth:0-360			Margin (dB)	-	-53.85
15	20.3648	19.62dBuV Pk	10.5	-39.5	-9.38	-	29.54
		Azimuth:0-360			Margin (dB)	-	-38.92

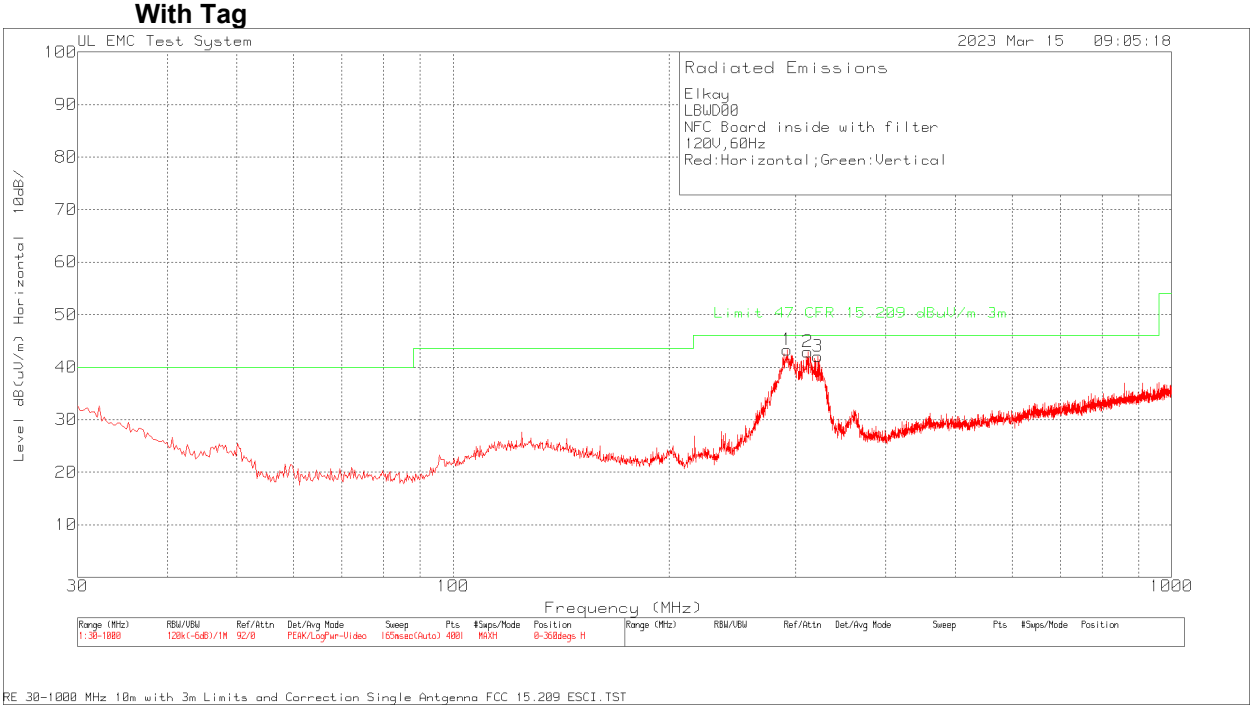
Radiated Emission Data

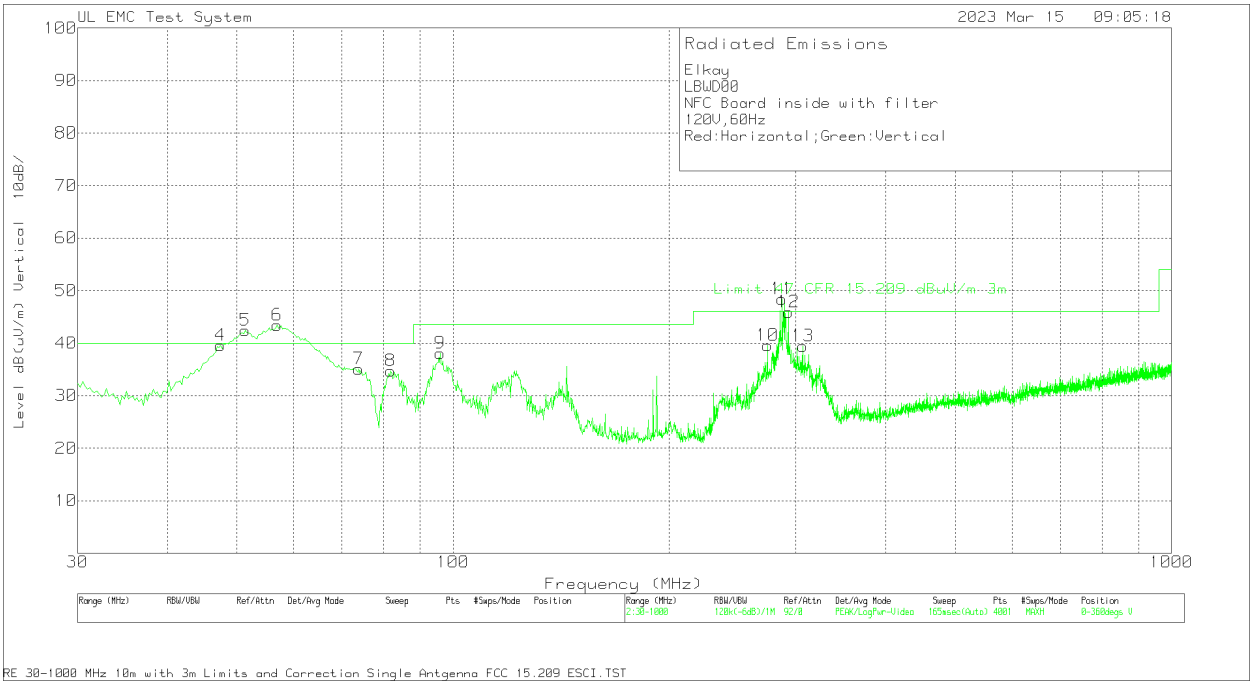
Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 dB(uVolts/meter)	2
13.561	62.23dBuV Qp	11.4	-39.6	34.03	-	84
Azimuth: 33				Margin (dB):	-	-49.97

LIMIT 1: 15.209 9-490kHz 300m dBuV/m
LIMIT 2: 15.225 490kHz-30MHz 30m dBuV/m

Pk - Peak detector
Qp - Quasi-Peak detector

8.5. TX SPURIOUS EMISSION 30 TO 1000 MHz – RF ID Reader Inside With Tag





Elkay
LBWD00
NFC Board inside with filter
120V,60Hz
Red:Horizontal;Green:Vertical

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 Level dB(uV/m)	
1	291.415	54.96dBuV Pk	19.4	-31.1	43.26	46.02	
		Azimuth:0-360	Height:200 Horz		Margin (dB)		-2.76
2	311.5425	54.29dBuV Pk	19.7	-31.1	42.89	46.02	
		Azimuth:0-360	Height:200 Horz		Margin (dB)		-3.13
3	321.485	53.16dBuV Pk	19.9	-31	42.06	46.02	
		Azimuth:0-360	Height:200 Horz		Margin (dB)		-3.96
4	47.46	56.79dBuV Pk	14.9	-32.1	39.59	40	
		Azimuth:0-360	Height:97 Vert		Margin (dB)		-.41
5	51.34	61.01dBuV Pk	13.4	-32	42.41	40	
		Azimuth:0-360	Height:97 Vert		Margin (dB)		2.41
6	56.9175	62.32dBuV Pk	13	-31.9	43.42	40	
		Azimuth:0-360	Height:197 Vert		Margin (dB)		3.42
7	73.8925	52.74dBuV Pk	14.2	-31.8	35.14	40	
		Azimuth:0-360	Height:197 Vert		Margin (dB)		-4.86
8	81.895	52.66dBuV Pk	13.7	-31.7	34.66	40	
		Azimuth:0-360	Height:97 Vert		Margin (dB)		-5.34
9	95.96	54.62dBuV Pk	15	-31.6	38.02	43.52	
		Azimuth:0-360	Height:97 Vert		Margin (dB)		-5.5
10	273.7125	51.3dBuV Pk	19.3	-31	39.6	46.02	
		Azimuth:0-360	Height:399 Vert		Margin (dB)		-6.42
11	286.8075	60.1dBuV Pk	19.4	-31.1	48.4	46.02	
		Azimuth:0-360	Height:399 Vert		Margin (dB)		2.38
12	292.6275	57.55dBuV Pk	19.4	-31	45.95	46.02	
		Azimuth:0-360	Height:399 Vert		Margin (dB)		-.07
13	306.6925	51.07dBuV Pk	19.5	-31.1	39.47	46.02	
		Azimuth:0-360	Height:399 Vert		Margin (dB)		-6.55

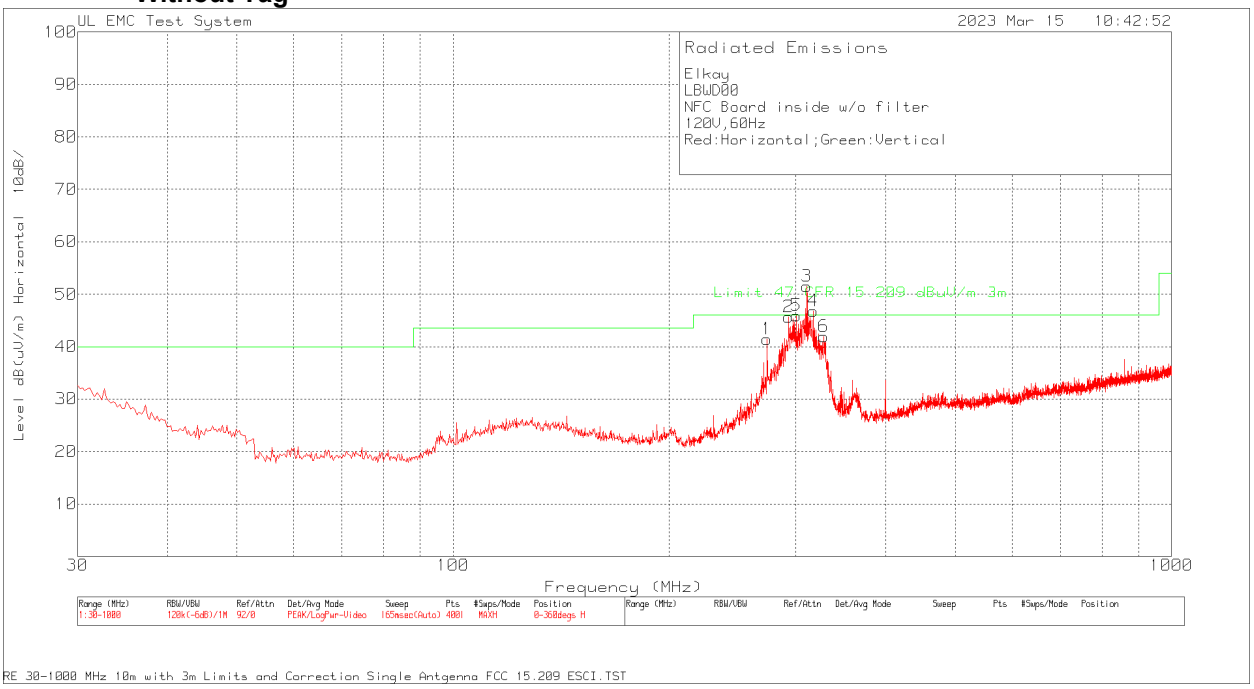
Radiated Emission Data

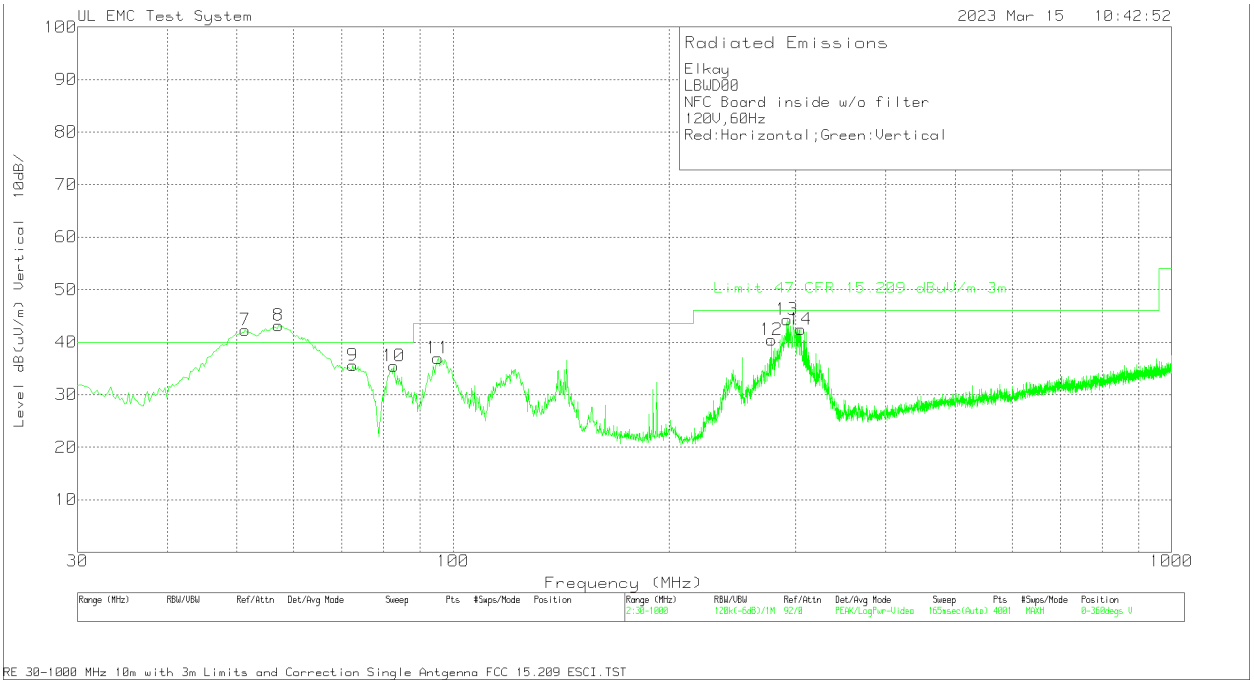
Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 Level dB(uV/m)	
292.156	54.35dBuV Qp	19.4	-31.1	42.65	46.02	
Azimuth: 230	Height:195 Horz			Margin (dB):		-3.37
312.683	54.23dBuV Qp	19.7	-31	42.93	46.02	
Azimuth: 117	Height:174 Horz			Margin (dB):		-3.09
321.404	51.36dBuV Qp	19.9	-31	40.26	46.02	
Azimuth: 217	Height:182 Horz			Margin (dB):		-5.76
288.203	53.93dBuV Qp	19.3	-31.1	42.13	46.02	
Azimuth: 214	Height:399 Vert			Margin (dB):		-3.89
291.457	53.09dBuV Qp	19.4	-31.1	41.39	46.02	
Azimuth: 224	Height:399 Vert			Margin (dB):		-4.63
57.233	54.2dBuV Qp	13	-31.9	35.3	40	
Azimuth: 63	Height:239 Vert			Margin (dB):		-4.7
51.534	52.81dBuV Qp	13.4	-32	34.21	40	
Azimuth: 131	Height:216 Vert			Margin (dB):		-5.79
47.46	47.94dBuV Qp	14.9	-32.1	30.74	40	
Azimuth: 131	Height:216 Vert			Margin (dB):		-9.26
74.626	44.66dBuV Qp	14.2	-31.8	27.06	40	
Azimuth: 308	Height:165 Vert			Margin (dB):		-12.94
82.488	45.5dBuV Qp	13.7	-31.8	27.4	40	
Azimuth: 149	Height:154 Vert			Margin (dB):		-12.6
95.651	50.2dBuV Qp	14.9	-31.6	33.5	43.52	
Azimuth: 186	Height:129 Vert			Margin (dB):		-10.02

