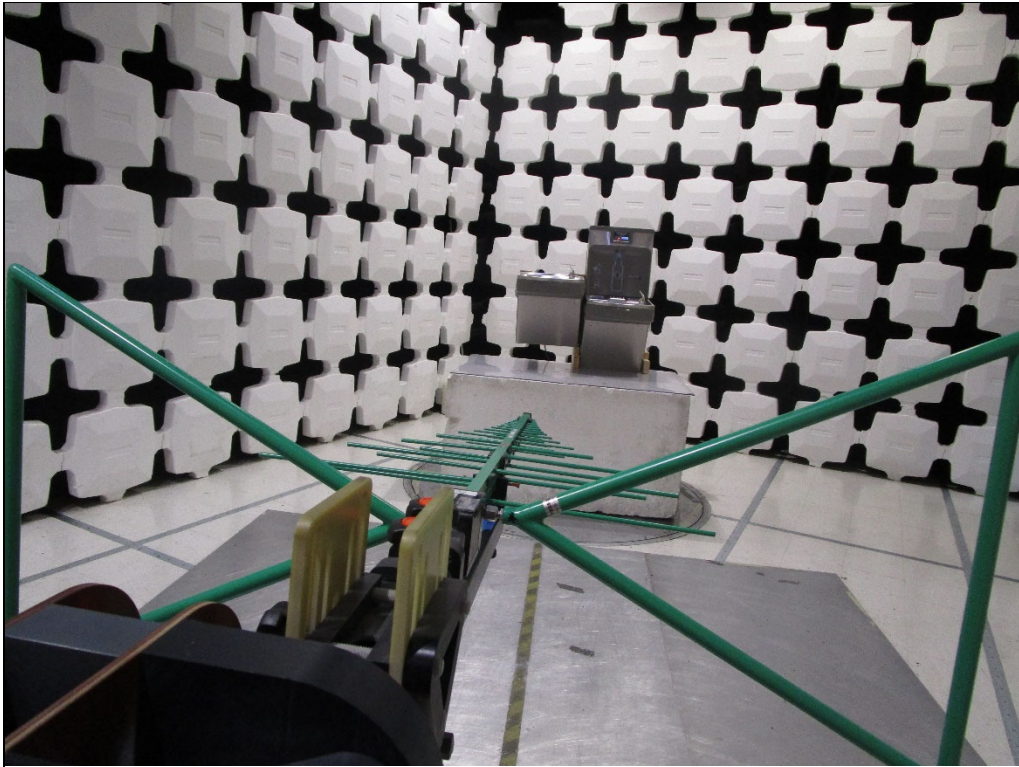




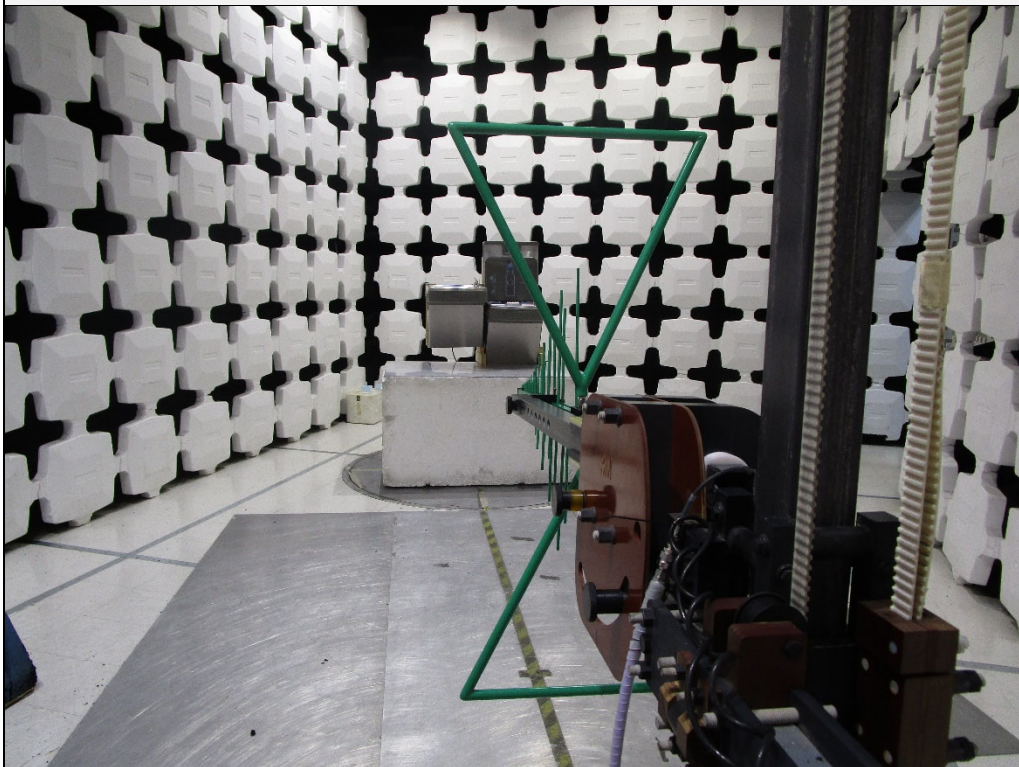
Test Setup for RF Conducted Emissions (AC Mains)



