

Sargent Manufacturing Company

TEST REPORT

SCOPE OF WORK

Emissions Testing – Aperio RF Module (BLE NTB-Push Button & NTB-Touchscreen), Model IN100

REPORT NUMBER

105779861BOX-006

ISSUE DATE

May 13, 2024

[REVISED DATE]

Original issue

DOCUMENT CONTROL NUMBER

Non-Specific Radio Report Shell Rev. October 2022
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EMISSIONS TEST REPORT (FULL COMPLIANCE)

Report Number: 105779861BOX-006

Project Number: G105779861

Report Issue Date: May 13, 2024

Model(s) Tested: IN100

Model(s) Partially Tested: None

Model(s) Not Tested but declared equivalent by the client: None

Standards: CFR47 FCC Part 15 Subpart C, Section 15.247: 04/2024
CFR47 FCC Part 15 Subpart C, Section 15.225: 04/2024
CFR47 FCC Part 15 Subpart C, Section 15.209: 04/2024
CFR47 FCC Part 15 Subpart C, Section 15.205: 04/2024
RSS-247 Issue 3 August 2023,
RSS-210 Issue 10 December 2019
KDB 558074 D01 15.247 Meas Guidance v05r02: 04/2019
RSS-Gen Issue 5 April 2018 +Amendment 1 March 2019

The product contains the following radio modules:
The Limited Module FCC ID containing all 4 radios:

FCC ID: U4A-SCYMCA1

IC: 6982A-SCYMCA1

Contains BLE Limited Module

FCC ID: Y88-MBM1CC2640

IC: 9504A-MBM1CC2640

Tested by:
Intertek Testing Services NA, Inc.
70 Codman Hill Road
Boxborough, MA 01719
USA

Client:
Sargent Manufacturing Company
100 Sargent Drive
New Haven, CT 6511
USA

Report prepared by



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1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
3	Client Information	--
4	Description of Equipment Under Test and Variant Models	--
5	System Setup and Method	--
6	Maximum Peak Output CFR47 FCC Part 15 Subpart C, Section 15.247 (b)(3): 04/2024 CFR47 FCC Part 15 Subpart C, Section 15.225 (a): 04/2024 CFR47 FCC Part 15 Subpart C, Section 15.209: 04/2024 CFR47 FCC Part 15 Subpart C, Section 15.205: 04/2024 RSS-247 Issue 3 August 2023 RSS-210 Issue 10 December 2019	Pass
7	6 dB Bandwidth (DTS Bandwidth) and Occupied Bandwidth CFR47 FCC Part 15 Subpart C, Section 15.247 (a)(2): 04/2024 RSS-247 Issue 3 August 2023	Pass
8	Maximum Power Spectral Density CFR47 FCC Part 15 Subpart C, Section 15.247 (e): 04/2024 RSS-247 Issue 3 August 2023	Pass
9	Band Edge Compliance CFR47 FCC Part 15 Subpart C, Section 15.247 (d): 04/2024 CFR47 FCC Part 15 Subpart C, Section 15.225 (b) (c) (d): 04/2024 RSS-247 Issue 3 August 2023 RSS-210 Issue 10 December 2019	Pass
10	Transmitter spurious emissions CFR47 FCC Part 15 Subpart C, Section 15.247 (d): 04/2024 CFR47 FCC Part 15 Subpart C, Section 15.225 (b) (c) (d): 04/2024 RSS-247 Issue 3 August 2023 RSS-210 Issue 10 December 2019	Pass
11	Digital Device Radiated Spurious Emissions CFR47 FCC Part 15 Subpart B 15.109: 04/2024 ISED ICES-003 Issue 7 October 2020	Pass
---	AC Mains Conducted Emissions FCC 47CFR Part 15.107: 04/2024 ISED ICES-003 Issue 7 October 2020	N/A
12	Revision History	--

Notes: The EUT is battery powered. The radio does not transmit simultaneously in normal operation.

3 Client Information

This EUT was tested at the request of:

Client: Sargent Manufacturing Company
100 Sargent Drive
New Haven, CT 6511
USA

Contact: Dave Debiase
Telephone: 203-821-5724
Email: dave.debiase@assaabloy.com

4 Description of Equipment Under Test and Variant Models

Manufacturer: Sargent Manufacturing Company
100 Sargent Drive
New Haven, CT 6511
USA

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Electronic access control system with Aperio RF Module BLE (NTB-Push Button)	Sargent Manufacturing Company	IN100	RR0XN900662
Electronic access control system with Aperio RF Module BLE (NTB-Touchscreen)	Sargent Manufacturing Company	IN100	RR0XN900826
Electronic access control system with Aperio RF Module 13.56 MHz RFID (NTB-Touchscreen)	Sargent Manufacturing Company	IN100	RV0XN900572
Electronic access control system with Aperio RF Module 13.56 MHz RFID (NTB-Push Button)	Sargent Manufacturing Company	IN100	RV0VN701377

Receive Date:	04/24/2024
Received Condition:	Good
Type:	Production
Test Date(s):	04/08/2024, 04/15/2024, 04/17/2024, 04/26/2024, 04/28/2024, 05/03/2024

Description of Equipment Under Test (provided by client)
Electronic access control system. It contains the radio modules as below. The Limited Module FCC ID containing all 4 radios is: FCC ID: U4A-SCYMCA1 IC: 6982A-SCYMCA1 Contains BLE Limited Module FCC ID: Y88-MBM1CC2640 IC: 9504A-MBM1CC2640

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
9 V (6 x 1.5 V Batteries)	1.5 A	DC	N/A

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	BLE – Programmed to transmit continuously with modulation at Low, Mid, and High channels
2	13.56 MHz RFID – Pre-programmed to transmit continuously with modulation.

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	BLE – nRF Connect for Desktop V4.4.0
2	13.56 MHz RFID – No software used

13.56 MHz RFID Radio/Receiver Characteristics

Frequency Band(s)	See FCC ID # U4A-SCYMCA1
Modulation Type(s)	See FCC ID # U4A-SCYMCA1
Maximum Field Strength (NTB-Push Button)	39.99 dBuV/m at 3 meters
Maximum Field Strength (NTB-Touchscreen)	40.69 dBuV/m at 3 meters
Test Channels	13.56 MHz
Occupied Bandwidth	See FCC ID # U4A-SCYMCA1
Frequency Hopper: Number of Hopping Channels	N/A
Frequency Hopper: Channel Dwell Time	N/A
Frequency Hopper: Max interval between two instances of use of the same channel	N/A
MIMO Information (# of Transmit and Receive antenna ports)	N/A
Equipment Type	Limited Module
Antenna Type and Gain	See FCC ID # U4A-SCYMCA1

Bluetooth Low Energy Radio/Receiver Characteristics

Frequency Band(s)	See FCC ID # Y88-MBM1CC2640
Modulation Type(s)	See FCC ID # Y88-MBM1CC2640
Maximum Field Strength (NTB-Push Button)	-12.70 dBm (EIRP)
Maximum Field Strength (NTB-Touchscreen)	-16.62 dBm (EIRP)
Test Channels	Low, Mid, and High Channels
Occupied Bandwidth	See FCC ID # Y88-MBM1CC2640
Frequency Hopper: Number of Hopping Channels	N/A
Frequency Hopper: Channel Dwell Time	N/A
Frequency Hopper: Max interval between two instances of use of the same channel	N/A
MIMO Information (# of Transmit and Receive antenna ports)	N/A
Equipment Type	Limited Module
Antenna Type and Gain	See FCC ID # Y88-MBM1CC2640

Variant Models:

The following variant models were not tested as part of this evaluation, but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

None

5 System Setup and Method

Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
--	USB Cable*	4.84	None	None	Laptop

*Notes: Cable used to support the testing only.

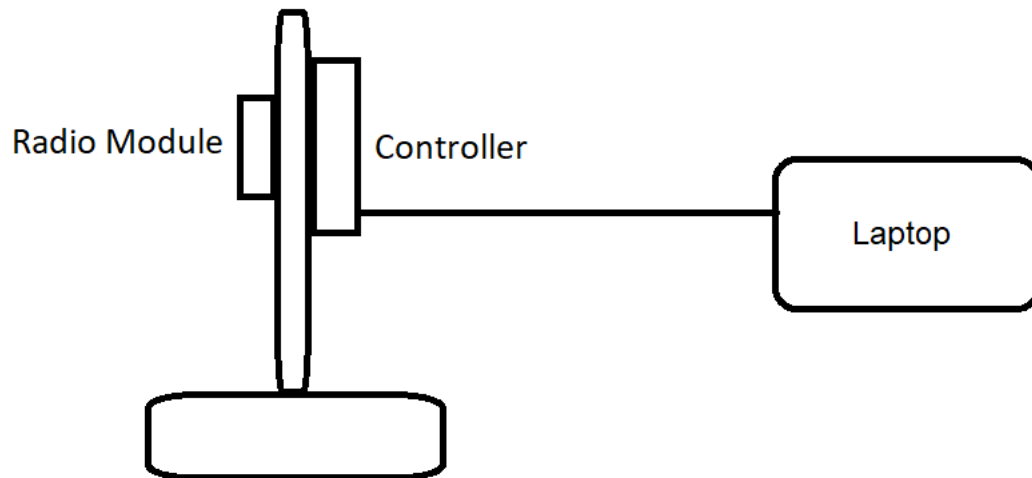
Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Laptop	Dell	Latitude 5430	Not Labelled

5.1 Method:

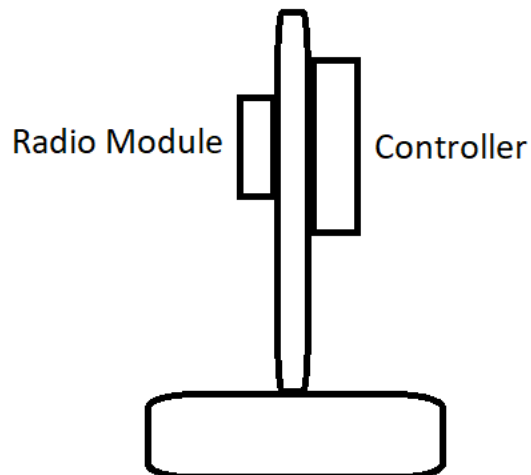
Configuration as required by ANSI C63.10-2013, RSS-Gen Issue 5 April 2018, and KDB 558074 D01 15.247 Meas Guidance v05r02: 04/2019.

5.2 EUT Block Diagram:

Low Energy Bluetooth Block Diagram



13 MHz RFID Block Diagram



6 Maximum Peak Output Power

6.1 Method

Tests are performed in accordance with CFR47 FCC Part 15.247, RSS-247, ANSI C63.10, and KDB 558074 D0115.247 Meas Guidancev05r02.

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.

6.2 Limits:

Limits – FCC Part §15.247 (b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt or 30 dBm.

Limits – FCC Part §15.225 (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.

Notes: The limits for RSS-247 and RSS-210 are the same as the FCC limits above.

6.3 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007	Weather Station Vantage Vue	Davis	6250	MS191212003	03/27/2024	03/27/2025
IW001'	2 meter cable	Insulated Wire	2801-NPS	001	07/19/2023	07/19/2024
HS001'	DC-18GHz cable 1.5m long	Huber & Suhner	SucoFlex 106A	HS001	01/30/2024	01/30/2025
HS002'	DC-18GHz cable 1.5M long	Huber & Suhner	SucoFlex 106A	HS002	07/19/2023	07/19/2024
145-408'	10m Chamber - 3m Track B in-floor Cable	Huber + Suhner	sucoflex 106-11000mm	001	07/19/2023	07/19/2024
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	10/16/2023	10/16/2024
ROS011'	ESW44 receiver 1Hz-44GHz	Rhode and Schwarz	ESW44	103296	06/28/2023	06/28/2024
145019'	Active Loop Antenna (9 KHz to 30 MHz)	EMCO	6502/1	9902-3267	03/05/2024	03/05/2025

Software Utilized:

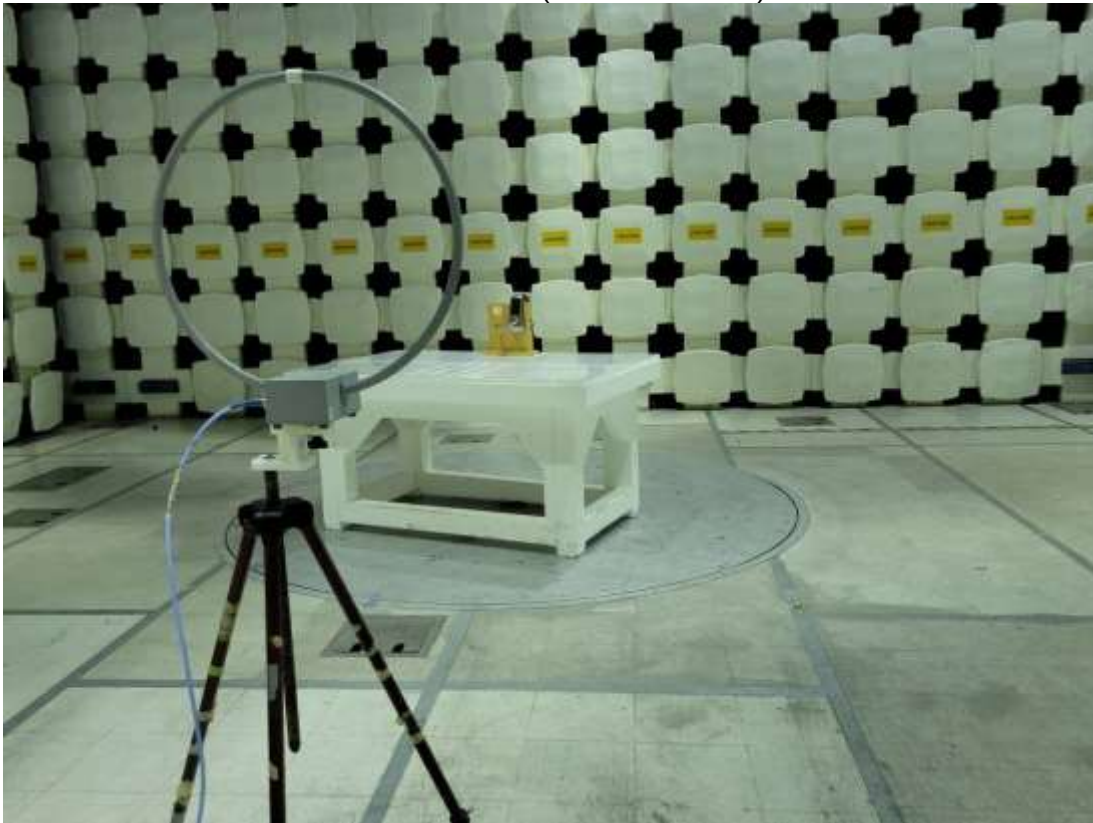
Name	Manufacturer	Version
None	N/A	N/A

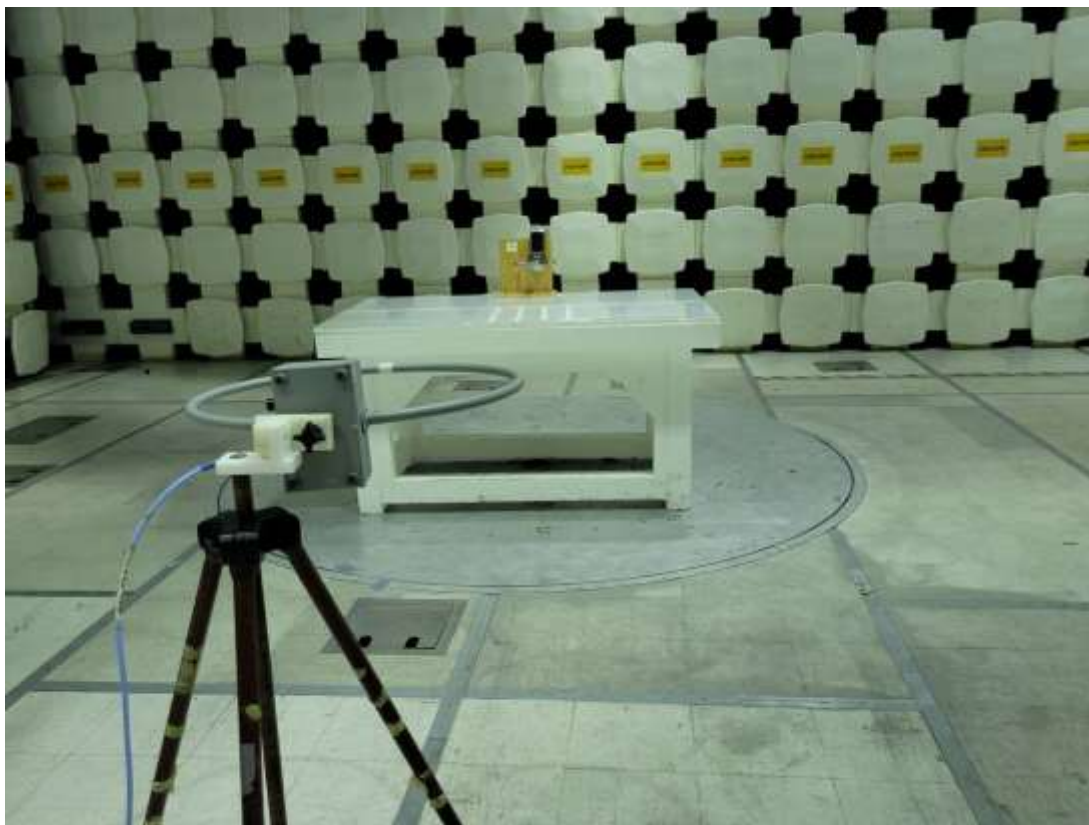
6.4 Results:

The sample tested was found to Comply.

6.5 Setup Photographs:

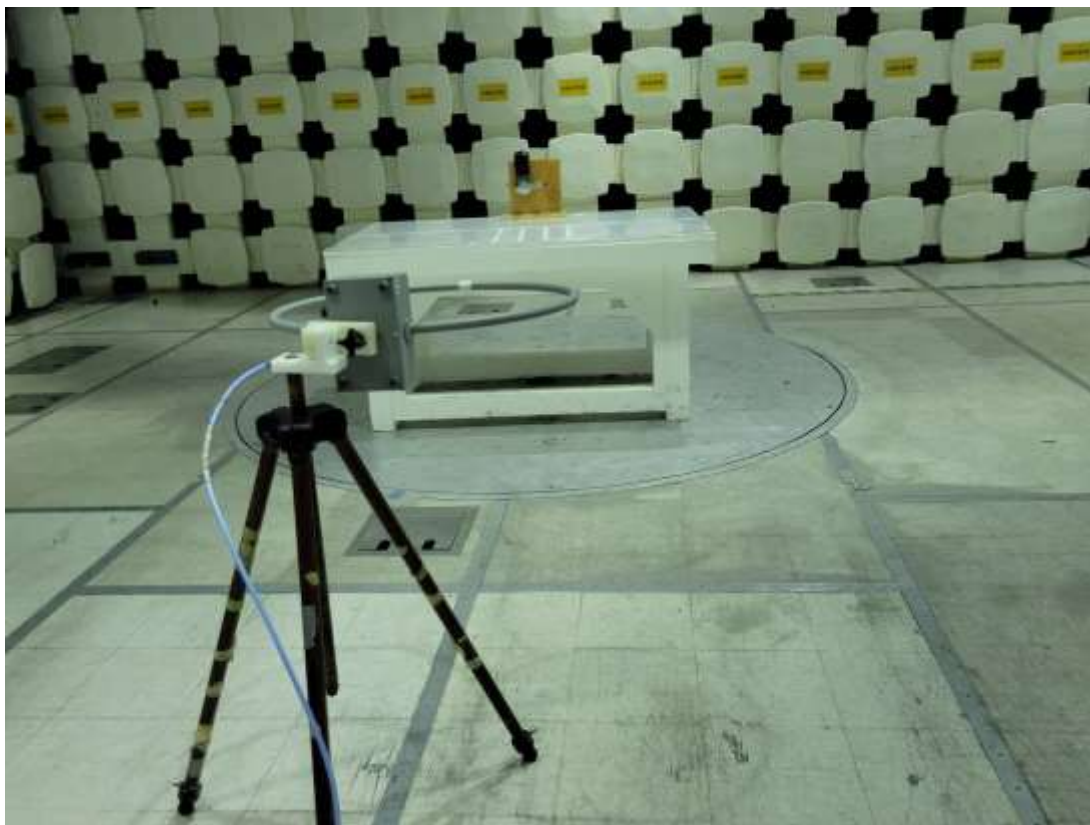
13.56 MHz RFID (NTB-Push Button)



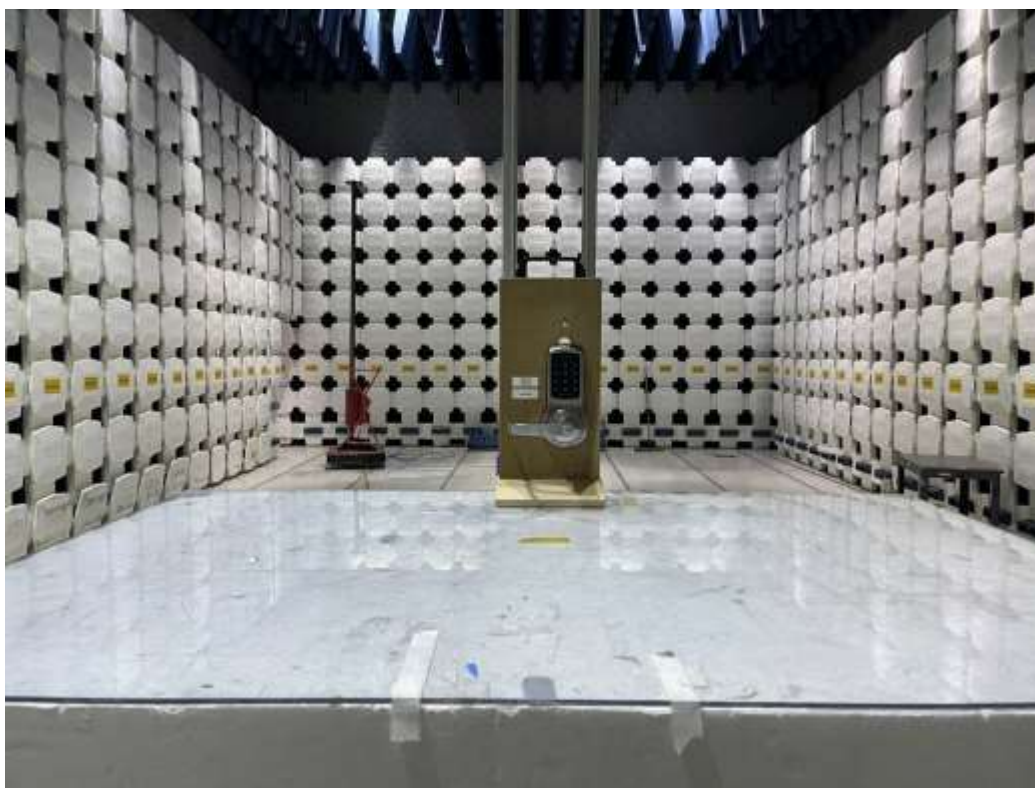
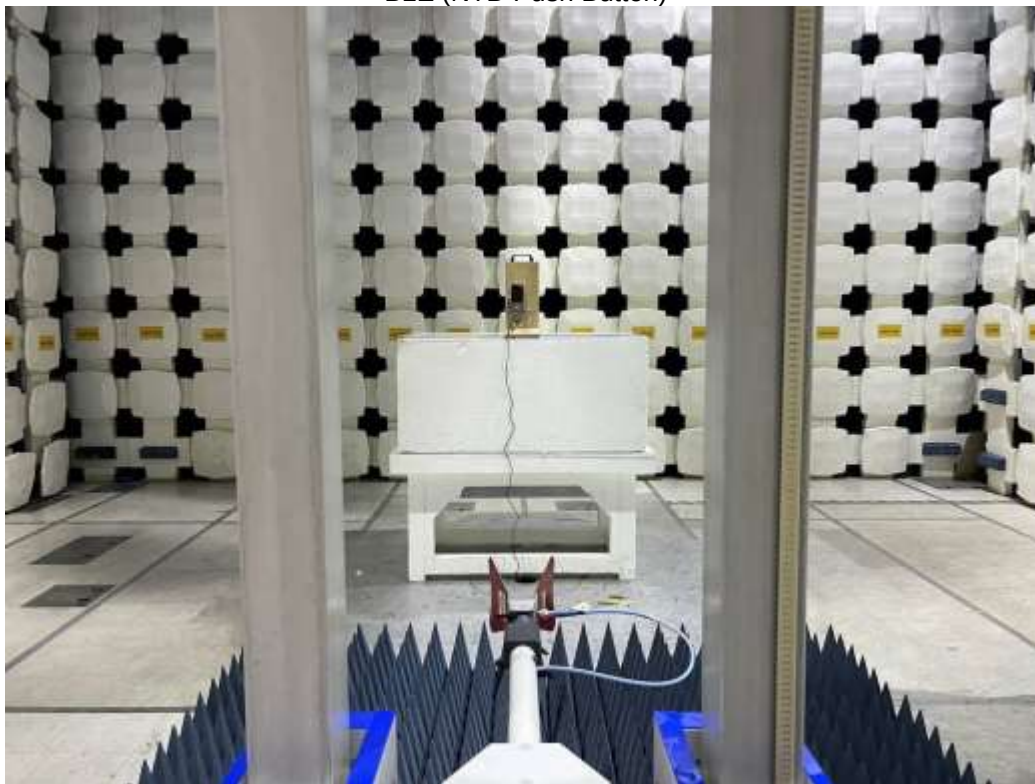


13.56 MHz RFID (NTB-Touchscreen)

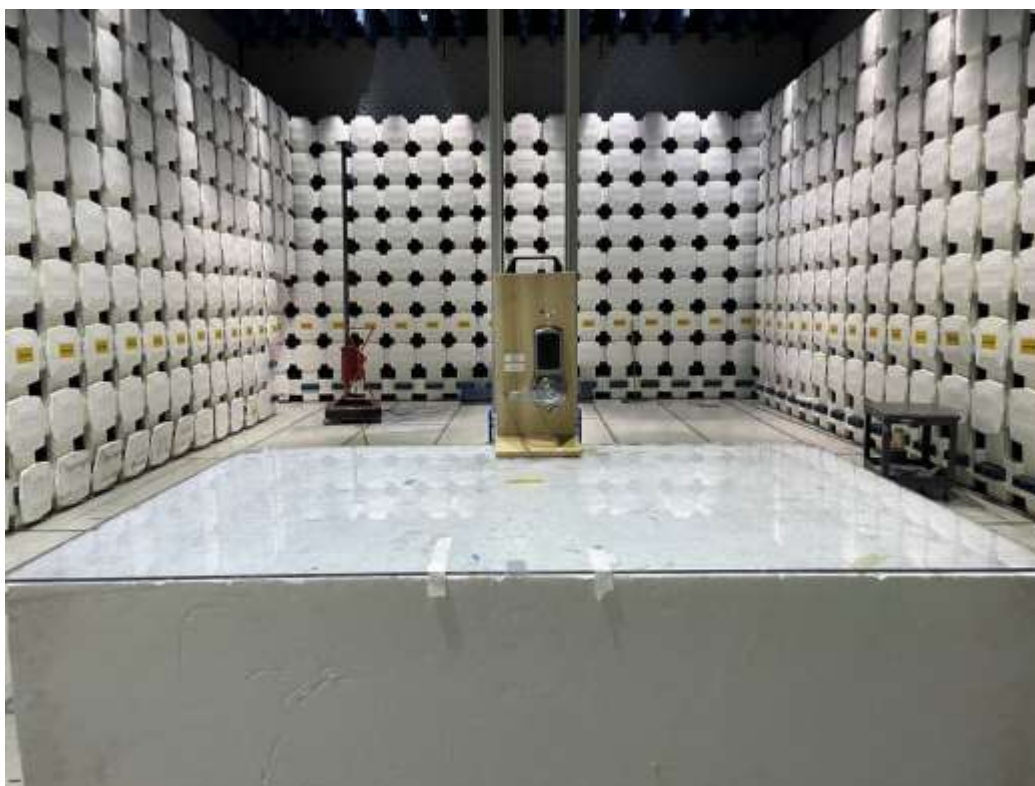
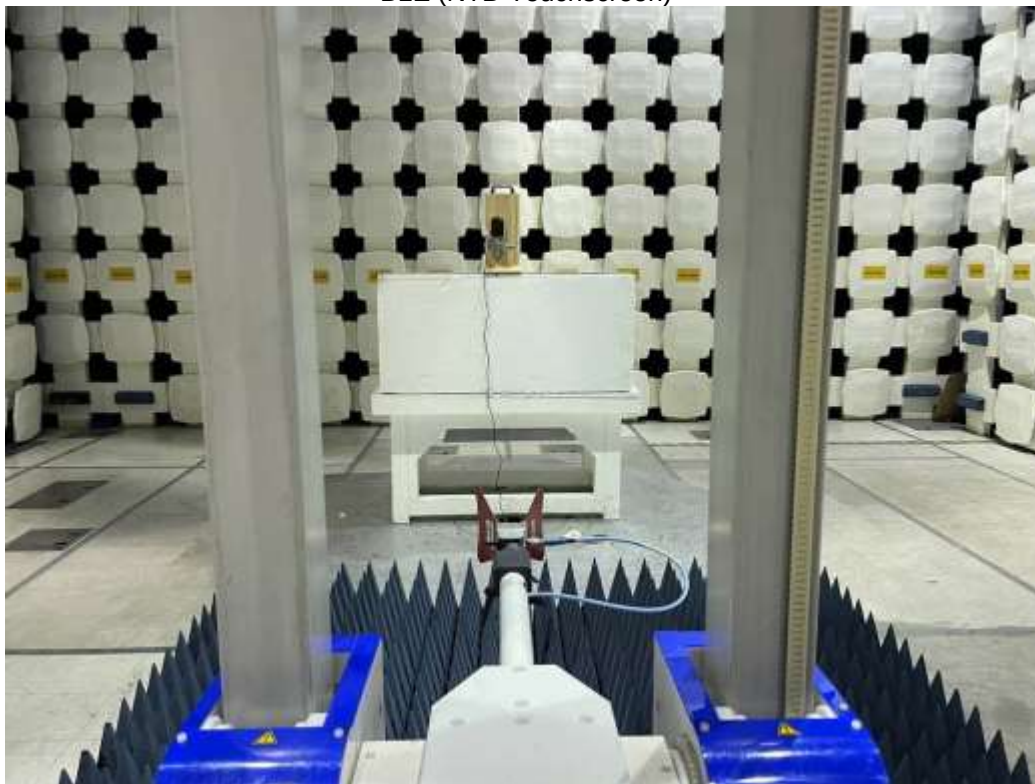




BLE (NTB-Push Button)



BLE (NTB-Touchscreen)



6.6 Test Data:**13.56 MHz RFID (NTB-Push Button) Field Strength**

Frequency (MHz)	Field Strength at 3 meters (dBuV/m)	Field Strength Limit at 3 meters (dBuV/m)	Results
13.56	39.99	84	Compliance

Limit at 13.56 MHz is 15,848 uV/m or 84 dBuV/m at 30 meter with distance factor of $40 \cdot \log(3/30)$ or 40 dB. The limit at 3 meters = 84 dBuV/m + 40 dB or 84 dBuV/m.