LIMIT 1: Limit 47 CFR 15.209 dBuV/m 3m

Pk - Peak detector
Qp - Quasi-Peak detector

Without Tag





Elkay
LBWD00
NFC Board inside w/o filter
120V,60Hz
Red:Horizontal;Green:Vertical

Trace Markers

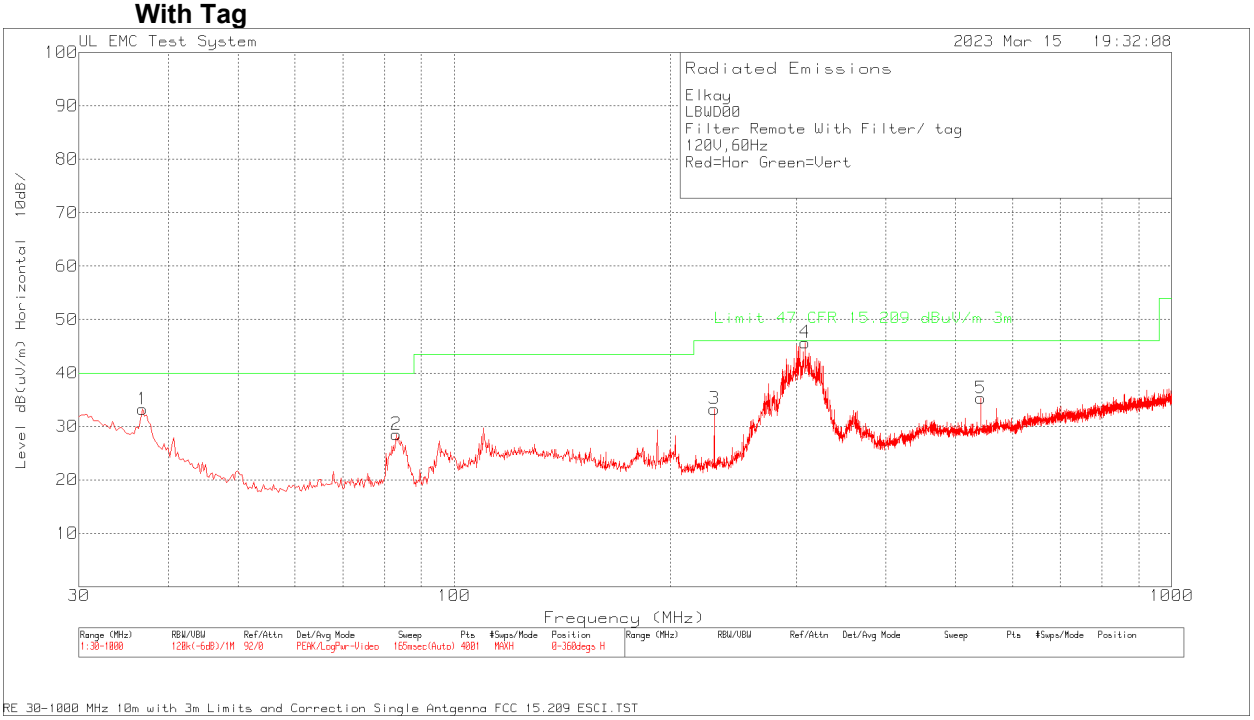
No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 Level dB(uV/m)	
1	273.47	53.18dBuV Pk	19.3	-31	41.48	46.02	
		Azimuth:0-360	Height:299 Horz		Margin (dB)	-4.54	
2	293.1125	57.21dBuV Pk	19.4	-31	45.61	46.02	
		Azimuth:0-360	Height:199 Horz		Margin (dB)	-.41	
3	310.815	63.06dBuV Pk	19.6	-31.1	51.56	46.02	
		Azimuth:0-360	Height:199 Horz		Margin (dB)	5.54	
4	317.12	58.04dBuV Pk	19.8	-31	46.84	46.02	
		Azimuth:0-360	Height:199 Horz		Margin (dB)	.82	
5	300.3875	57.55dBuV Pk	19.4	-31	45.95	46.02	
		Azimuth:0-360	Height:199 Horz		Margin (dB)	-.07	
6	328.0325	52.94dBuV Pk	20	-31	41.94	46.02	
		Azimuth:0-360	Height:199 Horz		Margin (dB)	-4.08	
7	51.34	60.91dBuV Pk	13.4	-32	42.31	40	
		Azimuth:0-360	Height:97 Vert		Margin (dB)	2.31	
8	57.16	62.05dBuV Pk	13	-31.9	43.15	40	
		Azimuth:0-360	Height:197 Vert		Margin (dB)	3.15	
9	72.4375	53.2dBuV Pk	14.2	-31.8	35.6	40	
		Azimuth:0-360	Height:197 Vert		Margin (dB)	-4.4	
10	82.6225	53.58dBuV Pk	13.6	-31.7	35.48	40	
		Azimuth:0-360	Height:197 Vert		Margin (dB)	-4.52	
11	95.2325	53.78dBuV Pk	14.8	-31.6	36.98	43.52	
		Azimuth:0-360	Height:97 Vert		Margin (dB)	-6.54	
12	277.35	52.04dBuV Pk	19.4	-31	40.44	46.02	
		Azimuth:0-360	Height:400 Vert		Margin (dB)	-5.58	
13	291.6575	55.95dBuV Pk	19.4	-31.1	44.25	46.02	
		Azimuth:0-360	Height:297 Vert		Margin (dB)	-1.77	
14	304.995	53.92dBuV Pk	19.5	-31	42.42	46.02	
		Azimuth:0-360	Height:97 Vert		Margin (dB)	-3.6	

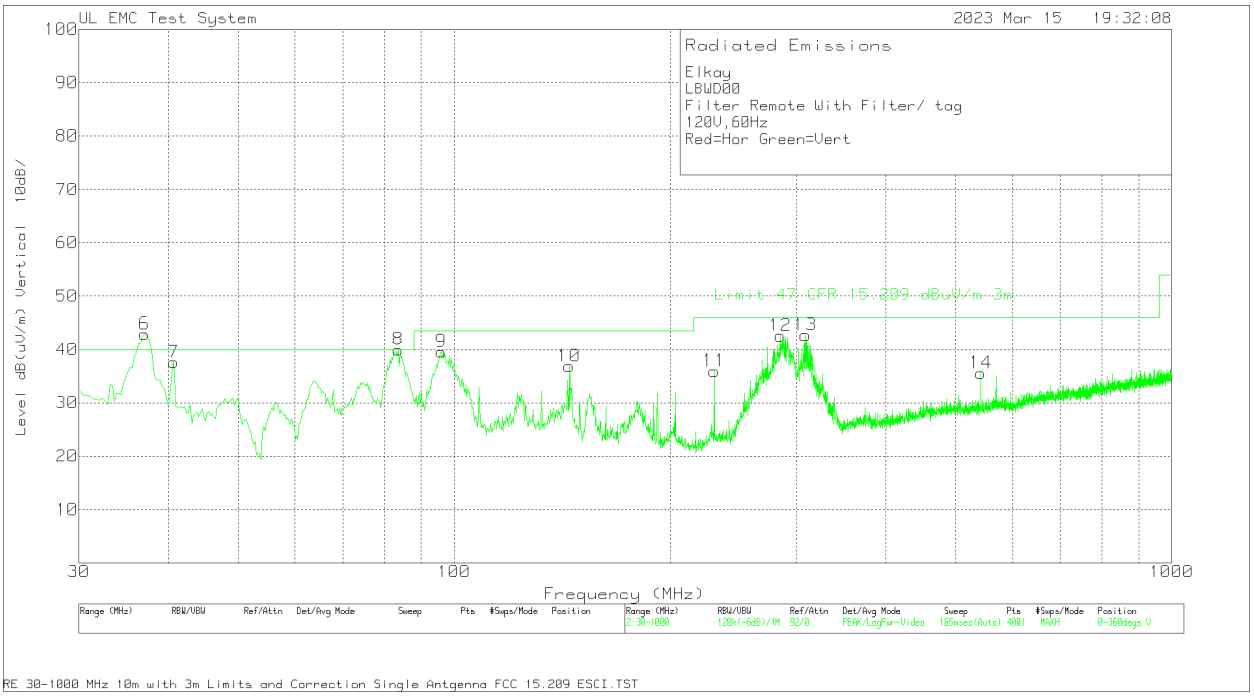
Radiated Emission Data

Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 Level dB(uV/m)	
310.599	54.52dBuV Qp	19.6	-31.1	43.02	46.02	
Azimuth: 153	Height:184 Horz			Margin (dB): -3		
317.543	52.81dBuV Qp	19.9	-31	41.71	46.02	
Azimuth: 121	Height:172 Horz			Margin (dB): -4.31		
301.38	54.14dBuV Qp	19.4	-31	42.54	46.02	
Azimuth: 214	Height:192 Horz			Margin (dB): -3.48		
293.113	52.8dBuV Qp	19.4	-31	41.2	46.02	
Azimuth: 214	Height:189 Horz			Margin (dB): -4.82		
273.335	43.83dBuV Qp	19.3	-31.1	32.03	46.02	
Azimuth: 255	Height:288 Horz			Margin (dB): -13.99		
327.868	50.68dBuV Qp	20	-31	39.68	46.02	
Azimuth: 202	Height:172 Horz			Margin (dB): -6.34		
291.658	53.46dBuV Qp	19.4	-31.1	41.76	46.02	
Azimuth: 230	Height:399 Vert			Margin (dB): -4.26		
277.586	46.63dBuV Qp	19.4	-31	35.03	46.02	
Azimuth: 231	Height:399 Vert			Margin (dB): -10.99		
304.995	51.33dBuV Qp	19.5	-31	39.83	46.02	
Azimuth: 299	Height:100 Vert			Margin (dB): -6.19		
51.534	52.81dBuV Qp	13.4	-32	34.21	40	
Azimuth: 131	Height:216 Vert			Margin (dB): -5.79		
57.233	54.2dBuV Qp	13	-31.9	35.3	40	
Azimuth: 63	Height:239 Vert			Margin (dB): -4.7		
74.626	44.66dBuV Qp	14.2	-31.8	27.06	40	
Azimuth: 308	Height:165 Vert			Margin (dB): -12.94		
82.488	45.5dBuV Qp	13.7	-31.8	27.4	40	
Azimuth: 149	Height:154 Vert			Margin (dB): -12.6		
95.651	50.2dBuV Qp	14.9	-31.6	33.5	43.52	
Azimuth: 186	Height:129 Vert			Margin (dB): -10.02		

LIMIT 1: Limit 47 CFR 15.209 dBuV/m 3m
Pk - Peak detector
Qp - Quasi-Peak detector

8.6. TX SPURIOUS EMISSION 30 TO 1000 MHz – RF ID Reader Remote With Tag





Elkay
LBWD00
Filter Remote With Filter/ tag
120V,60Hz
Red=Hor Green=Vert

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 Level dB(uV/m)	
1	36.79	43.03dBuV Pk	22.4	-32.2	33.23	40	
		Azimuth:0-360	Height:200 Horz		Margin (dB)		-6.77
2	83.1075	46.63dBuV Pk	13.6	-31.7	28.53	40	
		Azimuth:0-360	Height:200 Horz		Margin (dB)		-11.47
3	230.5475	47.1dBuV Pk	17.1	-30.9	33.3	46.02	
		Azimuth:0-360	Height:200 Horz		Margin (dB)		-12.72
4	308.6325	57.2dBuV Pk	19.6	-31.1	45.7	46.02	
		Azimuth:0-360	Height:200 Horz		Margin (dB)		-.32
5	542.4025	41.5dBuV Pk	24.1	-30.3	35.3	46.02	
		Azimuth:0-360	Height:399 Horz		Margin (dB)		-10.72
6	37.0325	52.78dBuV Pk	22.3	-32.2	42.88	40	
		Azimuth:0-360	Height:97 Vert		Margin (dB)		2.88
7	40.67	50.2dBuV Pk	19.5	-32.1	37.6	40	
		Azimuth:0-360	Height:97 Vert		Margin (dB)		-2.4
8	83.5925	58.2dBuV Pk	13.5	-31.7	40	40	
		Azimuth:0-360	Height:197 Vert		Margin (dB)		0
9	95.96	56.19dBuV Pk	15	-31.6	39.59	43.52	
		Azimuth:0-360	Height:97 Vert		Margin (dB)		-3.93
10	144.7025	49.16dBuV Pk	18.8	-31.1	36.86	43.52	
		Azimuth:0-360	Height:97 Vert		Margin (dB)		-6.66
11	230.5475	49.76dBuV Pk	17.1	-30.9	35.96	46.02	
		Azimuth:0-360	Height:197 Vert		Margin (dB)		-10.06
12	284.8675	54.28dBuV Pk	19.4	-31.1	42.58	46.02	
		Azimuth:0-360	Height:97 Vert		Margin (dB)		-3.44
13	308.875	54.2dBuV Pk	19.6	-31.1	42.7	46.02	
		Azimuth:0-360	Height:399 Vert		Margin (dB)		-3.32
14	542.4025	41.77dBuV Pk	24.1	-30.3	35.57	46.02	
		Azimuth:0-360	Height:197 Vert		Margin (dB)		-10.45