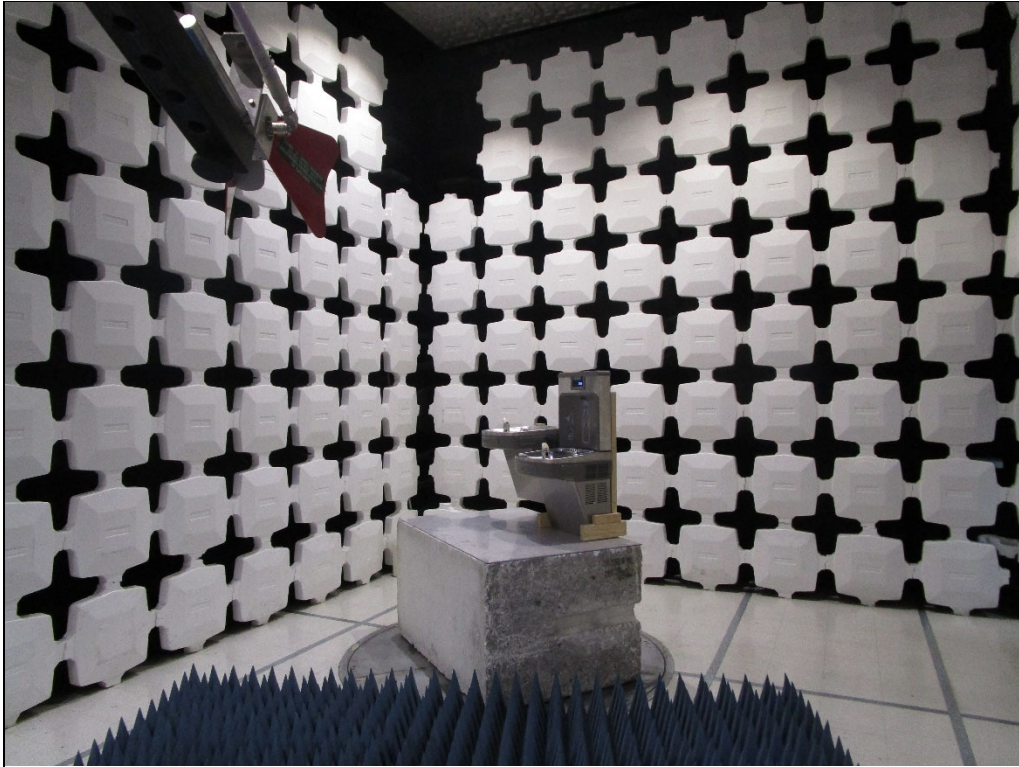
Test Setup for RF Conducted Emissions (AC Mains)



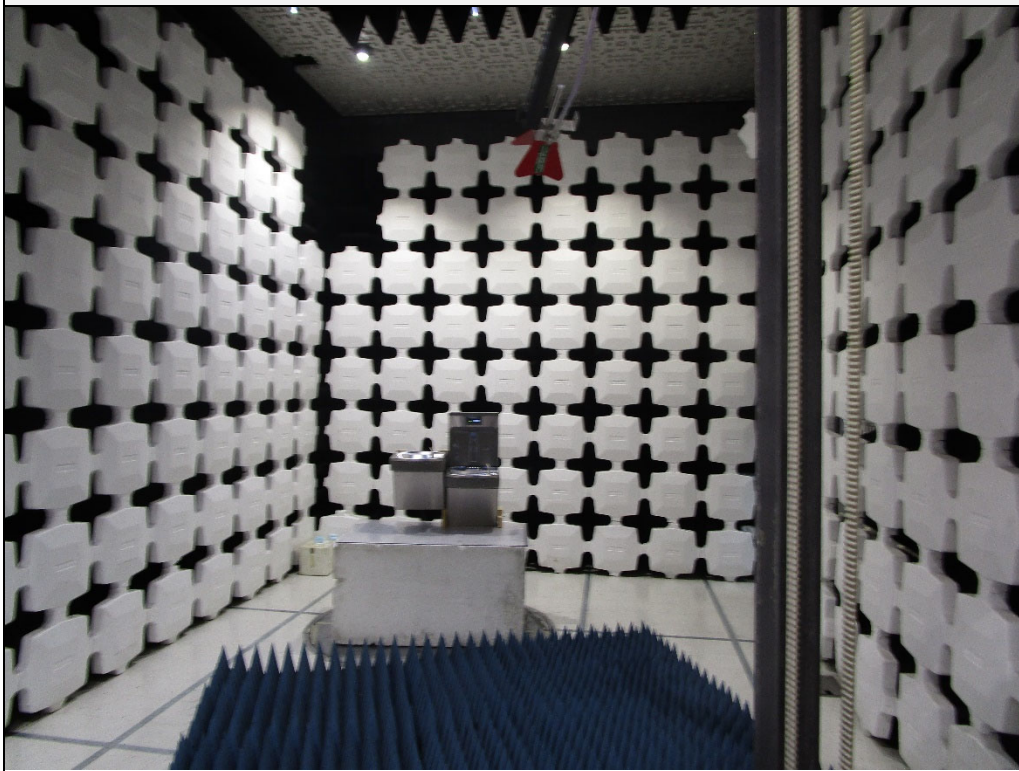
Test Setup for Radiated Emissions: 30MHz to 1GHz, Horizontal Polarization