13.56 MHz RFID (NTB-Touchscreen) Field Strength

Frequency (MHz)	Field Strength at 3 meters (dBuV/m)	Field Strength Limit at 3 meters (dBuV/m)	Results
13.56	40.69	84	Compliance

Limit at 13.56 MHz is 15,848 uV/m or 84 dBuV/m at 30 meter with distance factor of $40 \cdot \log(3/30)$ or 40 dB. The limit at 3 meters = 84 dBuV/m + 40 dB or 84 dBuV/m.

BLE (NTB-Push Button), EIRP

Frequency (MHz)	Field Strength (dBuV/m)	EIRP (dBm)	Conducted Power Limit (dBm)	Results
2402	82.50	-12.70	30	Compliance
2440	81.27	-13.93	30	Compliance
2480	80.45	-14.75	30	Compliance

BLE (NTB-Touchscreen), EIRP

Frequency (MHz)	Field Strength (dBuV/m)	EIRP (dBm)	Conducted Power Limit (dBm)	Results
2402	78.58	-16.62	30	Compliance
2440	74.86	-20.34	30	Compliance
2480	75.13	-20.07	30	Compliance

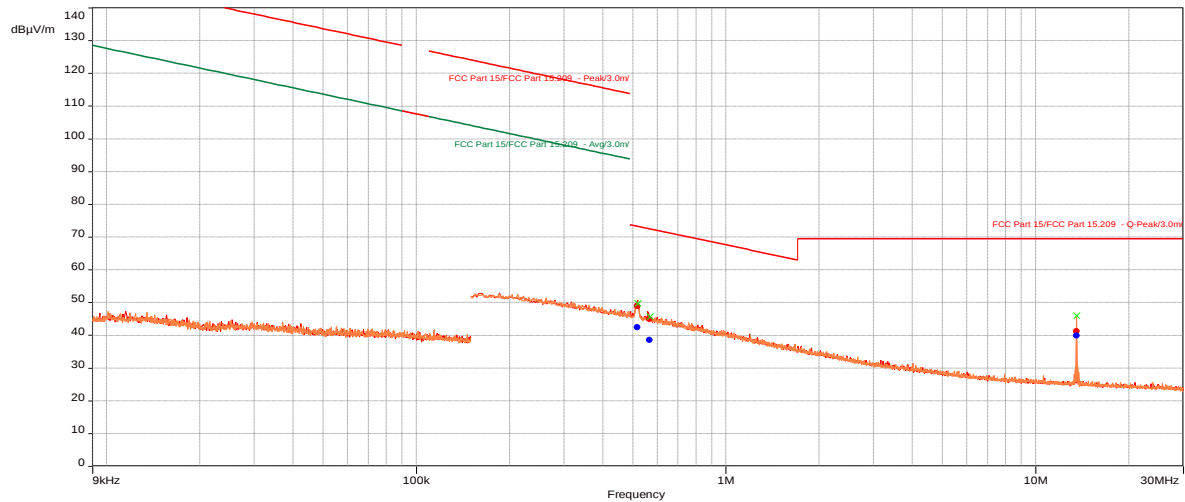
Notes: The EIRP was calculated from field strength with the formula below:

$$\text{EIRP} = E_{\text{Meas}} + 20 \log(d_{\text{Meas}}) - 104.7$$

13.56 MHz RFID (NTB-Push Button)

Test Information:

Date and Time	4/17/2024 9:55:37 PM
Client and Project Number	Sargent G105779861
Engineer	Virginia Moy/Vathan Ven
Temperature	23deg C
Humidity	28%
Atmospheric Pressure	1008mbars
Comments	Scan 3 RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209) Battery Mode_13.56MHz RFID_Push Button

Graph:**Results:**

Peak (PASS) (3)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51641	49.01	73.34	-24.33	283.40	Vertical	9k	0.10	11.04
0.56726	45.00	72.54	-27.55	180.40	Vertical	9k	0.10	11.09
13.56	41.26	69.54	-28.28	272.40	Vertical	9k	0.10	11.22

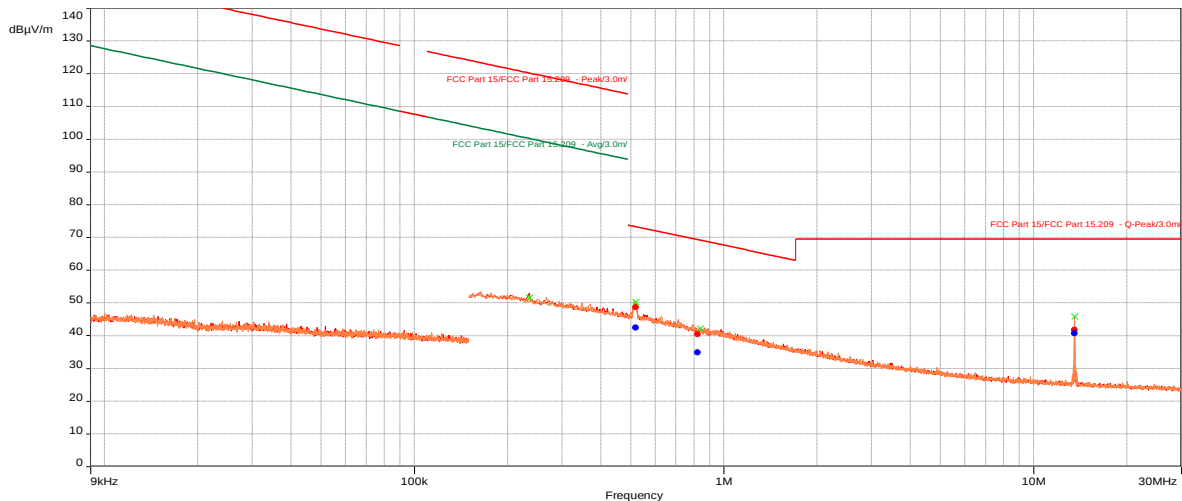
QuasiPeak (PASS) (3)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51641	42.52	73.34	-30.82	283.40	Vertical	9k	0.10	11.04
0.56726	38.58	72.54	-33.96	180.40	Vertical	9k	0.10	11.09
13.56	39.99	69.54	-29.55	272.40	Vertical	9k	0.10	11.22

13.56 MHz RFID (NTB-Touchscreen)

Test Information:

Date and Time	4/17/2024 9:17:16 PM
Client and Project Number	Sargent G105779861
Engineer	Virginia Moy/Vathan Ven
Temperature	23deg C
Humidity	28%
Atmospheric Pressure	1008mbars
Comments	Scan 2 RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209) Battery Mode_13.56MHz RFID Touch Screen

Graph:**Results:**

Peak (PASS) (3)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51867	48.68	73.30	-24.62	196.40	Vertical	9k	0.10	11.04
13.56	41.75	69.54	-27.79	99.00	Vertical	9k	0.10	11.22
0.82335	40.41	69.30	-28.88	23.10	Vertical	9k	0.10	11.14

QuasiPeak (PASS) (3)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51867	42.42	73.30	-30.88	196.40	Vertical	9k	0.10	11.04
13.56	40.69	69.54	-28.85	99.00	Vertical	9k	0.10	11.22
0.82335	34.90	69.30	-34.40	23.10	Vertical	9k	0.10	11.14

BLE (NTB-Push Button), Low Channel Radiated Field Strength at 3m (Worst-case polarity: H)



BLE (NTB-Push Button), Mid Channel Radiated Field Strength at 3m (Worst-case polarity: H)



Notes: Cable loss and antenna factor were compensated internally as Reference Offset.

BLE (NTB-Push Button), High Channel Radiated Field Strength at 3m (Worst-case polarity: H)



Notes: Cable loss and antenna factor were compensated internally as Reference Offset.

BLE (NTB-Touchscreen), Low Channel Radiated Field Strength at 3m (Worst-case polarity: H)



BLE (NTB-Touchscreen), Mid Channel Radiated Field Strength at 3m (Worst-case polarity: H)



Notes: Cable loss and antenna factor were compensated internally as Reference Offset.

BLE (NTB-Touchscreen), High Channel Radiated Field Strength at 3m (Worst-case polarity: H)



Notes: Cable loss and antenna factor were compensated internally as Reference Offset.

Product Standard: CFR47 FCC Part 15.247, RSS-247					Limit applied: See Report Section 6.2		
Test Date	Test Personnel/ Initials	Supervising Engineer/ Initials	Input Voltage	Mode	Atmospheric Data		
					Temp C°	Relative Humidity %	Atmospheric Pressure mbar
04/28/2024	Kouma Sinn <i>KPS</i>	Vathana F. Ven <i>VSV</i>	Battery Powered	Continuous Transmitting	23	29	1012
04/17/2024	Vathana F. Ven <i>VSV</i>	Kouma Sinn <i>KPS</i>	Battery Powered	Continuous Transmitting	23	28	1008

Deviations, Additions, or Exclusions: None

7 6 dB Bandwidth (DTS Bandwidth) and Occupied Bandwidth

7.1 Method

Tests are performed in accordance with CFR47 FCC Part 15.247, RSS-247, and ANSI C63.10.

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.

7.2 Limit

DTS Bandwidth Limit:

FCC Part §15.247 (a) (2) Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Occupied Bandwidth:

Upper and Lower Edges of OBW within 2400-2483.5 MHz

Notes: The limits for RSS-247 are the same as the FCC limits above.

7.3 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007'	Weather Station Vantage Vue	Davis	6250	MS191212003	03/27/2024	03/27/2025
IW001'	2 meter cable	Insulated Wire	2801-NPS	001	07/19/2023	07/19/2024
HS001'	DC-18GHz cable 1.5m long	Huber & Suhner	SucoFlex 106A	HS001	01/30/2024	01/30/2025
HS002'	DC-18GHz cable 1.5M long	Huber & Suhner	SucoFlex 106A	HS002	07/19/2023	07/19/2024
145-408'	10m Chamber - 3m Track B In-floor Cable	Huber + Suhner	sucoflex 106-11000mm	001	07/19/2023	07/19/2024
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	10/16/2023	10/16/2024
ROS011'	ESW44 receiver 1Hz-44GHz	Rhode and Schwarz	ESW44	103296	06/28/2023	06/28/2024

Software Utilized:

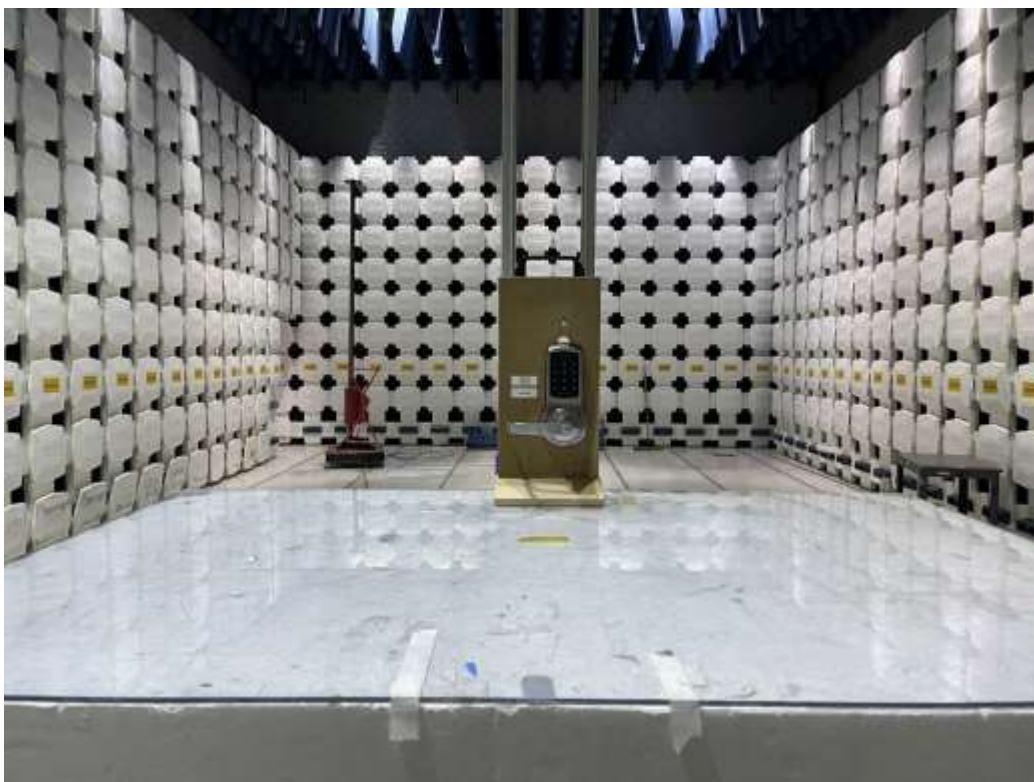
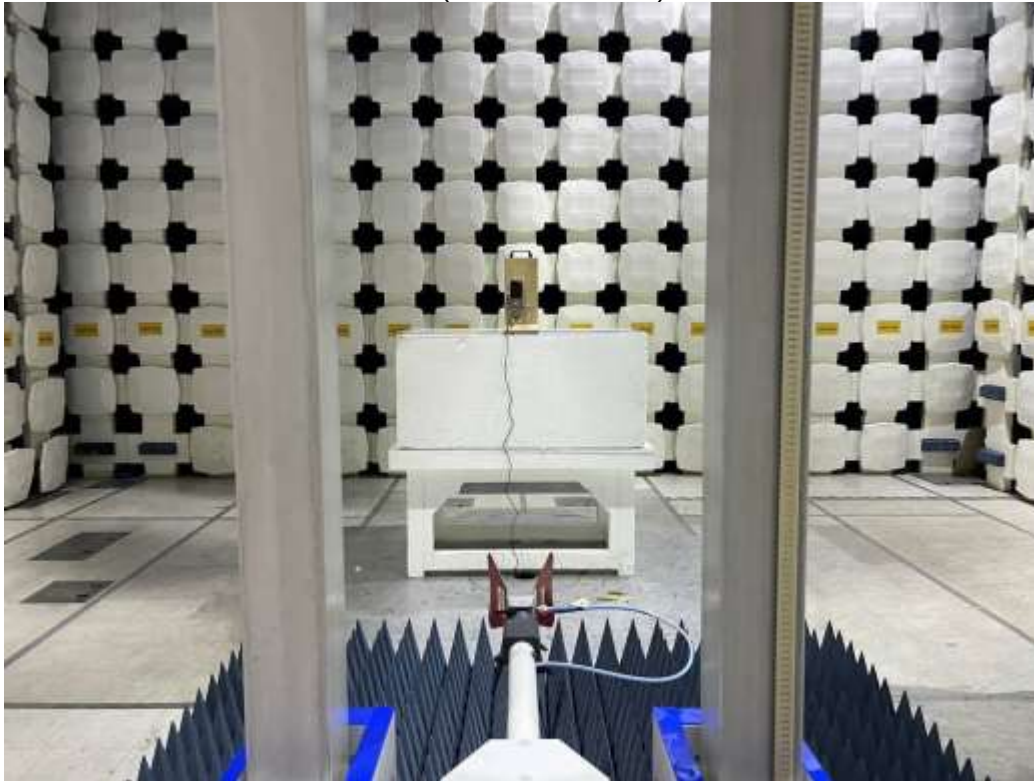
Name	Manufacturer	Version
None	N/A	N/A

7.4 Results:

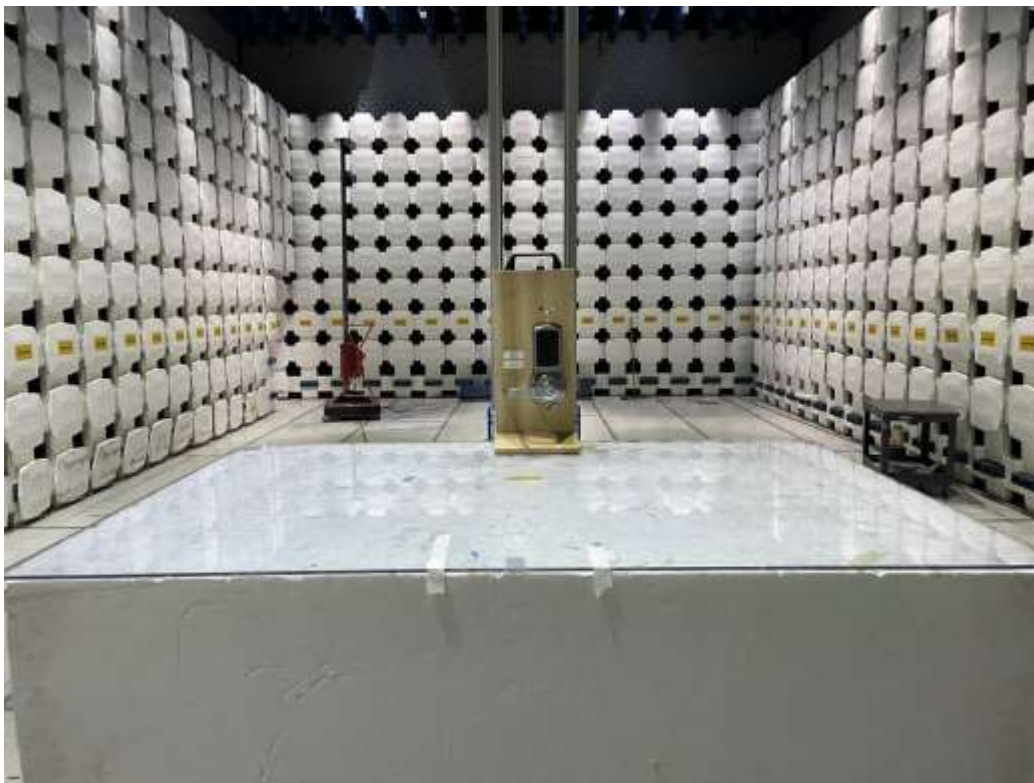
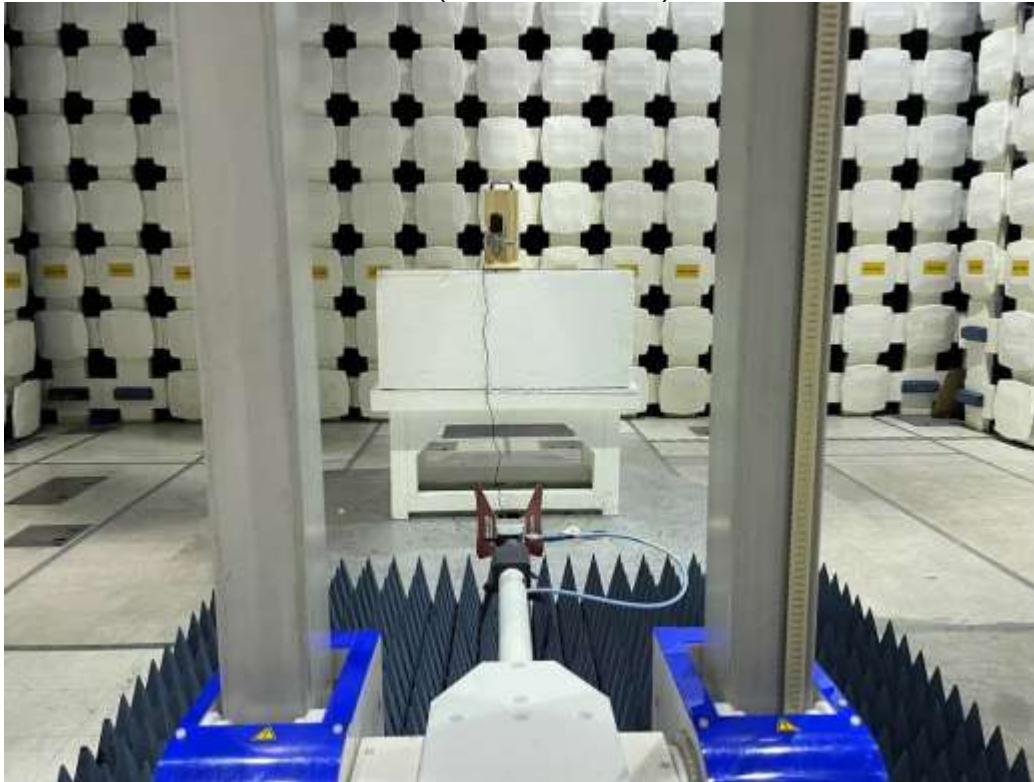
The sample tested was found to Comply.

7.5 Setup Photographs:

BLE (NTB-Push Button)



BLE (NTB-Touchscreen)



7.6 Test Data:**BLE (NTB-Push Button), DTS Bandwidth**

Frequency (MHz)	DTS Bandwidth (6 dB Bandwidth) (kHz)	DTS Bandwidth Limit (kHz)	Results
2402	789.20	≥ 500	Compliance
2440	799.20	≥ 500	Compliance
2480	799.20	≥ 500	Compliance

BLE (NTB-Touchscreen), DTS Bandwidth

Frequency (MHz)	DTS Bandwidth (6 dB Bandwidth) (kHz)	DTS Bandwidth Limit (kHz)	Results
2402	763.20	≥ 500	Compliance
2440	785.20	≥ 500	Compliance
2480	681.30	≥ 500	Compliance

BLE (NTB-Push Button), Occupied Bandwidth

Frequency (MHz)	Occupied Bandwidth (MHz)	Occupied Bandwidth Limit	Results
2402	1.167	Upper and Lower Edges of OBW within 2400-2483.5 MHz	Compliance
2440	1.294	Upper and Lower Edges of OBW within 2400-2483.5 MHz	Compliance
2480	1.261	Upper and Lower Edges of OBW within 2400-2483.5 MHz	Compliance

BLE (NTB-Touchscreen), Occupied Bandwidth

Frequency (MHz)	Occupied Bandwidth (MHz)	Occupied Bandwidth Limit	Results
2402	1.058	Upper and Lower Edges of OBW within 2400-2483.5 MHz	Compliance
2440	1.138	Upper and Lower Edges of OBW within 2400-2483.5 MHz	Compliance
2480	1.250	Upper and Lower Edges of OBW within 2400-2483.5 MHz	Compliance