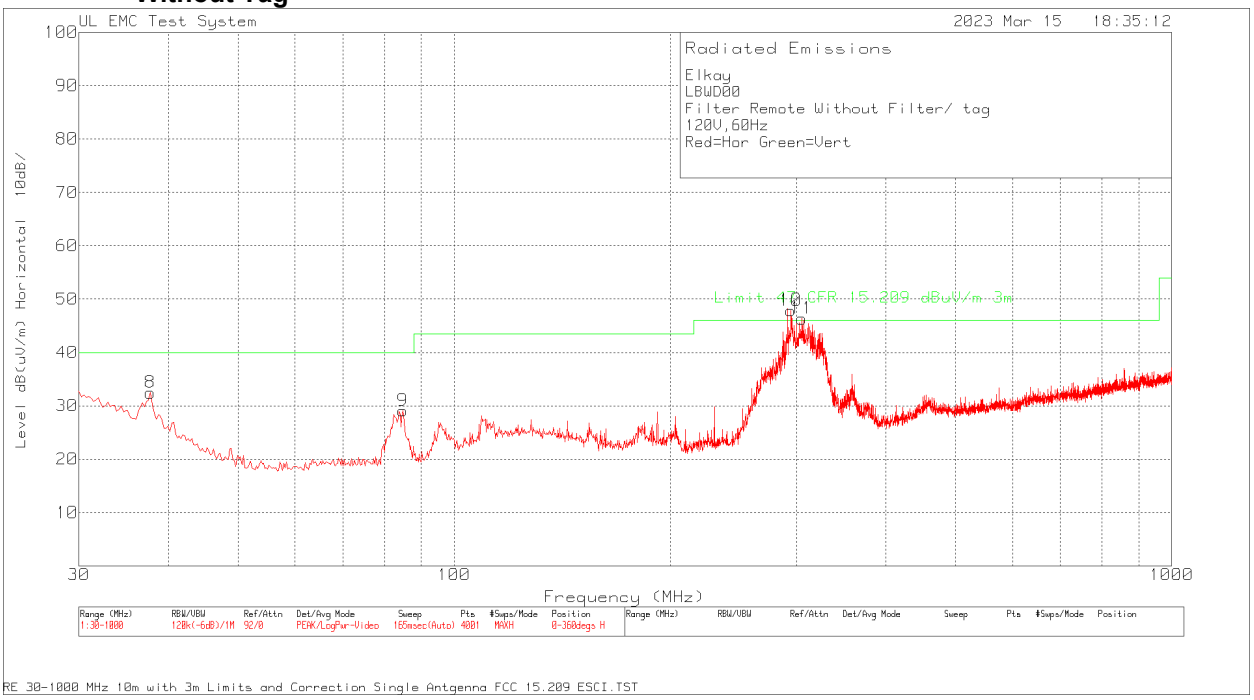
Radiated Emission Data

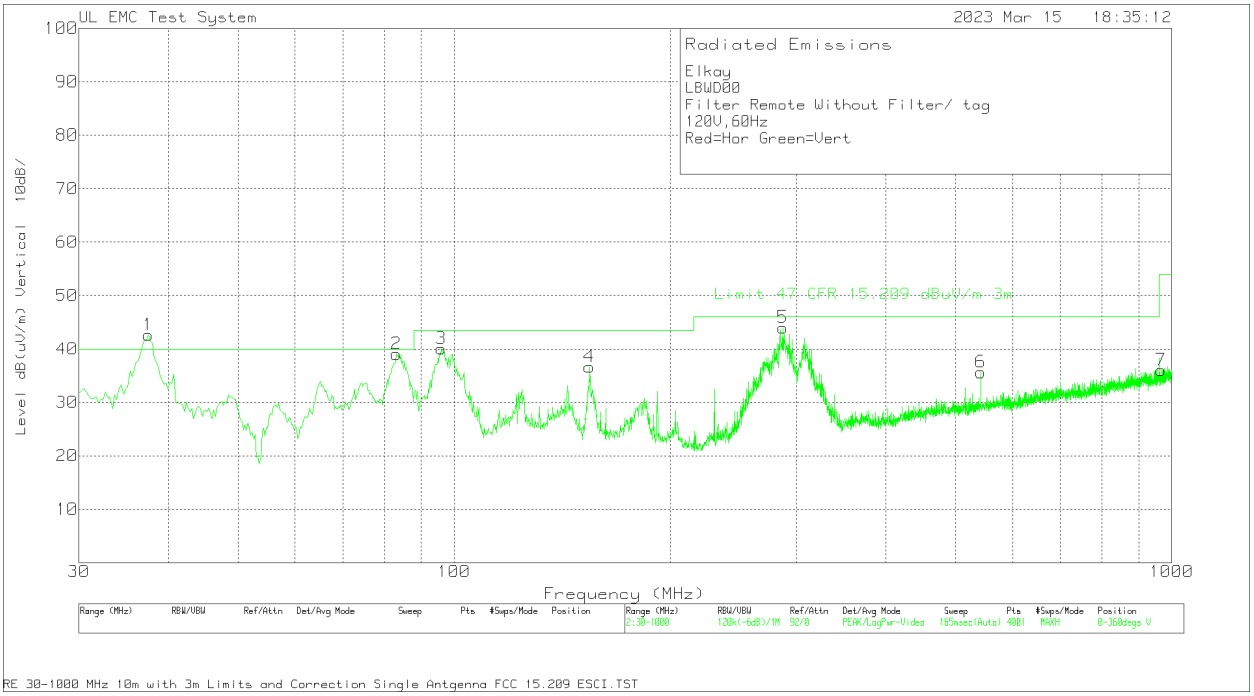
Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 Level dB(uV/m)	
308.633	49.56dBuV Qp	19.6	-31.1	38.06	46.02	
Azimuth: 94	Height:168 Horz			Margin (dB):		-7.96
37.243	45.9dBuV Qp	22.1	-32.1	35.9	40	
Azimuth: 328	Height:100 Vert			Margin (dB):		-4.1
40.67	48.16dBuV Qp	19.5	-32.1	35.56	40	
Azimuth: 113	Height:100 Vert			Margin (dB):		-4.44
83.037	50.6dBuV Qp	13.6	-31.7	32.5	40	
Azimuth: 56	Height:168 Vert			Margin (dB):		-7.5
95.993	54.02dBuV Qp	15	-31.6	37.42	43.52	
Azimuth: 129	Height:127 Vert			Margin (dB):		-6.1
284.868	53.51dBuV Qp	19.4	-31.1	41.81	46.02	
Azimuth: 219	Height:100 Vert			Margin (dB):		-4.21
308.875	48.6dBuV Qp	19.6	-31.1	37.1	46.02	
Azimuth: 2	Height:277 Vert			Margin (dB):		-8.92

LIMIT 1: Limit 47 CFR 15.209 dBuV/m 3m

Pk - Peak detector
Qp - Quasi-Peak detector

Without Tag





Elkay
LBWD00
Filter Remote Without Filter/ tag
120V,60Hz
Red=Hor Green=Vert

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 Level dB(uV/m)	
8	37.76	42.86dBuV Pk	21.7	-32.1	32.46	40	
		Azimuth:0-360	Height:300 Horz		Margin (dB)		-7.54
9	84.805	47.28dBuV Pk	13.5	-31.7	29.08	40	
		Azimuth:0-360	Height:199 Horz		Margin (dB)		-10.92
10	294.5675	59.46dBuV Pk	19.4	-31	47.86	46.02	
		Azimuth:0-360	Height:300 Horz		Margin (dB)		1.84
11	305.2375	57.85dBuV Pk	19.5	-31	46.35	46.02	
		Azimuth:0-360	Height:300 Horz		Margin (dB)		.33
1	37.5175	52.81dBuV Pk	21.9	-32.1	42.61	40	
		Azimuth:0-360	Height:97 Vert		Margin (dB)		2.61
2	83.1075	57.14dBuV Pk	13.6	-31.7	39.04	40	
		Azimuth:0-360	Height:399 Vert		Margin (dB)		-.96
3	95.96	56.63dBuV Pk	15	-31.6	40.03	43.52	
		Azimuth:0-360	Height:97 Vert		Margin (dB)		-3.49
4	154.4025	49.42dBuV Pk	18.3	-31.1	36.62	43.52	
		Azimuth:0-360	Height:97 Vert		Margin (dB)		-6.9
5	287.2925	55.66dBuV Pk	19.4	-31.1	43.96	46.02	
		Azimuth:0-360	Height:97 Vert		Margin (dB)		-2.06
6	542.4025	41.84dBuV Pk	24.1	-30.3	35.64	46.02	
		Azimuth:0-360	Height:297 Vert		Margin (dB)		-10.38
7	967.02	34.91dBuV Pk	28.8	-27.7	36.01	53.97	
		Azimuth:0-360	Height:399 Vert		Margin (dB)		-17.96

Radiated Emission Data

	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 Level dB(uV/m)	
	294.568	52.09dBuV Qp	19.4	-31	40.49	46.02	
Azimuth: 269		Height:267 Horz			Margin (dB):		-5.53
	305.238	45.51dBuV Qp	19.5	-31	34.01	46.02	
Azimuth: 228		Height:323 Horz			Margin (dB):		-12.01
	37.628	45.25dBuV Qp	21.8	-32.1	34.95	40	
Azimuth: 276		Height:102 Vert			Margin (dB):		-5.05
	84.28	49.26dBuV Qp	13.5	-31.7	31.06	40	
Azimuth: 47		Height:153 Vert			Margin (dB):		-8.94
	95.96	51.27dBuV Qp	15	-31.6	34.67	43.52	
Azimuth: 358		Height:145 Vert			Margin (dB):		-8.85
	287.293	53.1dBuV Qp	19.4	-31.1	41.4	46.02	
Azimuth: 223		Height:144 Vert			Margin (dB):		-4.62

LIMIT 1: Limit 47 CFR 15.209 dBuV/m 3m

Pk - Peak detector
Qp - Quasi-Peak detector

9. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency, over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

IC RSS-210, Annex B.6
Carrier frequency stability shall be maintained to ±0.01% (±100 ppm).

TEST PROCEDURE

ANSI C63.10-2013 Clause 6.8

RESULTS

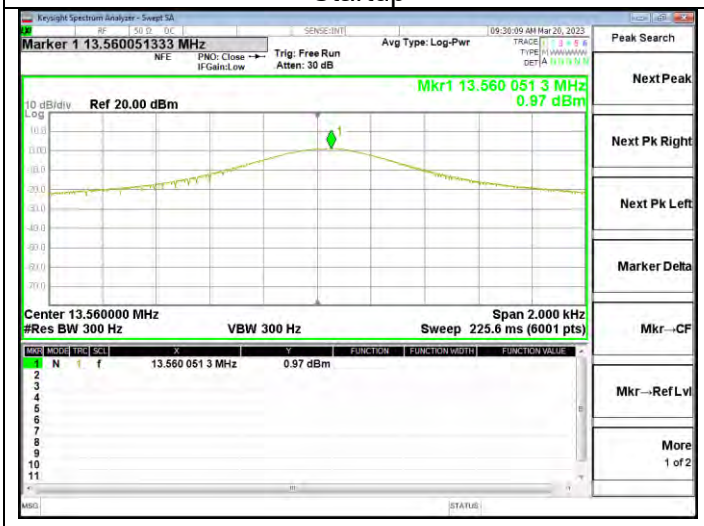
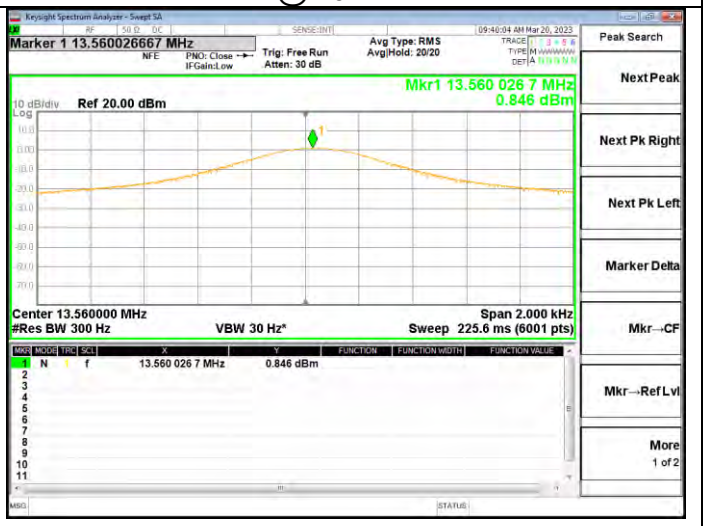
No non-compliance noted.