Test Setup for Radiated Emissions: 30MHz to 1GHz, Vertical Polarization



Test Setup for Radiated Emissions: Above 1GHz, Horizontal Polarization



Test Setup for Radiated Emissions: Above 1GHz, Vertical Polarization



FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 09/28/2023

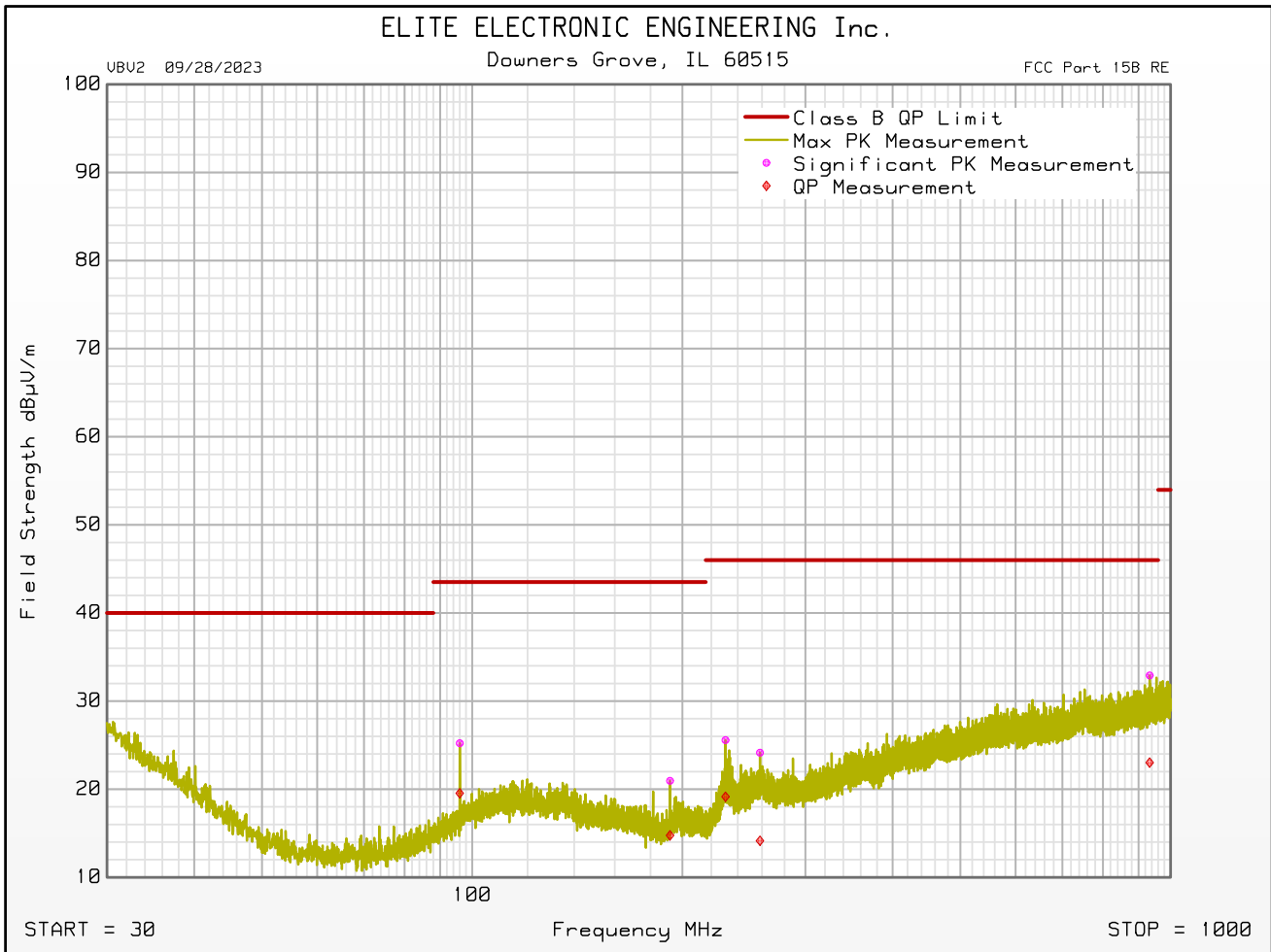
Manufacturer : Elkay Manufacturing Company
 Model : LZSTL8WSSP-W1
 Serial Number : 4310213587
 DUT Mode : LoRa transmitter in standby, NFC transmitter in standby
 Scan Type : Stepped Scan
 Test RBW : 120 kHz
 Prelim Dwell Time (s) : 0.0001
 Notes :
 Test Engineer : M. Longinotti
 Test Date : Nov 01, 2023 01:04:28 PM

Freq MHz	Peak Mtr Rdg dBuV	QP Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBµV/m	QP Total dBµV/m	QP Limit dBµV/m	QP Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive QP Level
30.420	4.6	-4.2	24.2	0.0	0.3	0.0	29.2	20.4	40.0	-19.6	Vertical	340	270	
95.980	8.4	2.8	16.2	0.0	0.6	0.0	25.2	19.5	43.5	-24.0	Horizontal	200	180	
135.640	3.7	-4.5	17.6	0.0	0.7	0.0	22.0	13.8	43.5	-29.7	Vertical	120	0	
191.980	5.1	-1.1	15.0	0.0	0.8	0.0	20.9	14.8	43.5	-28.8	Horizontal	120	45	
230.520	8.3	1.9	16.3	0.0	0.9	0.0	25.6	19.1	46.0	-26.9	Horizontal	120	225	
258.240	3.8	-6.2	19.4	0.0	1.0	0.0	24.1	14.1	46.0	-31.9	Horizontal	340	90	
556.440	4.1	-6.2	24.7	0.0	1.4	0.0	30.2	19.9	46.0	-26.1	Vertical	340	90	
933.420	4.4	-5.5	26.7	0.0	1.8	0.0	32.9	23.0	46.0	-23.0	Horizontal	200	45	

FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 09/28/2023

Manufacturer : Elkay Manufacturing Company
 Model : LZSTL8WSSP-W1
 Serial Number : 4310213587
 DUT Mode : LoRa transmitter in standby, NFC transmitter in standby
 Antenna Polarization : Horizontal
 Scan Type : Stepped Scan
 Test RBW : 120 kHz
 Prelim Dwell Time (s) : 0.0001
 Notes :
 Test Engineer : M. Longinotti
 Test Date : Nov 01, 2023 01:04:28 PM





FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 09/28/2023

Manufacturer : Elkay Manufacturing Company
 Model : LZSTL8WSSP-W1
 Serial Number : 4310213587
 DUT Mode : LoRa transmitter in standby, NFC transmitter in standby
 Scan Type : Stepped Scan
 Test RBW : 1 MHz
 Prelim Dwell Time (s) : 0.0001
 Notes :
 Test Engineer : M. Longinotti
 Test Date : Nov 02, 2023 01:24:37 PM

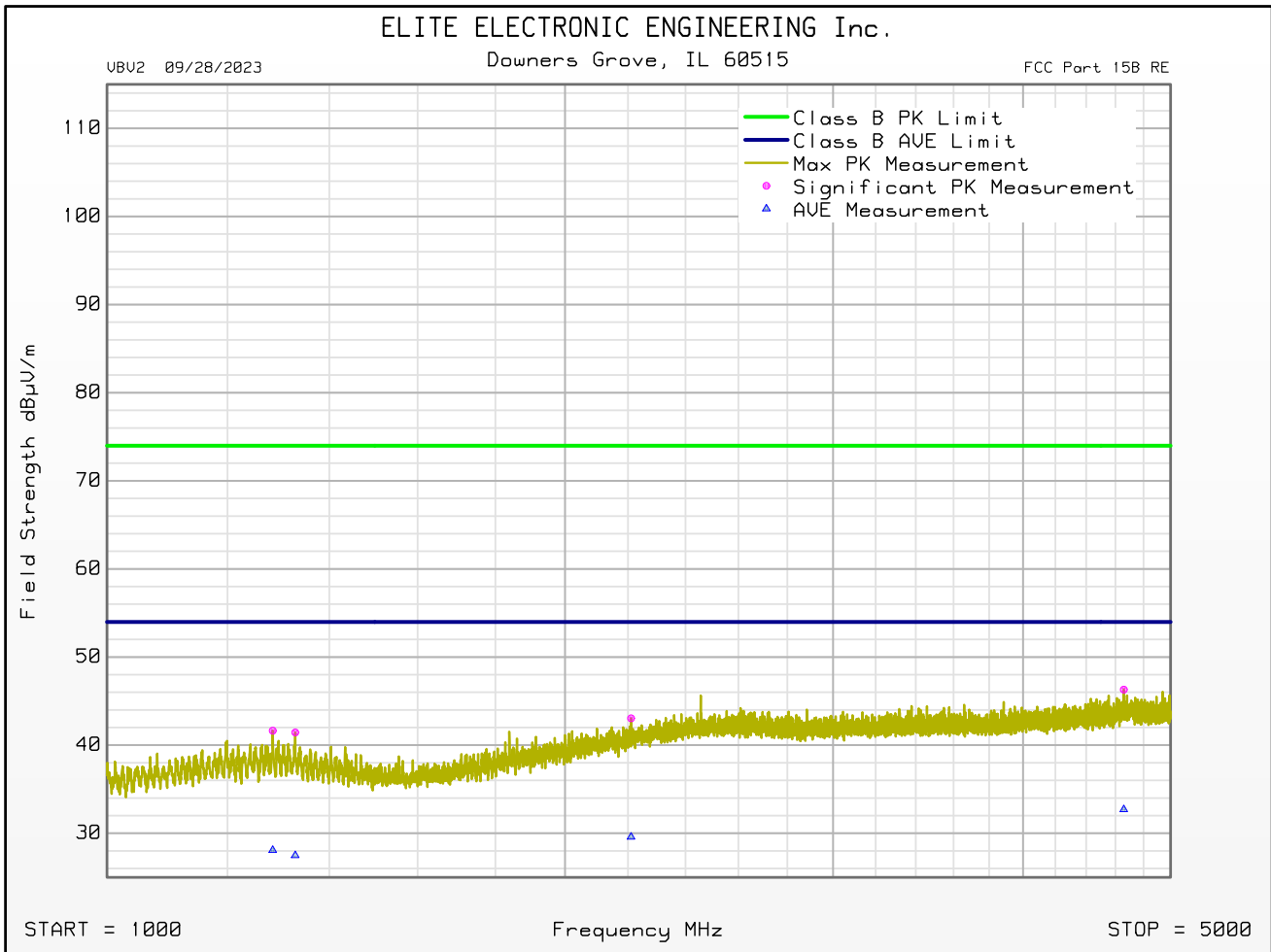
Freq MHz	Peak Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBuV/m	Peak Limit dBuV/m	Peak Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Peak Level
1285.000	50.7	29.7	-40.9	2.1	0.0	41.6	74.0	-32.3	Horizontal	120	135	
1329.500	50.6	29.6	-40.9	2.1	0.0	41.4	74.0	-32.5	Horizontal	340	225	
2210.000	49.3	31.5	-40.6	2.8	0.0	43.0	74.0	-30.9	Horizontal	340	45	
2402.000	51.3	32.6	-40.5	3.0	0.0	46.3	74.0	-27.6	Vertical	340	225	
3201.500	49.3	33.0	-40.5	3.4	0.0	45.3	74.0	-28.7	Vertical	200	270	
4658.500	48.0	34.6	-40.4	4.1	0.0	46.3	74.0	-27.7	Horizontal	200	225	

