

8.6 Test Data:

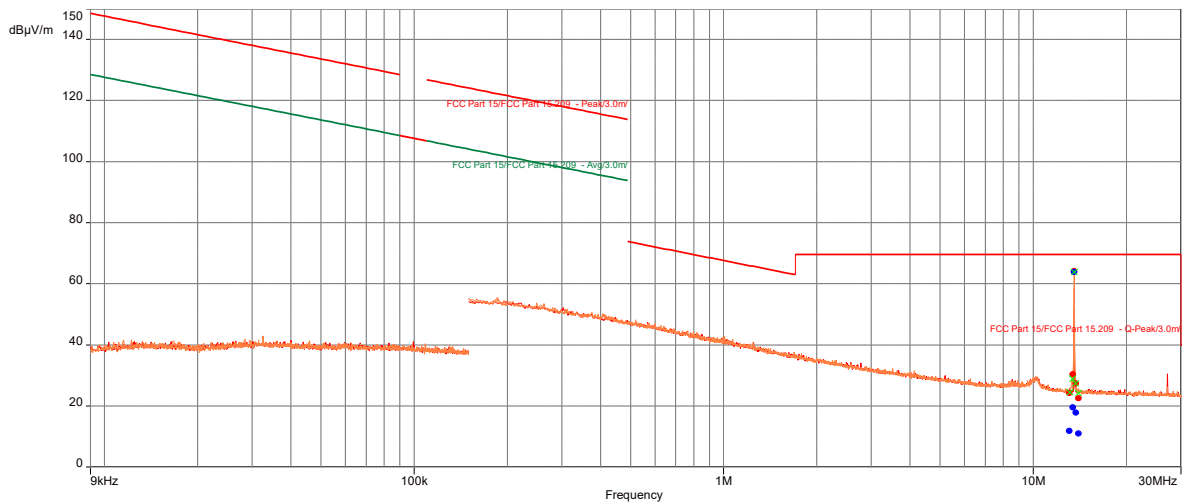
===Battery Powered===

13.56 MHz RFID (Plastic Enclosure, With Keypad), Field Strength at 3m, (X, Y, Z Polarities)

Test Information:

Date and Time	9/20/2024 12:10:36 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	24 deg C
Humidity	52 %
Atmospheric Pressure	1006 mbar
Comments	Scan 19_13.56MHz RFID With Modulation (Plastic Enclosure - With Keypad), RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209)

Graph:



Results:

QuasiPeak (PASS) (5)

Frequency (MHz)	Level (dBuV/m)	FCC 15.209 Limit (dBuV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time(s)	Correction (dB)
13.09968	11.90	69.54	-57.64	185.40	Vertical	9k	0.10	10.78
13.4455	19.55	69.54	-49.99	0.00	Vertical	9k	0.10	10.79
13.55989	63.84	69.54	-5.70	0.00	Vertical	9k	0.10	10.79
13.72051	17.77	69.54	-51.77	6.60	Vertical	9k	0.10	10.79
14.00237	11.01	69.54	-58.53	136.30	Vertical	9k	0.10	10.80

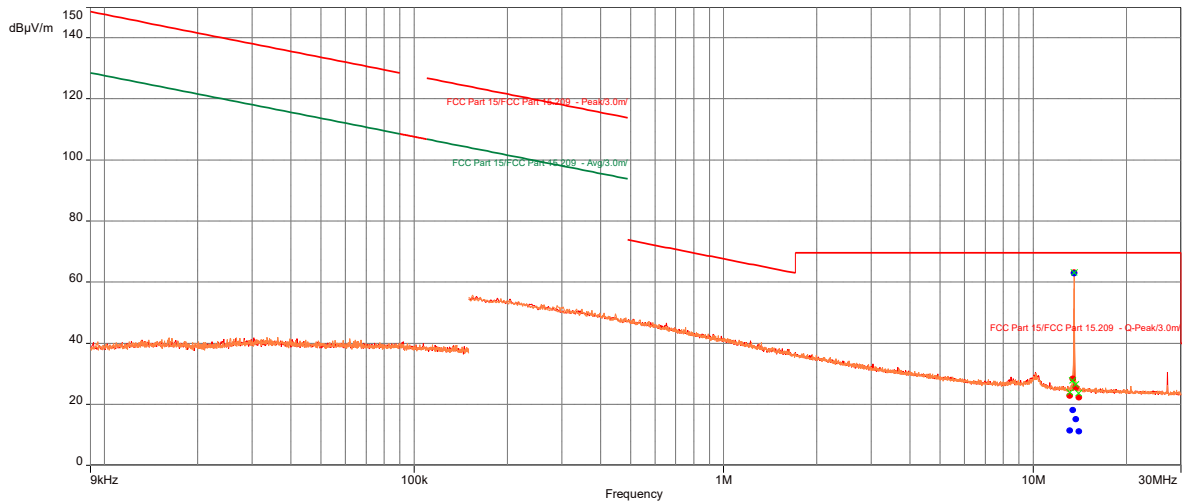
Notes: The band edge emissions deem to meet the FCC 15.225 band edge emissions limits since the fundamental signal at 13.56 MHz meets the FCC Part 15.209 general limits.

13.56 MHz RFID (Metal Enclosure, With Keypad), Field Strength at 3m, (X, Y, Z Polarities)

Test Information:

Date and Time	9/20/2024 11:36:48 AM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	24 deg C
Humidity	52 %
Atmospheric Pressure	1006 mbar
Comments	Scan 18_13.56MHz RFID With Modulation (Metal Enclosure - With Keypad), RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209)

Graph:



Results:

QuasiPeak (PASS) (5)

Frequency (MHz)	Level (dBμV/m)	FCC 15.209 Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time(s)	Correction (dB)
13.11382	11.36	69.54	-58.18	50.10	Vertical	9k	0.10	10.78
13.44213	18.07	69.54	-51.47	1.40	Vertical	9k	0.10	10.79
13.55989	62.86	69.54	-6.68	0.00	Vertical	9k	0.10	10.79
13.71726	15.10	69.54	-54.44	23.00	Vertical	9k	0.10	10.79
14.03491	11.20	69.54	-58.34	212.90	Vertical	9k	0.10	10.79

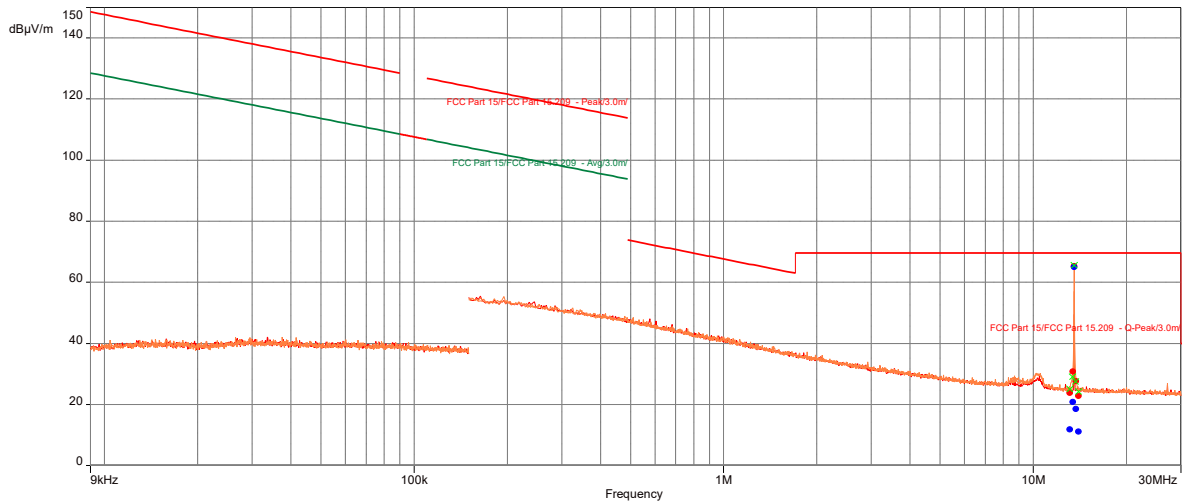
Notes: The band edge emissions deem to meet the FCC 15.225 band edge emissions limits since the fundamental signal at 13.56 MHz meets the FCC Part 15.209 general limits.