BLE (NTB-Push Button), Low Channel DTS Bandwidth



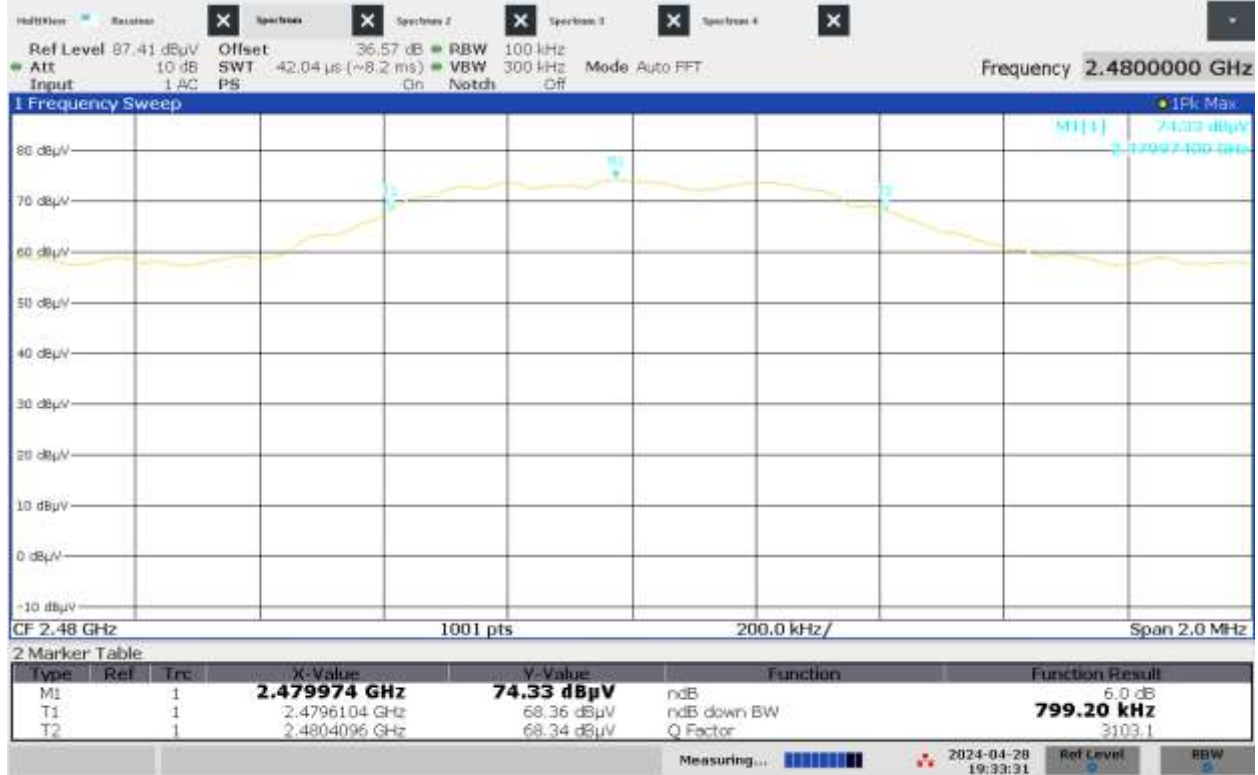
07:04:30 PM 04/26/2024

BLE (NTB-Push Button), Mid Channel DTS Bandwidth



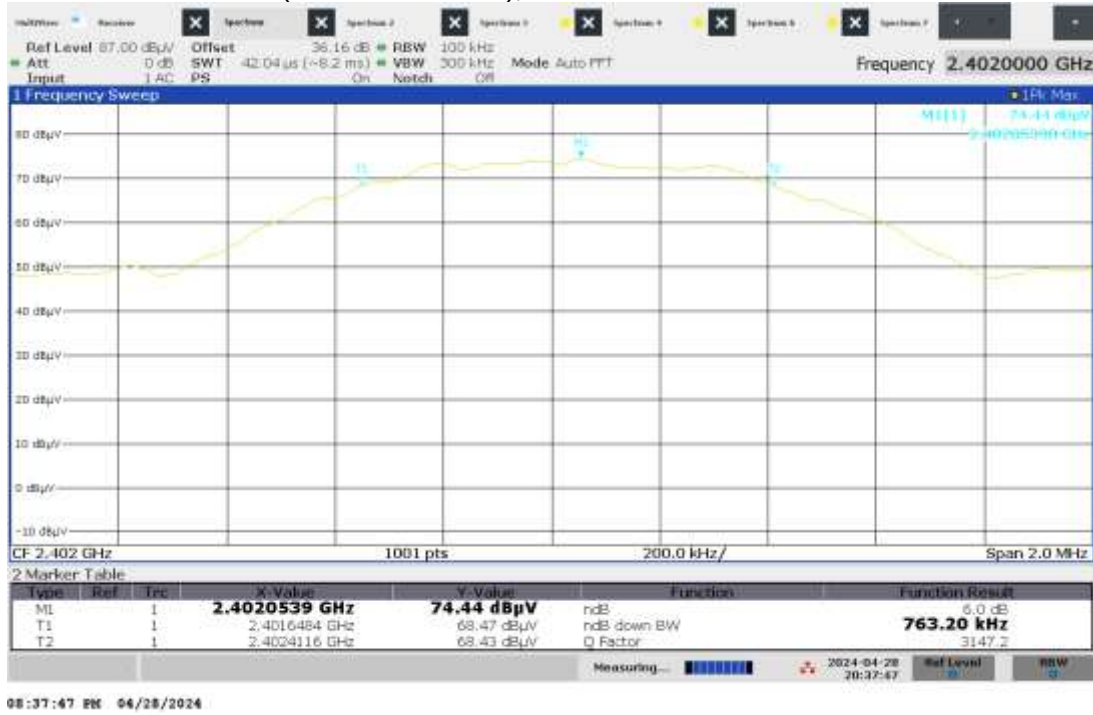
07:18:25 PM 04/26/2024

BLE (NTB-Push Button), High Channel DTS Bandwidth

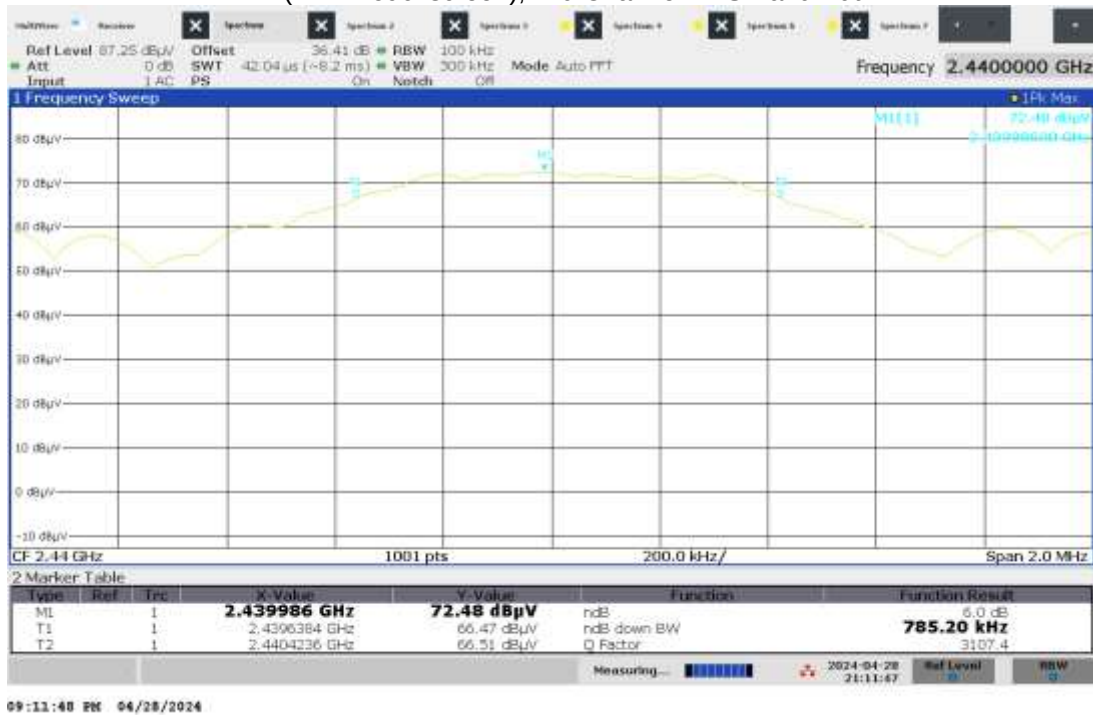


07:33:31 PM 04/28/2024

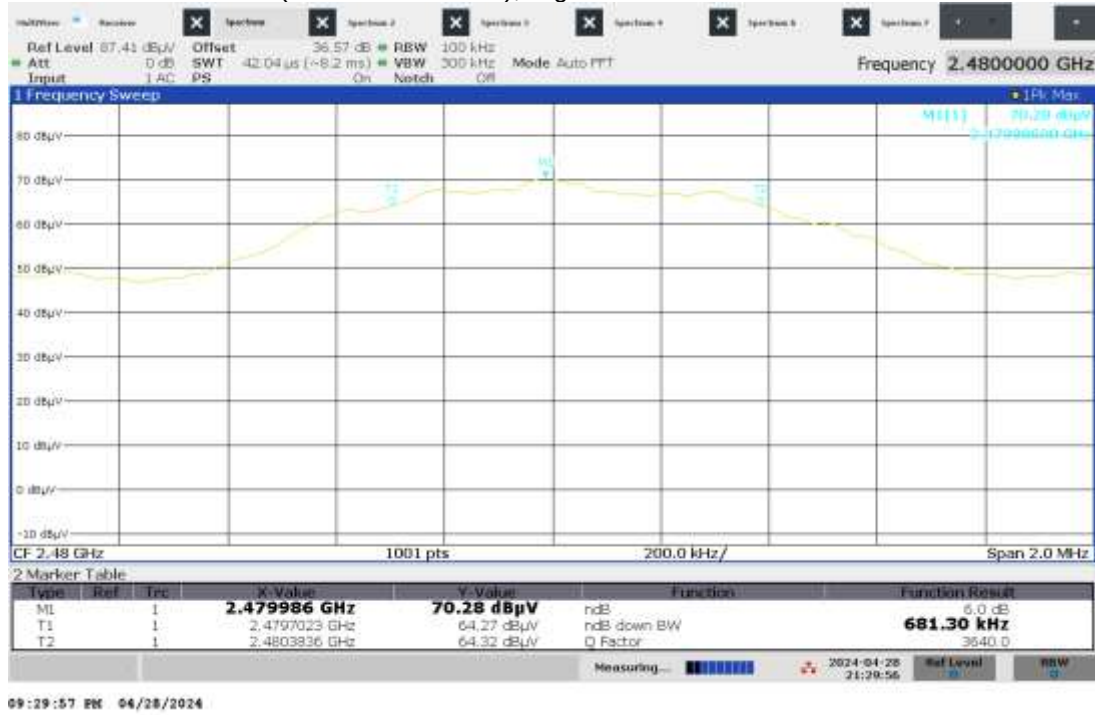
BLE (NTB-Touchscreen), Low Channel DTS Bandwidth



BLE (NTB-Touchscreen), Mid Channel DTS Bandwidth



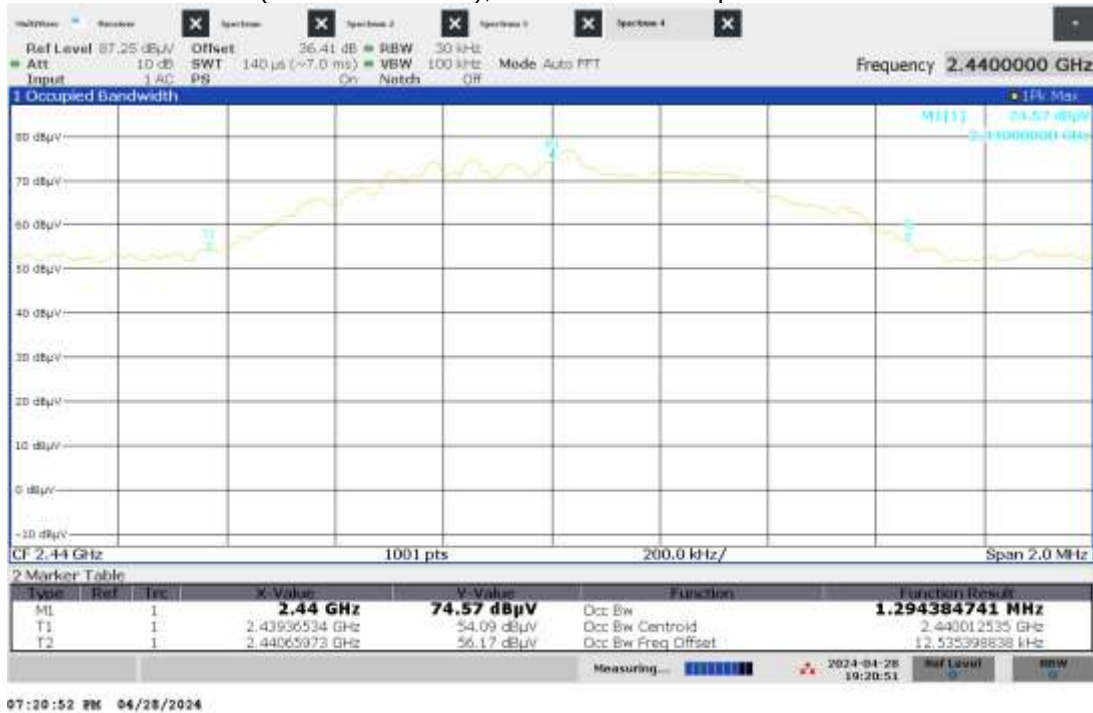
BLE (NTB-Touchscreen), High Channel DTS Bandwidth



BLE (NTB-Push Button), Low Channel Occupied Bandwidth



BLE (NTB-Push Button), Mid Channel Occupied Bandwidth



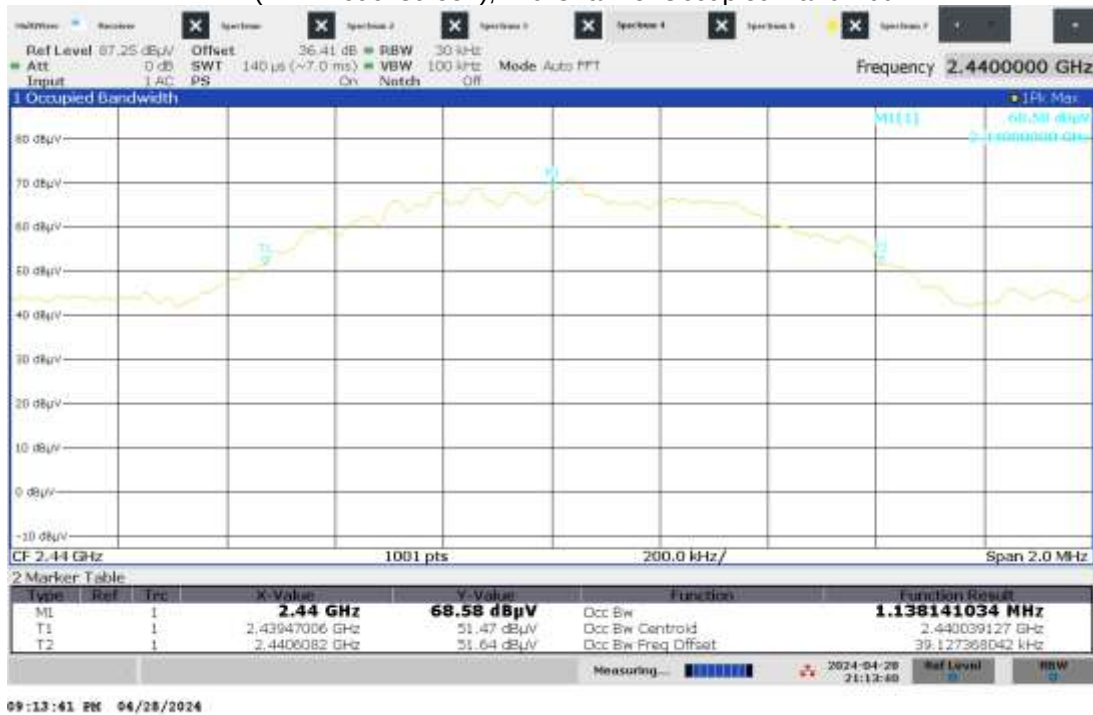
BLE (NTB-Push Button), High Channel Occupied Bandwidth



BLE (NTB-Touchscreen), Low Channel Occupied Bandwidth



BLE (NTB-Touchscreen), Mid Channel Occupied Bandwidth



BLE (NTB-Touchscreen), High Channel Occupied Bandwidth



Product Standard: CFR47 FCC Part 15.247, RSS-247					Limit applied: See Report Section 7.2		
Test Date	Test Personnel/ Initials	Supervising Engineer/ Initials	Input Voltage	Mode	Atmospheric Data		
					Temp C°	Relative Humidity %	Atmospheric Pressure mbar
04/28/2024	Kouma Sinn <i>KPS</i>	Vathana F. Ven <i>VSV</i>	Battery Powered	Continuous Transmitting	23	29	1012

Deviations, Additions, or Exclusions: None

8 Maximum Power Spectral Density

8.1 Method

Tests are performed in accordance with CFR47 FCC Part 15.247, RSS-247, and ANSI C63.10, and KDB 558074 D0115.247Meas Guidancev05r02.

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.

8.2 Limit

§15.247 (e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Notes: The limits for RSS-247 are the same as the FCC limits above.

8.3 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007'	Weather Station Vantage Vue	Davis	6250	MS191212003	03/27/2024	03/27/2025
IW001'	2 meter cable	Insulated Wire	2801-NPS	001	07/19/2023	07/19/2024
HS001'	DC-18GHz cable 1.5m long	Huber & Suhner	SucoFlex 106A	HS001	01/30/2024	01/30/2025
HS002'	DC-18GHz cable 1.5M long	Huber & Suhner	SucoFlex 106A	HS002	07/19/2023	07/19/2024
145-408'	10m Chamber - 3m Track B In-floor Cable	Huber + Suhner	sucoflex 106-11000mm	001	07/19/2023	07/19/2024
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	10/16/2023	10/16/2024
ROS011'	ESW44 receiver 1Hz-44GHz	Rhode and Schwarz	ESW44	103296	06/28/2023	06/28/2024

Software Utilized:

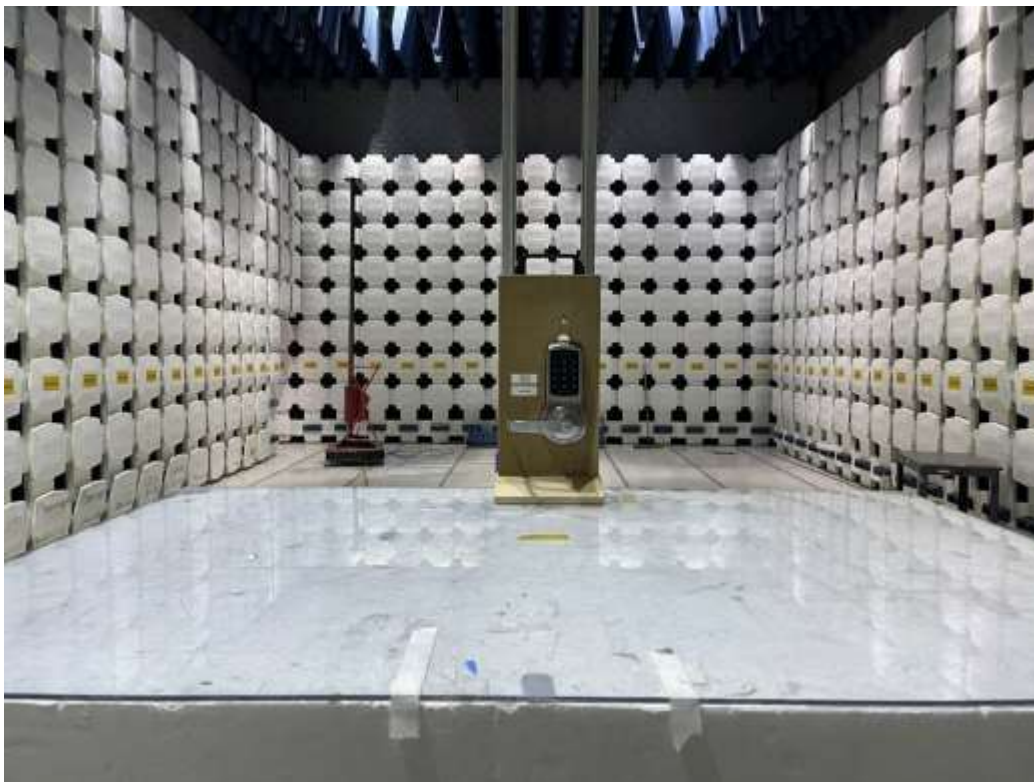
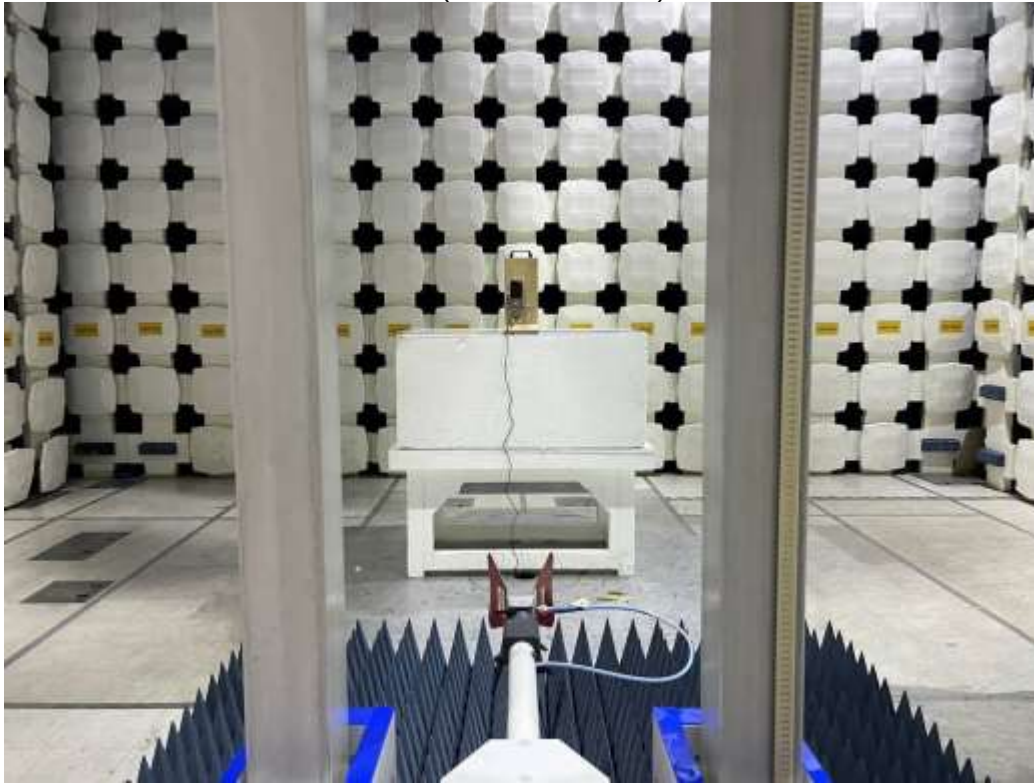
Name	Manufacturer	Version
None	N/A	N/A

8.4 Results:

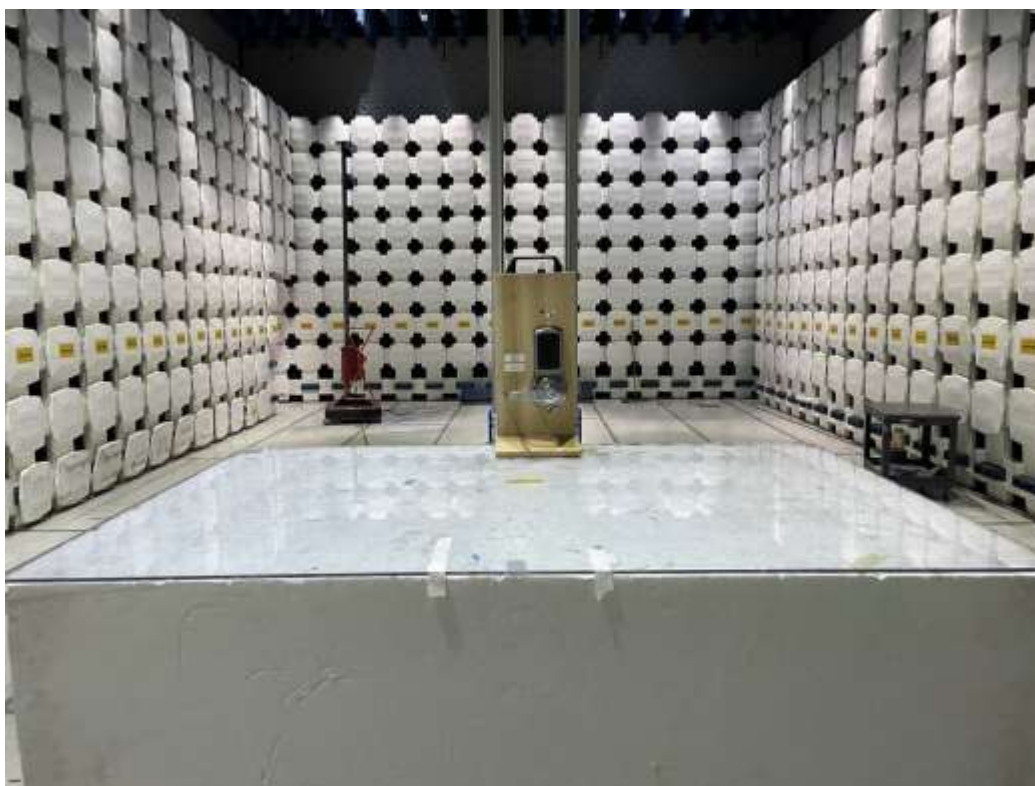
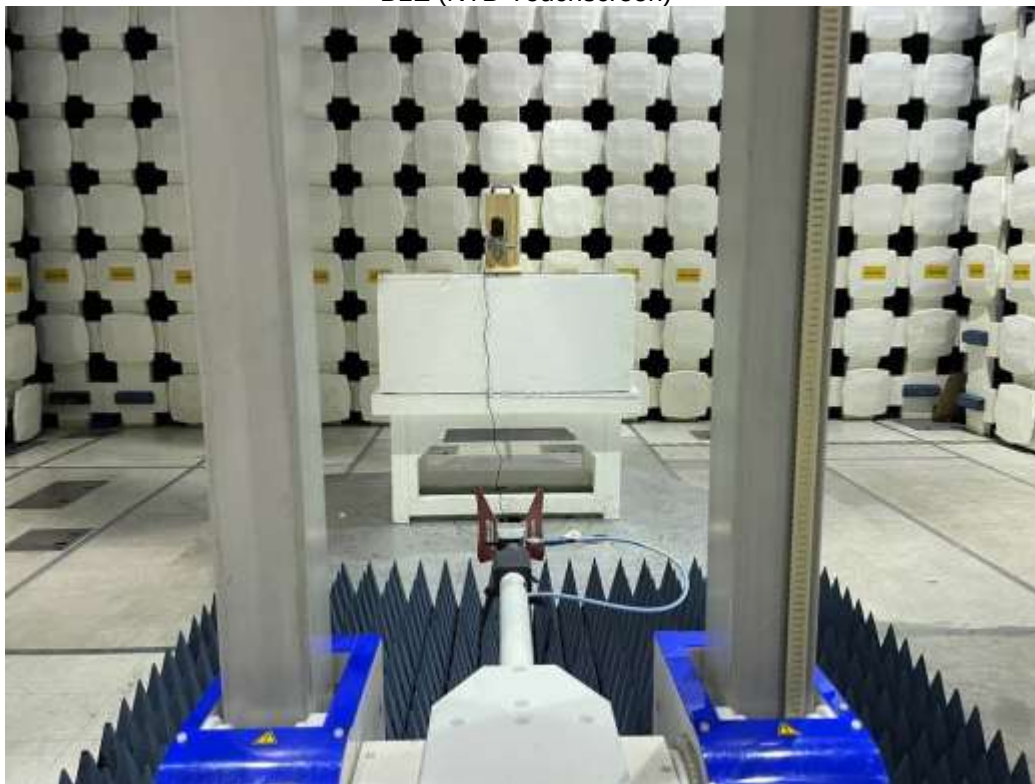
The sample tested was found to Comply.