Freq MHz	Average Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Average Total dBuV/m	Average Limit dBuV/m	Average Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Average Level
1285.000	37.1	29.7	-40.9	2.1	0.0	28.1	54.0	-25.9	Horizontal	120	135	
1329.500	36.7	29.6	-40.9	2.1	0.0	27.5	54.0	-26.5	Horizontal	340	225	
2210.000	35.9	31.5	-40.6	2.8	0.0	29.6	54.0	-24.4	Horizontal	340	45	
2402.000	35.6	32.6	-40.5	3.0	0.0	30.6	54.0	-23.4	Vertical	340	225	
3201.500	34.9	33.0	-40.5	3.4	0.0	30.9	54.0	-23.1	Vertical	200	270	
4658.500	34.4	34.6	-40.4	4.1	0.0	32.7	54.0	-21.3	Horizontal	200	225	

FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 09/28/2023

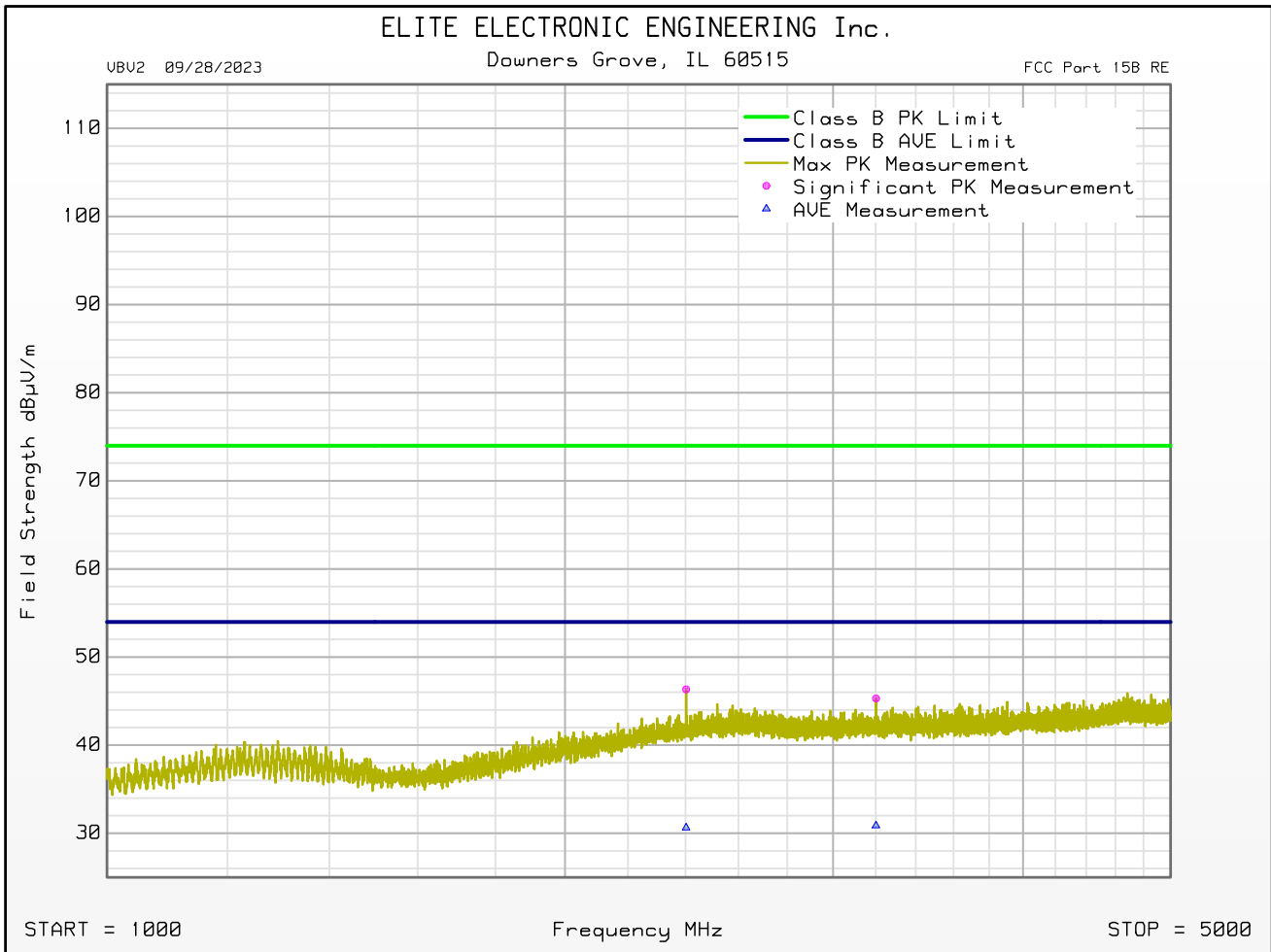
Manufacturer : Elkay Manufacturing Company
 Model : LZSTL8WSSP-W1
 Serial Number : 4310213587
 DUT Mode : LoRa transmitter in standby, NFC transmitter in standby
 Antenna Polarization : Horizontal
 Scan Type : Stepped Scan
 Test RBW : 1 MHz
 Prelim Dwell Time (s) : 0.0001
 Notes :
 Test Engineer : M. Longinotti
 Test Date : Nov 02, 2023 01:24:37 PM



FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 09/28/2023

Manufacturer : Elkay Manufacturing Company
 Model : LZSTL8WSSP-W1
 Serial Number : 4310213587
 DUT Mode : LoRa transmitter in standby, NFC transmitter in standby
 Antenna Polarization : Vertical
 Scan Type : Stepped Scan
 Test RBW : 1 MHz
 Prelim Dwell Time (s) : 0.0001
 Notes :
 Test Engineer : M. Longinotti
 Test Date : Nov 02, 2023 01:24:37 PM



22. Module Integration – Emissions Test

EUT Information	
Manufacturer	Elkay Manufacturing Company
Product	Connected Enhanced EZH20 Bottle Filling Station and Cooler
Model No.	LZSTL8WSSP-W1
Serial No.	4310213587
Mode	LoRa Transmit at 903MHz

Test Site Information	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic Chamber
Test Site Used	Room 29
Type of Antennas Used	Below 1GHz: Bilog (or equivalent) Above 1GHz: Double-ridged waveguide (or equivalent)
Notes	The cables were manually maximized during the preliminary emissions sweeps. The cable arrangement which resulted in the worst-case emissions was utilized.

Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1000 MHz)	4.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz – 6 GHz)	3.1
Radiated disturbance (electric field strength on an open area test site or alternative test site) (6 GHz – 18 GHz)	3.2
Radiated disturbance (electric field strength on an open area test site or alternative test site) (18 GHz – 26.5 GHz)	3.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (26.5 GHz – 40 GHz)	3.4

Requirements

Per 996369 D04 Module Integration Guide v01:

Testing of the host product with all the transmitters installed is recommended, to verify that the host product meets all the applicable FCC rules. The radio spectrum is to be investigated with all the transmitters in the final host product functioning to determine that no emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f).

The testing shall also check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration. No emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f).

In any 100kHz 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 20dB below that in the 100kHz 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. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Procedures

Radiated measurements were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles and anechoic absorber material is installed over the ferrite tiles. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2014 for site attenuation.

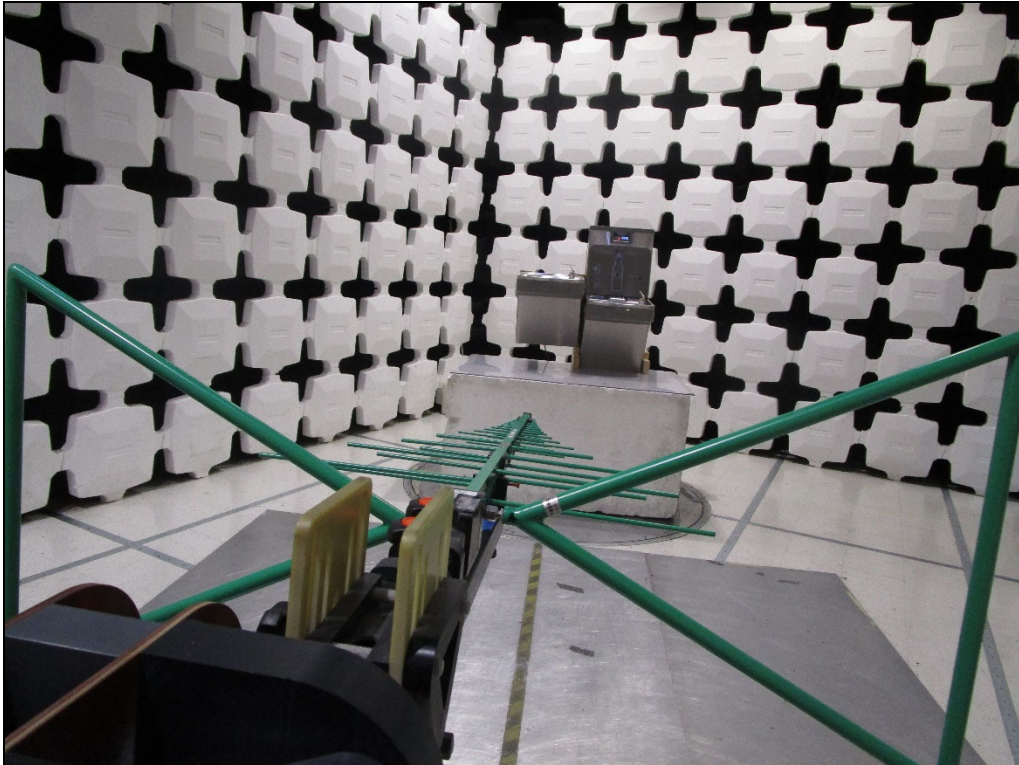
The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

Preliminary radiated emissions tests were performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3-meter distance from the EUT. The entire frequency range from 30MHz to 10.0GHz was investigated using a peak detector function.