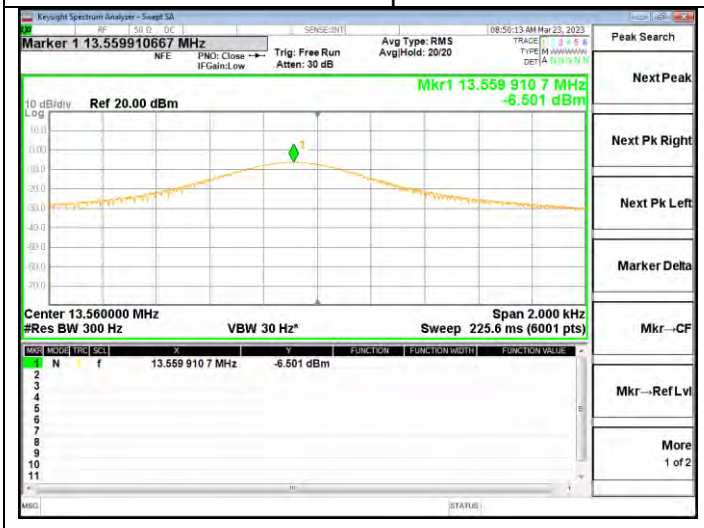
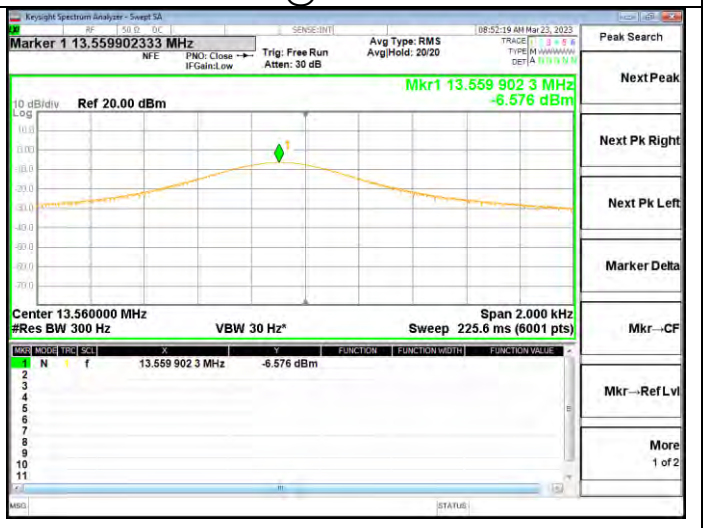
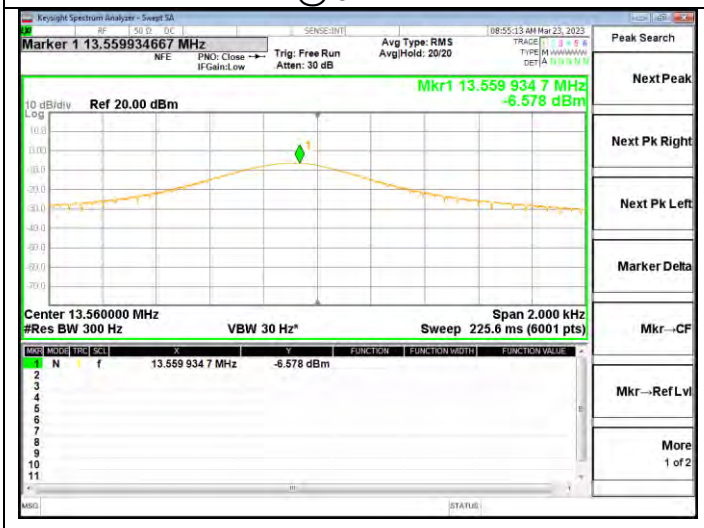
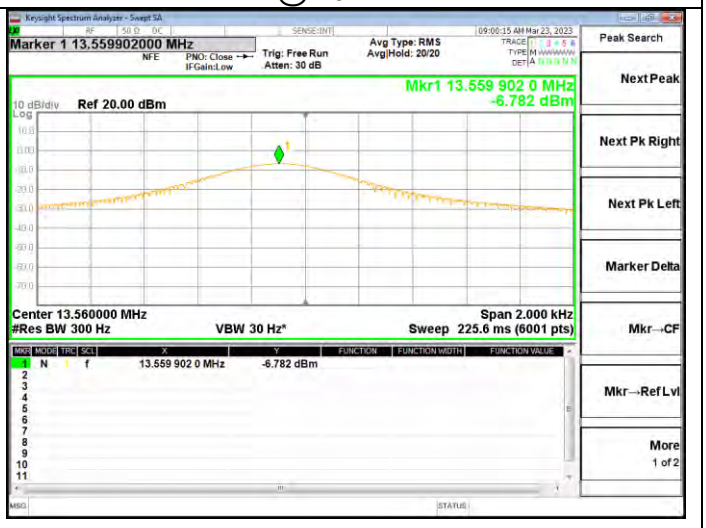
9.1. Type A

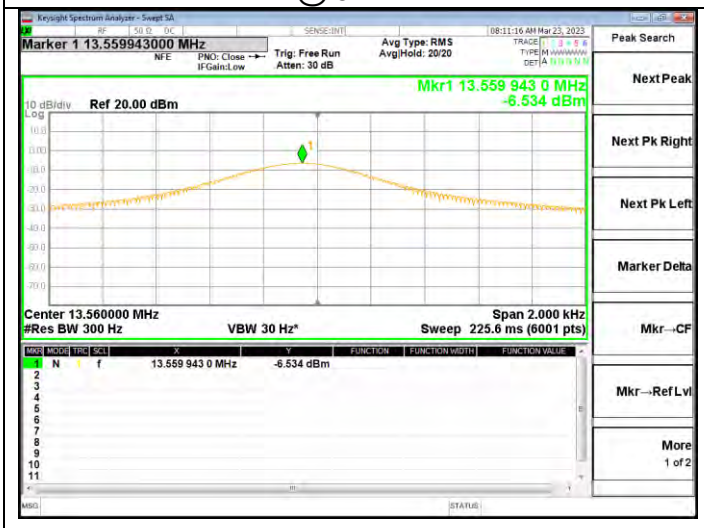
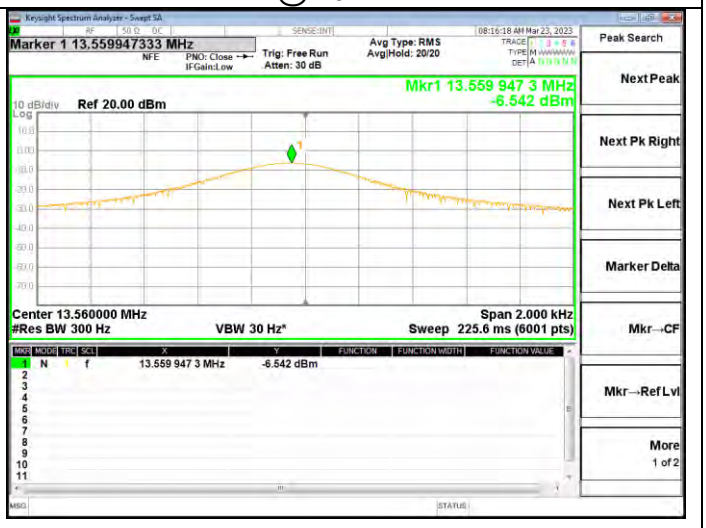
Reader Mode

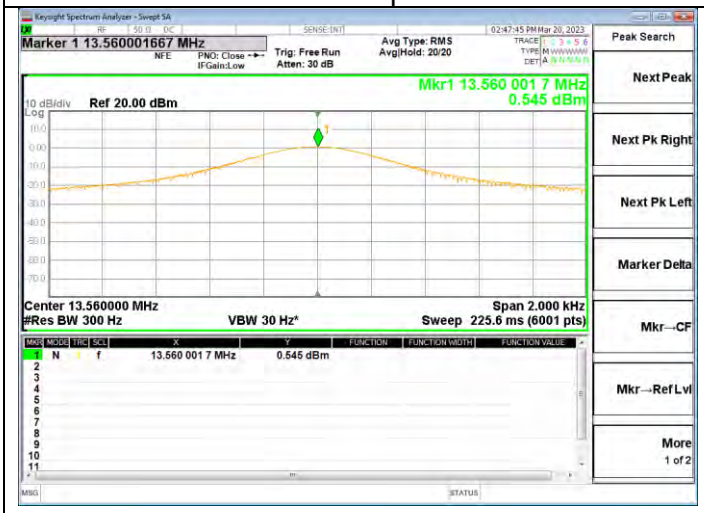
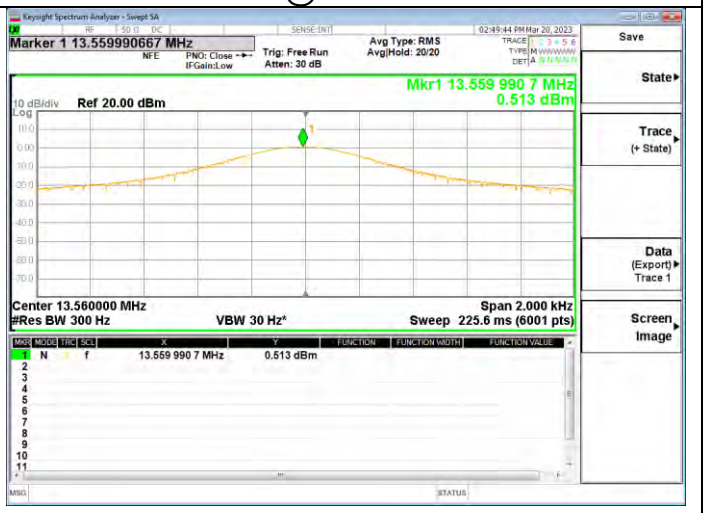
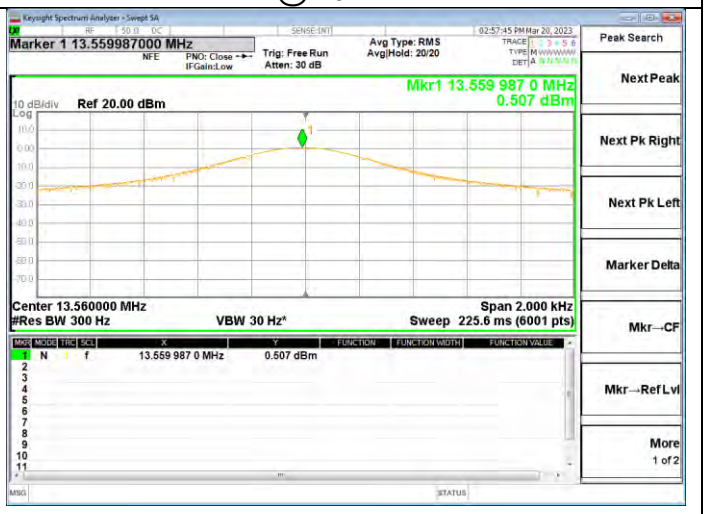
106Kbps

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measured with Time Elapse								
(Vdc)	(ºC)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
5.00	50	13.5599107	10.369	13.5599023	10.988	13.5599347	8.599	13.5599020	11.010	± 100
5.00	40	13.5599530	7.249	13.5599387	8.304	13.5599430	7.987	13.5599473	7.670	± 100
5.00	30	13.5600017	3.658	13.5599907	4.469	13.5599833	5.015	13.5599870	4.742	± 100
5.00	***20***	***13.5600513***	***0.000***	***13.5600320***	***1.423***	***13.5600343***	***1.254***	***13.5600267***	***1.814***	***± 100***
5.00	10	13.5600840	-2.412	13.5600700	-1.379	13.5600757	-1.799	13.5600747	-1.726	± 100
5.00	0	13.5600977	-3.422	13.5600983	-3.466	13.5601117	-4.454	13.5600970	-3.370	± 100
5.00	-10	13.5601060	-4.034	13.5601047	-3.938	13.5601023	-3.761	13.5601047	-3.938	± 100
5.00	-20	13.5600877	-2.684	13.5600840	-2.412	13.5600810	-2.190	13.5600860	-2.559	± 100
4.25	20	13.5600097	3.068	13.5599987	3.879	13.5600423	0.664	13.5600250	1.940	± 100
5.75	20	13.5600567	-0.398	13.5600573	-0.442	13.5600503	0.074	13.5600393	0.885	± 100

Temperature: 20°C, 5VDC	
Startup	@ 2 mins
	
@ 5 mins	@ 10 mins
	

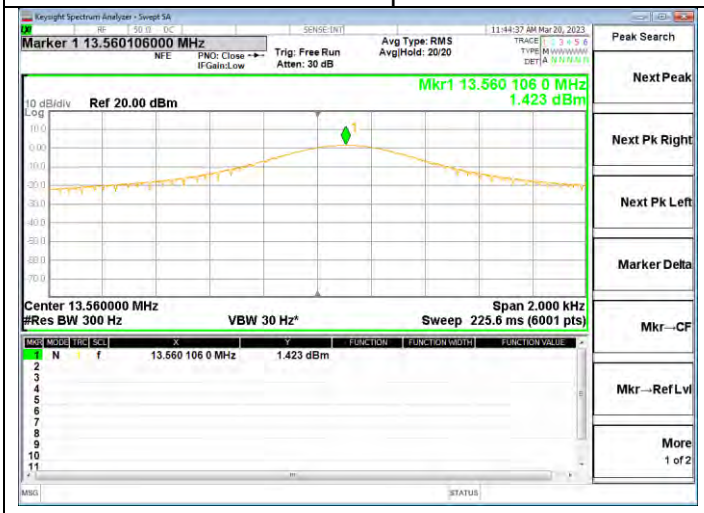
Temperature: 50°C, 5VDC	
Startup	@ 2 mins
	
@ 5 mins	@ 10 mins
	

Temperature: 40°C, 5VDC	
Startup	@ 2 mins
	
@ 5 mins	@ 10 mins
	

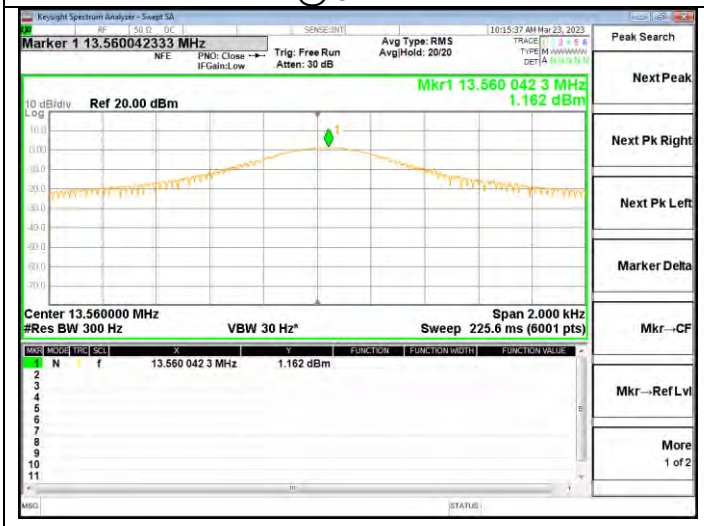
Temperature: 30°C, 5VDC	
Startup	@ 2 mins
	