8.5 Setup Photographs:

BLE (NTB-Push Button)



BLE (NTB-Touchscreen)



8.6 Test Data:**BLE (NTB-Push Button), Peak Power Spectral Density**

Frequency (MHz)	Peak Power Spectral Density (dBuV/m)	Peak Power Spectral Density (dBm)	Limit (dBm)	Result
2402	65.72	-29.48	8	Compliance
2440	64.64	-30.56	8	Compliance
2480	61.00	-34.20	8	Compliance

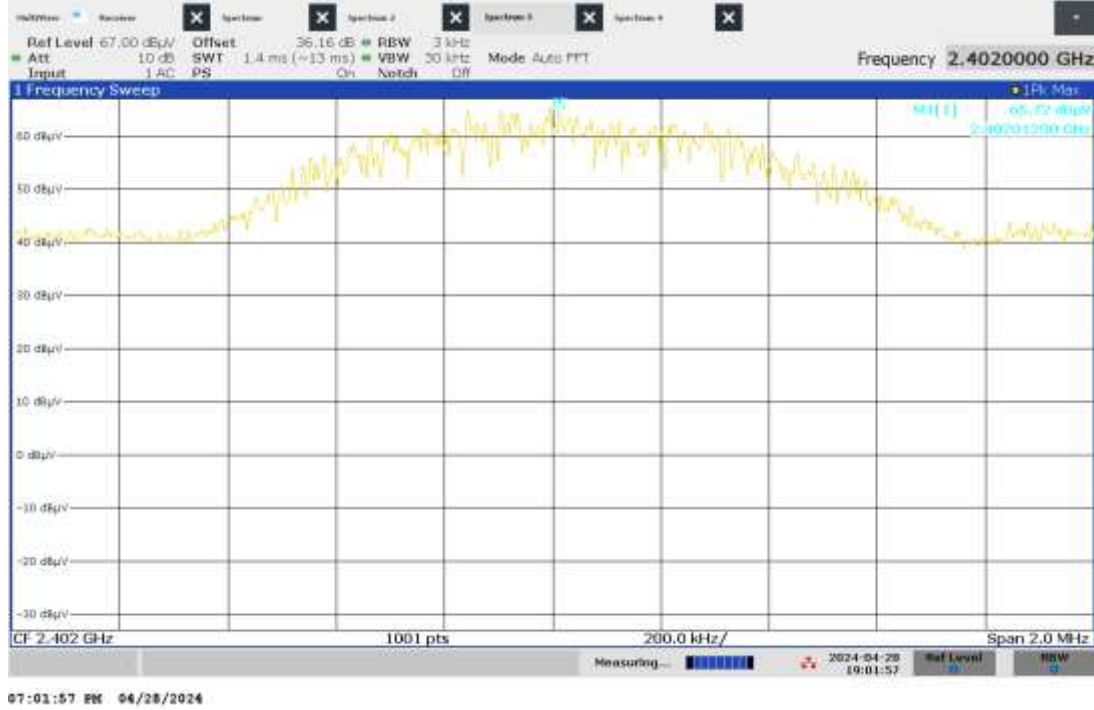
BLE (NTB-Touchscreen), Peak Power Spectral Density

Frequency (MHz)	Peak Power Spectral Density (dBuV/m)	Peak Power Spectral Density (dBm)	Limit (dBm)	Result
2402	59.47	-35.73	8	Compliance
2440	58.88	-36.32	8	Compliance
2480	55.35	-39.85	8	Compliance

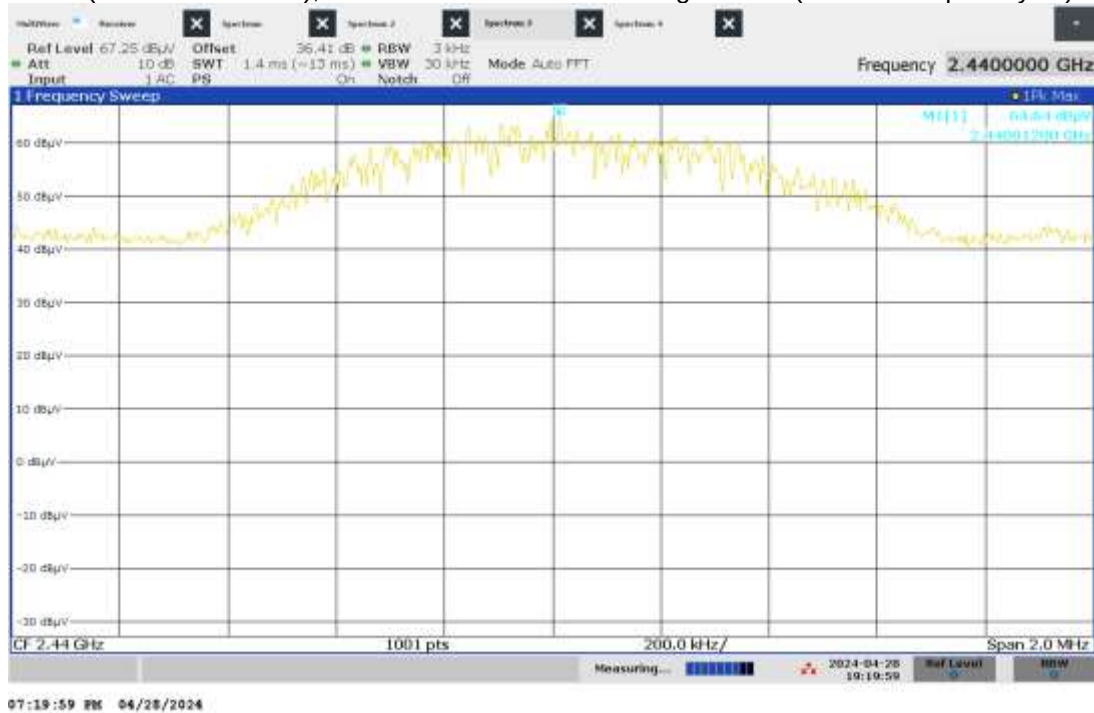
Notes: The Peak Power Spectral Density was calculated from field strength with the formula below:

$$EIRP = E_{Meas} + 20 \log(d_{Meas}) - 104.7$$

BLE (NTB-Push Button), Low Channel PSD Field Strength at 3m (Worst-case polarity: H)



BLE (NTB-Push Button), Mid Channel PSD Field Strength at 3m (Worst-case polarity: H)



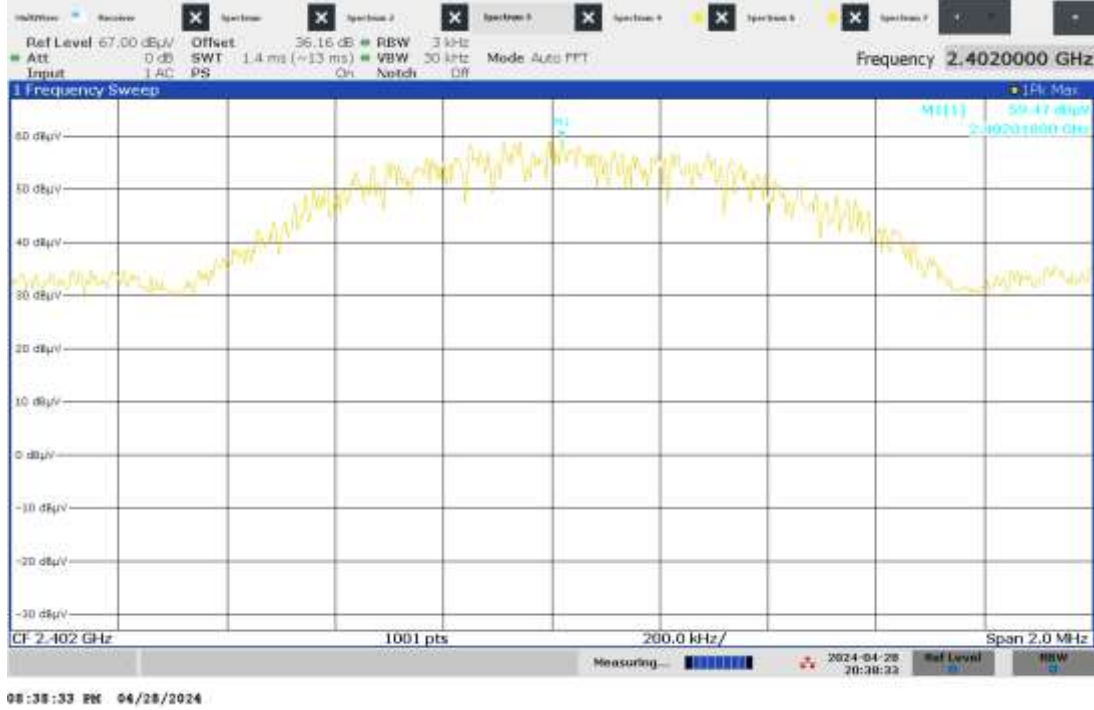
Notes: Cable loss and antenna factor were compensated internally as Reference Offset.

BLE (NTB-Push Button), High Channel PSD Field Strength at 3m (Worst-case polarity: H)



Notes: Cable loss and antenna factor were compensated internally as Reference Offset.

BLE (NTB-Touchscreen), Low Channel PSD Field Strength at 3m (Worst-case polarity: H)

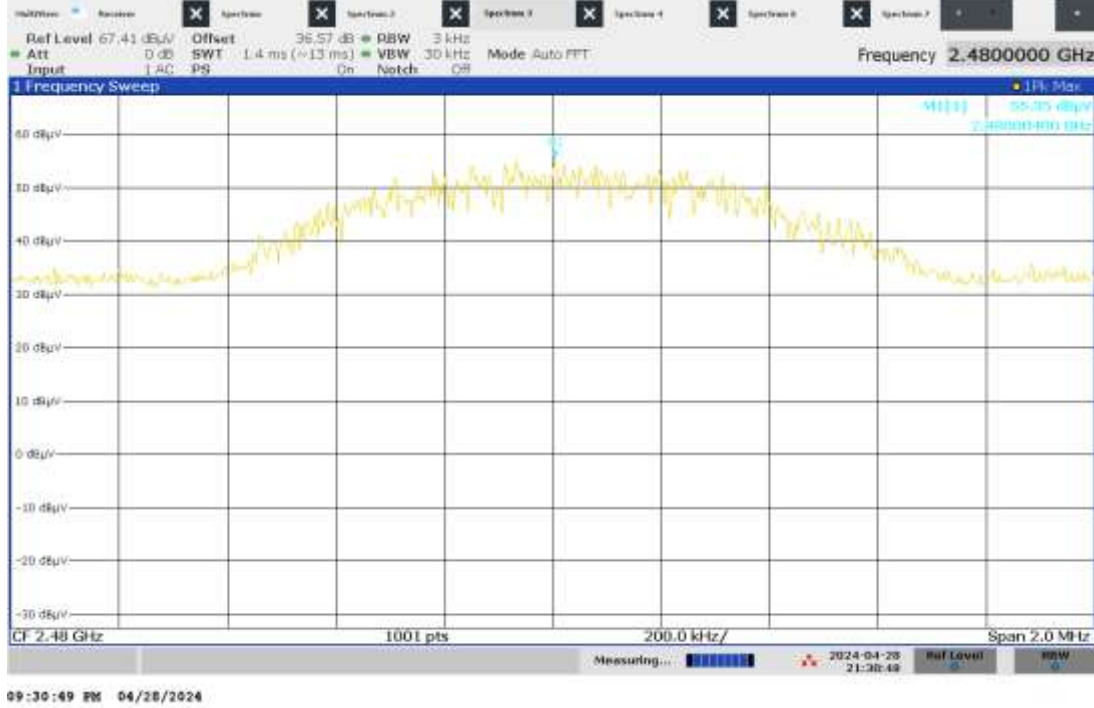


BLE (NTB-Touchscreen), Mid Channel PSD Field Strength at 3m (Worst-case polarity: H)



Notes: Cable loss and antenna factor were compensated internally as Reference Offset.

BLE (NTB-Touchscreen), High Channel PSD Field Strength at 3m (Worst-case polarity: H)



Notes: Cable loss and antenna factor were compensated internally as Reference Offset.

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
04/28/2024	Kouma Sinn <i>KPS</i>	Vathana F. Ven <i>VSV</i>	Battery Powered	Continuous Transmitting	23	29	1012

Deviations, Additions, or Exclusions: None

9 Band Edge Compliance

9.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C 15.247, RSS 247, and ANSI C 63.10.

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.

9.2 Limit

15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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))

15.225 (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 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 emissions limits in 15.209.

Notes: The limits for RSS-247 and RSS-210 are the same as the FCC limits above.

9.3 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007'	Weather Station Vantage Vue	Davis	6250	MS191212003	03/27/2024	03/27/2025
IW001'	2 meter cable	Insulated Wire	2801-NPS	001	07/19/2023	07/19/2024
HS001'	DC-18GHz cable 1.5m long	Huber & Suhner	SucoFlex 106A	HS001	01/30/2024	01/30/2025
HS002'	DC-18GHz cable 1.5M long	Huber & Suhner	SucoFlex 106A	HS002	07/19/2023	07/19/2024
145-408'	10m Chamber - 3m Track B in-floor Cable	Huber + Suhner	sucoflex 106-11000mm	001	07/19/2023	07/19/2024
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	10/16/2023	10/16/2024
ROS011'	ESW44 receiver 1Hz-44GHz	Rhode and Schwarz	ESW44	103296	06/28/2023	06/28/2024

Software Utilized:

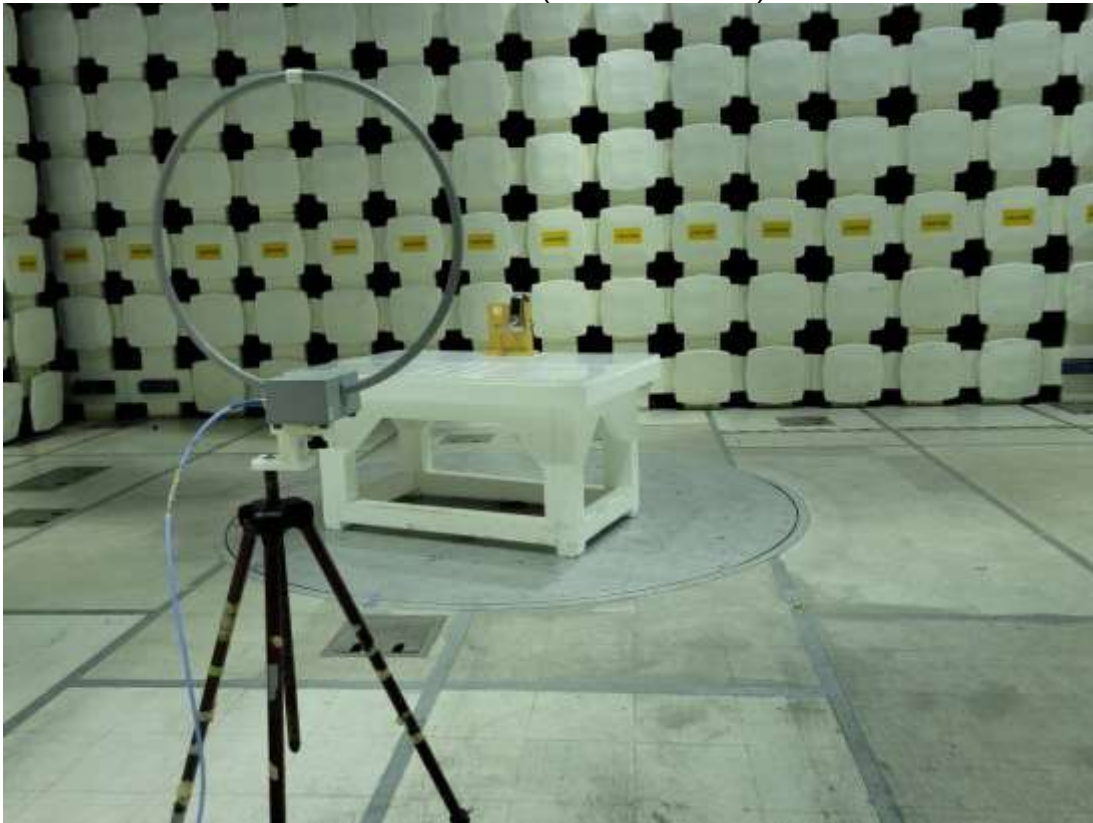
Name	Manufacturer	Version
None	N/A	N/A

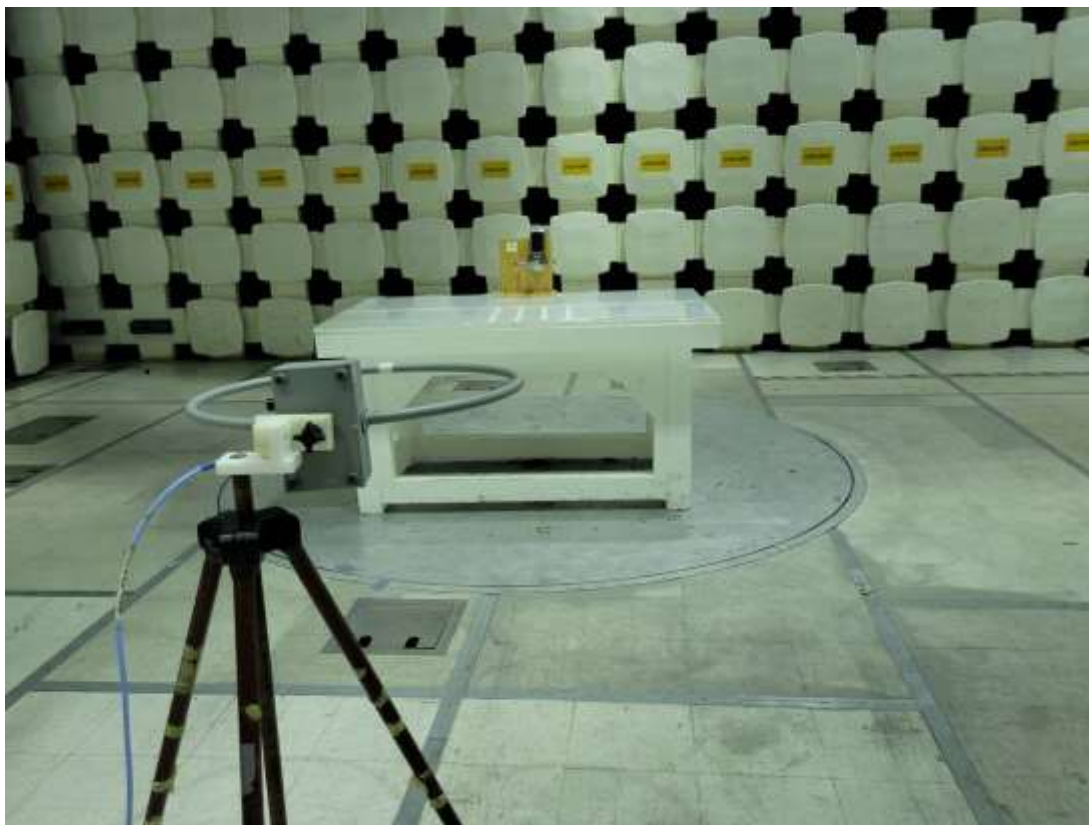
9.4 Results:

The sample tested was found to Comply.

9.5 Setup Photographs:

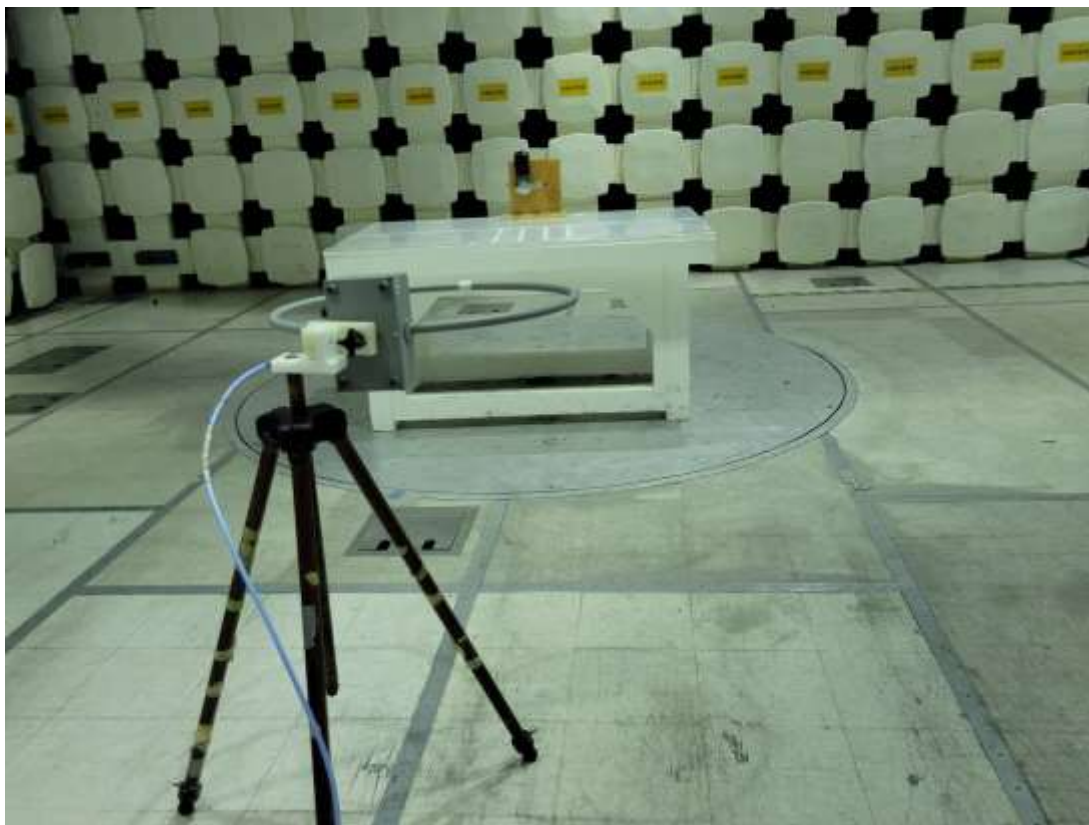
13.56 MHz RFID (NTB-Push Button)



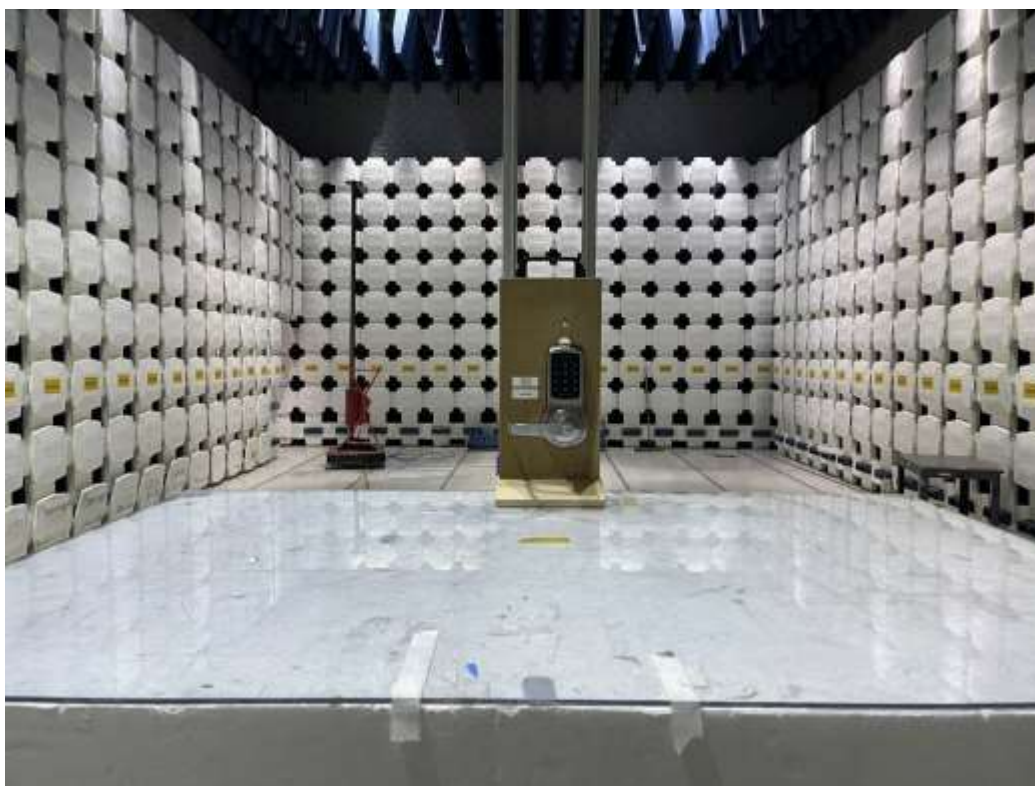
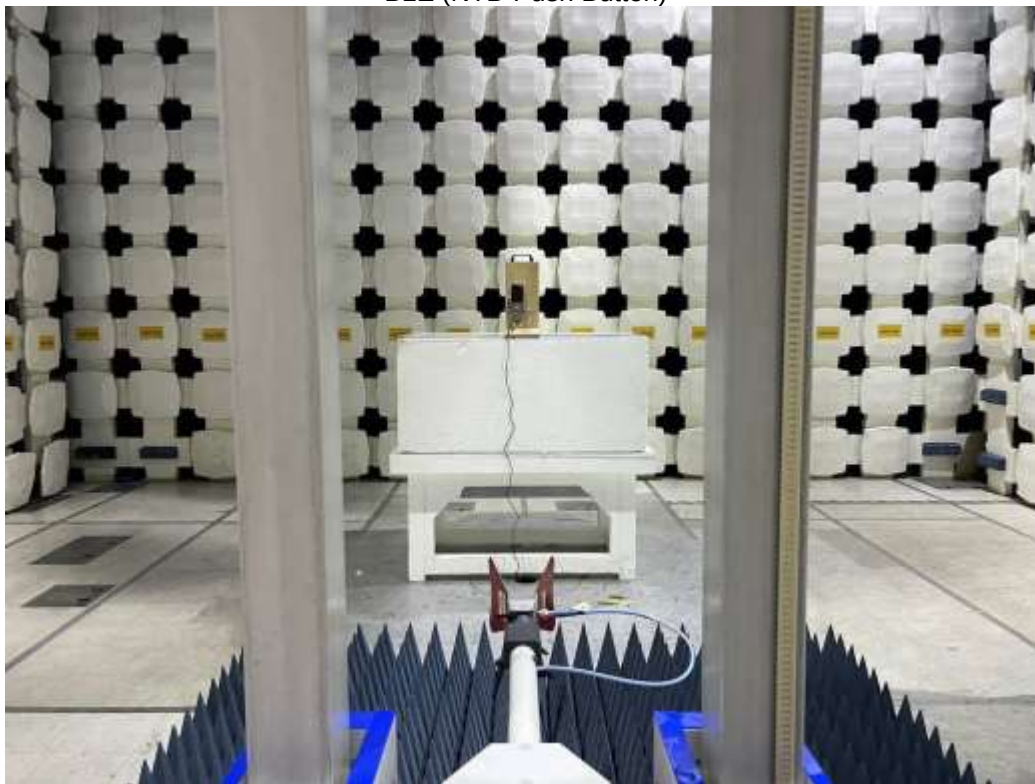


13.56 MHz RFID (NTB-Touchscreen)

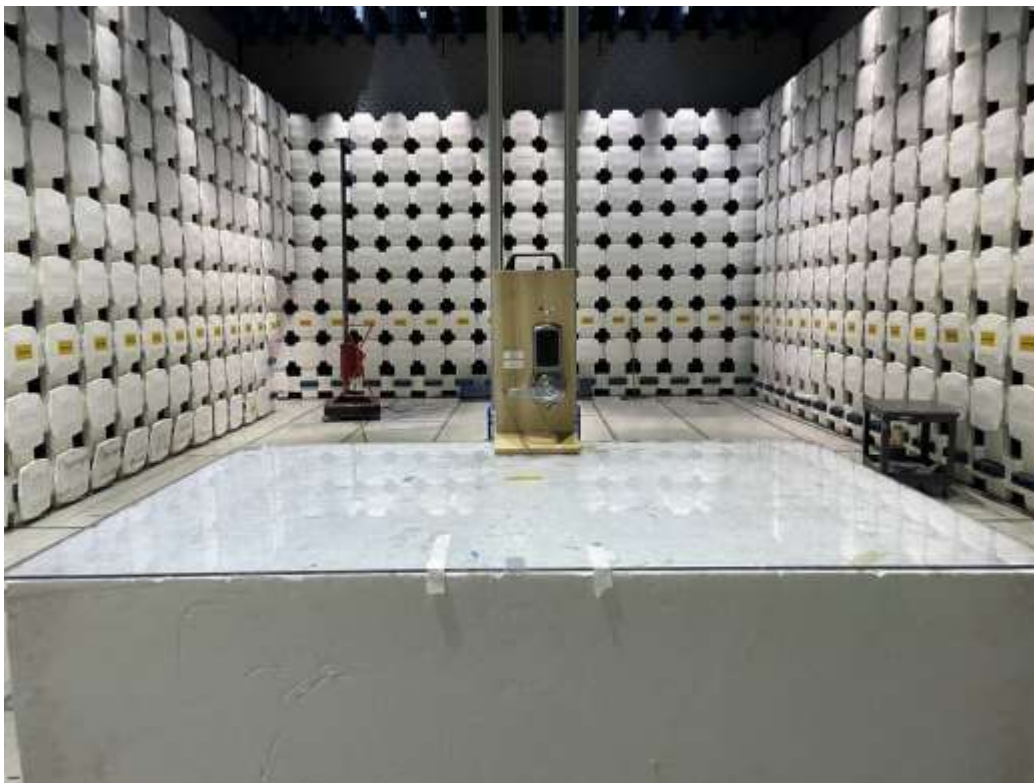
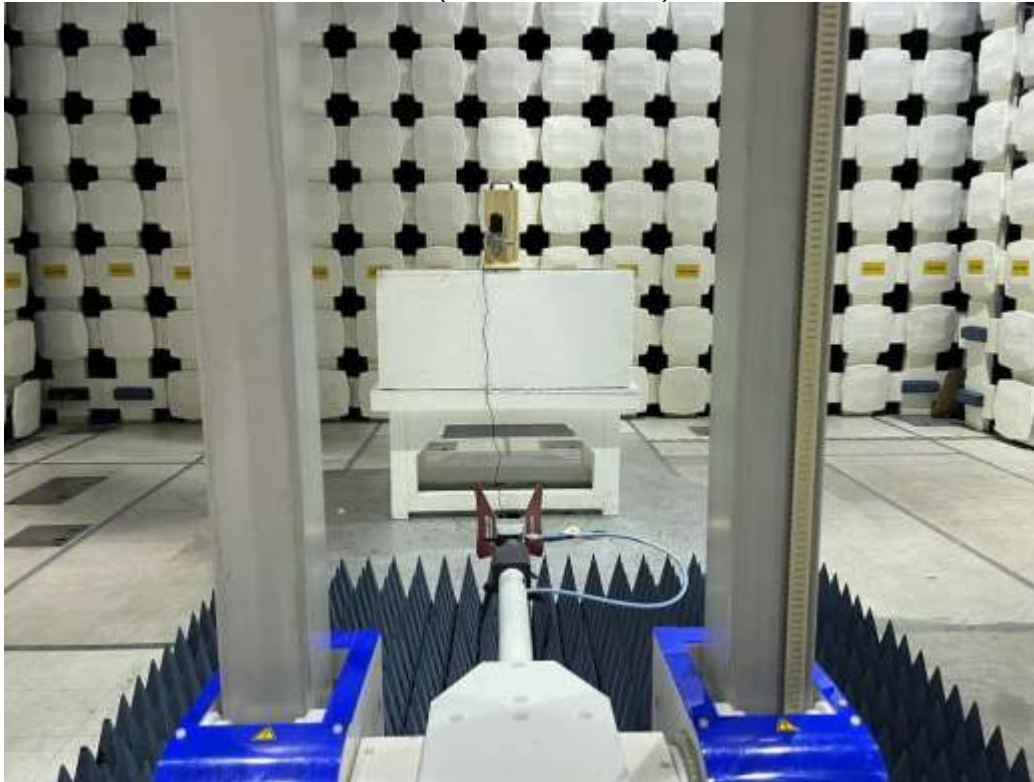