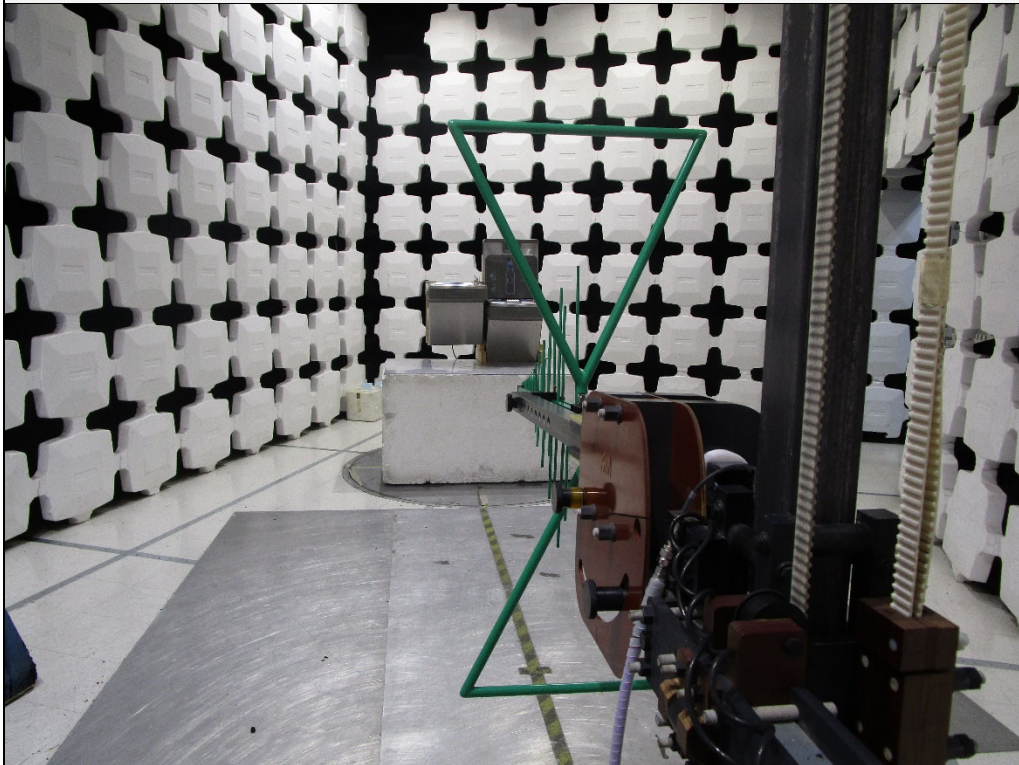
The final open field emission tests were then manually performed over the frequency range of 30MHz to 10.0GHz.

- 1) For all harmonics not in the restricted bands, the following procedure was used:
 - a) The field strength of the fundamental was measured using a bilog antenna. The bilog antenna was positioned at a 3-meter distance from the EUT. The EUT was placed on an 80cm high non-conductive stand. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.
 - b) The field strengths of all of the harmonics not in the restricted band were then measured using a double-ridged waveguide antenna. The waveguide antenna was positioned at a 3-meter distance from the EUT. The EUT was placed on a non-conductive stand. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.
 - c) To ensure that maximum or worst-case emission levels at the fundamental and harmonics were measured, the following steps were taken when measuring the fundamental emissions and the spurious emissions:
 - i. The EUT was rotated so that all of its sides were exposed to the receiving antenna.
 - ii. Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
 - iii. The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.
 - iv. In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer, the measuring antenna was not raised or lowered to ensure maximized readings. Instead, the EUT was rotated through all axis to ensure the maximum readings were recorded for the EUT.
 - d) All harmonics not in the restricted bands must be at least 20dB below levels measured at the fundamental. However, attenuation below the general limits specified in §15.209(a) is not required.
- 2) For all emissions in the restricted bands, the following procedure was used:
 - a) The field strengths of all emissions below 1GHz were measured using a bi-log antenna. The bilog antenna was positioned at a 3-meter distance from the EUT. The EUT was placed on an 80cm high non-conductive stand. A peak detector with a resolution bandwidth of 100kHz was used on the spectrum analyzer.
 - b) The field strengths of all emissions above 1GHz were measured using a double-ridged waveguide antenna. The waveguide antenna was positioned at a 3-meter distance from the EUT. The EUT was placed on a non-conductive stand. A peak detector with a resolution bandwidth of 1MHz was used on the spectrum analyzer.