@ 5 mins	@ 10 mins
	

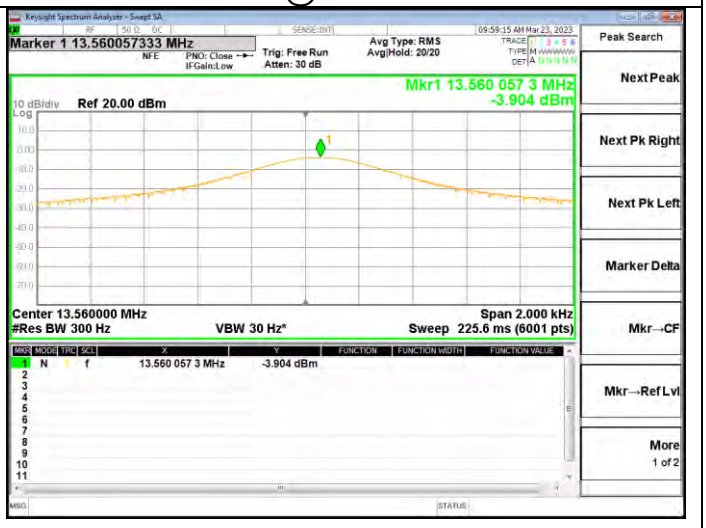
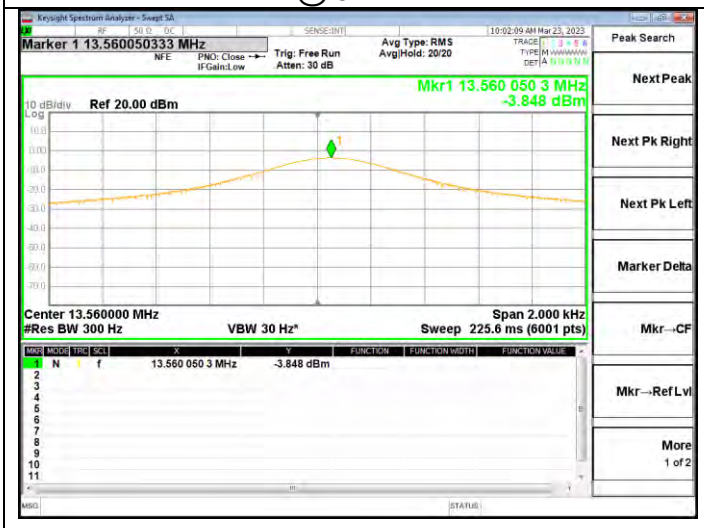
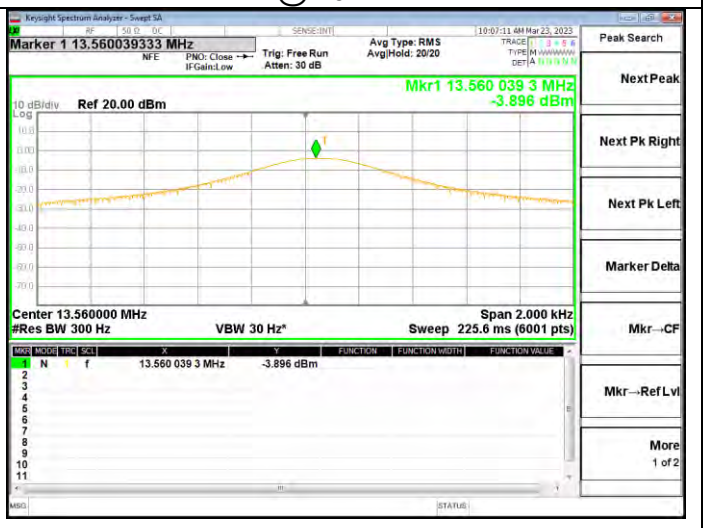
Temperature: 10°C, 5VDC	
Startup	@ 2 mins
	
@ 5 mins	@ 10 mins
	

Temperature: 0°C, 5VDC	
Startup	@ 2 mins
	
@ 5 mins	@ 10 mins
	

Temperature: -10°C, 5VDC	
Startup	@ 2 mins
	
@ 5 mins	@ 10 mins
	

Temperature: -20°C, 5VDC	
Startup	@ 2 mins
	
@ 5 mins	@ 10 mins
	

85% of Rated Supply Voltage (4.25 V), Temperature: 20°C	
Startup	@ 2 mins
	
@ 5 mins	@ 10 mins
	

115% of Rated Supply Voltage (5.75 V), Temperature: 20°C	
Startup	@ 2 mins
	
@ 5 mins	@ 10 mins
	

10. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207
IC RSS-GEN, Section 8.8

(a) Except as shown in paragraphs (b) and (c) of this section, for 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 50μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Notes: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

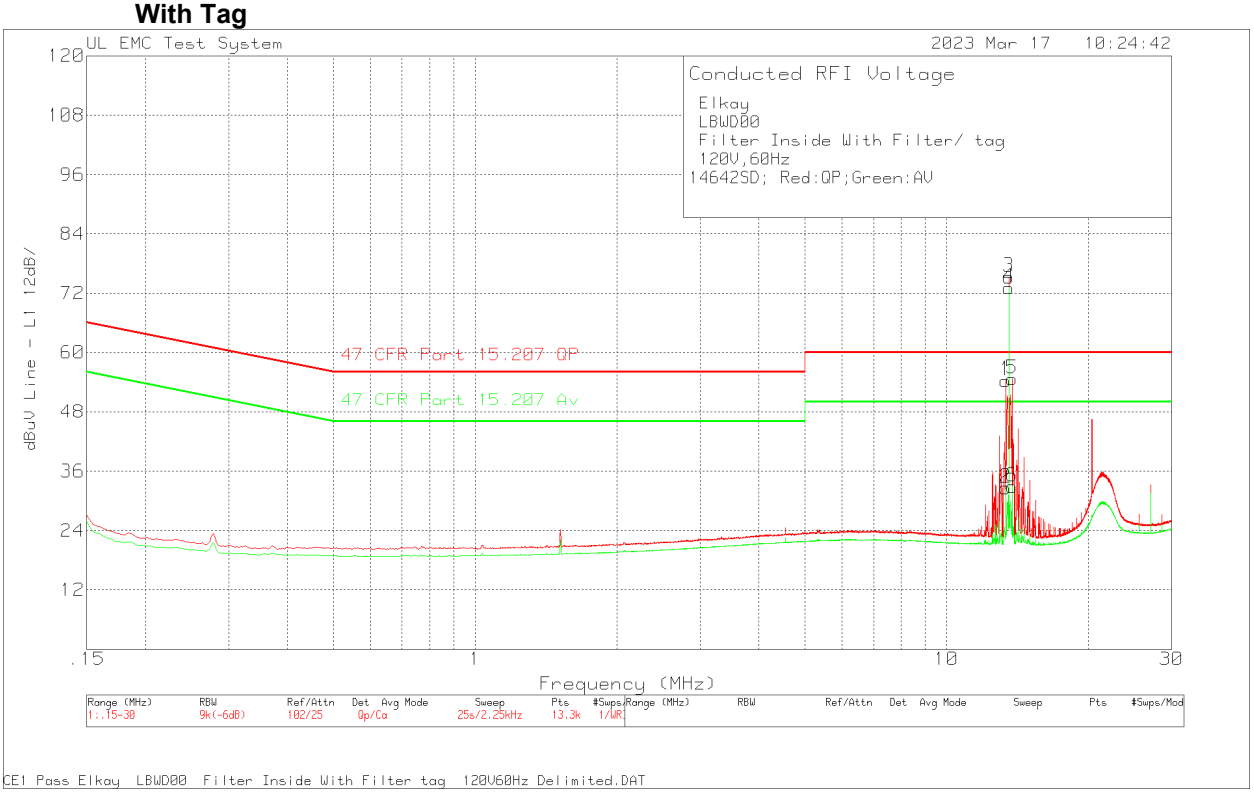
TEST PROCEDURE

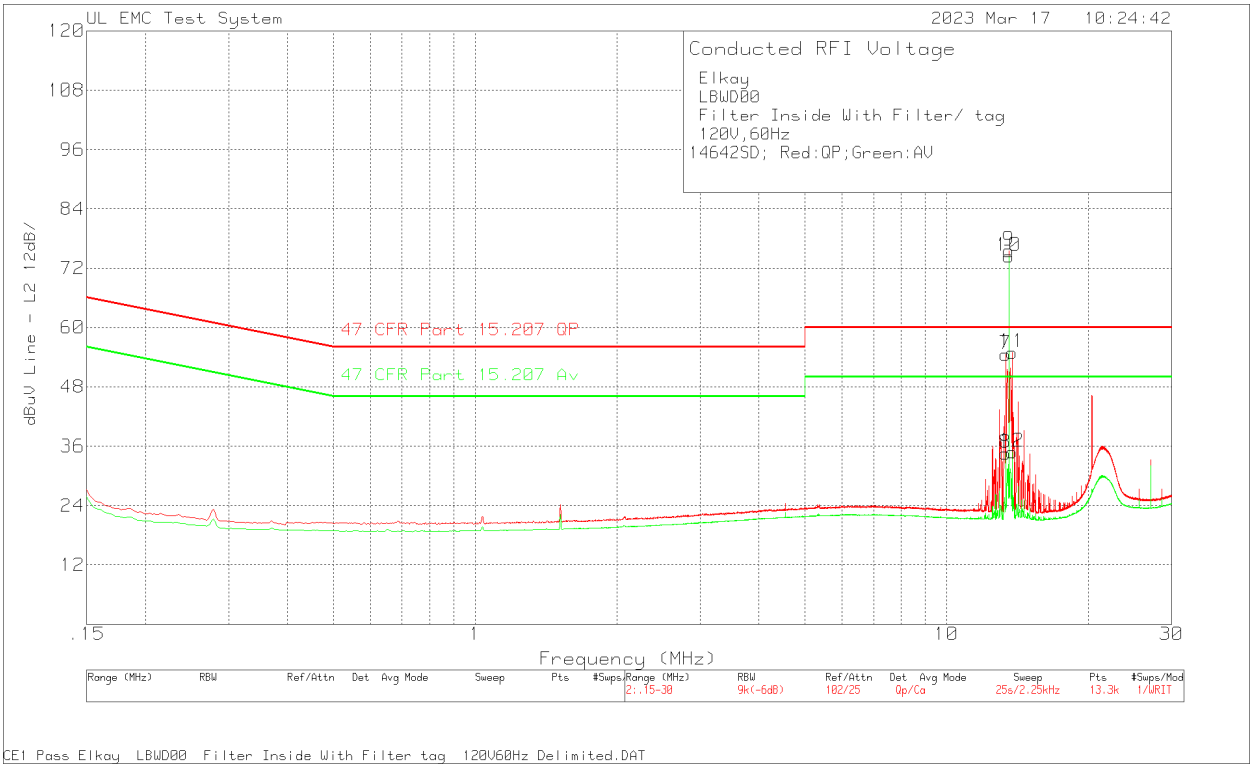
ANSI C63.10:2013

RESULTS

No non-compliance noted:

10.1. Normal Board with normal antenna – RF ID Reader Inside With Tag





Elkay
LBWD00
Filter Inside With Filter/ tag
120V,60Hz
14642SD;Red:QP;Green:AV

Trace Markers

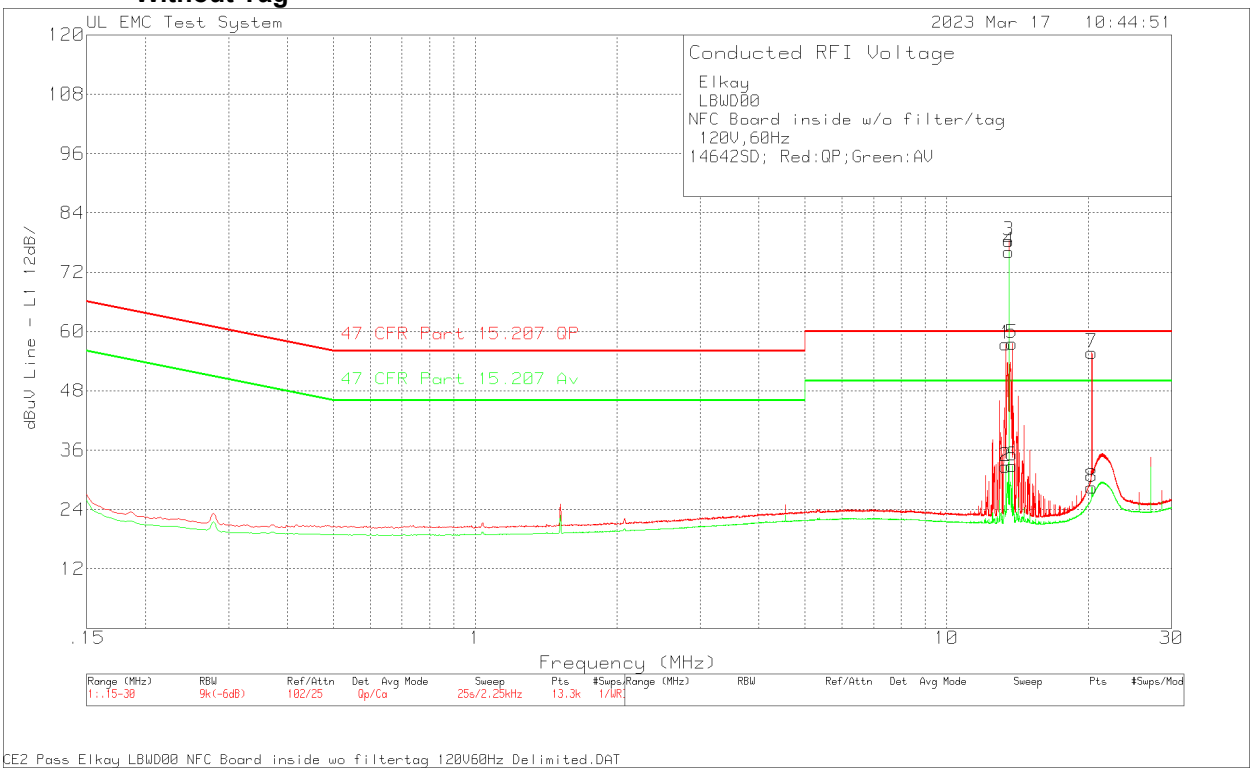
No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dBuV	Limit:1	2
Line							
1	13.3508	43.13dBuV Qp	.1	11.1	54.33	60	-
					Margin (dB)	-5.67	-
2	13.3508	21.43dBuV Ca	.1	11.1	32.63	-	50
					Margin (dB)	-	-17.37
3	13.56	64.08dBuV Qp	.1	11.1	75.28	60	-
					Margin (dB)	15.28	-
4	13.56	61.95dBuV Ca	.1	11.1	73.15	-	50
					Margin (dB)	-	23.15
5	13.7693	43.45dBuV Qp	.1	11.1	54.65	60	-
					Margin (dB)	-5.35	-
6	13.7693	21.69dBuV Ca	.1	11.1	32.89	-	50
					Margin (dB)	-	-17.11
Neutral							
7	13.3508	43.36dBuV Qp	.1	11.1	54.56	60	-
					Margin (dB)	-5.44	-
8	13.3508	23.31dBuV Ca	.1	11.1	34.51	-	50
					Margin (dB)	-	-15.49
9	13.56	64.35dBuV Qp	.1	11.1	75.55	60	-
					Margin (dB)	15.55	-
10	13.56	63.18dBuV Ca	.1	11.1	74.38	-	50
					Margin (dB)	-	24.38
11	13.7693	43.74dBuV Qp	.1	11.1	54.94	60	-
					Margin (dB)	-5.06	-
12	13.7693	23.62dBuV Ca	.1	11.1	34.82	-	50
					Margin (dB)	-	-15.18