BLE (NTB-Push Button)



BLE (NTB-Touchscreen)

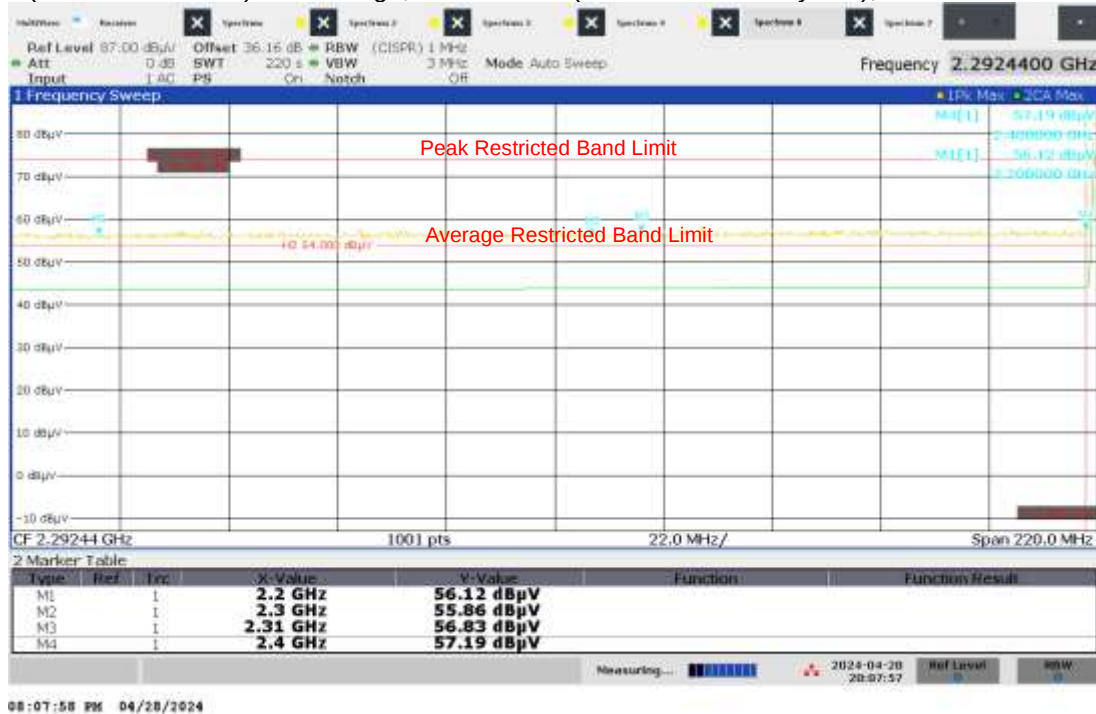


9.6 Test Data:

BLE (NTB-Push Button) Lower Edge, 100 kHz RBW (Worst-case Polarity – H), 20 dBc Limit



BLE (NTB-Push Button) Lower Edge, 1 MHz RBW (Worst-case Polarity – H), Restricted Band Limit

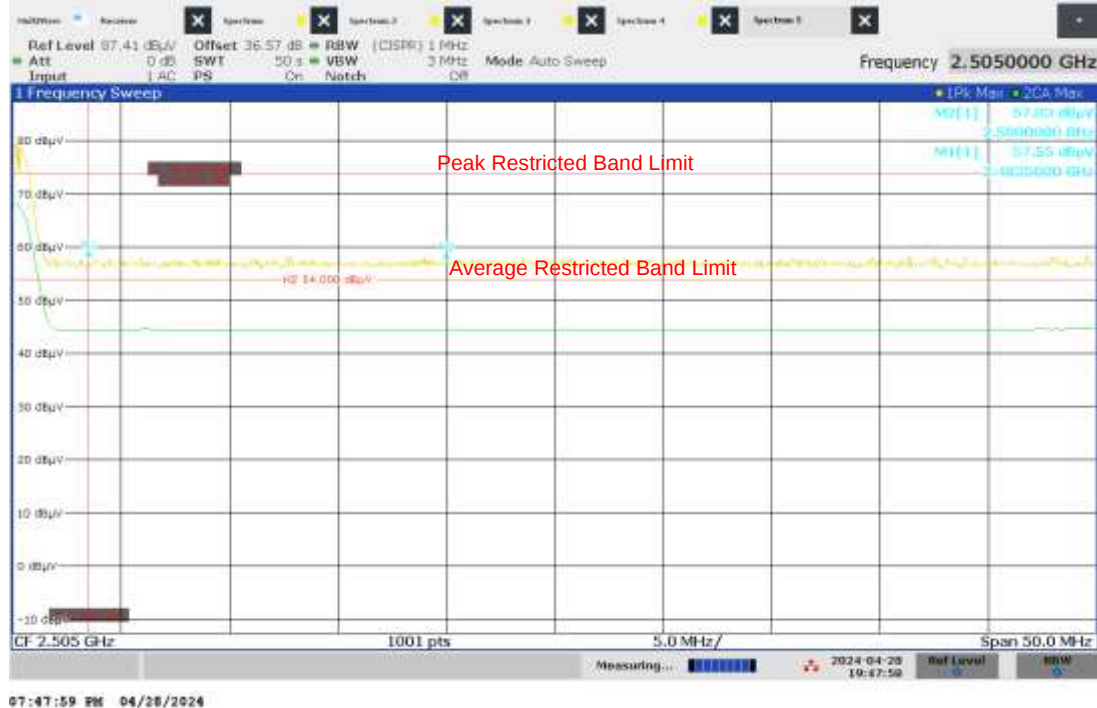


Notes: Antenna factor and cable loss were compensated internally as dB off-set.

BLE (NTB-Push Button) Upper Edge, 100 kHz RBW (Worst-case Polarity – H), 20 dBc Limit

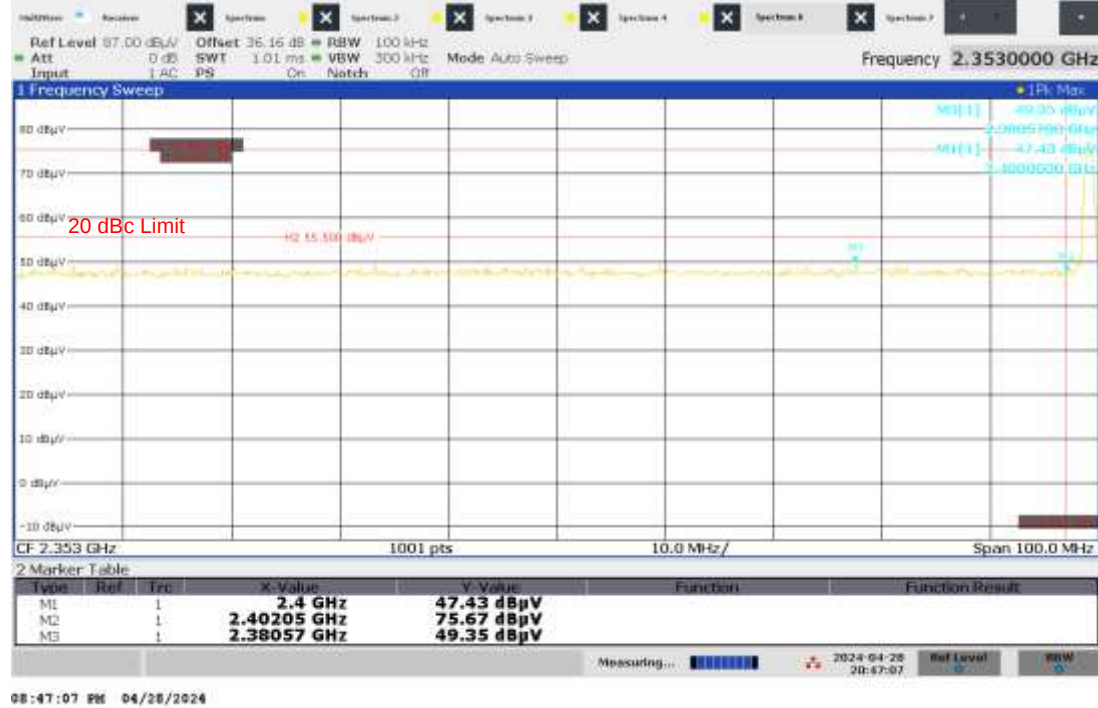


BLE (NTB--Push Button) Upper Edge, 1 MHz RBW (Worst-case Polarity – H), Restricted Band Limit

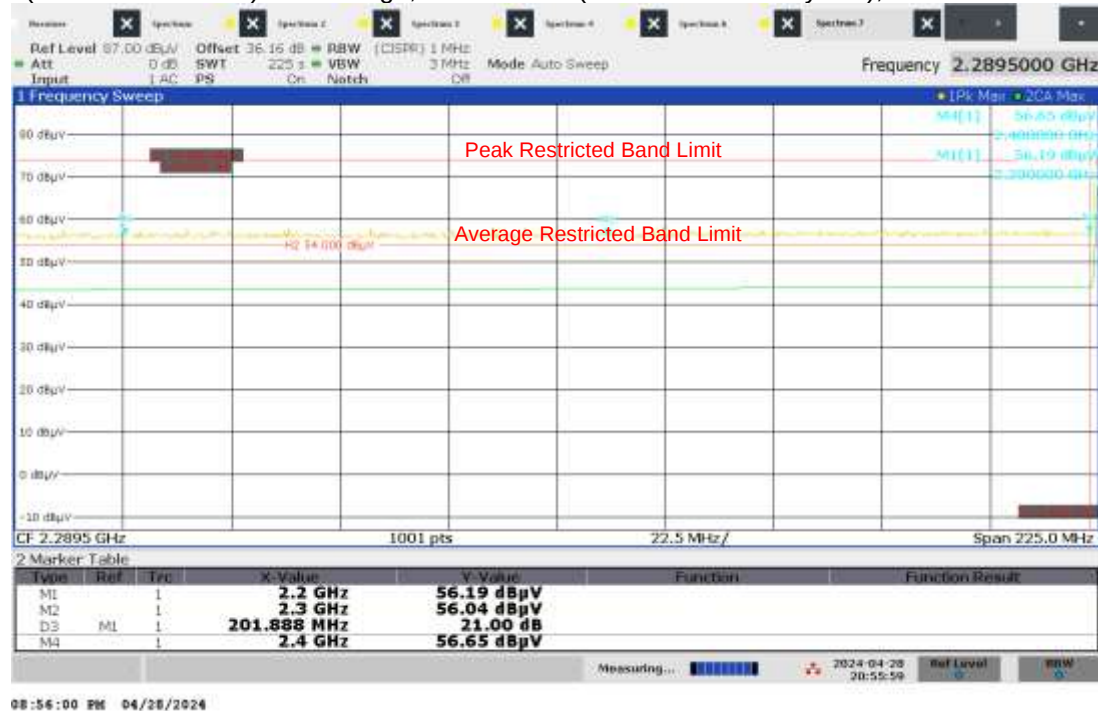


Notes: Antenna factor and cable loss were compensated internally as dB off-set.

BLE (NTB-Touchscreen) Lower Edge, 100 kHz RBW (Worst-case Polarity – H), 20 dBc Limit

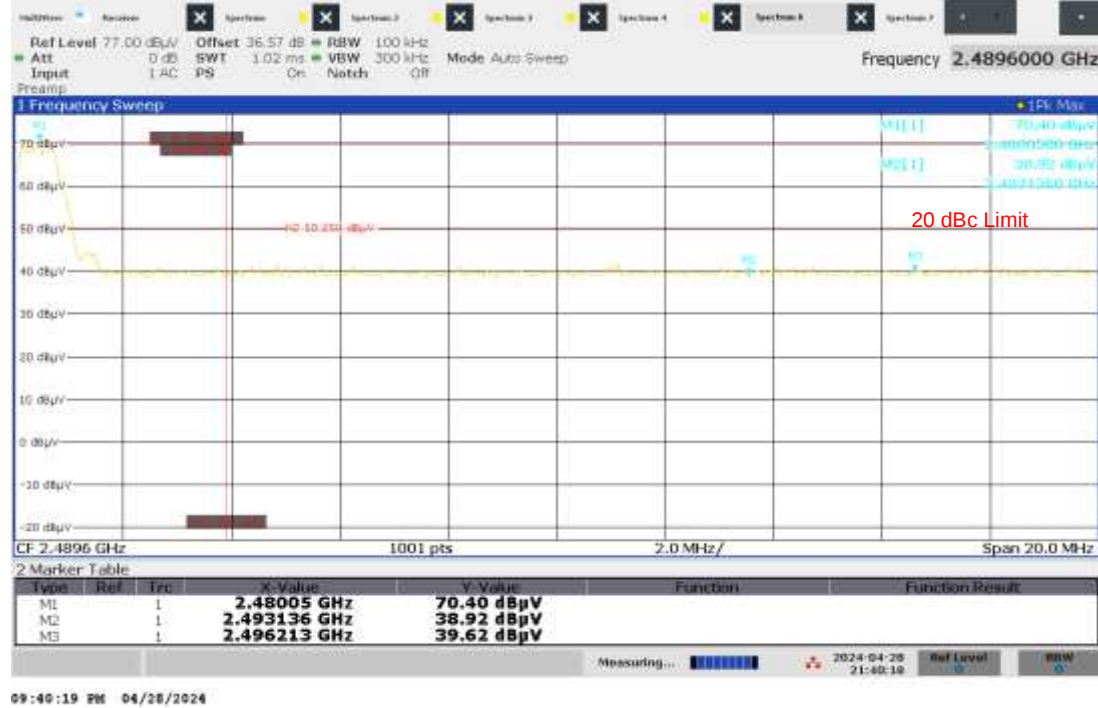


BLE (NTB-Touchscreen) Lower Edge, 1 MHz RBW (Worst-case Polarity – H), Restricted Band Limit

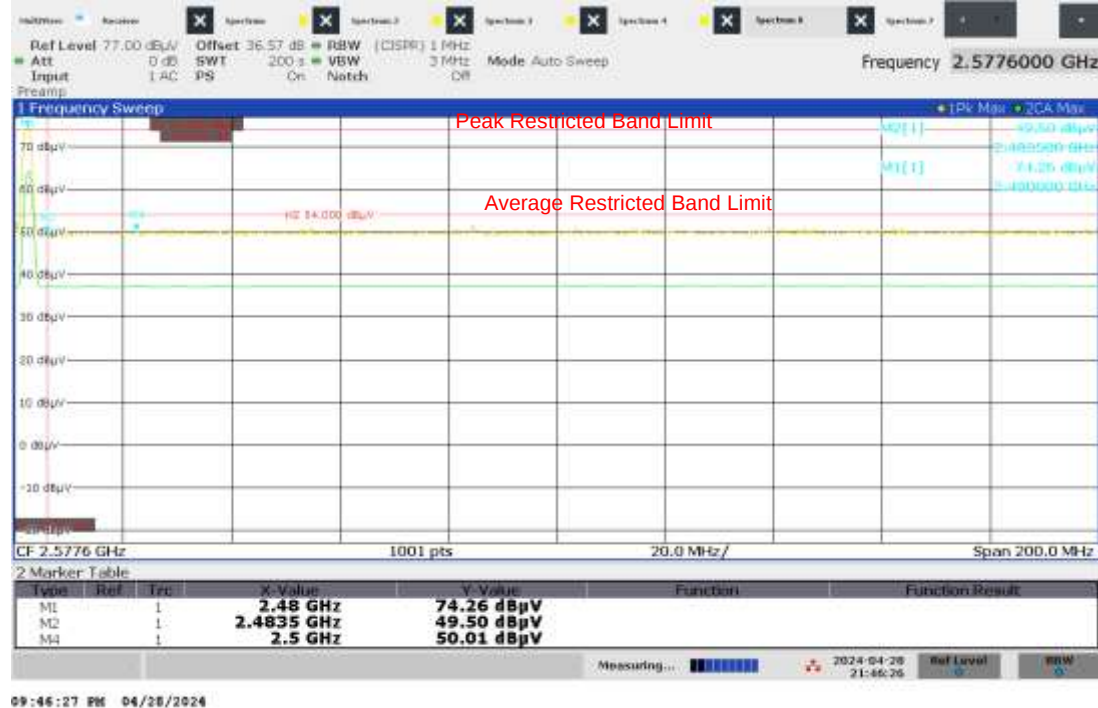


Notes: Antenna factor and cable loss were compensated internally as dB off-set.

BLE (NTB-Touchscreen) Upper Edge, 100 kHz RBW (Worst-case Polarity – H), 20 dBc Limit



BLE (NTB-Touchscreen) Upper Edge, 1 MHz RBW (Worst-case Polarity – H), Restricted Band Limit

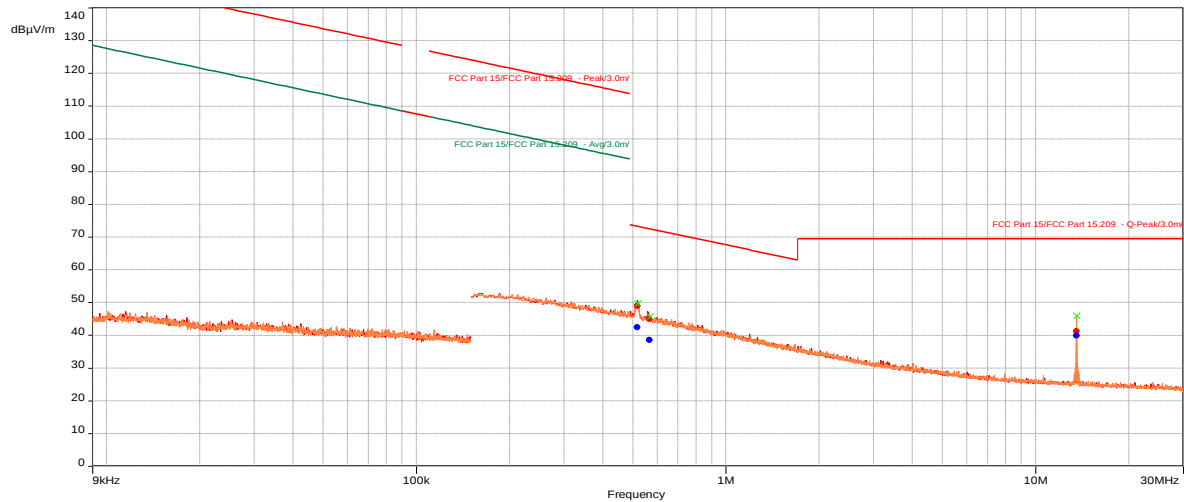


Notes: Antenna factor and cable loss were compensated internally as dB off-set.

13.56 MHz RFID (NTB-Push Button) Band Edges

Test Information:

Date and Time	4/17/2024 9:55:37 PM
Client and Project Number	Sargent G105779861
Engineer	Virginia Moy/Vathan Ven
Temperature	23deg C
Humidity	28%
Atmospheric Pressure	1008mbars
Comments	Scan 3 RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209) Battery Mode 13.56MHz RFID Push Button

Graph:**Results:**

Peak (PASS) (3)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51641	49.01	73.34	-24.33	283.40	Vertical	9k	0.10	11.04
0.56726	45.00	72.54	-27.55	180.40	Vertical	9k	0.10	11.09
13.56	41.26	69.54	-28.28	272.40	Vertical	9k	0.10	11.22

QuasiPeak (PASS) (3)

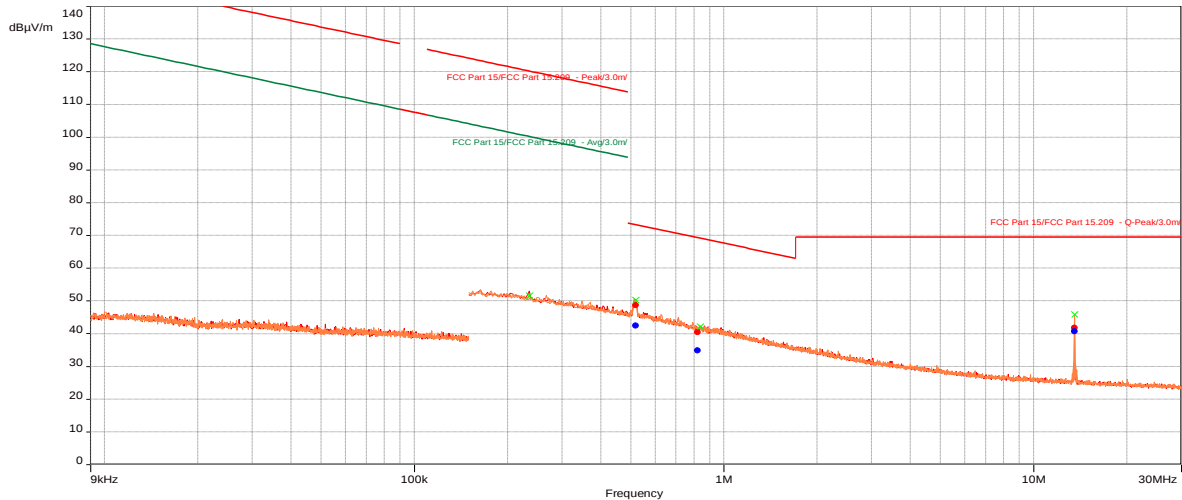
Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51641	42.52	73.34	-30.82	283.40	Vertical	9k	0.10	11.04
0.56726	38.58	72.54	-33.96	180.40	Vertical	9k	0.10	11.09
13.56	39.99	69.54	-29.55	272.40	Vertical	9k	0.10	11.22

Notes: Since the fundamental field strength at 13.56 MHz meets the spurious emission limit, the band edge spurious emissions deem to meet the edge requirements.

13.56 MHz RFID (NTB-Touchscreen) Band Edges

Test Information:

Date and Time	4/17/2024 9:17:16 PM
Client and Project Number	Sargent G105779861
Engineer	Virginia Moy/Vathan Ven
Temperature	23deg C
Humidity	28%
Atmospheric Pressure	1008mbars
Comments	Scan 2 RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209) Battery Mode 13.56MHz RFID Touch Screen

Graph:**Results:**

Peak (PASS) (3)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51867	48.68	73.30	-24.62	196.40	Vertical	9k	0.10	11.04
13.56	41.75	69.54	-27.79	99.00	Vertical	9k	0.10	11.22
0.82335	40.41	69.30	-28.88	23.10	Vertical	9k	0.10	11.14

QuasiPeak (PASS) (3)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51867	42.42	73.30	-30.88	196.40	Vertical	9k	0.10	11.04
13.56	40.69	69.54	-28.85	99.00	Vertical	9k	0.10	11.22
0.82335	34.90	69.30	-34.40	23.10	Vertical	9k	0.10	11.14

Notes: Since the fundamental field strength at 13.56 MHz meets the spurious emission limit, the band edge spurious emissions deem to meet the edge requirements.

Product Standard: CFR47 FCC Part 15.247, RSS-247					Limit applied: See Report Section 6.2		
Test Date	Test Personnel/ Initials	Supervising Engineer/ Initials	Input Voltage	Mode	Atmospheric Data		
					Temp C°	Relative Humidity %	Atmospheric Pressure mbar
04/28/2024	Kouma Sinn <i>KPS</i>	Vathana F. Ven <i>VSV</i>	Battery Powered	Continuous Transmitting	23	29	1012
04/17/2024	Vathana F. Ven <i>VSV</i>	Kouma Sinn <i>KPS</i>	Battery Powered	Continuous Transmitting	23	28	1008

Deviations, Additions, or Exclusions: None

10 Transmitter spurious emissions

10.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C 15.247, FCC Part 15 Subpart B, RSS 247, 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 dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

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 dB μ V 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.

10.2 Limits

Limits – FCC Part §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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))

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-247 and RSS-210 are the same as the FCC limits above.

10.3 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
IW001	2 meter cable	Insulated Wire	2801-NPS	001	07/19/2023	07/19/2024
HS001	DC-18GHz cable 1.5m long	Huber & Suhner	SucoFlex 106A	HS001	01/30/2024	01/30/2025
HS002	DC-18GHz cable 1.5M long	Huber & Suhner	SucoFlex 106A	HS002	07/19/2023	07/19/2024
145-408	10m Chamber - 3m Track B In-floor Cable	Huber + Suhner	sucocflex 106-11000mm	001	07/19/2023	07/19/2024
ROS011	ESW44 receiver 1Hz-44GHz	Rhode and Schwarz	ESW44	103296	06/28/2023	06/28/2024
145019	Active Loop Antenna (9 KHz to 30 MHz)	EMCO	6502/1	9902-3267	03/05/2024	03/05/2025
ETS003	9kHz-30MHz Active Loop Antenna	ETS Lindgren	6502	00143396	01/25/2024	01/25/2025

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
IW001	2 meter cable	Insulated Wire	2801-NPS	001	07/19/2023	07/19/2024
145-406	10m Track A In-floor Cable #1	Huber + Suhner	sucocflex 160-19220mm	001	07/19/2023	07/19/2024
145-414	Cable 145-414	Huber + Suhner	3m Track A cable	145-414	07/19/2023	07/19/2024
147-326	Immunity Cable	Huber + Suhner	Sucoflex 106	233089-005	07/19/2023	07/19/2024
PRE11	50dB gain pre-amp	Pasternack	PRE11	PRE11	09/15/2023	09/15/2024
145106	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	09/14/2023	09/14/2024
ROS011	ESW44 receiver 1Hz-44GHz	Rhode and Schwarz	ESW44	103296	06/28/2023	06/28/2024

Test equipment used from 1-3 GHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007	Weather Station Vantage Vue	Davis	6250	MS191212003	03/27/2024	03/27/2025
IW001	2 meter cable	Insulated Wire	2801-NPS	001	07/19/2023	07/19/2024
HS001	DC-18GHz cable 1.5m long	Huber & Suhner	SucoFlex 106A	HS001	01/30/2024	01/30/2025
HS002	DC-18GHz cable 1.5M long	Huber & Suhner	SucoFlex 106A	HS002	07/19/2023	07/19/2024
145-408	10m Chamber - 3m Track B In-floor Cable	Huber + Suhner	sucocflex 106-11000mm	001	07/19/2023	07/19/2024
PRE12	Pre-amplifier	Com Power	PAM-118A	18040117	12/26/2023	12/26/2024
ETS002	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	10/16/2023	10/16/2024
ROS011	ESW44 receiver 1Hz-44GHz	Rhode and Schwarz	ESW44	103296	06/28/2023	06/28/2024
REA008	band reject filter 2.4GHz	Reactel, Inc	12RX7-2441.75-x140 S	17-01	10/31/2023	10/31/2024

Test equipment used from 3-18 GHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007	Weather Station Vantage Vue	Davis	6250	MS191212003	03/27/2024	03/27/2025
IW001	2 meter cable	Insulated Wire	2801-NPS	001	07/19/2023	07/19/2024
HS001	DC-18GHz cable 1.5m long	Huber & Suhner	SucoFlex 106A	HS001	01/30/2024	01/30/2025
HS002	DC-18GHz cable 1.5M long	Huber & Suhner	SucoFlex 106A	HS002	07/19/2023	07/19/2024
145-408	10m Chamber - 3m Track B In-floor Cable	Huber + Suhner	sucocflex 106-11000mm	001	07/19/2023	07/19/2024
PRE12	Pre-amplifier	Com Power	PAM-118A	18040117	12/26/2023	12/26/2024
ETS002	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	10/16/2023	10/16/2024
ROS011	ESW44 receiver 1Hz-44GHz	Rhode and Schwarz	ESW44	103296	06/28/2023	06/28/2024
REA004	3GHz High Pass Filter	Reactel, Inc	7HSX-3G/18G-S11	06-1	02/27/2024	02/27/2025

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	Nexio	2022.0.27.0

Test equipment used from 18-25 GHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007	Weather Station Vantage Vue	Davis	6250	MS191212003	03/27/2024	03/27/2025
ROS011	ESW44 receiver 1Hz-44GHz	Rhode and Schwarz	ESW44	103296	06/28/2023	06/28/2024
CBLHF2012-5M-2	5m 9kHz-40GHz Coaxial Cable - SET2	Huber & Suhner	SF102	252676002	02/27/2024	02/27/2025
CBLHF2012-2M-1	2m 9kHz-40GHz Coaxial Cable - SET1	Huber & Suhner	SF102	252675001	02/27/2024	02/27/2025
EMC018	18-40GHz Pre-amp 40dB gain	The EMC Shop	PA40G	27490-01	07/18/2023	07/18/2024
EMC04	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	02/13/2024	02/13/2025