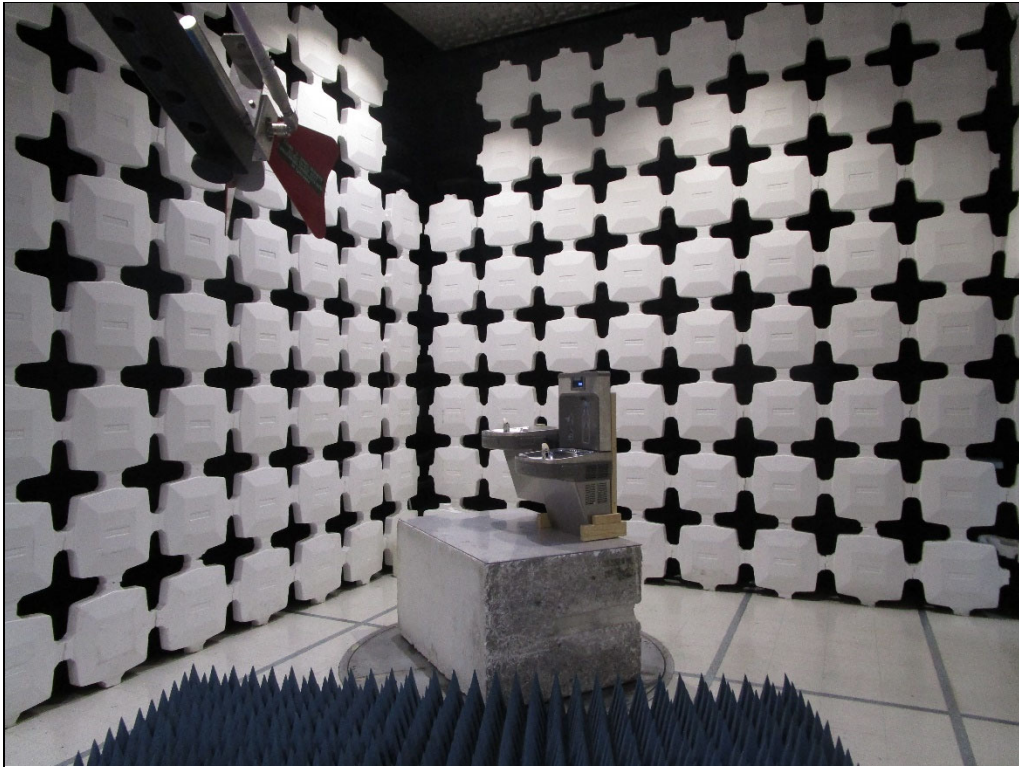
- c) To ensure that maximum (or worst case) emission levels were measured, the following steps were taken when taking all measurements:
 - i. The EUT was rotated so that all of its sides were exposed to the receiving antenna.
 - ii. Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
 - iii. The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.
 - iv. In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer, the measuring antenna was not raised or lowered to ensure maximized readings. Instead, the EUT was rotated through all axis to ensure the maximum readings were recorded.
- d) For all radiated emissions measurements below 1GHz, if the peak reading is below the limits listed in §15.209(a), no further measurements are required. If, however, the peak readings exceed the limits listed in 15.209(a), then the emissions are remeasured using a quasi-peak detector.
- e) For all radiated emissions measurements above 1GHz, the peak readings must comply with the §15.35(b) limits. §15.35(b) states that when average radiated emissions measurements are specified, there also is a limit on the peak level of the radiated emissions. The limit on the peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. Therefore, all peak readings above 1GHz must be no greater than 20dB above the limits specified in §15.209(a).
- f) Next, for all radiated emissions measurements above 1GHz, the resolution bandwidth was set to 1MHz. The analyzer was set to linear mode with a 10Hz video bandwidth in order to simulate an average detector and an average reading was taken.



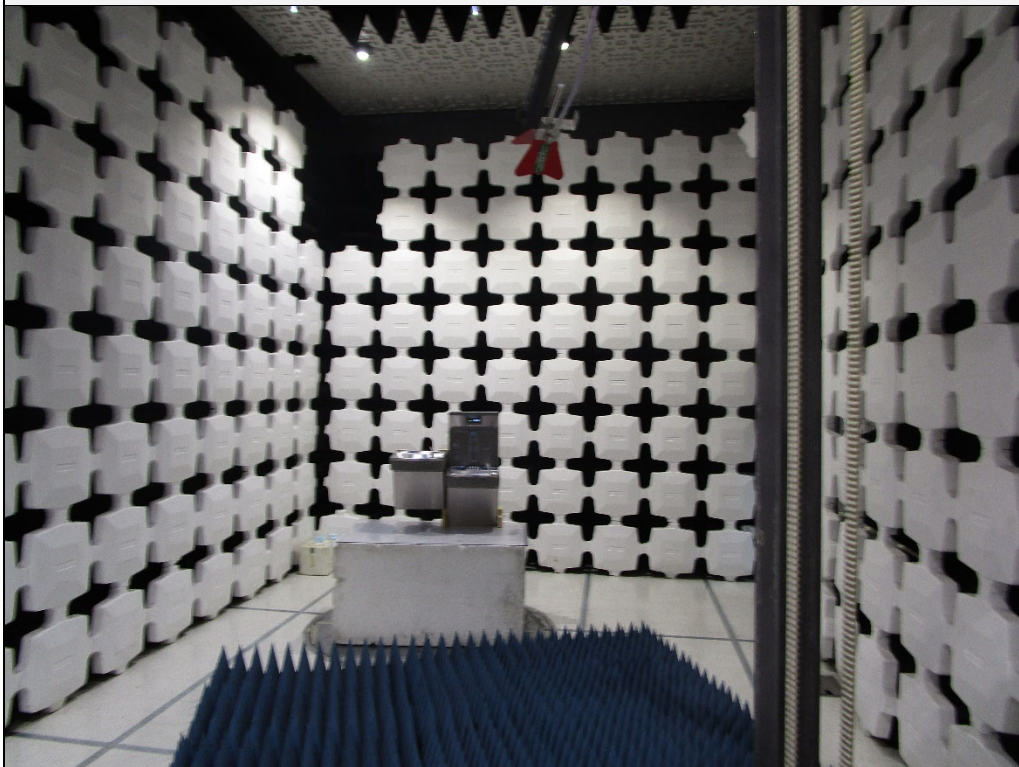
Test Setup for Spurious Emissions: 30MHz to 1GHz, Horizontal Polarization



Test Setup for Spurious Emissions: 30MHz to 1GHz, Vertical Polarization



Test Setup for Spurious Emissions: Above 1GHz, Horizontal Polarization



Test Setup for Spurious Emissions: Above 1GHz, Vertical Polarization