LIMIT 1: 47 CFR Part 15.207 QP
LIMIT 2: 47 CFR Part 15.207 Av

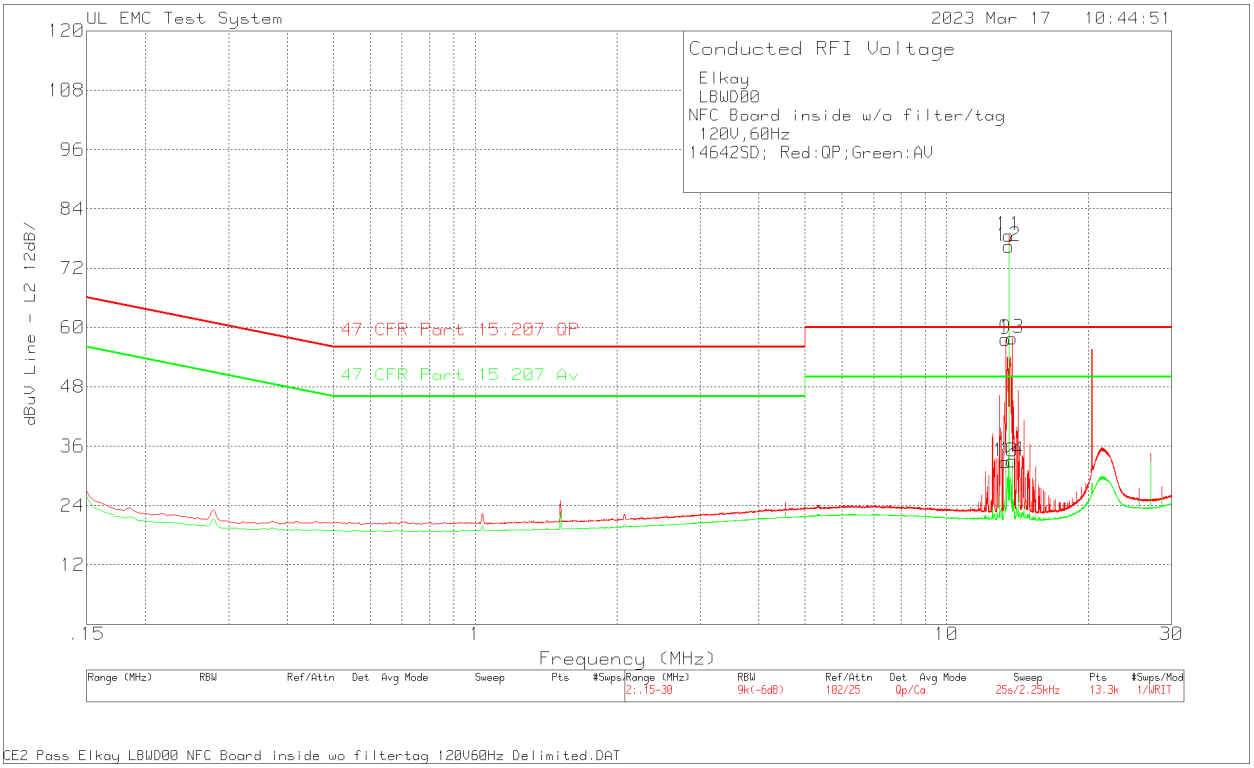
Qp - Quasi-Peak detector
Ca - CISPR Average detection

Frequencies between 13.110MHz to 14.010MHz are not subject to limits

Without Tag



CE2 Pass Elkay LBWD00 NFC Board inside wo filtertag 120V60Hz Delimited.DAT



CE2 Pass Elkay LBWD00 NFC Board inside wo filtertag 120V60Hz Delimited.DAT

Elkay
LBWD00
NFC Boardinside w/o filter/tag
120V,60Hz
14642SD;Red:QP;Green:AV

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dBuV	Limit:1	2
Line							
1	13.3508	46.21dBuV Qp	.1	11.1	57.41	60	-
					Margin (dB)	-2.59	-
2	13.3508	21.51dBuV Ca	.1	11.1	32.71	-	50
					Margin (dB)	-	-17.29
3	13.56	67.15dBuV Qp	.1	11.1	78.35	60	-
					Margin (dB)	18.35	-
4	13.56	64.98dBuV Ca	.1	11.1	76.18	-	50
					Margin (dB)	-	26.18
5	13.7693	46.35dBuV Qp	.1	11.1	57.55	60	-
					Margin (dB)	-2.45	-
6	13.7693	21.63dBuV Ca	.1	11.1	32.83	-	50
					Margin (dB)	-	-17.17
7	20.3393	44.1dBuV Qp	0	11.6	55.7	60	-
					Margin (dB)	-4.3	-
8	20.3393	16.91dBuV Ca	0	11.6	28.51	-	50
					Margin (dB)	-	-21.49
Neutral							
9	13.3508	46.45dBuV Qp	.1	11.1	57.65	60	-
					Margin (dB)	-2.35	-
10	13.3508	21.67dBuV Ca	.1	11.1	32.87	-	50
					Margin (dB)	-	-17.13
11	13.56	67.42dBuV Qp	.1	11.1	78.62	60	-
					Margin (dB)	18.62	-
12	13.56	65.25dBuV Ca	.1	11.1	76.45	-	50
					Margin (dB)	-	26.45
13	13.7693	46.64dBuV Qp	.1	11.1	57.84	60	-
					Margin (dB)	-2.16	-
14	13.7693	21.83dBuV Ca	.1	11.1	33.03	-	50
					Margin (dB)	-	-16.97

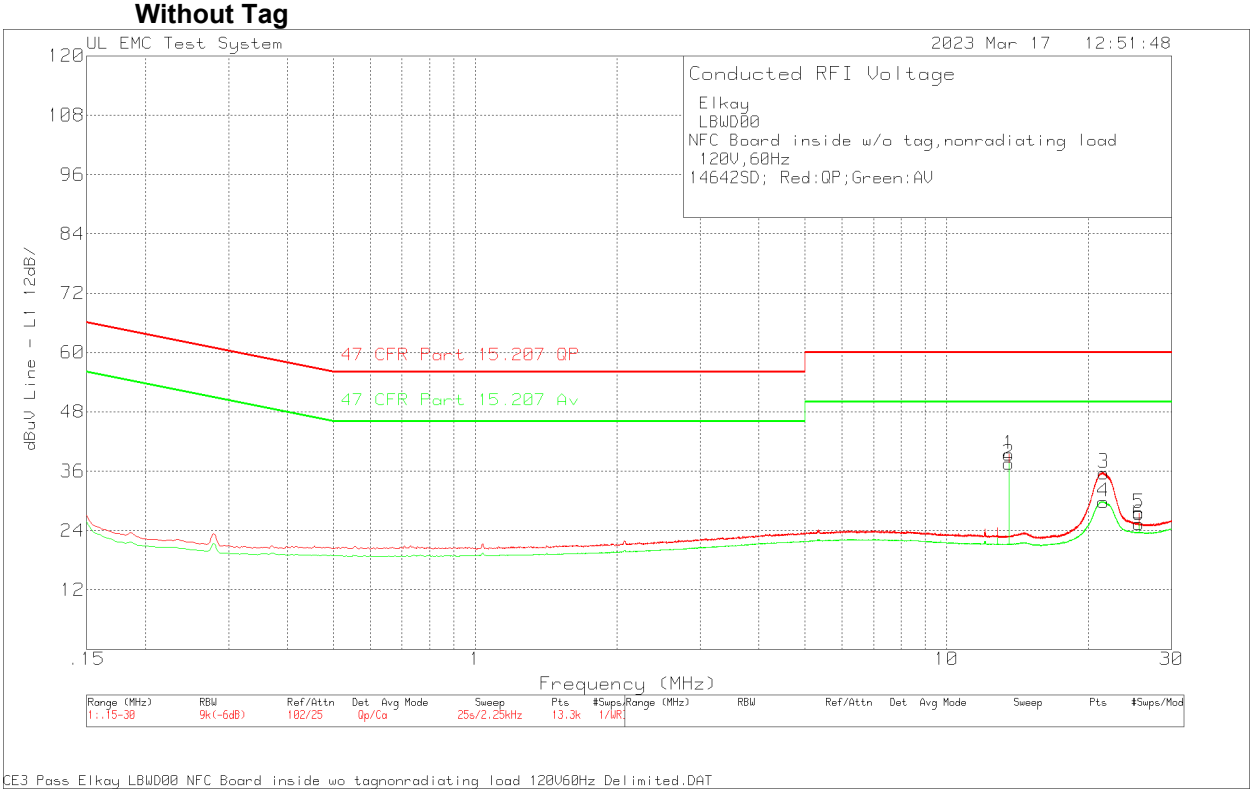
LIMIT 1: 47 CFR Part 15.207 QP
LIMIT 2: 47 CFR Part 15.207 Av

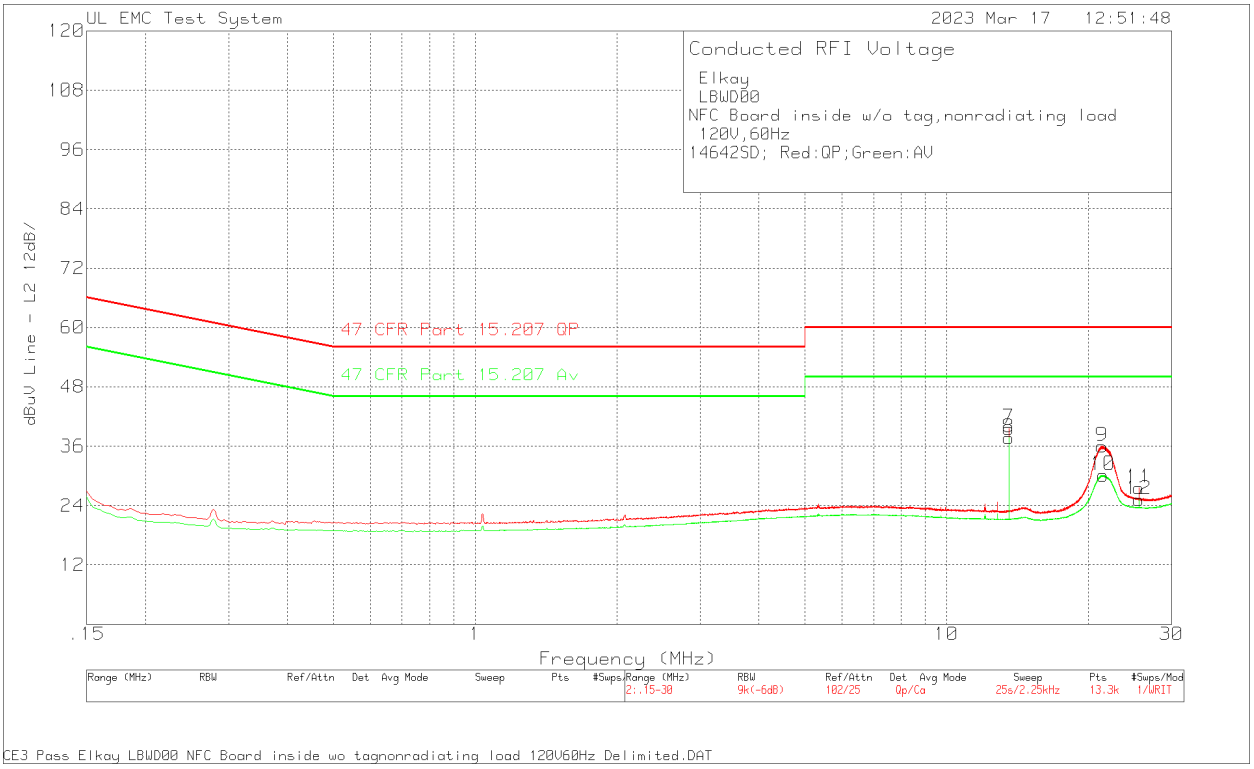
Qp - Quasi-Peak detector
Ca - CISPR Average detection

Frequencies between 13.110MHz to 14.010MHz are not subject to limits

10.2. Modified Board non radiating antenna

Without Tag





Elkay
LBWD00
NFC Boardinside w/o tag,nonradiating load
120V,60Hz
14642SD;Red:QP;Green:AV