Software Utilized:

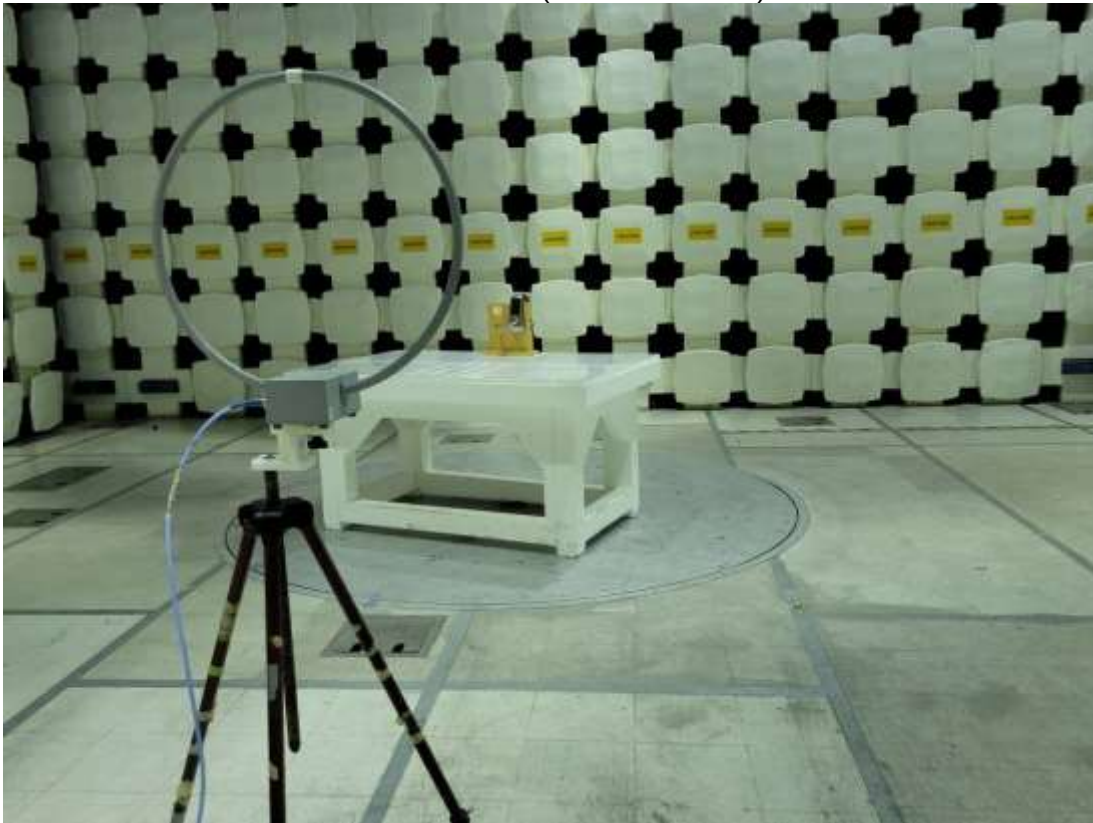
Name	Manufacturer	Version
None	N/A	N/A

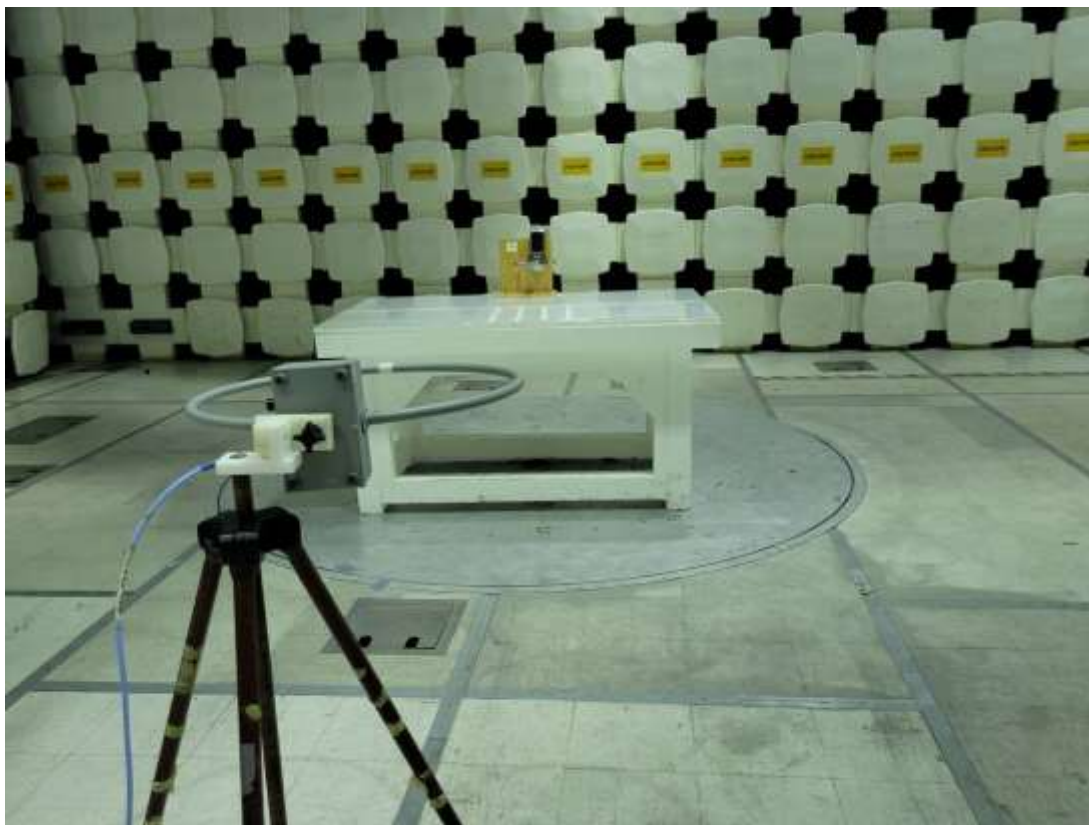
10.4 Results:

The sample tested was found to Comply.

10.5 Setup Photographs:

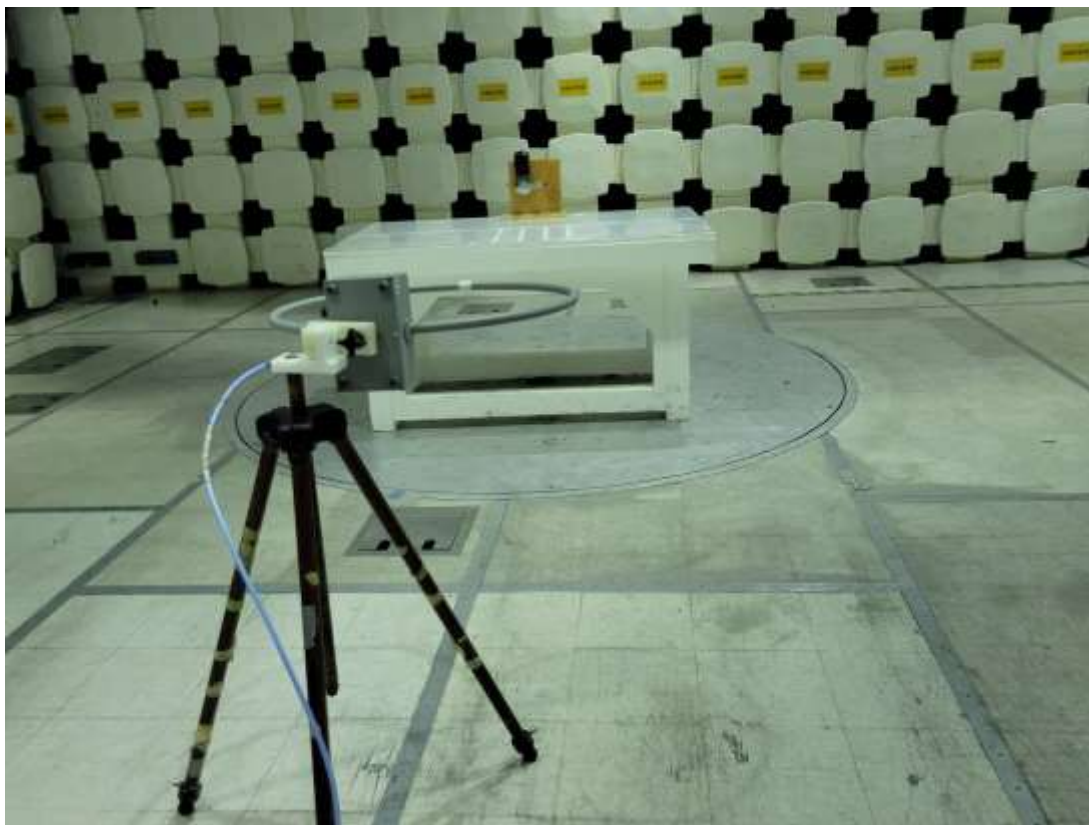
13.56 MHz RFID (NTB-Push Button)





13.56 MHz RFID (NTB-Touchscreen)

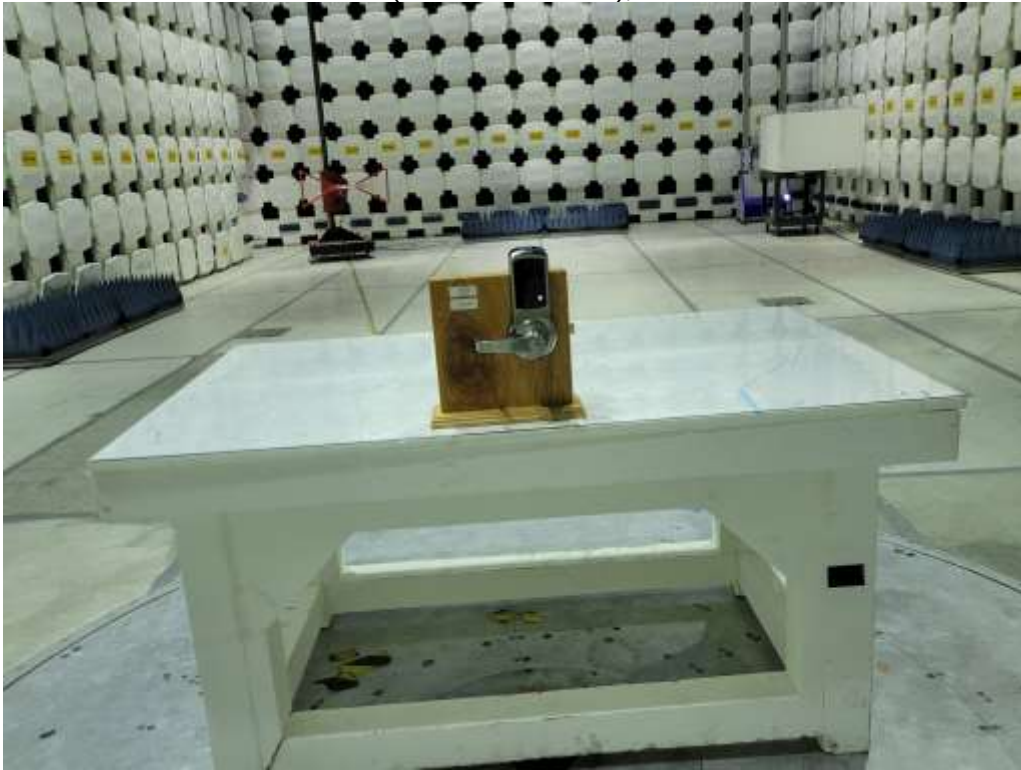




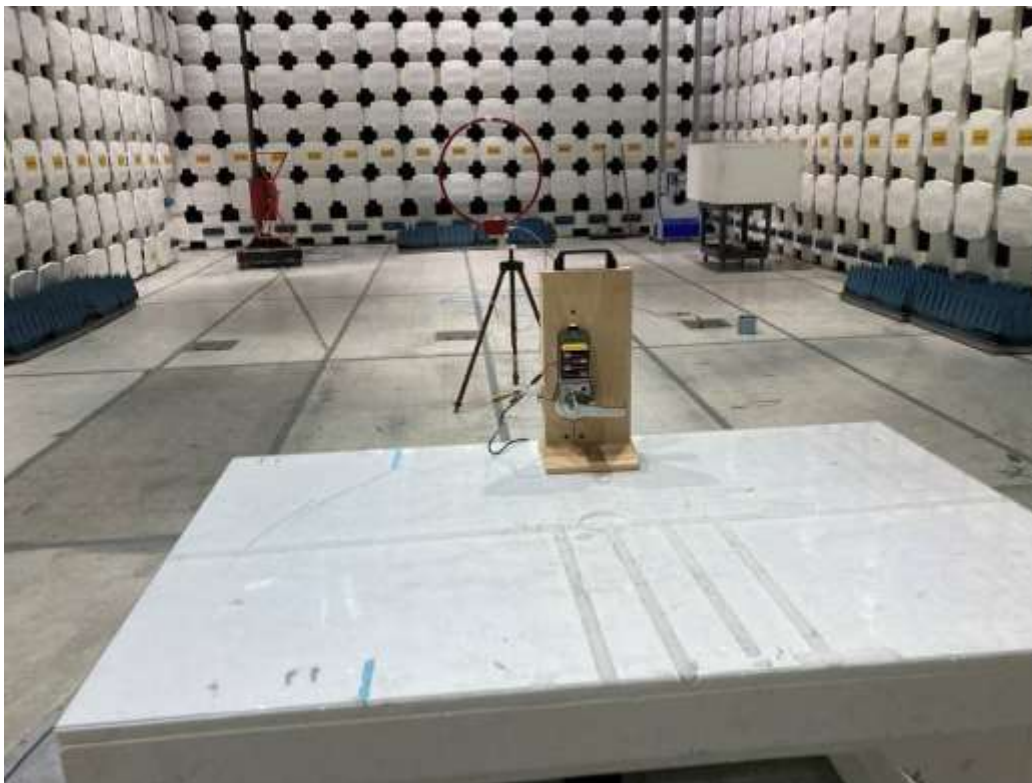
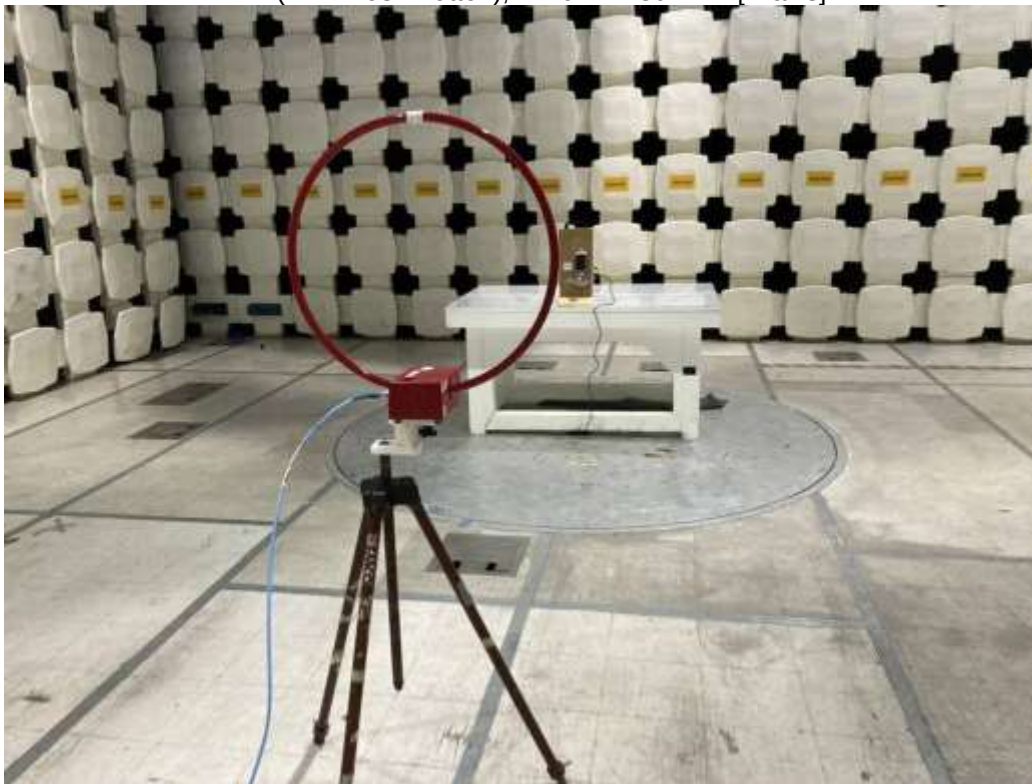
13.56 MHz RFID (NTB-Push Button), RE 30-1000 MHz

-- Photos Not Available --

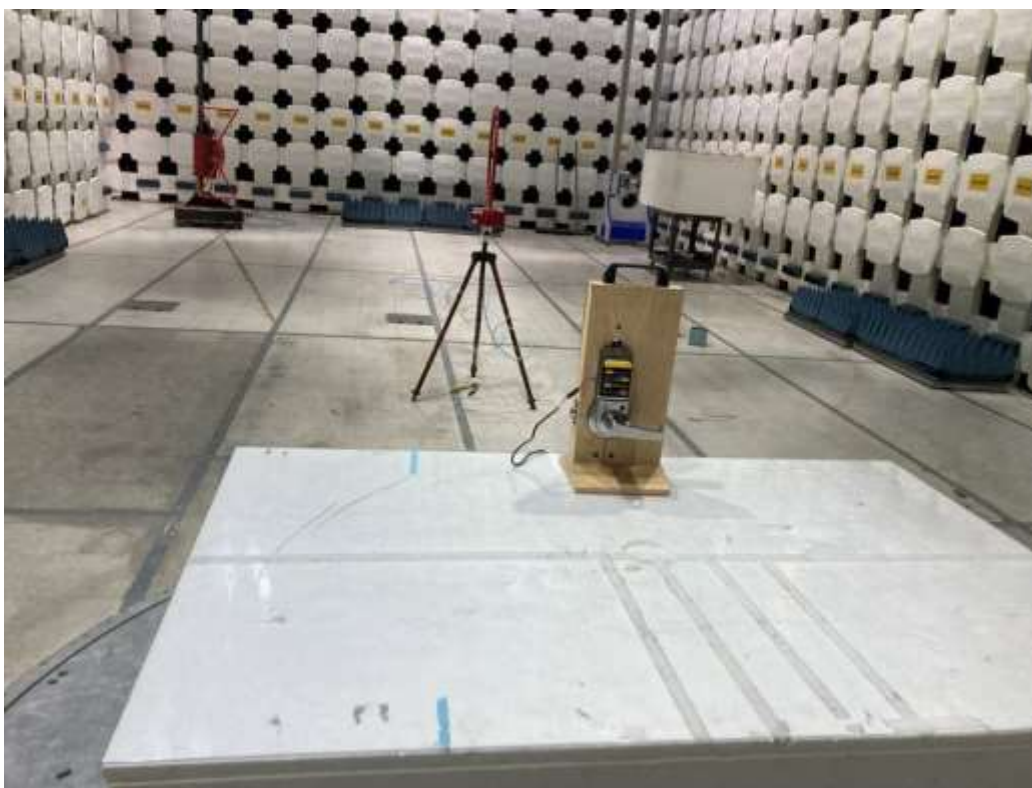
13.56 MHz RFID (NTB-Touchscreen), RE 30-1000 MHz



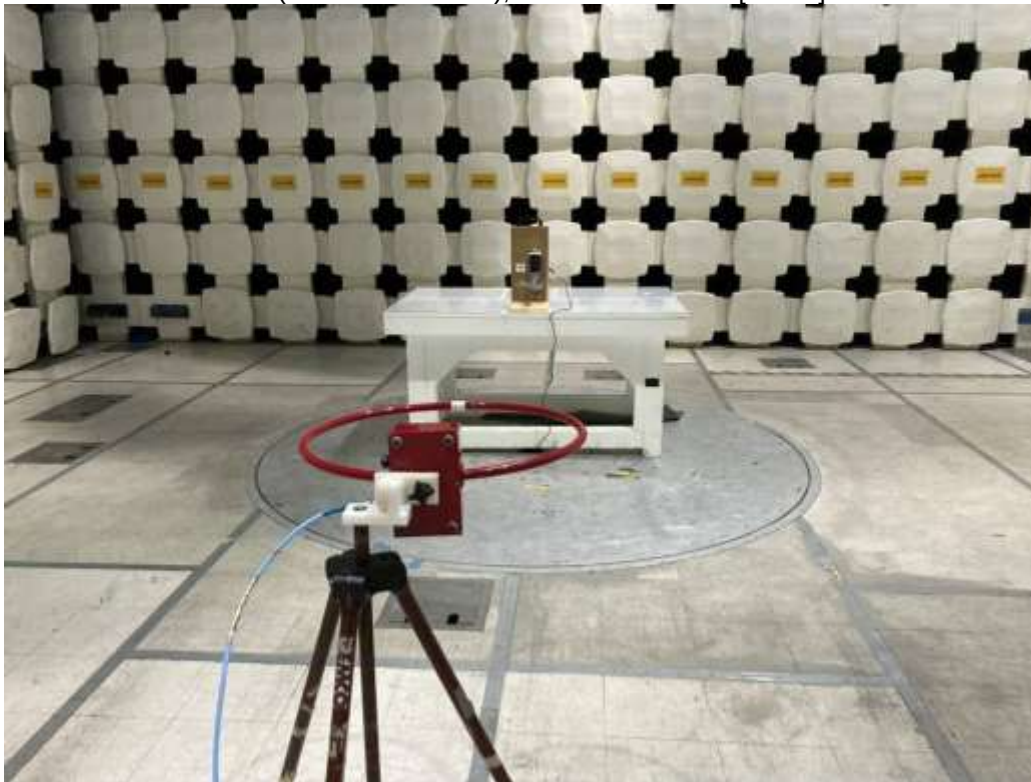
BLE (NTB-Push Button), RE 9 kHz-30 MHz [X-axis]



BLE (NTB-Push Button), RE 9 kHz-30 MHz [Y-axis]



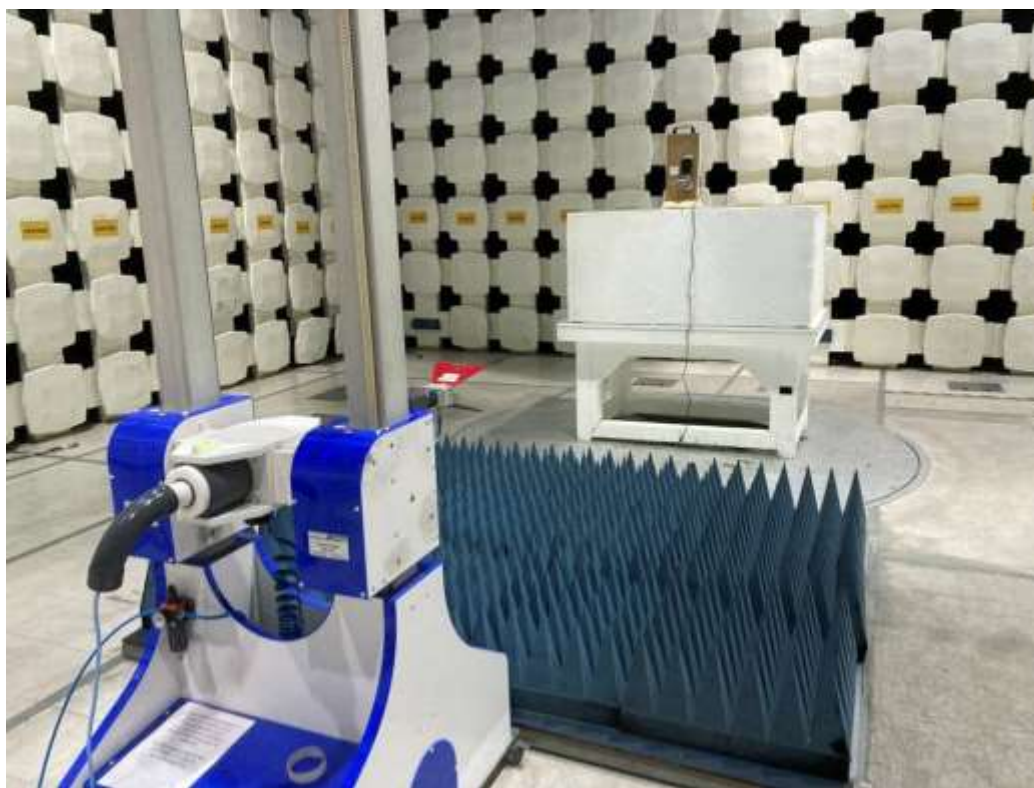
BLE (NTB-Push Button), RE 9 kHz-30 MHz [Z-axis]



BLE (NTB-Push Button), 30-1000 MHz



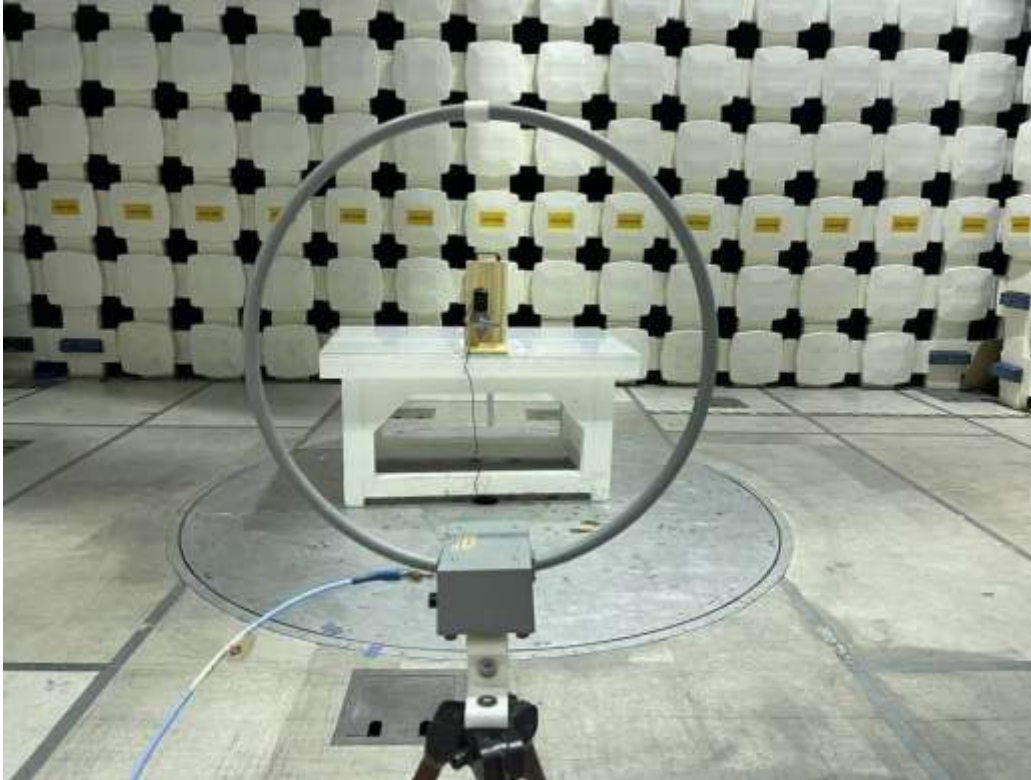
BLE (NTB-Push Button), RE 1-18 GHz



BLE (NTB-Push Button), RE 18-25 GHz



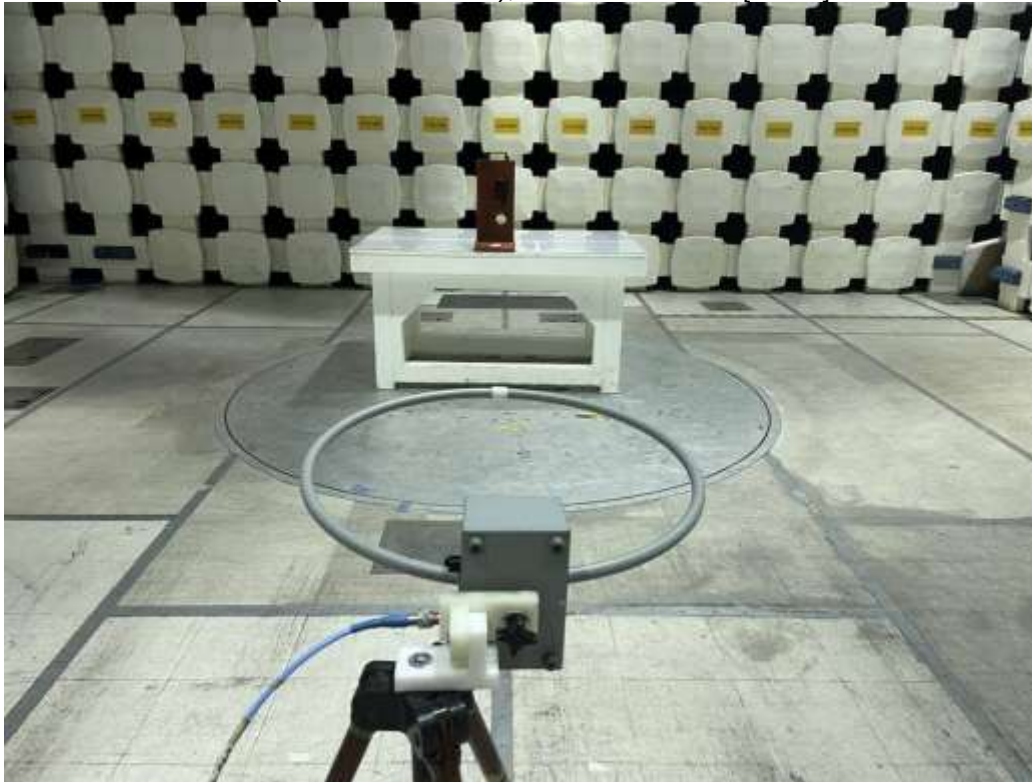
BLE (NTB-Touchscreen), RE 9 kHz-30 MHz [X-axis]