13.56 MHz RFID (Plastic Enclosure, Without Keypad), Field Strength at 3m, (X, Y, Z Polarities)

Test Information:

Date and Time	9/20/2024 8:32:02 AM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	24 deg C
Humidity	52 %
Atmospheric Pressure	1006 mbar
Comments	Scan 13_ 13.56 MHz RFID With Modulation (Plastic Enclosure - Without Keypad), RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209)

Graph:



Results:

QuasiPeak (PASS) (5)

Frequency (MHz)	Level (dBµV/m)	FCC 15.209 Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time(s)	Correction (dB)
13.12302	11.79	69.54	-57.75	358.40	Vertical	9k	0.10	10.78
13.44943	20.85	69.54	-48.69	1.30	Vertical	9k	0.10	10.79
13.56	65.09	69.54	-4.45	0.00	Vertical	9k	0.10	10.79
13.7195	18.57	69.54	-50.97	12.00	Vertical	9k	0.10	10.79
13.99272	11.17	69.54	-58.37	23.10	Vertical	9k	0.10	10.80

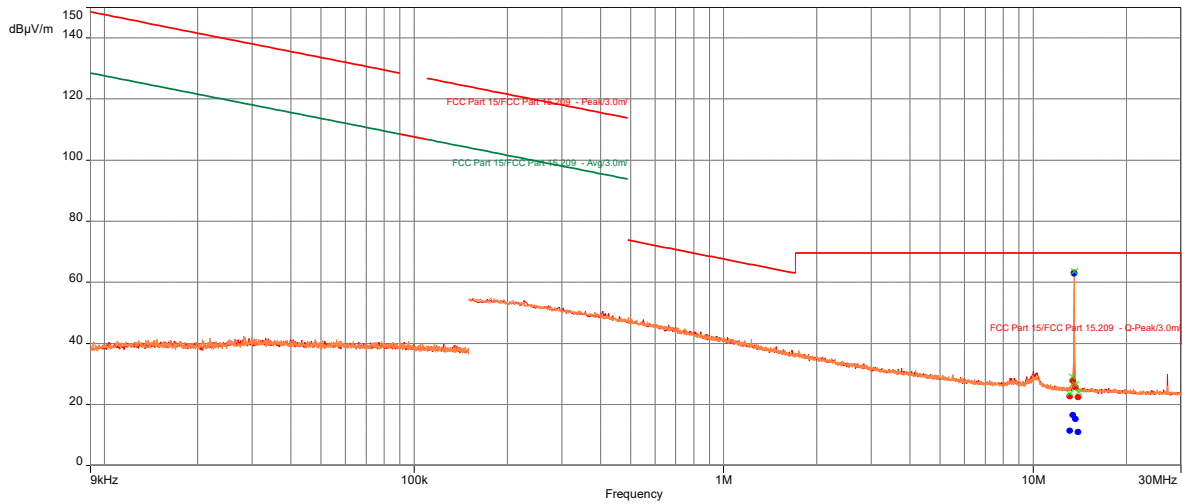
Notes: The band edge emissions deem to meet the FCC 15.225 band edge emissions limits since the fundamental signal at 13.56 MHz meets the FCC Part 15.209 general limits.

13.56 MHz RFID (Metal Enclosure, Without Keypad), Field Strength at 3m, (X, Y, Z Polarities)

Test Information:

Date and Time	9/20/2024 9:52:06 AM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	24 deg C
Humidity	52 %
Atmospheric Pressure	1006 mbar
Comments	Scan 15_ 13.56 MHz RFID With Modulation (Metal Enclosure - Without Keypad), RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209)

Graph:



Results:

QuasiPeak (PASS) (5)

Frequency (MHz)	Level (dBμV/m)	FCC 15.209 Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time(s)	Correction (dB)
13.11853	11.42	69.54	-58.12	218.40	Vertical	9k	0.10	10.78
13.44022	16.49	69.54	-53.05	336.80	Vertical	9k	0.10	10.78
13.56011	62.85	69.54	-6.69	0.00	Vertical	9k	0.10	10.79
13.69179	15.22	69.54	-54.32	336.80	Vertical	9k	0.10	10.79
13.98127	10.94	69.54	-58.60	66.40	Vertical	9k	0.10	10.80

Notes: The band edge emissions deem to meet the FCC 15.225 band edge emissions limits since the fundamental signal at 13.56 MHz meets the FCC Part 15.209 general limits.

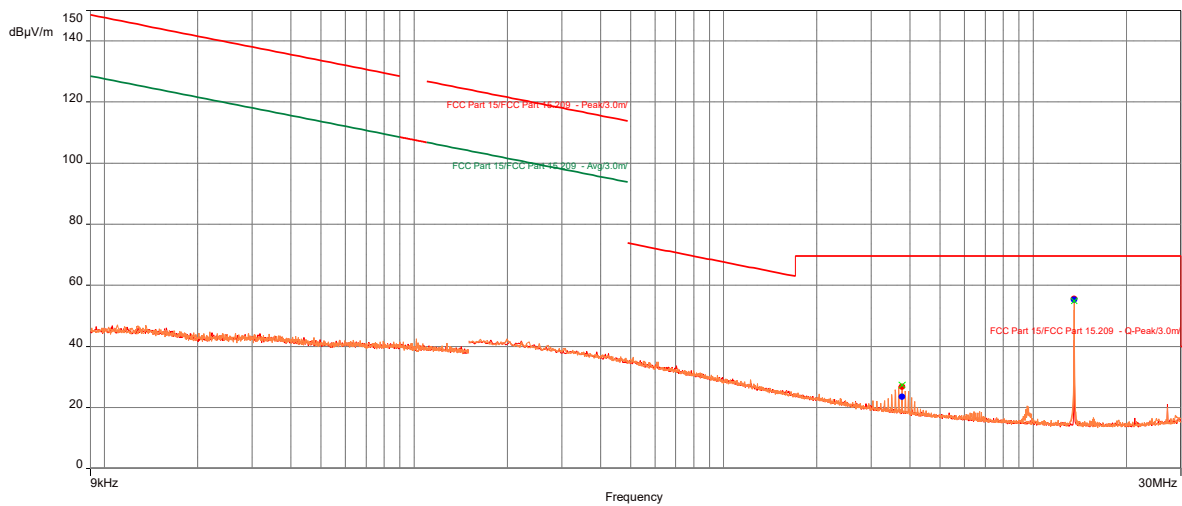
===POE Powered===

13.56 MHz RFID (Plastic Enclosure, With Keypad), Field Strength at 3m, (X, Y, Z Polarities)

Test Information:

Date and Time	11/18/2024 2:51:55 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	22 %
Atmospheric Pressure	1000 mbars
Comments	Scan 56_RFID 13.56 MHz (Plastic With Keypad), POE Powered, RE 9 kHz-30 MHz, 3m

Graph:



Results:

QuasiPeak (PASS) (2)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time In (S)	Correction (dB)
3.76868	23.55	69.54	-45.99	55.70	Vertical	9k	0.10	0.20
13.55989	55.33	69.54	-14.21	271.00	Vertical	9k	0.10	0.33

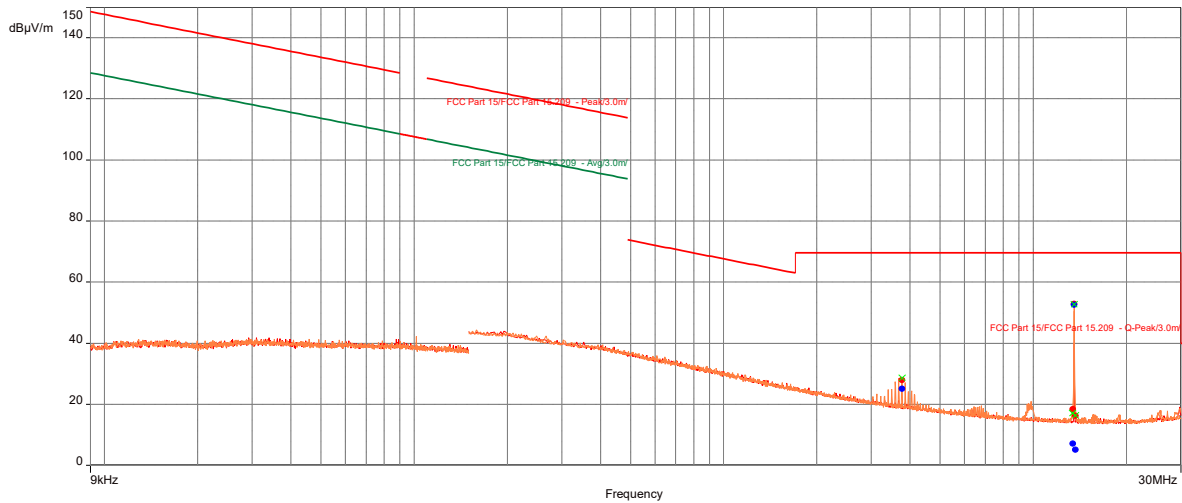
Notes: The band edge emissions deem to meet the FCC 15.225 band edge emissions limits since the fundamental signal at 13.56 MHz meets the FCC Part 15.209 general limits.