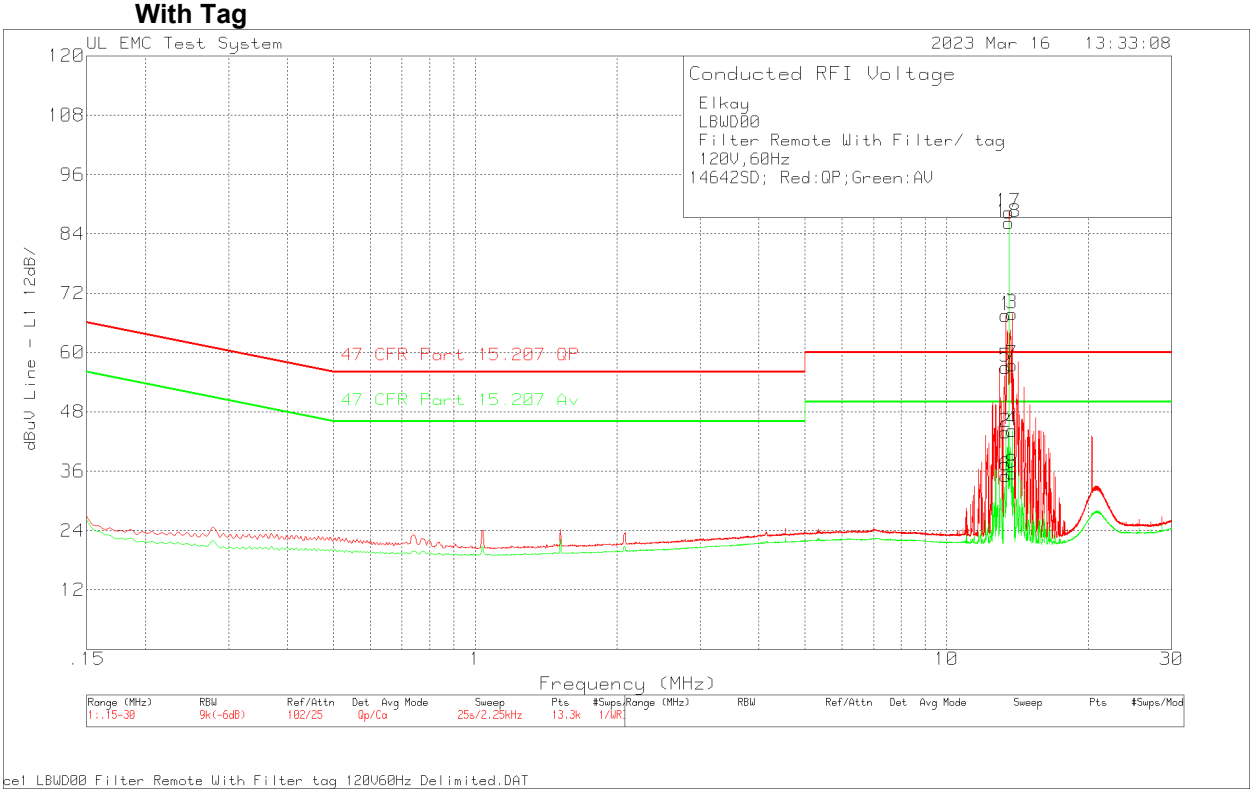
Trace Markers

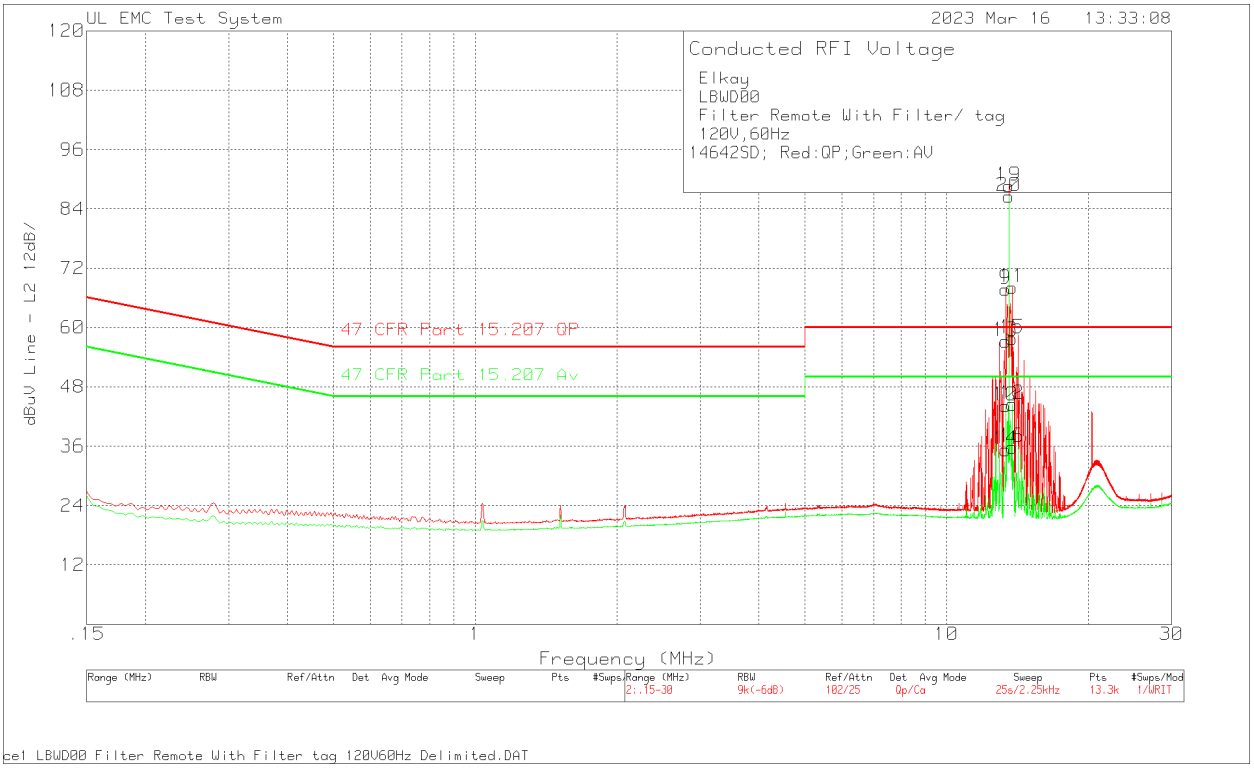
No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dBuV	Limit:1	2
Line							
1	13.56	28.25dBuV Qp	.1	11.1	39.45	60	-
					Margin (dB)	-20.55	-
2	13.56	26.34dBuV Ca	.1	11.1	37.54	-	50
					Margin (dB)	-	-12.46
3	21.561	24.04dBuV Qp	0	11.6	35.64	60	-
					Margin (dB)	-24.36	-
4	21.5385	18.18dBuV Ca	0	11.6	29.78	-	50
					Margin (dB)	-	-20.22
5	25.5998	15.7dBuV Qp	0	11.8	27.5	60	-
					Margin (dB)	-32.5	-
6	25.5998	13.54dBuV Ca	0	11.8	25.34	-	50
					Margin (dB)	-	-24.66
Neutral							
7	13.56	28.39dBuV Qp	.1	11.1	39.59	60	-
					Margin (dB)	-20.41	-
8	13.56	26.48dBuV Ca	.1	11.1	37.68	-	50
					Margin (dB)	-	-12.32
9	21.372	24.4dBuV Qp	0	11.6	36	60	-
					Margin (dB)	-24	-
10	21.4778	18.53dBuV Ca	0	11.6	30.13	-	50
					Margin (dB)	-	-19.87
11	25.5998	15.74dBuV Qp	0	11.8	27.54	60	-
					Margin (dB)	-32.46	-
12	25.5998	13.44dBuV Ca	0	11.8	25.24	-	50
					Margin (dB)	-	-24.76

LIMIT 1: 47 CFR Part 15.207 QP
LIMIT 2: 47 CFR Part 15.207 Av

Qp - Quasi-Peak detector
Ca - CISPR Average detection

10.3. Normal Board with normal antenna – RF ID Reader Remote With Tag





Elkay
LBWD00
Filter Remote With Filter/ tag
120V,60Hz
14642SD;Red:QP;Green:AV

Trace Markers

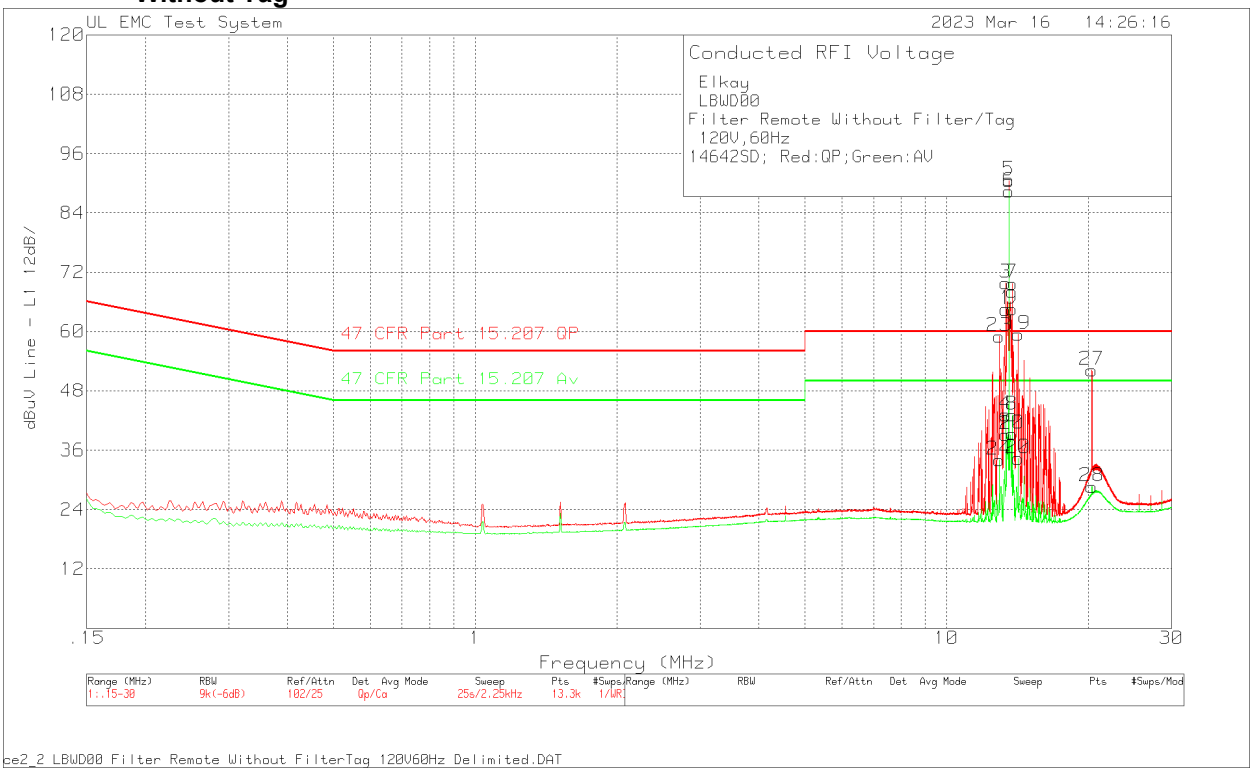
No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dBuV	Limit:1	2
Line							
1	13.3508	56.32dBuV Qp	.1	11.1	67.52	60	-
					Margin (dB)	7.52	-
2	13.3508	32.72dBuV Ca	.1	11.1	43.92	-	50
					Margin (dB)	-	-6.08
3	13.7693	56.63dBuV Qp	.1	11.1	67.83	60	-
					Margin (dB)	7.83	-
4	13.7693	33.02dBuV Ca	.1	11.1	44.22	-	50
					Margin (dB)	-	-5.78
5	13.344	45.8dBuV Qp	.1	11.1	57	60	-
					Margin (dB)	-3	-
6	13.344	23.91dBuV Ca	.1	11.1	35.11	-	50
					Margin (dB)	-	-14.89
7	13.776	46.29dBuV Qp	.1	11.1	57.49	60	-
					Margin (dB)	-2.51	-
8	13.776	24.37dBuV Ca	.1	11.1	35.57	-	50
					Margin (dB)	-	-14.43
17	13.56	77.2dBuV Qp	.1	11.1	88.4	60	-
					Margin (dB)	28.4	-
18	13.56	75.09dBuV Ca	.1	11.1	86.29	-	50
					Margin (dB)	-	36.29
Neutral							
9	13.3508	56.56dBuV Qp	.1	11.1	67.76	60	-
					Margin (dB)	7.76	-
10	13.3508	32.93dBuV Ca	.1	11.1	44.13	-	50
					Margin (dB)	-	-5.87
11	13.7693	56.92dBuV Qp	.1	11.1	68.12	60	-
					Margin (dB)	8.12	-
12	13.7693	33.28dBuV Ca	.1	11.1	44.48	-	50
					Margin (dB)	-	-5.52
13	13.344	46.04dBuV Qp	.1	11.1	57.24	60	-
					Margin (dB)	-2.76	-
14	13.344	24.09dBuV Ca	.1	11.1	35.29	-	50
					Margin (dB)	-	-14.71
15	13.776	46.57dBuV Qp	.1	11.1	57.77	60	-
					Margin (dB)	-2.23	-
16	13.776	24.6dBuV Ca	.1	11.1	35.8	-	50
					Margin (dB)	-	-14.2
19	13.56	77.47dBuV Qp	.1	11.1	88.67	60	-
					Margin (dB)	28.67	-
20	13.56	75.35dBuV Ca	.1	11.1	86.55	-	50
					Margin (dB)	-	36.55