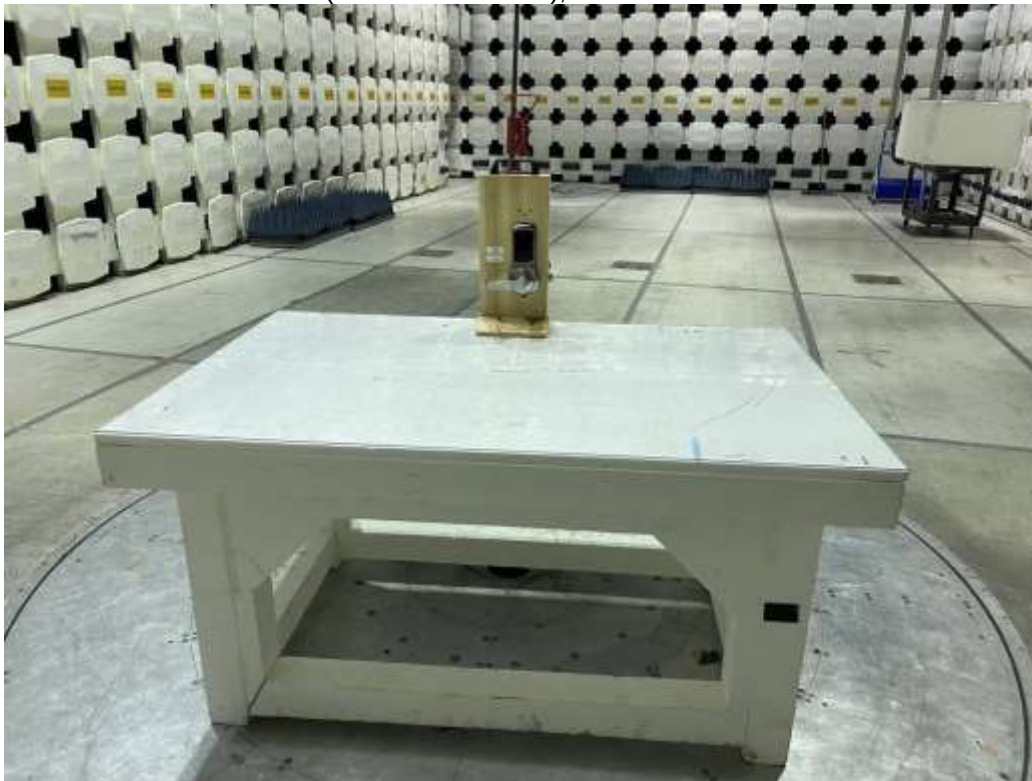
BLE (NTB-Touchscreen), RE 9 kHz-30 MHz [Y-axis]



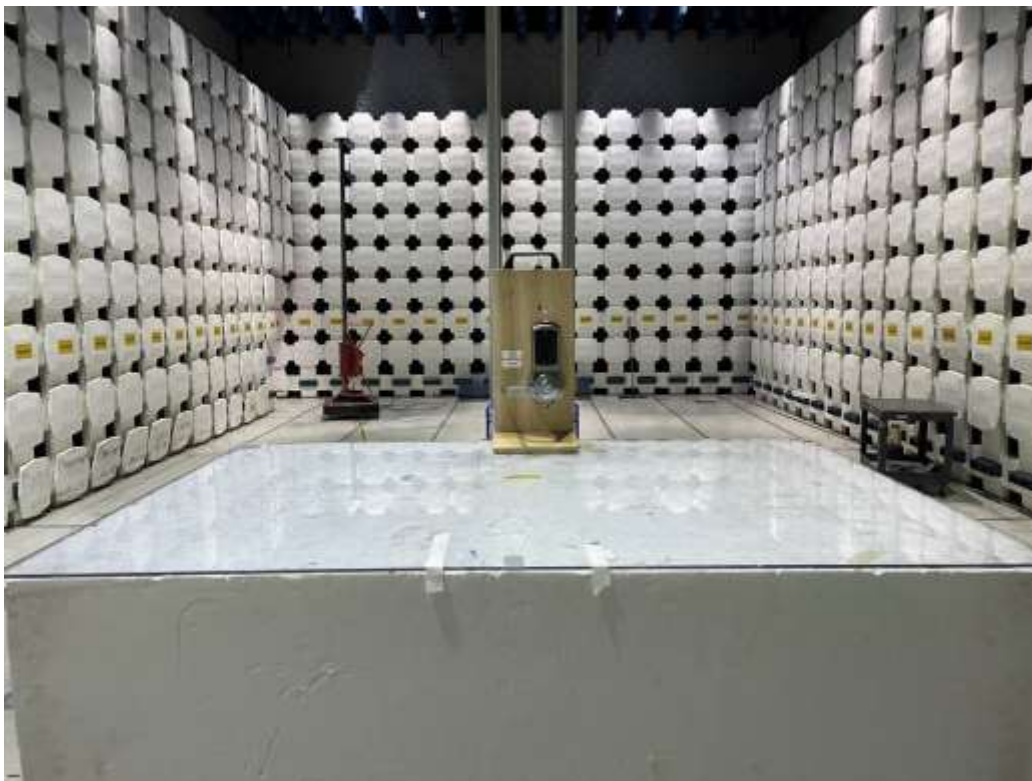
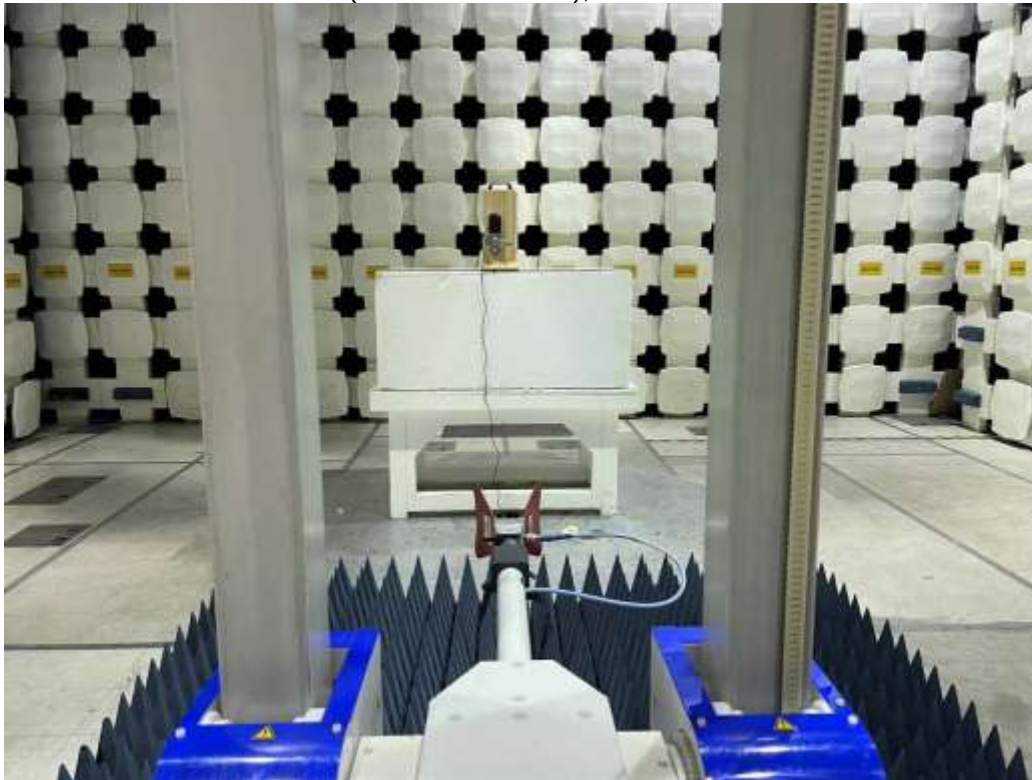
BLE (NTB-Touchscreen), RE 9 kHz-30 MHz [Z-axis]



BLE (NTB-Touchscreen), RE 30-1000 MHz



BLE (NTB-Touchscreen), RE 1-18 GHz



BLE (NTB-Touchscreen), RE 18-25 GHz



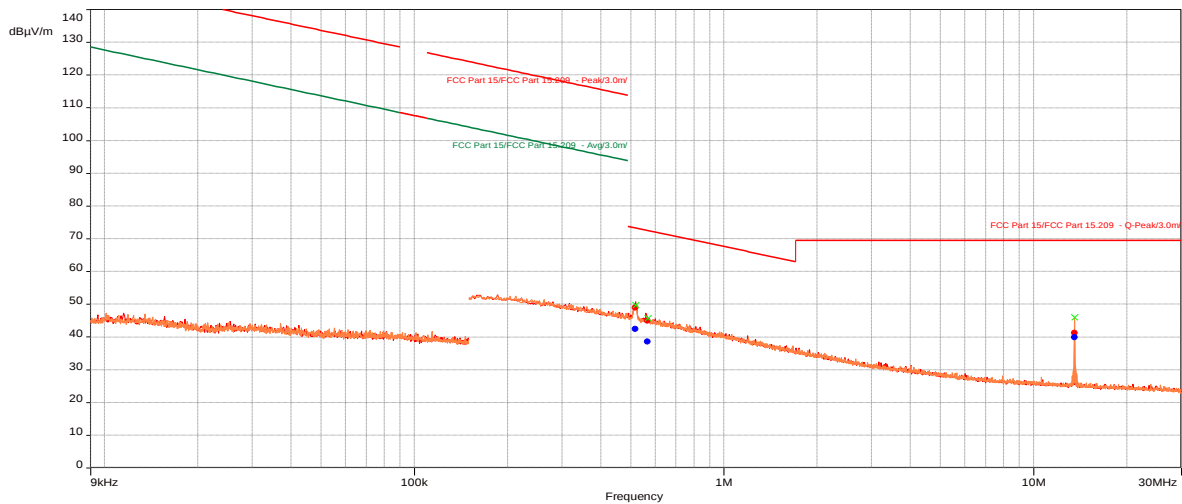
10.6 Plots/Data:

13.56 MHz (NTB-Push Button), RE 9 kHz-30 MHz

Test Information:

Date and Time	4/17/2024 9:55:37 PM
Client and Project Number	Sargent G105779861
Engineer	Virginia Moy/Vathan Ven
Temperature	23deg C
Humidity	28%
Atmospheric Pressure	1008mbars
Comments	Scan 3 RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209) Battery Mode_13.56MHz RFID_Push Button

Graph:



Results:

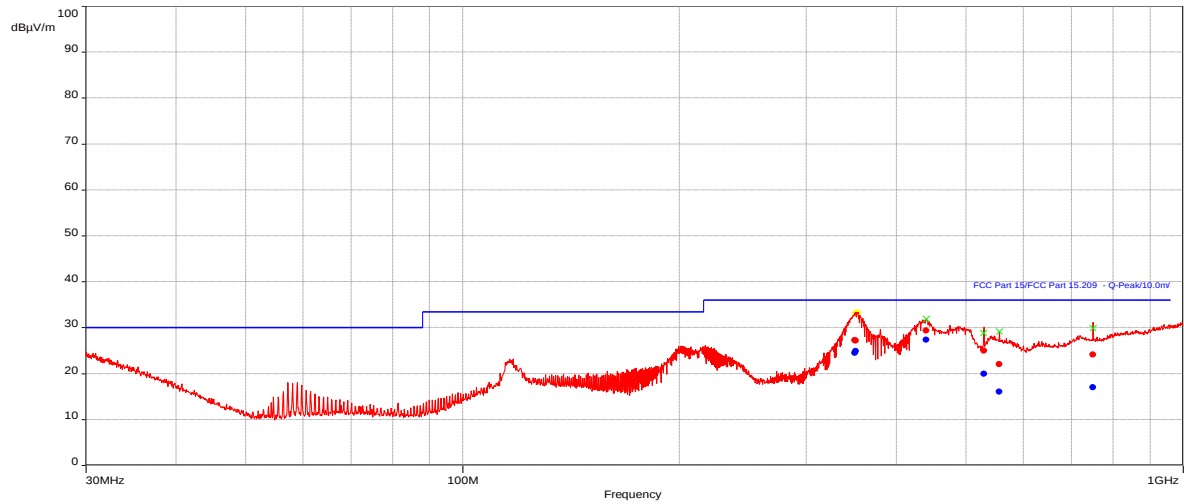
QuasiPeak (PASS) (3)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51641	42.52	73.34	-30.82	283.40	Vertical	9k	0.10	11.04
0.56726	38.58	72.54	-33.96	180.40	Vertical	9k	0.10	11.09
13.56	39.99	69.54	-29.55	272.40	Vertical	9k	0.10	11.22

13.56 MHz (NTB-Push Button), RE 30-1000 MHz

Test Information:

Date and Time	4/17/2024 10:30:58 PM
Client and Project Number	Sargent G105779861
Engineer	Virginia Moy/Vathan Ven
Temperature	23deg C
Humidity	28%
Atmospheric Pressure	1008mbars
Comments	Scan 4 RE 30-1000MHz Battery Mode_ 13.56MHz RFID Push Button

Graph:**Results:**

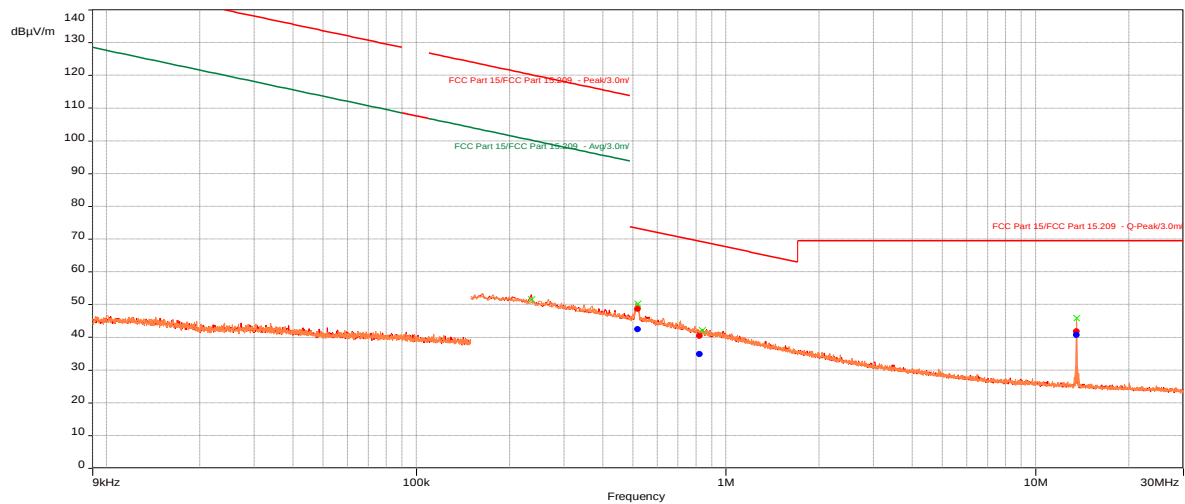
QuasiPeak (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
350.4093	24.49	36.00	-11.51	82.50	4.00	Horizontal	120k	0.10	-16.90
351.2431	24.90	36.00	-11.10	71.60	4.00	Horizontal	120k	0.10	-16.90
440.2666	27.34	36.00	-8.66	348.70	4.00	Vertical	120k	0.10	-14.41
528.8309	20.00	36.00	-16.00	213.10	4.00	Vertical	120k	0.10	-12.59
555.9884	16.08	36.00	-19.92	191.00	4.00	Vertical	120k	0.10	-12.18
749.6274	16.98	36.00	-19.02	272.80	1.92	Horizontal	120k	0.10	-8.63

13.56 MHz (NTB-Touchscreen), RE 9 kHz-30 MHz

Test Information:

Date and Time	4/17/2024 9:17:16 PM
Client and Project Number	Sargent G105779861
Engineer	Virginia Moy/Vathan Ven
Temperature	23deg C
Humidity	28%
Atmospheric Pressure	1008mbars
Comments	Scan 2 RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209) Battery Mode 13.56MHz RFID Touch Screen

Graph:**Results:**

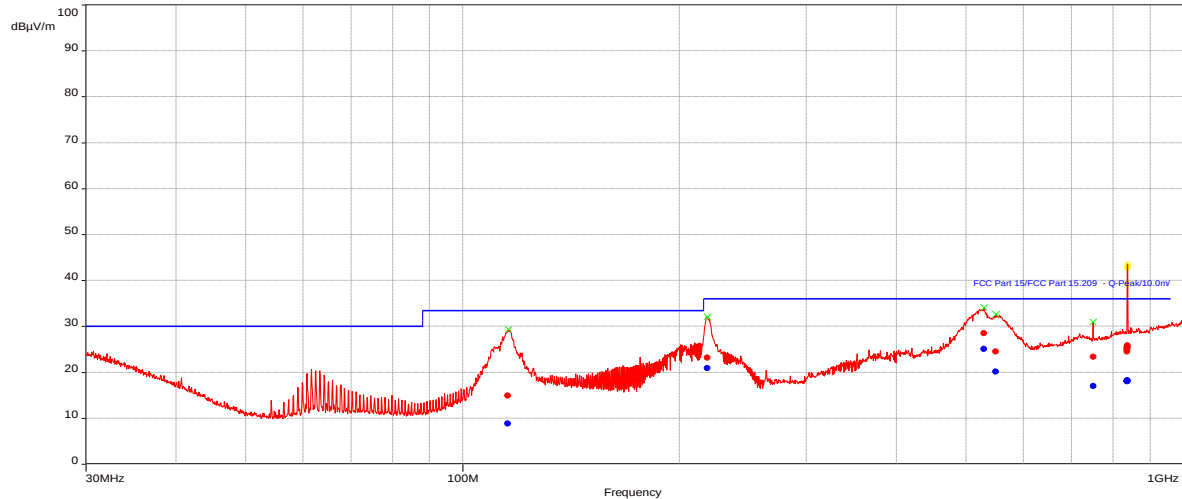
QuasiPeak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51867	42.42	73.30	-30.88	196.40	Vertical	9k	0.10	11.04
13.56	40.69	69.54	-28.85	99.00	Vertical	9k	0.10	11.22
0.82335	34.90	69.30	-34.40	23.10	Vertical	9k	0.10	11.14

13.56 MHz (NTB-Touchscreen), RE 30-1000 MHz

Test Information:

Date and Time	4/17/2024 8:17:15 PM
Client and Project Number	Sargent G105779861
Engineer	Virginia Moy/Vathan Ven
Temperature	23deg C
Humidity	28%
Atmospheric Pressure	1008mbars
Comments	Scan 1 RE 30-1000MHz Battery Mode_13.56MHz RFID Touch Screen

Graph:**Results:**

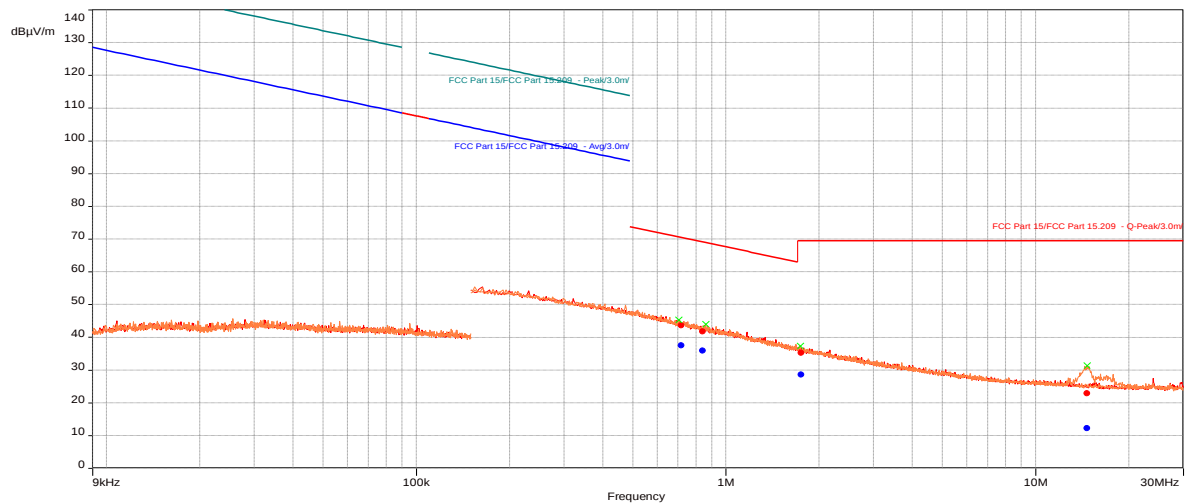
QuasiPeak (PASS) (11)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
115.6128	8.82	33.50	-24.68	175.00	4.00	Horizontal	120k	0.10	-19.14
218.5234	20.96	36.00	-15.04	233.30	3.62	Horizontal	120k	0.10	-21.07
528.8295	25.14	36.00	-10.86	142.20	4.00	Vertical	120k	0.10	-12.59
549.507	20.17	36.00	-15.83	175.00	4.00	Vertical	120k	0.10	-12.26
750.5372	17.00	36.00	-19.00	153.10	4.00	Vertical	120k	0.10	-8.61
836.2144	18.13	36.00	-17.87	126.10	1.39	Vertical	120k	0.10	-6.89
836.2569	18.10	36.00	-17.90	316.00	3.27	Vertical	120k	0.10	-6.89
836.6786	18.15	36.00	-17.85	44.90	2.00	Vertical	120k	0.10	-6.84
836.8843	18.10	36.00	-17.90	299.90	2.75	Vertical	120k	0.10	-6.82
837.23	18.17	36.00	-17.83	348.50	1.62	Vertical	120k	0.10	-6.81
837.4974	18.21	36.00	-17.79	245.30	3.20	Vertical	120k	0.10	-6.80

BLE (NTB-Push Button) Tx Low Channel, RE 9 kHz-30 MHz

Test Information:

Date and Time	4/15/2024 4:37:15 PM
Client and Project Number	Sargent_G105779861
Engineer	Vathana Ven/Virginia Moy
Temperature	22 deg C
Humidity	35%
Atmospheric Pressure	999mbars
Comments	Scan 1 RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209) Tx Low CH Push Button

Graph:**Results:**

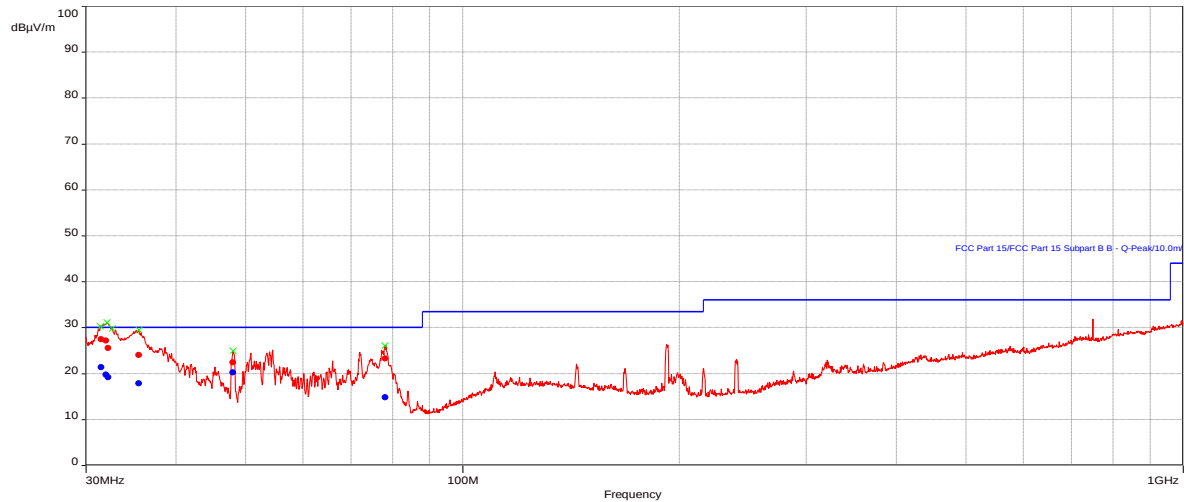
QuasiPeak (PASS) (4)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.71607	37.56	70.49	-32.93	240.00	Vertical	9k	0.10	11.13
0.8399	35.93	69.11	-33.18	88.10	Vertical	9k	0.10	11.14
1.75275	28.67	69.54	-40.87	61.20	Vertical	9k	0.10	11.54
14.64563	12.25	69.54	-57.29	147.50	Vertical	9k	0.10	11.17

BLE (NTB-Push Button) Tx Low Channel, RE 30-1000 MHz

Test Information:

Date and Time	4/8/2024 9:11:05 AM
Client and Project Number	Sargent/Assa Asabloy G105779861
Engineer	Virginia Moy/ Kouma Sinn
Temperature	23 deg C
Humidity	25%
Atmospheric Pressure	1010mbars
Comments	Scan 1: Push Button Version (2.4 GHz BLE) , Tx Low Channel, RE 30-1000MHz

Graph:**Results:**

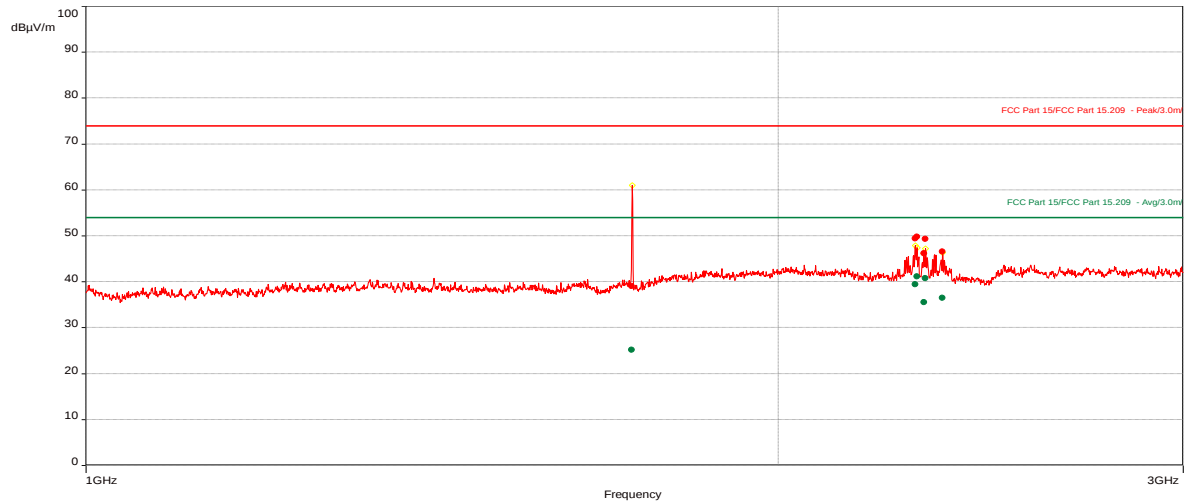
QuasiPeak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
31.5373	21.43	30.00	-8.57	50.30	1.31	Vertical	120k	0.10	-13.56
31.9937	19.75	30.00	-10.25	71.90	2.76	Vertical	120k	0.10	-13.88
32.2121	19.25	30.00	-10.75	77.30	1.69	Vertical	120k	0.10	-14.00
35.5484	17.84	30.00	-12.16	17.60	2.39	Vertical	120k	0.10	-16.16
48.0359	20.28	30.00	-9.72	82.90	2.44	Vertical	120k	0.10	-24.47
78.0853	14.86	30.00	-15.14	272.80	4.00	Vertical	120k	0.10	-25.30