13.56 MHz RFID (Metal Enclosure, With Keypad), Field Strength at 3m, (X, Y, Z Polarities)

Test Information:

Date and Time	11/18/2024 12:55:41 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	22 %
Atmospheric Pressure	1000 mbars
Comments	Scan 53_RFID 13.56 MHz, (Metal- With Keypad), POE Powered, RE 9 kHz-30 MHz, 3m

Graph:



Results:

QuasiPeak (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time (s)	Correction (dB)
13.44662	7.12	69.54	-62.42	28.50	Vertical	9k	0.10	0.33
13.56	52.68	69.54	-16.86	6.60	Vertical	9k	0.10	0.33
13.68808	5.12	69.54	-64.42	22.60	Vertical	9k	0.10	0.33
3.76755	25.07	69.54	-44.47	82.50	Vertical	9k	0.10	0.20

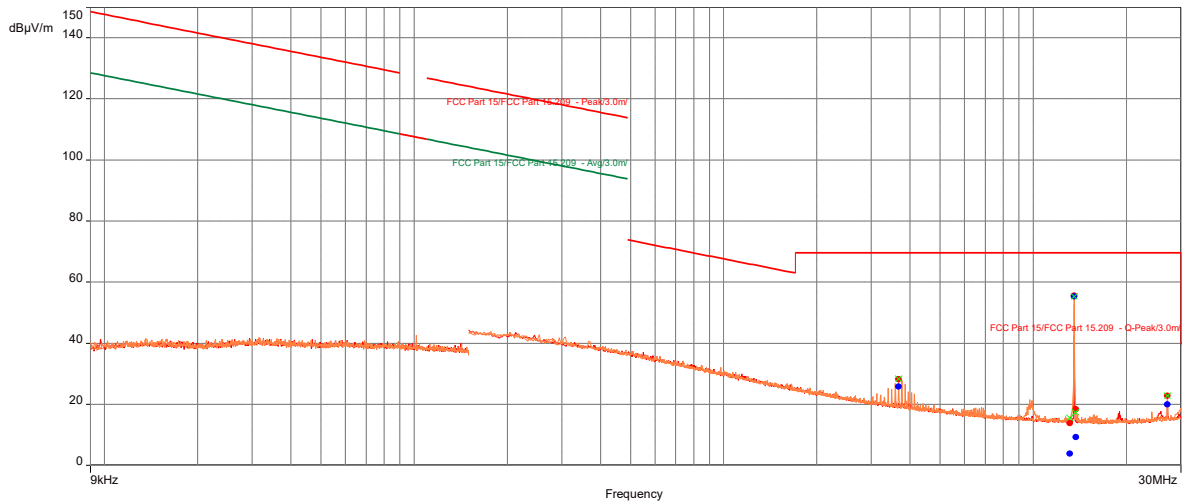
Notes: The band edge emissions deem to meet the FCC 15.225 band edge emissions limits since the fundamental signal at 13.56 MHz meets the FCC Part 15.209 general limits.

13.56 MHz RFID (Plastic Enclosure, Without Keypad), Field Strength at 3m, (X, Y, Z Polarities)

Test Information:

Date and Time	11/18/2024 11:20:41 AM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	22 %
Atmospheric Pressure	1000 mbars
Comments	Scan 50_RFID 13.56 MHz (Plastic- No Keypad), POE Powered, RE 150 kHz-30 MHz, 3m

Graph:



Results:

QuasiPeak (PASS) (5)

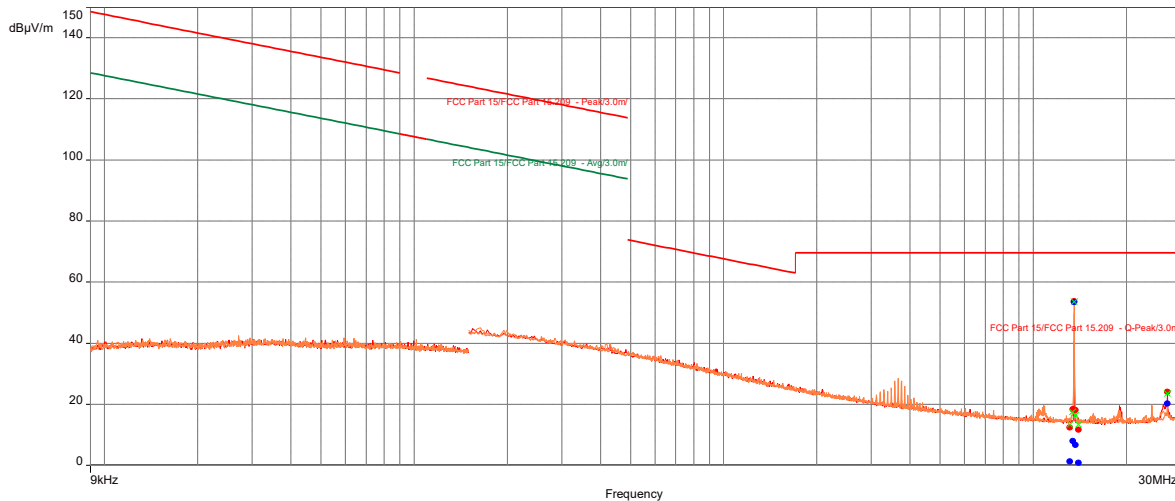
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time (s)	Correction (dB)
3.67439	25.83	69.54	-43.71	55.60	Vertical	9k	0.10	0.19
13.11034	3.85	69.54	-65.69	249.30	Vertical	9k	0.10	0.33
13.56	55.34	69.54	-14.20	271.10	Vertical	9k	0.10	0.33
13.71782	9.25	69.54	-60.29	281.60	Vertical	9k	0.10	0.33
27.11973	19.94	69.54	-49.60	87.90	Horizontal	9k	0.10	0.45

13.56 MHz RFID (Metal Enclosure, Without Keypad), Field Strength at 3m, (X, Y, Z Polarities)

Test Information:

Date and Time	11/18/2024 9:27:01 AM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	22 %
Atmospheric Pressure	1000 mbars
Comments	Scan 47_RFID 13.56 MHz (Metal- No Keypad), POE Powered, RE 150 kHz-30 MHz, 3m

Graph:



Results:

QuasiPeak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	RBW	Meas.Time (s)	Correction (dB)
13.10932	1.25	69.54	-68.29	23.00	X-axis	9000.00	9k	0.10	0.33
13.42788	8.05	69.54	-61.49	353.50	X-axis	9000.00	9k	0.10	0.33
13.56011	53.51	69.54	-16.03	360.00	X-axis	9000.00	9k	0.10	0.33
13.67495	6.67	69.54	-62.87	6.70	X-axis	9000.00	9k	0.10	0.33
14.00798	0.83	69.54	-68.71	6.60	X-axis	9000.00	9k	0.10	0.34
27.11861	20.27	69.54	-49.27	325.20	Z-axis	9000.00	9k	0.10	0.45

Product Standard: CFR47 FCC Part 15.247, RSS-247				Limit applied: See Report Section 8.2			
Test Date	Test Personnel/ Initials	Supervising Engineer/ Initials	Input Voltage	Mode	Atmospheric Data		
					Temp C°	Relative Humidity %	Atmospheric Pressure mbar
09/20/2024	Kouma Sinn <i>KPS</i>	N/A	Battery Powered	Continuous Transmitting	24	52	1006
11/18/2024	Kouma Sinn <i>KPS</i>	N/A	POE Powered	Continuous Transmitting	22	22	1000

Deviations, Additions, or Exclusions: None

9 Transmitter spurious emissions

9.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C 15.225, FCC Part 15 Subpart B, RSS 210, ISSED ICES 003, ANSI C 63.10, and ANSI C 63.4.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucisp
Radiated Emissions, 10m	30-1000 MHz	4.6dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dBμV/m
- RA = Receiver Amplitude (including preamplifier) in dBμV
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of

1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V

AF = 7.4 dB/m

CF = 1.6 dB

AG = 29.0 dB

FS = 32 dB μ V/m

To convert from dB μ V to μ V or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μ V
NF = Net Reading in dB μ V

Example:

$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$

$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$

Alternately, when BAT-EMC Emission Software is used, the "Level" includes all losses and gains and is compared directly in the "Margin" column to the "Limit". The "Correction" includes Antenna Factor, Preamp, and Cable Loss. These are already accounted for in the "Level" column.

9.2 Limits

Limits – FCC Part §15.225 (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 band shall not exceed the general radiated emission limits in FCC Part §15.209.

Notes: The limits for RSS-210 are the same as the FCC limits above.

9.3 Test Equipment Used:

Test equipment used from 9 kHz-30 MHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007'	Weather Station Vantage Vue	Davis	6250	MS191212003	03/27/2024	03/27/2025
ROS014'	Receiver 1Hz-44GHz	Rhode & Schwarz	ESW 44	103232	06/10/2024	06/10/2025
145-420'	Receiver to floor cable	Utiflex	UFB311A-2-0591-70070	145-420	02/27/2024	02/27/2025
145-414'	Cable 145-414	Huber + Suhner	3m Track A cable	145-414	07/15/2024	07/15/2025
145-422'	10Amp Pre-amp to under floor	Utiflex	UFB311A-0-2756-70070	145-422	03/26/2024	03/26/2025
IW003'	8.4 meter cable	Insulated Wire	2800-NPS	003	01/17/2024	01/17/2025
ETS003'	9kHz-30MHz Active Loop Antenna	ETS Lindgren	6502	00143396	01/25/2024	01/25/2025
CBL053'	BNC cable 7.62 meters	MookEERF	RG58U	cbl053	11/20/2023	11/20/2024

Test equipment used from 30-1000 MHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007'	Weather Station Vantage Vue	Davis	6250	MS191212003	03/27/2024	03/27/2025
ROS014'	Receiver 1Hz-44GHz	Rhode & Schwarz	ESW 44	103232	06/10/2024	06/10/2025
145-420'	Receiver to floor cable	Utiflex	UFB311A-2-0591-70070	145-420	02/27/2024	02/27/2025
HS003'	10m under floor cable	Huber-Schuner	10m-1	HS003	02/27/2024	02/27/2025
IW006'	DC-18GHz cable 8.4m long	Insulated Wire	2800-NPS	IW006	05/23/2024	05/23/2025
HS001'	DC-18GHz cable 1.5m long	Huber & Suhner	SucoFlex 106A	HS001	01/30/2024	01/30/2025
145145'	Broadband Hybrid Antenna 30 MHz - 3 GHz	Sunol Sciences Corp.	JB3	A122313	07/11/2024	07/11/2025
PRE10'	30-1000MHz pre-amp	ITS	PRE10	PRE10	02/27/2024	02/27/2025

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	Nexio	2023.0.9.0

9.4 Results:

The sample tested was found to Comply.