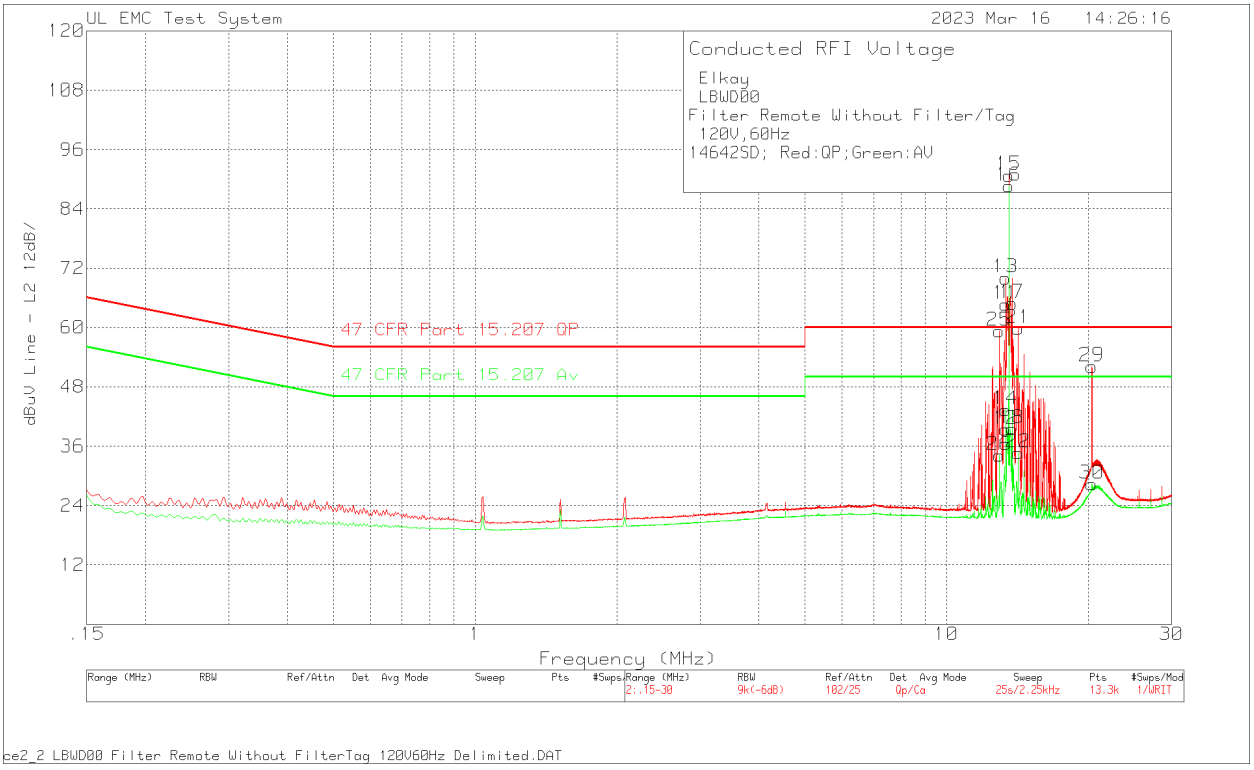
LIMIT 1: 47 CFR Part 15.207 QP
LIMIT 2: 47 CFR Part 15.207 Av

Qp - Quasi-Peak detector
Ca - CISPR Average detection

Frequencies between 13.110MHz to 14.010MHz are not subject to limits

Without Tag





Elkay
LBWD00
FilterRemote Without Filter/Tag
120V,60Hz
14642SD;Red:QP;Green:AV

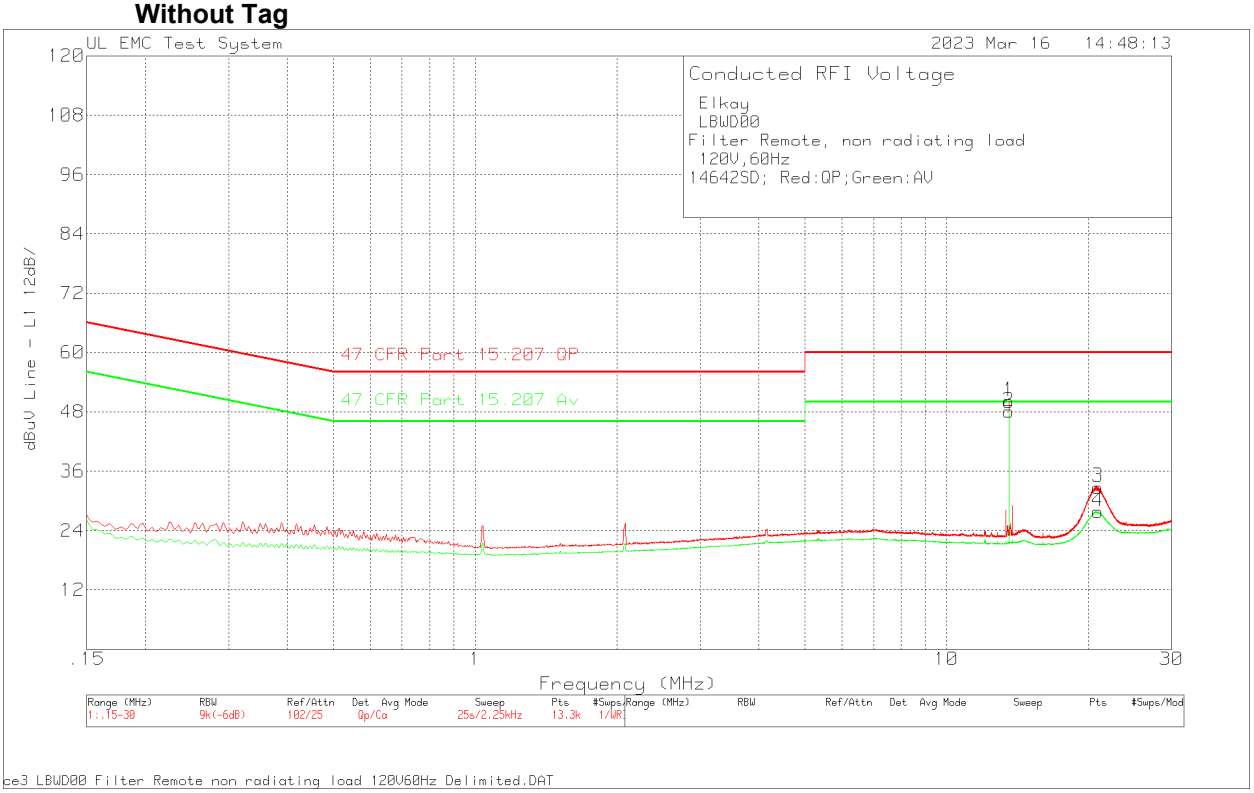
Trace Markers

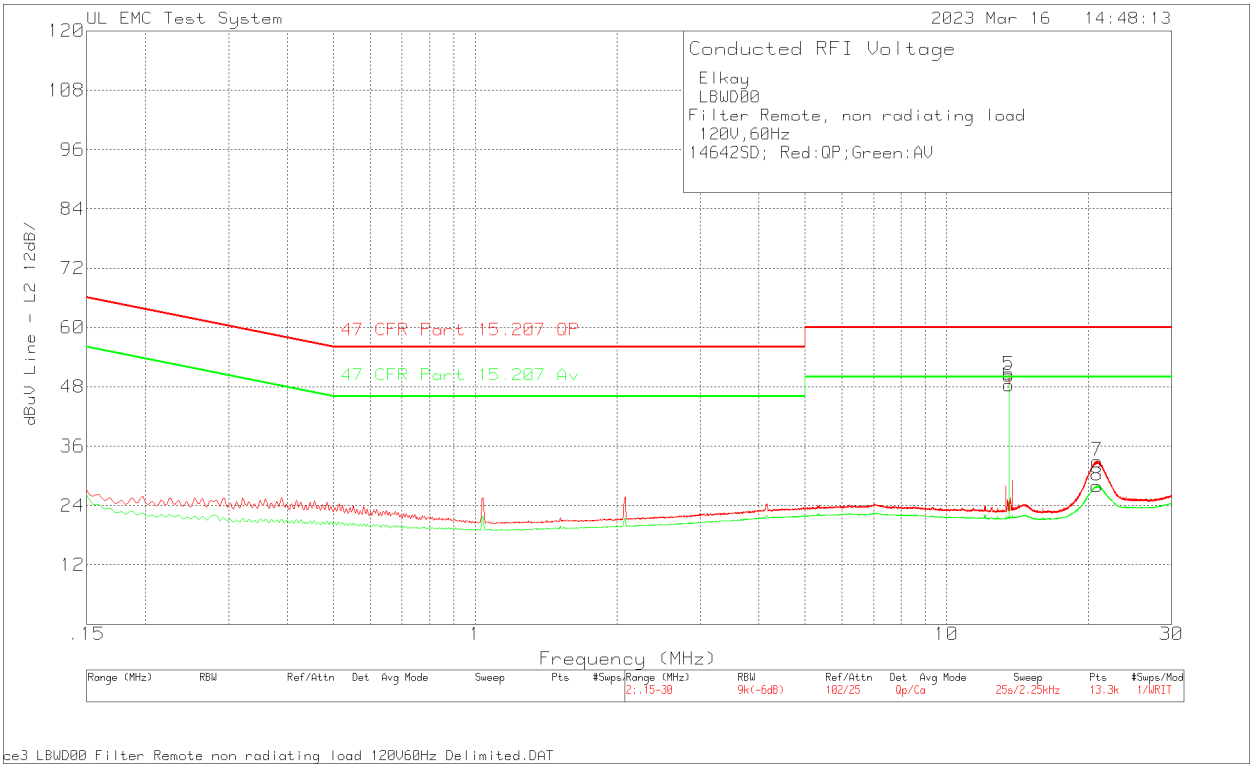
No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dBuV	Limit:1	2
Line							
1	13.3463	53.28dBuV Qp	.1	11.1	64.48	60	-
					Margin (dB)	4.48	-
2	13.3463	27.98dBuV Ca	.1	11.1	39.18	-	50
					Margin (dB)	-	-10.82
3	13.3508	58.58dBuV Qp	.1	11.1	69.78	60	-
					Margin (dB)	9.78	-
4	13.3508	31.98dBuV Ca	.1	11.1	43.18	-	50
					Margin (dB)	-	-6.82
5	13.56	79.33dBuV Qp	.1	11.1	90.53	60	-
					Margin (dB)	30.53	-
6	13.56	77.2dBuV Ca	.1	11.1	88.4	-	50
					Margin (dB)	-	38.4
7	13.7693	58.53dBuV Qp	.1	11.1	69.73	60	-
					Margin (dB)	9.73	-
8	13.7693	31.94dBuV Ca	.1	11.1	43.14	-	50
					Margin (dB)	-	-6.86
9	13.7738	53.39dBuV Qp	.1	11.1	64.59	60	-
					Margin (dB)	4.59	-
10	13.7738	28.07dBuV Ca	.1	11.1	39.27	-	50
					Margin (dB)	-	-10.73
19	14.1878	48.14dBuV Qp	.1	11.2	59.44	60	-
					Margin (dB)	-.56	-
20	14.1878	23.05dBuV Ca	.1	11.2	34.35	-	50
					Margin (dB)	-	-15.65
23	12.9323	47.86dBuV Qp	.1	11.1	59.06	60	-
					Margin (dB)	-.94	-
24	12.9323	22.78dBuV Ca	.1	11.1	33.98	-	50
					Margin (dB)	-	-16.02
27	20.3393	40.54dBuV Qp	0	11.6	52.14	60	-
					Margin (dB)	-7.86	-
28	20.3393	17.05dBuV Ca	0	11.6	28.65	-	50
					Margin (dB)	-	-21.35
Neutral							
11	13.3463	53.52dBuV Qp	.1	11.1	64.72	60	-
					Margin (dB)	4.72	-
12	13.3463	28.19dBuV Ca	.1	11.1	39.39	-	50
					Margin (dB)	-	-10.61
13	13.3508	58.83dBuV Qp	.1	11.1	70.03	60	-
					Margin (dB)	10.03	-
14	13.3508	32.2dBuV Ca	.1	11.1	43.4	-	50
					Margin (dB)	-	-6.6
15	13.56	79.59dBuV Qp	.1	11.1	90.79	60	-
					Margin (dB)	30.79	-
16	13.56	77.46dBuV Ca	.1	11.1	88.66	-	50
					Margin (dB)	-	38.66
17	13.7738	53.67dBuV Qp	.1	11.1	64.87	60	-
					Margin (dB)	4.87	-
18	13.7738	28.32dBuV Ca	.1	11.1	39.52	-	50
					Margin (dB)	-	-10.48
21	14.1878	48.49dBuV Qp	.1	11.2	59.79	60	-
					Margin (dB)	-.21	-
22	14.1878	23.34dBuV Ca	.1	11.2	34.64	-	50
					Margin (dB)	-	-15.36
25	12.9323	48.06dBuV Qp	.1	11.1	59.26	60	-
					Margin (dB)	-.74	-
26	12.9323	22.92dBuV Ca	.1	11.1	34.12	-	50
					Margin (dB)	-	-15.88
29	20.3393	40.53dBuV Qp	0	11.6	52.13	60	-
					Margin (dB)	-7.87	-
30	20.3393	16.73dBuV Ca	0	11.6	28.33	-	50
					Margin (dB)	-	-21.67

LIMIT 1: 47 CFR Part 15.207 QP
LIMIT 2: 47 CFR Part 15.207 Av
Qp - Quasi-Peak detector
Ca - CISPR Average detection

Frequencies between 13.110MHz to 14.010MHz are not subject to limits

10.4. Modified Board non radiating antenna Without Tag





Elkay
LBWD00
FilterRemote, non radiating load
120V,60Hz
14642SD;Red:QP;Green:AV

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dBuV	Limit:1	2
Line							
1	13.56	38.93dBuV Qp	.1	11.1	50.13	60	-
					Margin (dB)	-9.87	-
2	13.56	36.93dBuV Ca	.1	11.1	48.13	-	50
					Margin (dB)	-	-1.87
3	20.9355	21.15dBuV Qp	0	11.6	32.75	60	-
					Margin (dB)	-27.25	-
4	20.9333	16.19dBuV Ca	0	11.6	27.79	-	50
					Margin (dB)	-	-22.21
Neutral							
5	13.56	39.17dBuV Qp	.1	11.1	50.37	60	-
					Margin (dB)	-9.63	-
6	13.56	37.16dBuV Ca	.1	11.1	48.36	-	50
					Margin (dB)	-	-1.64
7	20.895	21.4dBuV Qp	0	11.6	33	60	-
					Margin (dB)	-27	-
8	20.8343	16.38dBuV Ca	0	11.6	27.98	-	50
					Margin (dB)	-	-22.02

LIMIT 1: 47 CFR Part 15.207 QP
LIMIT 2: 47 CFR Part 15.207 Av

Qp - Quasi-Peak detector
Ca - CISPR Average detection