9.5 Setup Photographs:

13.56 MHz RFID (Metal Enclosure With Keypad), 9 kHz – 30 MHz, Antenna on X-Axis



13.56 MHz RFID (Metal Enclosure With Keypad), 9 kHz – 30 MHz, Antenna on Y-Axis



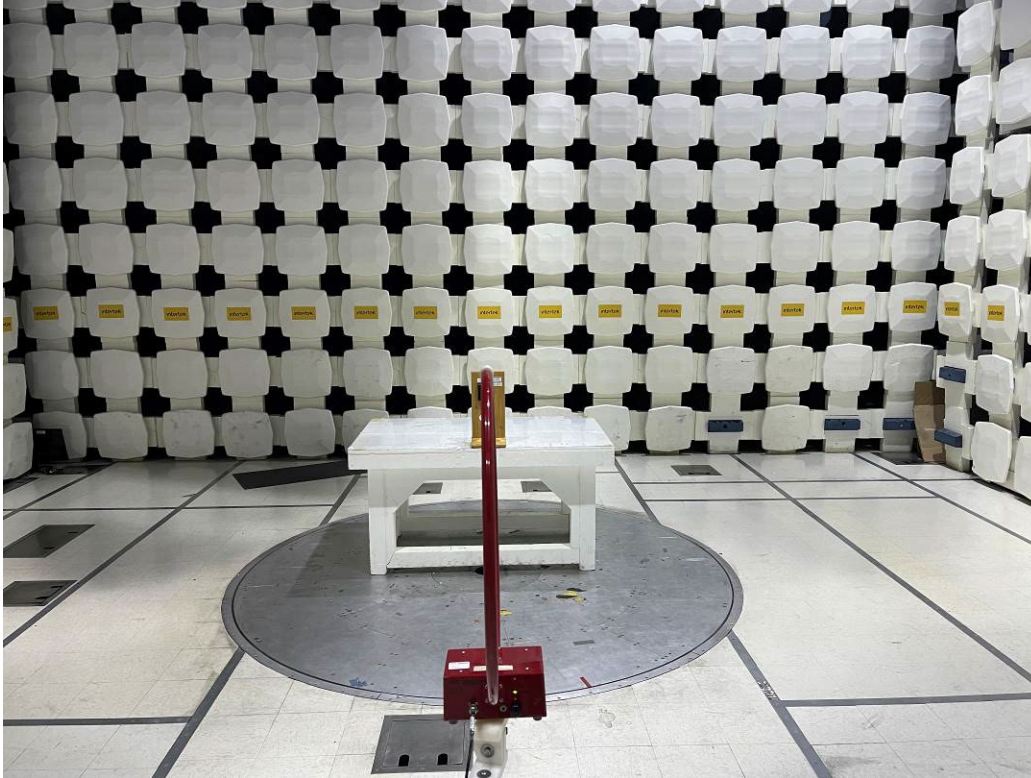
13.56 MHz RFID (Metal Enclosure With Keypad), 9 kHz – 30 MHz, Antenna on Z-Axis



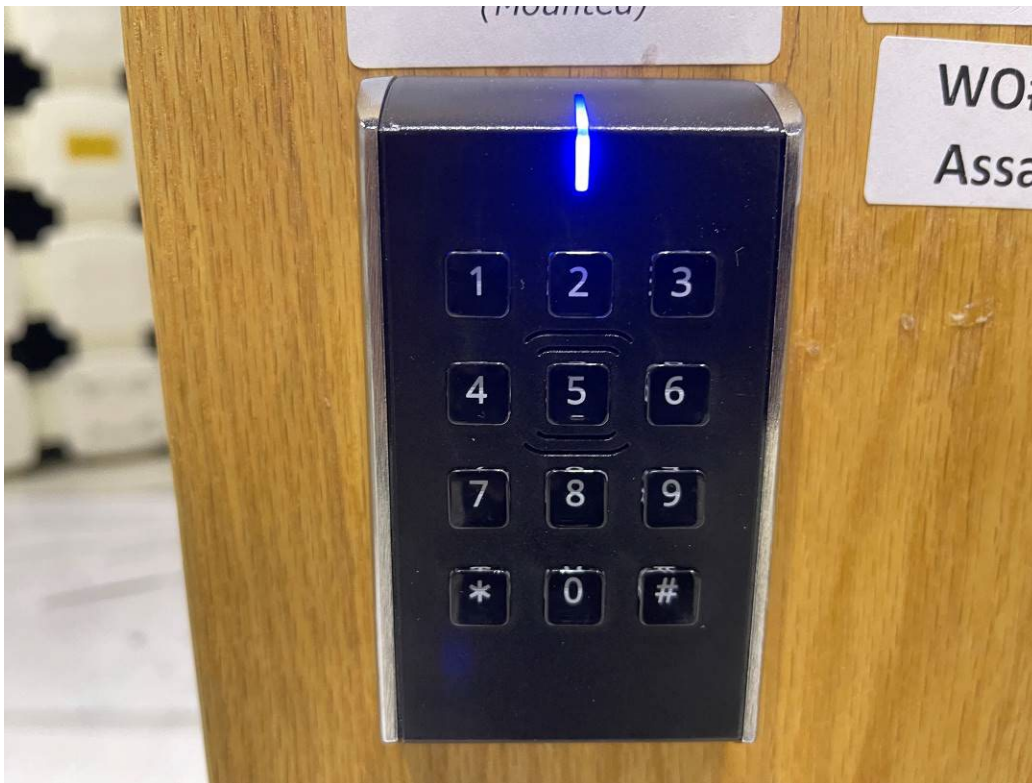
13.56 MHz RFID (Plastic Enclosure With Keypad), 9 kHz – 30 MHz, Antenna on X-Axis



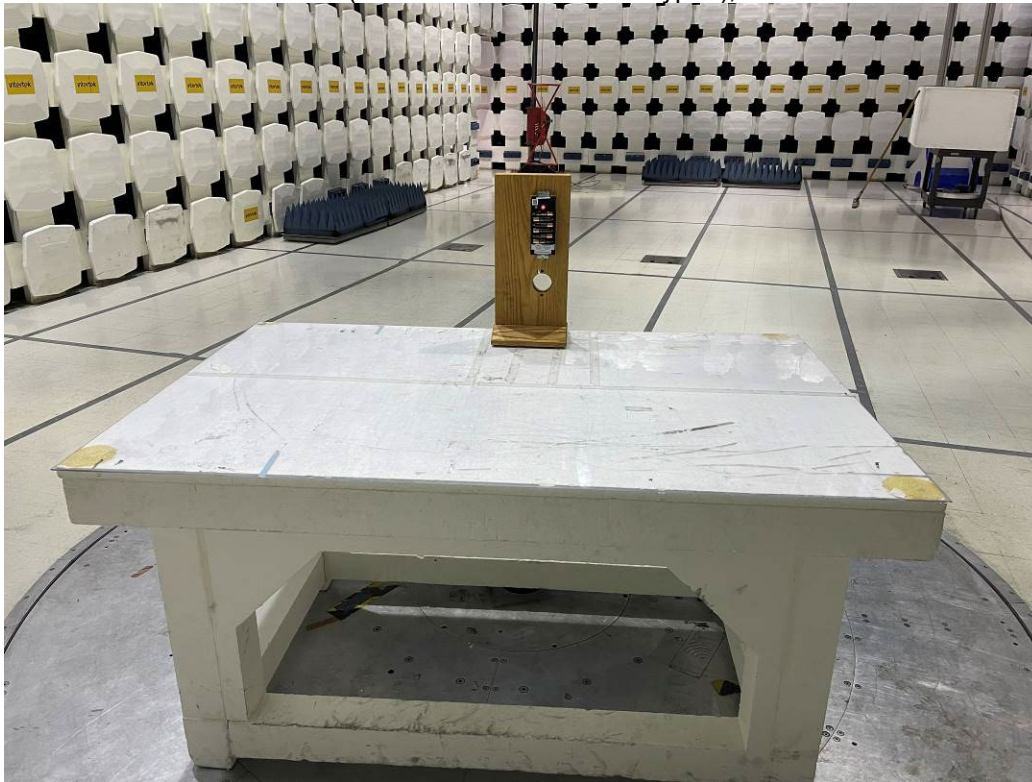
13.56 MHz RFID (Plastic Enclosure With Keypad), 9 kHz – 30 MHz, Antenna on Y-Axis



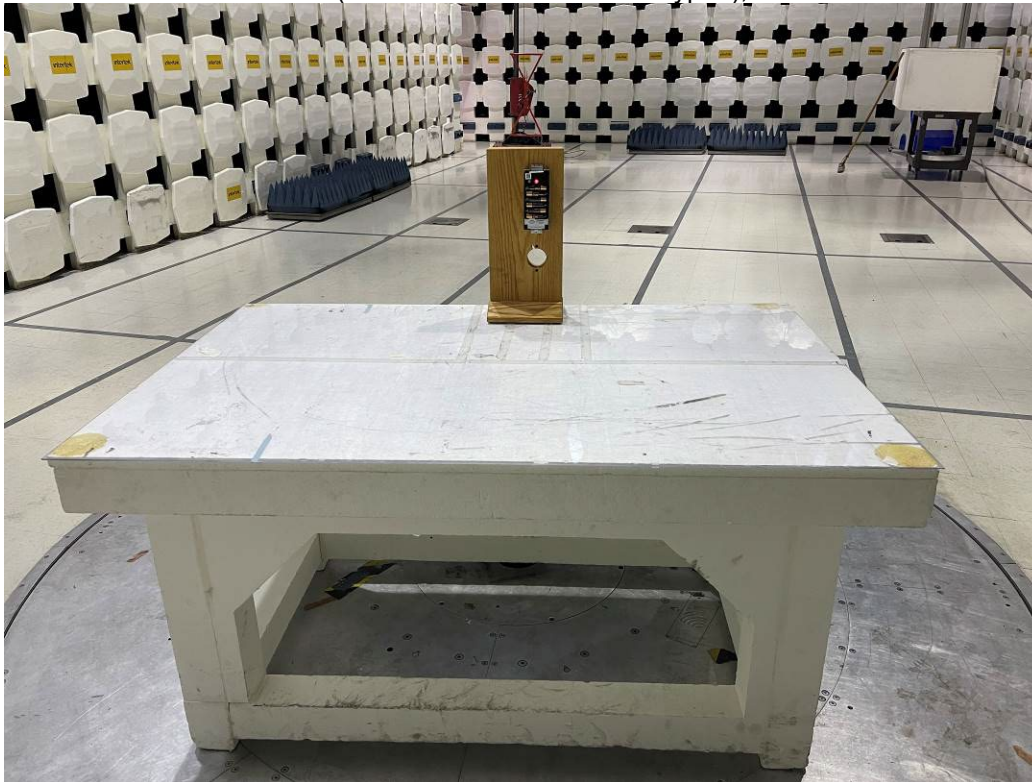
13.56 MHz RFID (Metal Enclosure With Keypad), 30-1000 MHz



13.56 MHz RFID (Plastic Enclosure With Keypad), 30-1000 MHz



13.56 MHz RFID (Metal Enclosure Without Keypad), 30-1000 MHz



13.56 MHz RFID (Plastic Enclosure Without Keypad), 30-1000 MHz



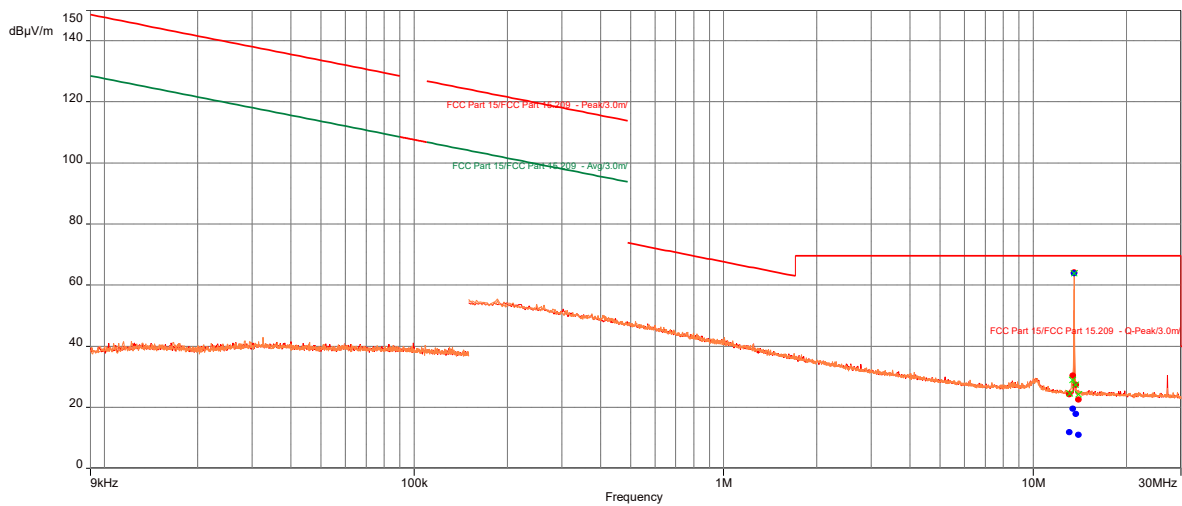
9.6 Plots/Data:

13.56 MHz RFID (Plastic Enclosure, With Keypad), 9 kHz- 30 MHz, Test Distance at 3m, (X, Y, Z Polarities)

Test Information:

Date and Time	9/20/2024 12:10:36 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	24 deg C
Humidity	52 %
Atmospheric Pressure	1006 mbar
Comments	Scan 19_13.56MHz RFID With Modulation (Plastic Enclosure - With Keypad), RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209)

Graph:



Results:

QuasiPeak (PASS) (5)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time(s)	Correction (dB)
13.09968	11.90	69.54	-57.64	185.40	Vertical	9k	0.10	10.78
13.4455	19.55	69.54	-49.99	0.00	Vertical	9k	0.10	10.79
13.55989	63.84	69.54	-5.70	0.00	Vertical	9k	0.10	10.79
13.72051	17.77	69.54	-51.77	6.60	Vertical	9k	0.10	10.79
14.00237	11.01	69.54	-58.53	136.30	Vertical	9k	0.10	10.80

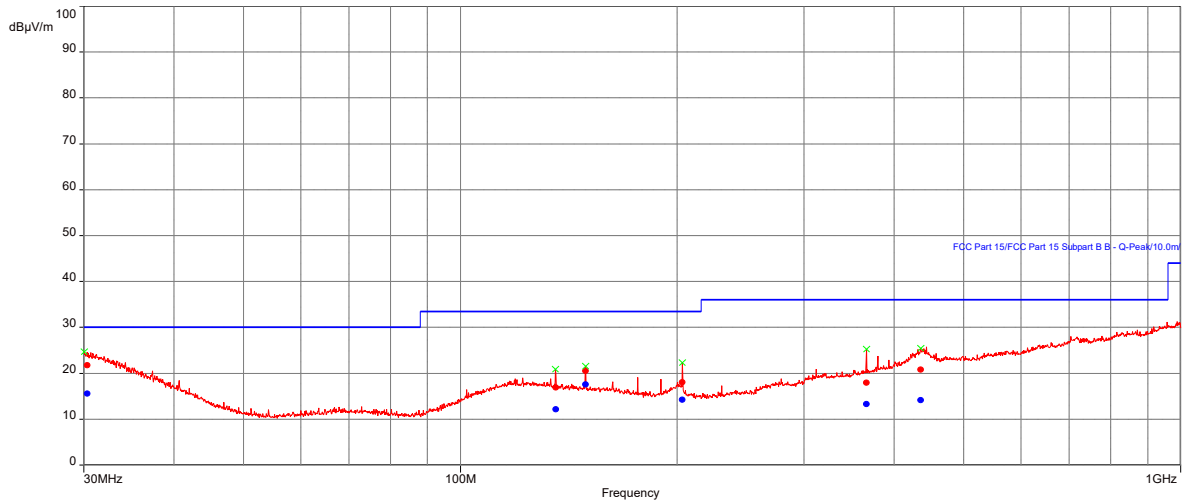
Notes: The fundamental frequency signal at 13.56 MHz meets the FCC Part 15.209 limit, it deems to meet the FCC 15.225 limit since the FCC Part 15.209 limit is lower than FCC Part 15.255 limit.

13.56 MHz RFID (Plastic Enclosure, With Keypad), 30-1000 MHz, Test Distance at 10m, (V/H Polarities)

Test Information:

Date and Time	9/14/2024 12:52:05 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	26 deg C
Humidity	41 %
Atmospheric Pressure	1012 mbars
Comments	Scan 7: 13.56 MHz RFID (Plastic Enclosure - With Keypad), RE 30-1000MHz

Graph:



Results:

QuasiPeak (PASS) (6)

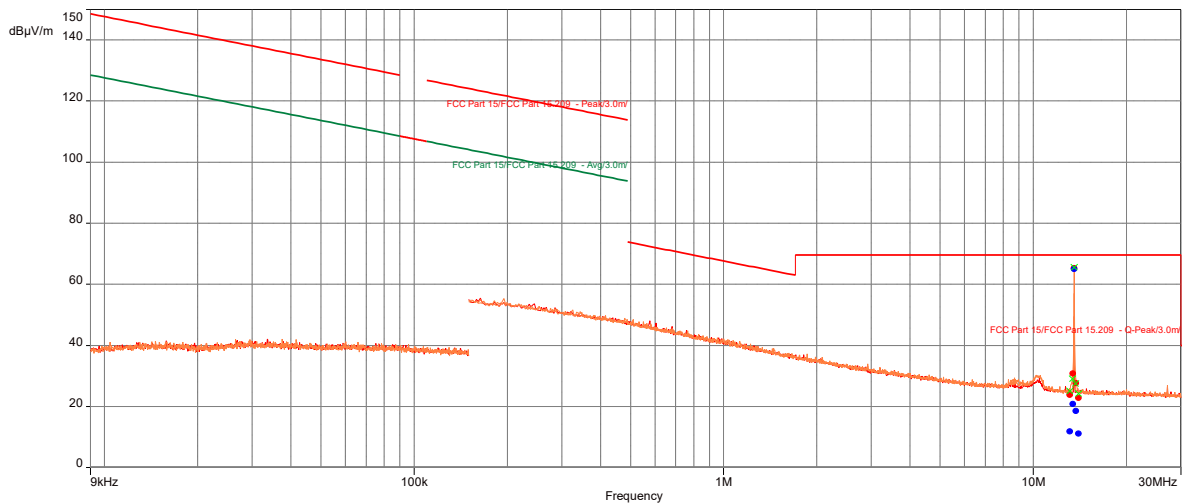
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	RBW	Meas.Time(s)	Correction (dB)
30.3464	15.60	30.00	-14.40	250.20	4.00	Horizontal	120000.00	120k	0.10	-13.07
135.6299	12.14	33.50	-21.36	158.30	4.00	Vertical	120000.00	120k	0.10	-19.35
149.169	17.62	33.50	-15.88	353.10	1.54	Vertical	120000.00	120k	0.10	-20.16
203.3925	14.29	33.50	-19.21	352.90	2.15	Vertical	120000.00	120k	0.10	-20.76
366.1051	13.35	36.00	-22.65	126.10	4.00	Horizontal	120000.00	120k	0.10	-16.89
435.7647	14.15	36.00	-21.85	163.70	4.00	Vertical	120000.00	120k	0.10	-14.95

13.56 MHz RFID (Plastic Enclosure, Without Keypad), 9 kHz- 30 MHz, Test Distance at 3m, (X, Y, Z Polarities)

Test Information:

Date and Time	9/20/2024 8:32:02 AM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	24 deg C
Humidity	52 %
Atmospheric Pressure	1006 mbar
Comments	Scan 13_ 13.56 MHz RFID With Modulation (Plastic Enclosure - Without Keypad), RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209)

Graph:



Results:

QuasiPeak (PASS) (5)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time(s)	Correction (dB)
13.12302	11.79	69.54	-57.75	358.40	Vertical	9k	0.10	10.78
13.44943	20.85	69.54	-48.69	1.30	Vertical	9k	0.10	10.79
13.56	65.09	69.54	-4.45	0.00	Vertical	9k	0.10	10.79
13.7195	18.57	69.54	-50.97	12.00	Vertical	9k	0.10	10.79
13.99272	11.17	69.54	-58.37	23.10	Vertical	9k	0.10	10.80

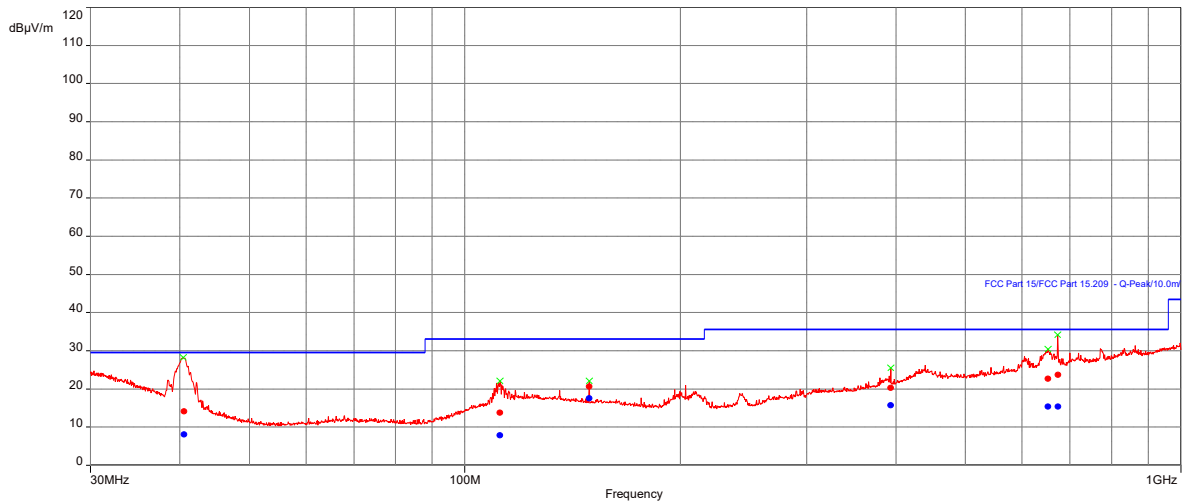
Notes: The fundamental frequency signal at 13.56 MHz meets the FCC Part 15.209 limit, it deems to meet the FCC 15.225 limit since the FCC Part 15.209 limit is lower than FCC Part 15.255 limit.

13.56 MHz RFID (Plastic Enclosure, Without Keypad), 30-1000 MHz, Test Distance at 10m, (V/H Polarities)

Test Information:

Date and Time	9/25/2024 2:25:57 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	24 deg C
Humidity	45 %
Atmospheric Pressure	1015 mbars
Comments	Scan 27_13.56 MHz RFID With Modulation (Plastic Enclosure - Without Keypad), RE 30-1000MHz

Graph:



Results:

QuasiPeak (PASS) (6)

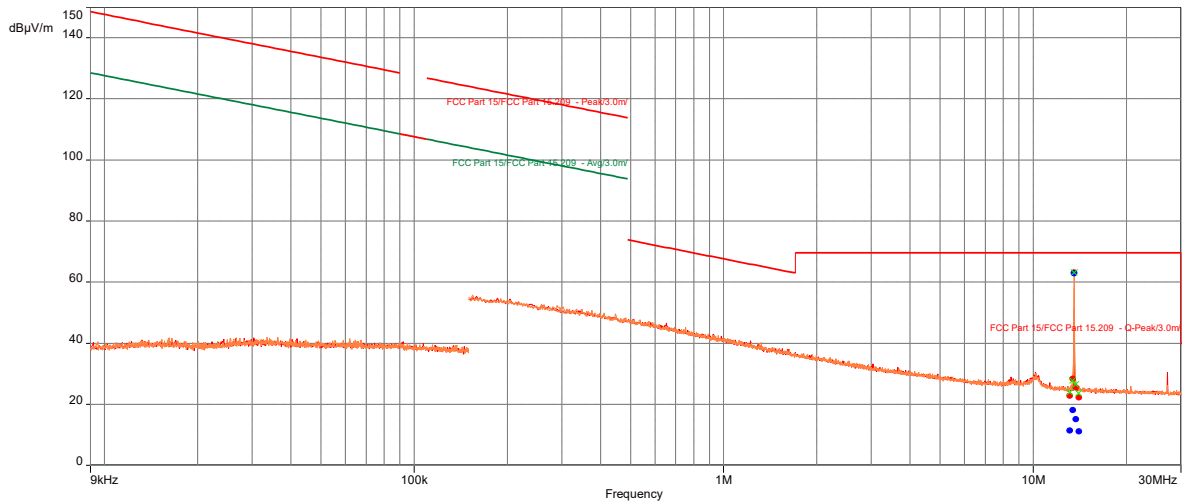
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	RBW	Meas.Time(s)	Correction (dB)
40.5627	8.14	29.54	-21.40	336.90	3.48	Horizontal	120000.00	120k	0.10	-20.12
111.9527	7.91	33.06	-25.15	125.70	1.84	Horizontal	120000.00	120k	0.10	-19.76
149.1705	17.53	33.06	-15.53	358.00	1.45	Vertical	120000.00	120k	0.10	-20.00
393.219	15.77	35.56	-19.79	234.70	4.00	Horizontal	120000.00	120k	0.10	-16.21
652.268	15.42	35.56	-20.14	28.40	2.59	Vertical	120000.00	120k	0.10	-10.61
673.2441	15.44	35.56	-20.12	282.80	2.14	Vertical	120000.00	120k	0.10	-10.45

13.56 MHz RFID (Metal Enclosure, With Keypad), 9 kHz- 30 MHz, Test Distance at 3m, (X, Y, Z Polarities)

Test Information:

Date and Time	9/20/2024 11:36:48 AM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	24 deg C
Humidity	52 %
Atmospheric Pressure	1006 mbar
Comments	Scan 18_13.56MHz RFID With Modulation (Metal Enclosure - With Keypad), RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209)

Graph:



Results:

QuasiPeak (PASS) (5)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time(s)	Correction (dB)
13.11382	11.36	69.54	-58.18	50.10	Vertical	9k	0.10	10.78
13.44213	18.07	69.54	-51.47	1.40	Vertical	9k	0.10	10.79
13.55989	62.86	69.54	-6.68	0.00	Vertical	9k	0.10	10.79
13.71726	15.10	69.54	-54.44	23.00	Vertical	9k	0.10	10.79
14.03491	11.20	69.54	-58.34	212.90	Vertical	9k	0.10	10.79

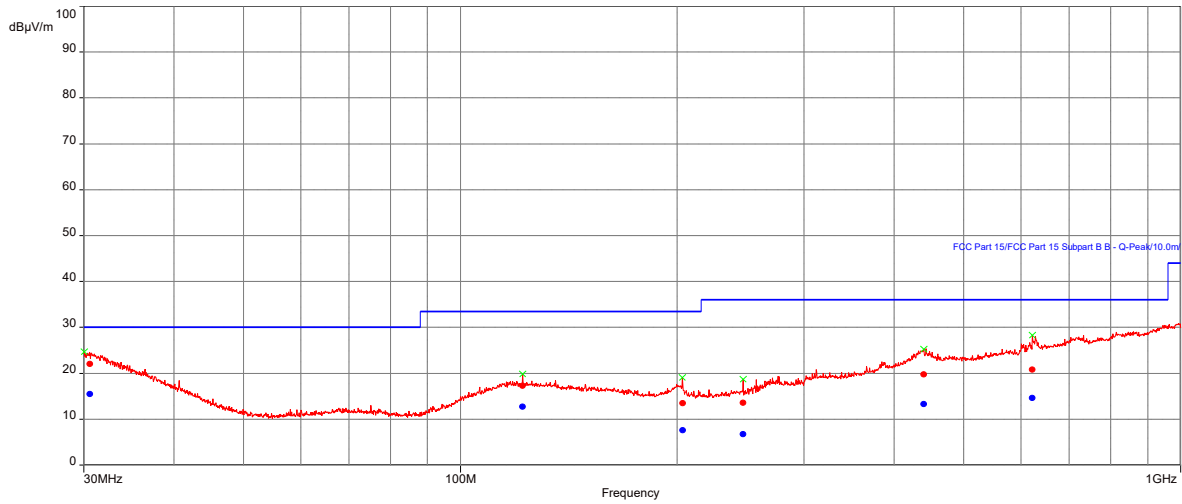
Notes: The fundamental frequency signal at 13.56 MHz meets the FCC Part 15.209 limit, it deems to meet the FCC 15.225 limit since the FCC Part 15.209 limit is lower than FCC Part 15.255 limit.

13.56 MHz RFID (Metal Enclosure, With Keypad), 30-1000 MHz, Test Distance at 10m, (V/H Polarities)

Test Information:

Date and Time	9/14/2024 1:37:11 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	26 deg C
Humidity	41 %
Atmospheric Pressure	1012 mbars
Comments	Scan 8: 13.56 MHz RFID (Metal Enclosure - With Keypad), RE 30-1000MHz

Graph:



Results:

QuasiPeak (PASS) (6)

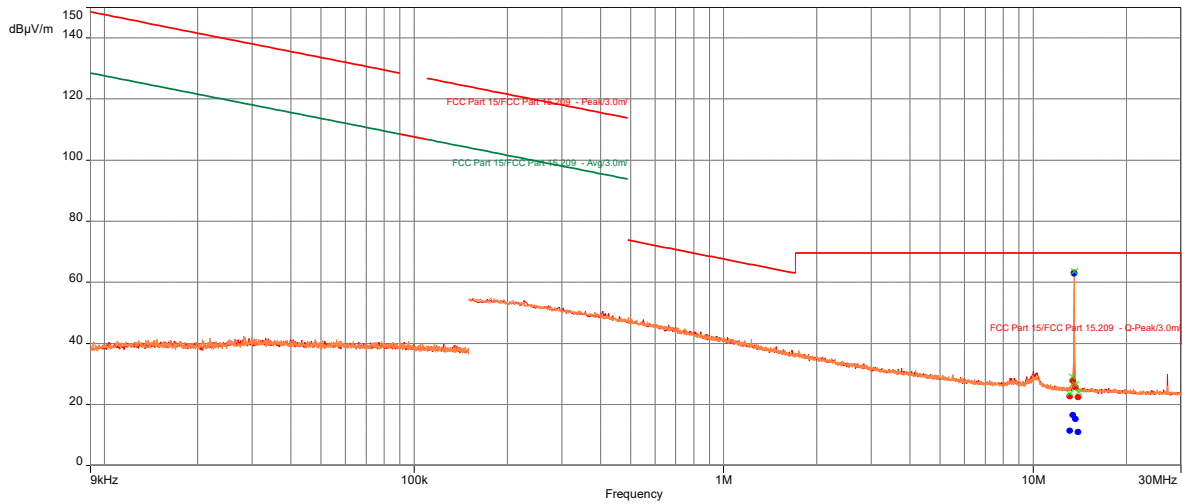
Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	RBW	Meas.Time(s)	Correction (dB)
30.5978	15.54	30.00	-14.46	98.70	3.74	Vertical	120000.00	120k	0.10	-13.17
122.0699	12.71	33.50	-20.79	12.00	1.86	Vertical	120000.00	120k	0.10	-18.93
203.6005	7.64	33.50	-25.86	360.00	1.70	Vertical	120000.00	120k	0.10	-20.87
247.1109	6.79	36.00	-29.21	309.40	3.50	Horizontal	120000.00	120k	0.10	-20.61
440.2796	13.31	36.00	-22.69	82.50	4.00	Vertical	120000.00	120k	0.10	-14.84
622.4659	14.65	36.00	-21.35	326.00	3.59	Horizontal	120000.00	120k	0.10	-11.44

13.56 MHz RFID (Metal Enclosure, Without Keypad), 9 kHz- 30 MHz, Test Distance at 3m, (X, Y, Z Polarities)

Test Information:

Date and Time	9/20/2024 9:52:06 AM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	24 deg C
Humidity	52 %
Atmospheric Pressure	1006 mbar
Comments	Scan 15_ 13.56 MHz RFID With Modulation (Metal Enclosure - Without Keypad), RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209)

Graph:



Results:

QuasiPeak (PASS) (5)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time(s)	Correction (dB)
13.11853	11.42	69.54	-58.12	218.40	Vertical	9k	0.10	10.78
13.44022	16.49	69.54	-53.05	336.80	Vertical	9k	0.10	10.78
13.56011	62.85	69.54	-6.69	0.00	Vertical	9k	0.10	10.79
13.69179	15.22	69.54	-54.32	336.80	Vertical	9k	0.10	10.79
13.98127	10.94	69.54	-58.60	66.40	Vertical	9k	0.10	10.80

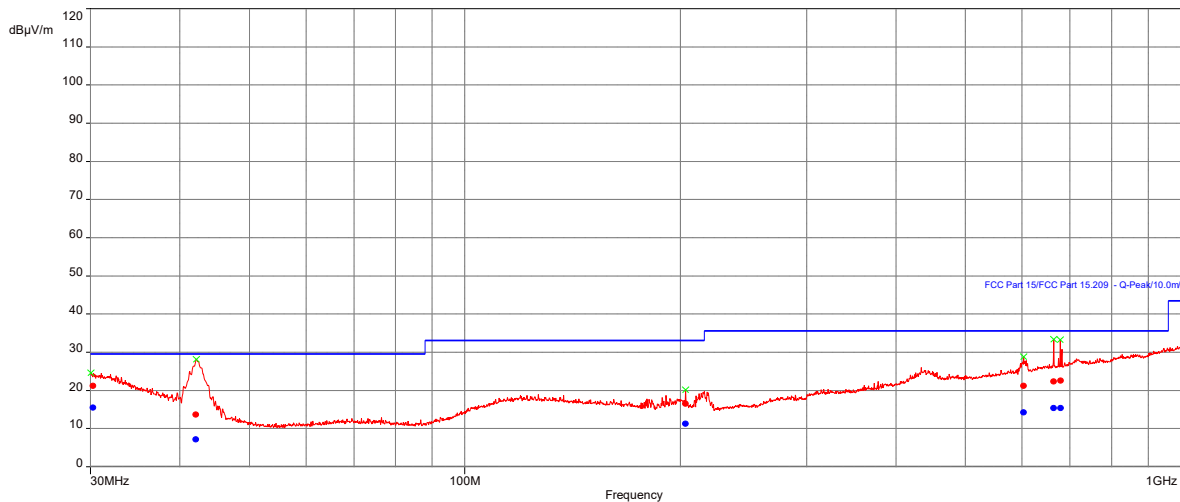
Notes: The fundamental frequency signal at 13.56 MHz meets the FCC Part 15.209 limit, it deems to meet the FCC 15.225 limit since the FCC Part 15.209 limit is lower than FCC Part 15.255 limit.

13.56 MHz RFID (Metal Enclosure, Without Keypad), 30-1000 MHz, Test Distance at 10m, (V/H Polarities)

Test Information:

Date and Time	9/25/2024 12:56:09 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	24 deg C
Humidity	45 %
Atmospheric Pressure	1015 mbars
Comments	Scan 25_13.56 MHz RFID With Modulation (Metal Enclosure - Without Keypad), RE 30-1000MHz

Graph:



Results:

QuasiPeak (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time(s)	Correction (dB)
30.2416	15.57	29.54	-13.97	153.00	4.00	Vertical	120k	0.10	-12.99
42.0767	7.14	29.54	-22.40	82.70	3.79	Horizontal	120k	0.10	-21.16
203.4	11.34	33.06	-21.72	358.70	2.20	Vertical	120k	0.10	-20.57
602.8276	14.22	35.56	-21.34	190.80	2.52	Vertical	120k	0.10	-12.12
664.3912	15.45	35.56	-20.11	76.90	1.31	Vertical	120k	0.10	-10.49
679.0046	15.45	35.56	-20.11	277.30	1.76	Vertical	120k	0.10	-10.32

Product Standard: CFR47 FCC Part 15 15.225, RSS-210, FCC 47CFR15 Part 15 Subpart B, ISD ICES-003				Limit applied: See Report Section 10.2 Pretest Verification w/BB source: Yes			
Test Date	Test Personnel/ Initials	Supervising Engineer/ Initials	Input Voltage	Mode	Atmospheric Data		
					Temp C°	Relative Humidity %	Atmospheric Pressure mbar
09/14/2024	Kouma Sinn <i>KPS</i>	N/A	Battery Powered	Continuous Transmitting	26	41	1012
09/20/2024	Kouma Sinn <i>KPS</i>	N/A	Battery Powered	Continuous Transmitting	24	52	1006
09/25/2024	Kouma Sinn <i>KPS</i>	N/A	Battery Powered	Continuous Transmitting	24	45	1015

Deviations, Additions, or Exclusions: None

10 AC Mains Line Conducted Emissions

10.1 Method

Tests are performed in accordance with ANSI C63.4.

TEST SITE: EMC Lab

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucisp
AC Line Conducted Emissions	150 kHz - 30 MHz	2.8 dB	3.4 dB
Telco Port Emissions	150 kHz - 30 MHz	4.1 dB	5.0 dB
AC Line Conducted Emissions	9 kHz - 150 MHz	2.4 dB	3.4 dB

As shown in the table above our conducted emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculations

The following is how net line-conducted readings were determined:

$$NF = RF + LF + CF + AF$$

Where NF = Net Reading in dB μ V

RF = Reading from receiver in dB μ V

LF = LISN or ISN Correction Factor in dB

CF = Cable Correction Factor in dB

AF = Attenuator Loss Factor in dB

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

NF = Net Reading in dB μ V

Example:

$$NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V}$$

$$UF = 10^{(49.1 \text{ dB}\mu\text{V} / 20)} = 285.1 \mu\text{V/m}$$

When BAT-EMC Emission Software is used, the "Level" includes all losses and gains and is compared directly in the "Margin" column to the "Limit". The "Correction" includes LISN Factor, Attenuator, and Cable Loss. These are already accounted for in the "Level" column.

10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV009'	weather station	Davis Instruments	6351 Vantage VUE	DAV009	04/05/2024	04/05/2025
ROS012'	EPL receiver 5kHz-30MHz ID#1350.4444K10-100953-Wj	Rhode & Schwarz	EPL	100953	02/05/2024	02/05/2025
LISN53'	Single Phase LISN 20 Amp	Com Power	LI-220C	20070071	12/22/2023	12/22/2024
CBLBNC2012-2'	50 Ohm Coaxial Cable	Pomona	RG-58 C/U	CBLBNC2012-2	04/23/2024	04/23/2025
WEI31'	10 dB 18GHz 5W Attenuator	Weinschel	WA2-10-0403	WEI31	01/17/2024	01/17/2025

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	Nexio	2023.0.9.3

10.3 Results:

The sample tested was found to Comply.

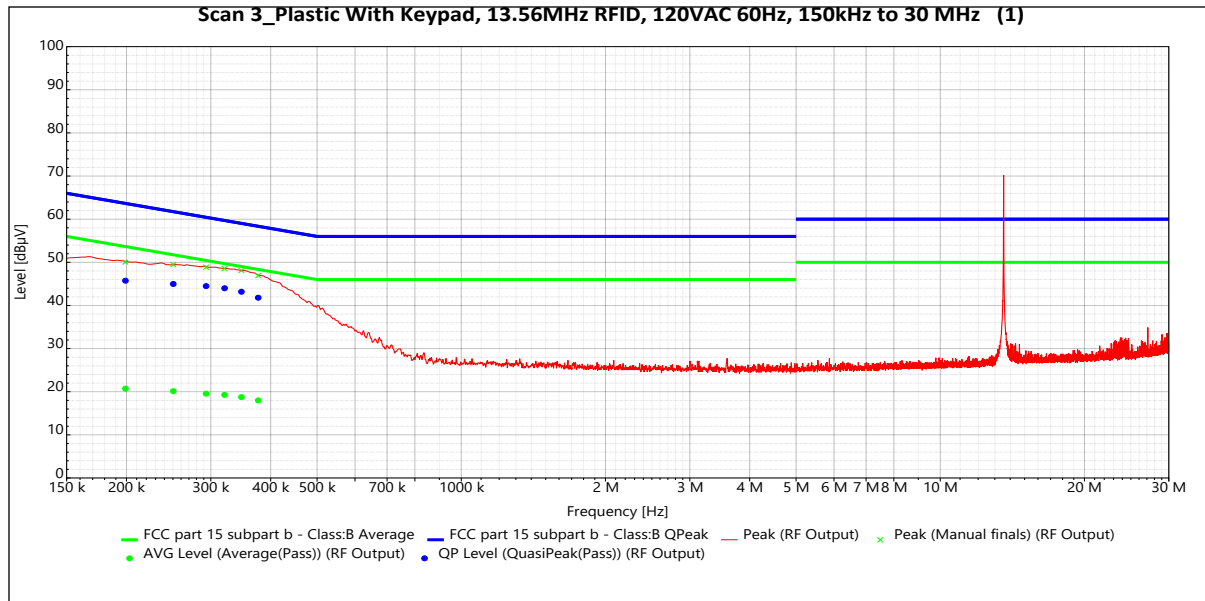
10.4 Setup Photographs:



10.5 Plots/Data:

DATE	11/22/2024
ENGINEER	Kouma Sinn
CLIENT AND PROJECT	Sargent

EUT: Line conducted emissions



Final source: Average(Pass)

Frequency	Line	Correction (dB)	AVG Level (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)	RBW (Hz)	Meas.Time (s)
199.005 kHz	Phase 1	9.769	20.717	53.631	-32.915	9 kHz	5
250.451 kHz	Phase 1	9.761	20.124	51.716	-31.591	9 kHz	5
293.263 kHz	Phase 1	9.755	19.549	50.411	-30.862	9 kHz	5
320.505 kHz	Phase 1	9.755	19.266	49.681	-30.414	9 kHz	5
347.505 kHz	Phase 1	9.756	18.743	49.01	-30.267	9 kHz	5
376.755 kHz	Phase 1	9.757	17.984	48.34	-30.356	9 kHz	5

Final source: QuasiPeak(Pass)

Frequency	Line	Correction (dB)	RBW (Hz)	Meas.Time (s)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dB)
199.005 kHz	Phase 1	9.769	9 kHz	5	45.738	63.631	-17.893
250.451 kHz	Phase 1	9.761	9 kHz	5	44.98	61.716	-16.736
293.263 kHz	Phase 1	9.755	9 kHz	5	44.479	60.411	-15.932
320.505 kHz	Phase 1	9.755	9 kHz	5	43.985	59.681	-15.696
347.505 kHz	Phase 1	9.756	9 kHz	5	43.173	59.01	-15.837
376.755 kHz	Phase 1	9.757	9 kHz	5	41.791	58.34	-16.549

Product Standard: CFR47 FCC Part 15 Subpart B, ICES-003				Limit applied: All Class B Pretest Verification w/ signal generator: Ye			
Test Date	Test Personnel/ Initials	Supervising Engineer/ Initials	Input Voltage	Mode	Atmospheric Data		
					Temp C°	Relative Humidity %	Atmospheric Pressure mbar
11/22/2024	Kouma Sinn <i>KPS</i>	N/A	120VAC 60Hz	Continuous Transmitting	24	33	998

Deviations, Additions, or Exclusions: None

11 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	12/19/2204	105838170BOX-001.1356MHz	KPS <i>KPS</i>	VFV <i>VFV</i>	Original Issue
1	06/23/2205	105838170BOX-001.1356MHz.1	KPS <i>KPS</i>	VFV <i>VFV</i>	Updated RSS-210 from Issue 10 to 11 throughout the report