BLE (NTB-Push Button) Tx Low Channel, RE 1-3 GHz

Test Information:

Date and Time	4/15/2024 6:49:14 PM
Client and Project Number	Sargent_G105779861
Engineer	Vathana Ven/Virginia Moy
Temperature	22 deg C
Humidity	35%
Atmospheric Pressure	999mbars
Comments	Scan 4 RE 1 to 3GHz Tx Low CH Push Button

Graph:**Results:**

Peak (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
1727.065	39.11	74.00	-34.89	230.70	1.00	Vertical	1M	-20.91
2294.324	49.42	74.00	-24.58	74.30	2.51	Horizontal	1M	-17.95
2298	49.85	74.00	-24.15	74.10	2.51	Horizontal	1M	-17.94
2314.324	46.21	74.00	-27.79	191.60	2.51	Horizontal	1M	-17.91
2317.838	49.31	74.00	-24.69	74.30	2.51	Horizontal	1M	-17.92
2358.038	46.61	74.00	-27.39	191.40	1.00	Vertical	1M	-17.84

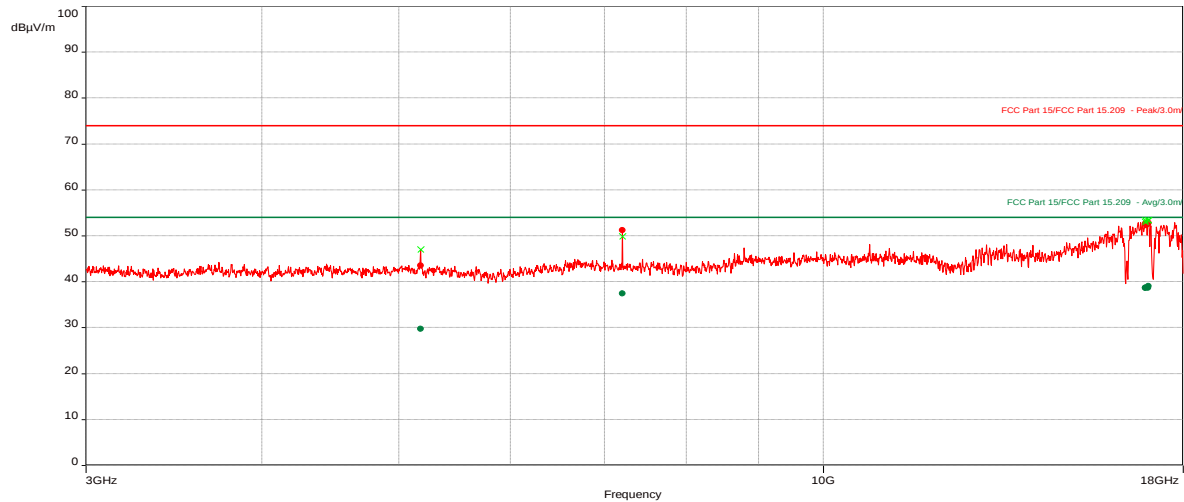
AVG (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
1727.065	25.23	54.00	-28.77	230.70	1.00	Vertical	1M	-20.91
2294.324	39.49	54.00	-14.51	74.30	2.51	Horizontal	1M	-17.95
2298	41.13	54.00	-12.87	74.10	2.51	Horizontal	1M	-17.94
2314.324	35.54	54.00	-18.46	191.60	2.51	Horizontal	1M	-17.91
2317.838	40.78	54.00	-13.22	74.30	2.51	Horizontal	1M	-17.92
2358.038	36.51	54.00	-17.49	191.40	1.00	Vertical	1M	-17.84

BLE (NTB-Push Button) Tx Low Channel, RE 3-18 GHz

Test Information:

Date and Time	4/15/2024 7:41:10 PM
Client and Project Number	Sargent_G105779861
Engineer	Vathana Ven/Virginia Moy
Temperature	22 deg C
Humidity	35%
Atmospheric Pressure	999mbars
Comments	Scan 5 RE 3 to 18GHz _Tx Low CH_ Push Button

Graph:**Results:**

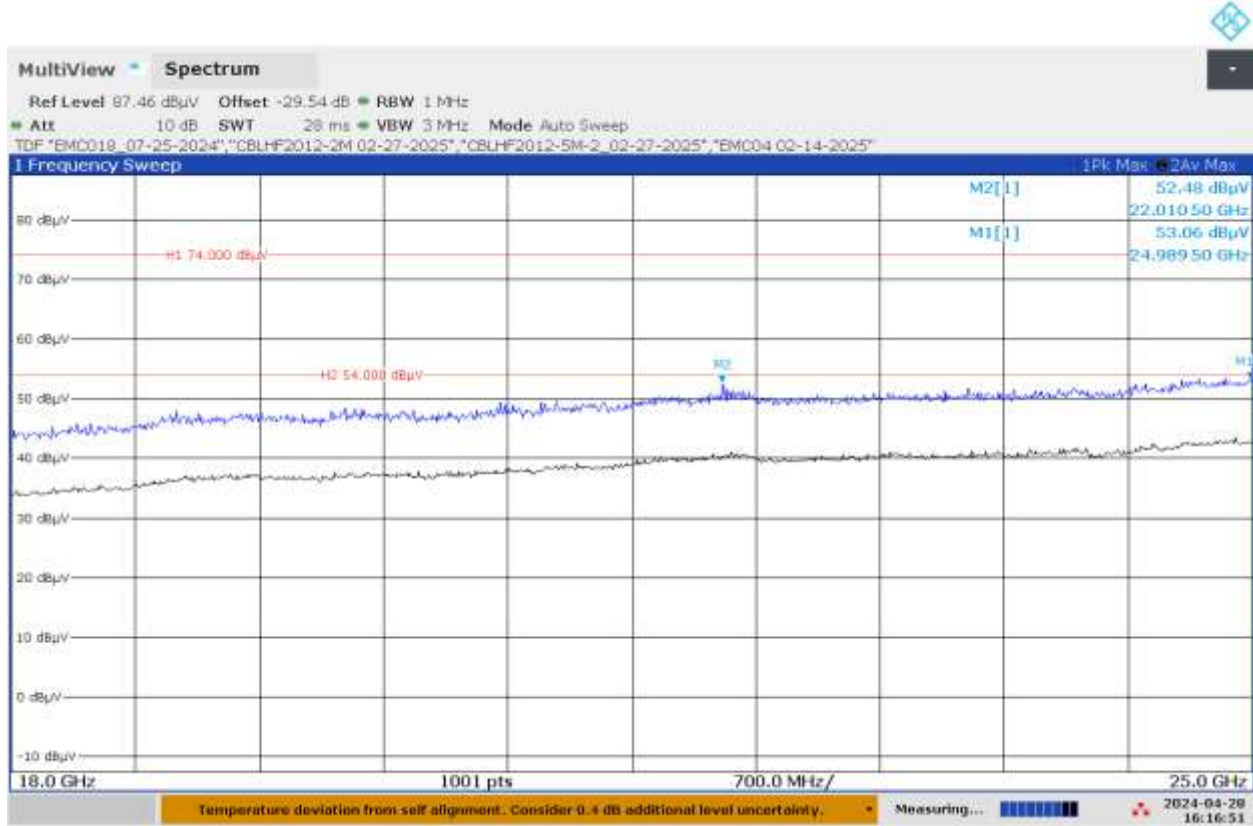
Peak (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
5182.176	43.54	74.00	-30.46	265.60	4.00	Horizontal	1M	-13.12
7206.945	51.28	74.00	-22.72	265.60	4.00	Vertical	1M	-10.25
16925.411	52.60	74.00	-21.4	360.00	4.00	Vertical	1M	2.11
16926.52	52.65	74.00	-21.35	338.70	4.00	Horizontal	1M	2.11
17002.019	52.54	74.00	-21.46	265.60	1.00	Horizontal	1M	2.12
17011.684	52.83	74.00	-21.17	360.00	4.00	Horizontal	1M	2.11

AVG (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
5182.176	29.79	54.00	-24.21	265.60	4.00	Horizontal	1M	-13.12
7206.945	37.42	54.00	-16.58	265.60	4.00	Vertical	1M	-10.25
16925.411	38.72	54.00	-15.28	360.00	4.00	Vertical	1M	2.11
16926.52	38.66	54.00	-15.34	338.70	4.00	Horizontal	1M	2.11
17002.019	38.74	54.00	-15.26	265.60	1.00	Horizontal	1M	2.12
17011.684	39.06	54.00	-14.94	360.00	4.00	Horizontal	1M	2.11

BLE (NTB-Push Button) Tx Low Channel, RE 18-25 GHz



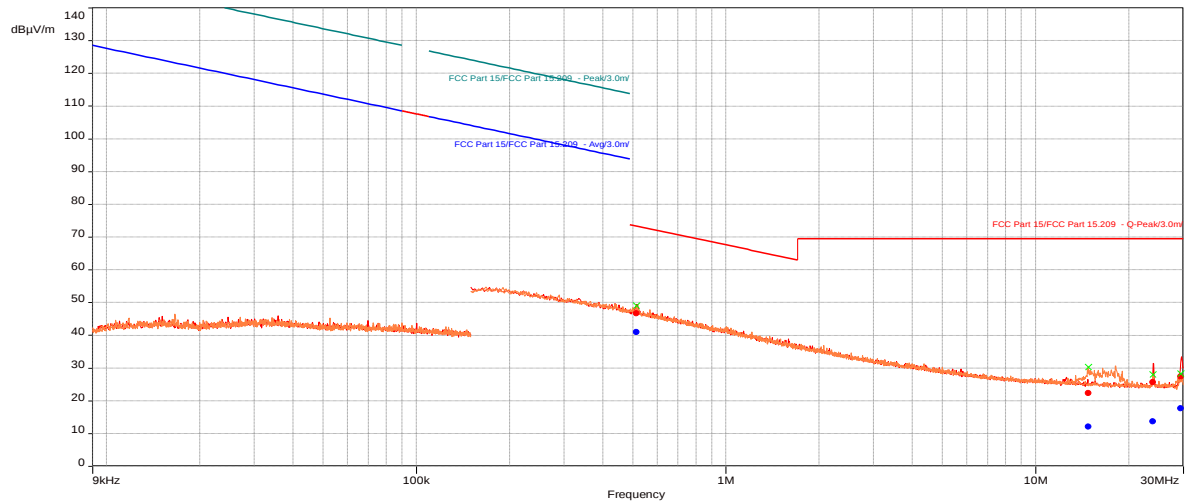
04:16:51 PM 04/28/2024

Notes: Testing was performed manually around the EUT at 10cm distance. No emission was detected above the test instrument noise floor. The cable loss, antenna factor, filter loss, and pre-amp gain were compensated as transducer factor (TDF) and the distance factor was compensated as Reference Offset

BLE (NTB-Push Button) Tx Mid Channel, RE 9 kHz-30 MHz

Test Information:

Date and Time	4/15/2024 5:11:21 PM
Client and Project Number	Sargent_G105779861
Engineer	Vathana Ven/Virginia Moy
Temperature	22 deg C
Humidity	35%
Atmospheric Pressure	999mbars
Comments	Scan 2 RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209) Tx Mid CH Push Button

Graph:**Results:**

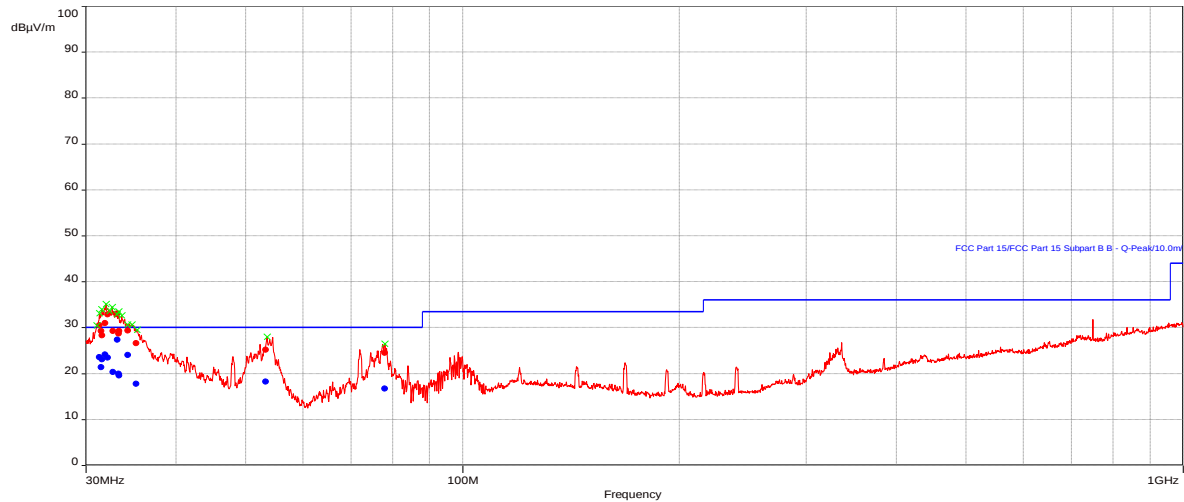
QuasiPeak (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
23.93819	13.73	69.54	-55.81	12.30	Vertical	9k	0.10	10.25
29.41332	17.71	69.54	-51.83	180.60	Vertical	9k	0.10	9.17
0.51473	41.03	73.38	-32.35	66.20	Vertical	9k	0.10	11.04
14.81212	12.13	69.54	-57.41	104.40	Vertical	9k	0.10	11.16

BLE (NTB-Push Button) Tx Mid Channel, RE 30-1000 MHz

Test Information:

Date and Time	4/8/2024 9:55:12 AM
Client and Project Number	Sargent/Assa Asabloy G105779861
Engineer	Virginia Moy/ Kouma Sinn
Temperature	23 deg C
Humidity	25%
Atmospheric Pressure	1010mbars
Comments	Scan 2: Push Button Version (2.4 GHz BLE) , Tx Mid Channel, RE 30-1000MHz

Graph:**Results:**

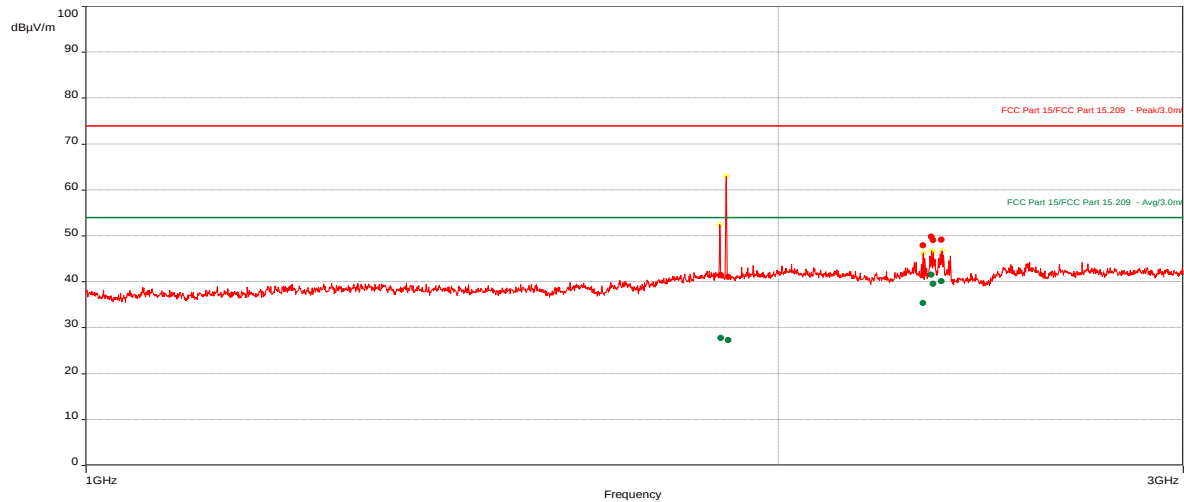
QuasiPeak (PASS) (13)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
31.3553	23.54	30.00	-6.46	357.00	2.45	Vertical	120k	0.10	-13.43
31.5429	21.44	30.00	-8.56	311.30	2.45	Vertical	120k	0.10	-13.56
31.581	23.13	30.00	-6.87	104.60	2.45	Vertical	120k	0.10	-13.59
31.8932	24.11	30.00	-5.89	17.60	4.00	Vertical	120k	0.10	-13.81
32.1784	23.45	30.00	-6.55	88.20	2.44	Vertical	120k	0.10	-13.98
32.7298	20.35	30.00	-9.65	88.30	1.31	Vertical	120k	0.10	-14.30
33.1904	27.41	30.00	-2.59	142.70	1.62	Vertical	120k	0.10	-14.59
33.3308	19.95	30.00	-10.05	180.30	4.00	Vertical	120k	0.10	-14.69
33.3538	19.58	30.00	-10.42	327.40	1.47	Vertical	120k	0.10	-14.70
34.3184	24.04	30.00	-5.96	61.20	2.75	Vertical	120k	0.10	-15.33
35.2442	17.75	30.00	-12.25	34.00	4.00	Vertical	120k	0.10	-15.92
53.327	18.21	30.00	-11.79	0.00	1.55	Vertical	120k	0.10	-26.12
78.0254	16.74	30.00	-13.26	298.10	4.00	Vertical	120k	0.10	-25.29

BLE (NTB-Push Button) Tx Mid Channel, RE 1-3 GHz

Test Information:

Date and Time	4/15/2024 9:14:36 PM
Client and Project Number	Sargent_G105779861
Engineer	Vathana Ven/Virginia Moy
Temperature	22 deg C
Humidity	35%
Atmospheric Pressure	999mbars
Comments	Scan 7 RE 1 to 3GHz Tx Mid CH Push Button

Graph:**Results:**

Peak (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
1888.707	41.49	74.00	-32.51	113.40	2.51	Horizontal	1M	-19.07
1902.39	41.05	74.00	-32.95	74.30	4.00	Vertical	1M	-18.96
2312.436	47.89	74.00	-26.11	191.50	2.51	Horizontal	1M	-17.91
2331.938	49.81	74.00	-24.19	191.60	2.51	Horizontal	1M	-17.91
2336.237	49.07	74.00	-24.93	74.30	2.51	Horizontal	1M	-17.90
2355.826	49.16	74.00	-24.84	191.50	2.51	Horizontal	1M	-17.85

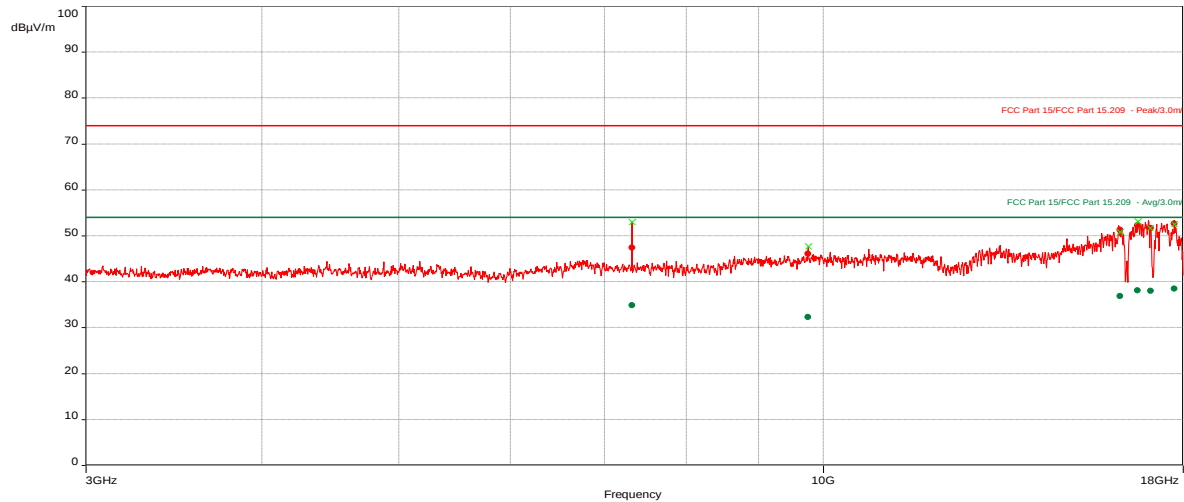
AVG (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
1888.707	27.76	54.00	-26.24	113.40	2.51	Horizontal	1M	-19.07
1902.39	27.25	54.00	-26.75	74.30	4.00	Vertical	1M	-18.96
2312.436	35.41	54.00	-18.59	191.50	2.51	Horizontal	1M	-17.91
2331.938	41.54	54.00	-12.46	191.60	2.51	Horizontal	1M	-17.91
2336.237	39.59	54.00	-14.41	74.30	2.51	Horizontal	1M	-17.90
2355.826	40.10	54.00	-13.90	191.50	2.51	Horizontal	1M	-17.85

BLE (NTB-Push Button) Tx Mid Channel, RE 3-18 GHz

Test Information:

Date and Time	4/15/2024 8:26:02 PM
Client and Project Number	Sargent_G105779861
Engineer	Vathana Ven/Virginia Moy
Temperature	22 deg C
Humidity	35%
Atmospheric Pressure	999mbars
Comments	Scan 6 RE 3 to 18GHz_Tx Mid CH_Push Button

Graph:**Results:**

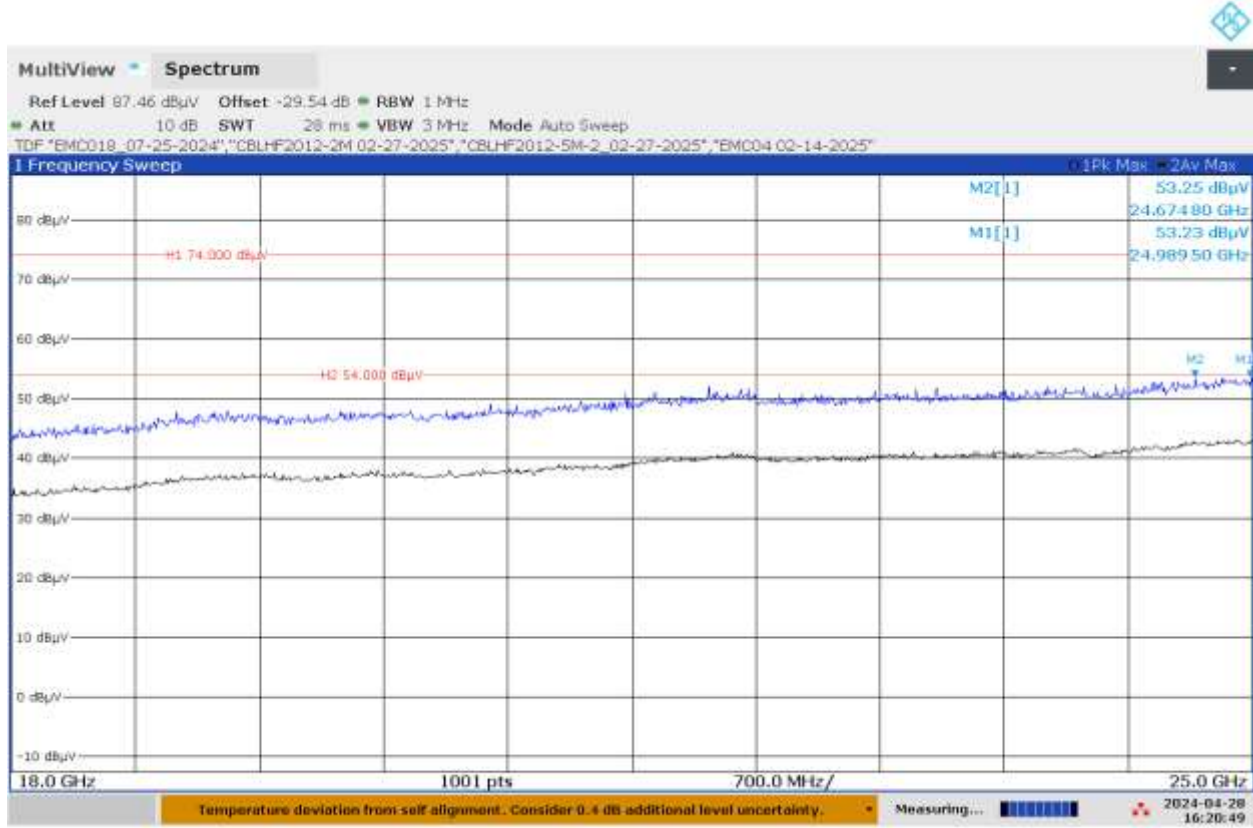
Peak (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
7320.488	47.42	74.00	-26.58	265.70	4.00	Horizontal	1M	-10.18
9759.14	46.09	74.00	-27.91	265.60	4.00	Horizontal	1M	-7.70
16239.678	51.32	74.00	-22.69	360.00	4.00	Horizontal	1M	0.55
16715.145	52.31	74.00	-21.69	360.00	4.00	Horizontal	1M	1.95
17067.753	51.74	74.00	-22.26	0.00	1.00	Horizontal	1M	2.02
17751.551	52.67	74.00	-21.33	0.00	1.00	Horizontal	1M	2.35

AVG (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
7320.488	34.93	54.00	-19.07	265.70	4.00	Horizontal	1M	-10.18
9759.14	32.34	54.00	-21.66	265.60	4.00	Horizontal	1M	-7.70
16239.678	36.90	54.00	-17.10	360.00	4.00	Horizontal	1M	0.55
16715.145	38.16	54.00	-15.84	360.00	4.00	Horizontal	1M	1.95
17067.753	38.02	54.00	-15.98	0.00	1.00	Horizontal	1M	2.02
17751.551	38.49	54.00	-15.51	0.00	1.00	Horizontal	1M	2.35

BLE (NTB-Push Button) Tx Mid Channel, RE 18-25 GHz



04:20:49 PM 04/28/2024

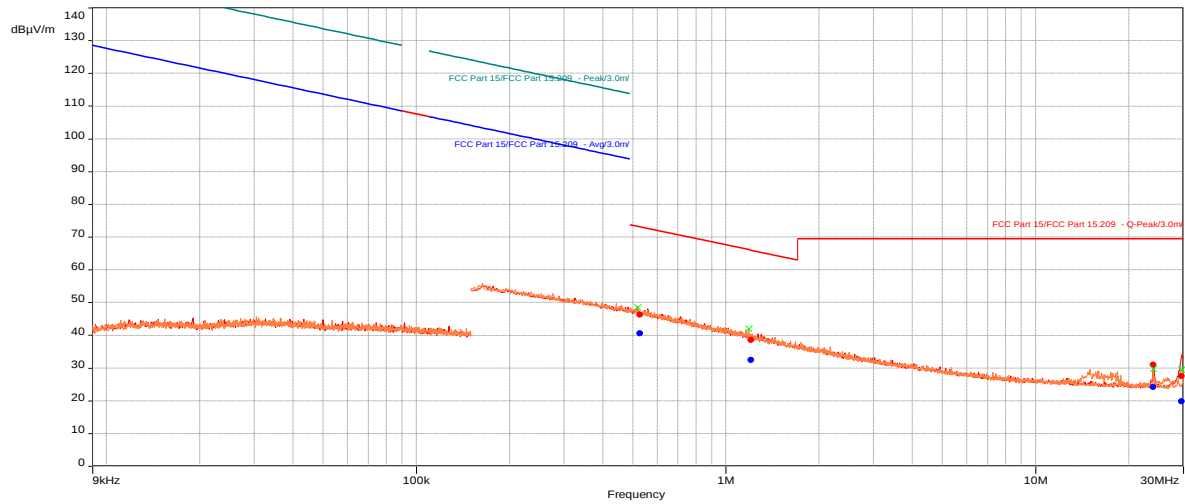
Notes: Testing was performed manually around the EUT at 10cm distance. No emission was detected above the test instrument noise floor. The cable loss, antenna factor, filter loss, and pre-amp gain were compensated as transducer factor (TDF) and the distance factor was compensated as Reference Offset

BLE (NTB-Push Button) Tx High Channel, RE 9 kHz-30 MHz

Test Information:

Date and Time	4/15/2024 5:40:21 PM
Client and Project Number	Sargent_G105779861
Engineer	Vathana Ven/Virginia Moy
Temperature	22 deg C
Humidity	35%
Atmospheric Pressure	999mbars
Comments	Scan 3 RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209) Tx High CH Push Button

Graph:



Results:

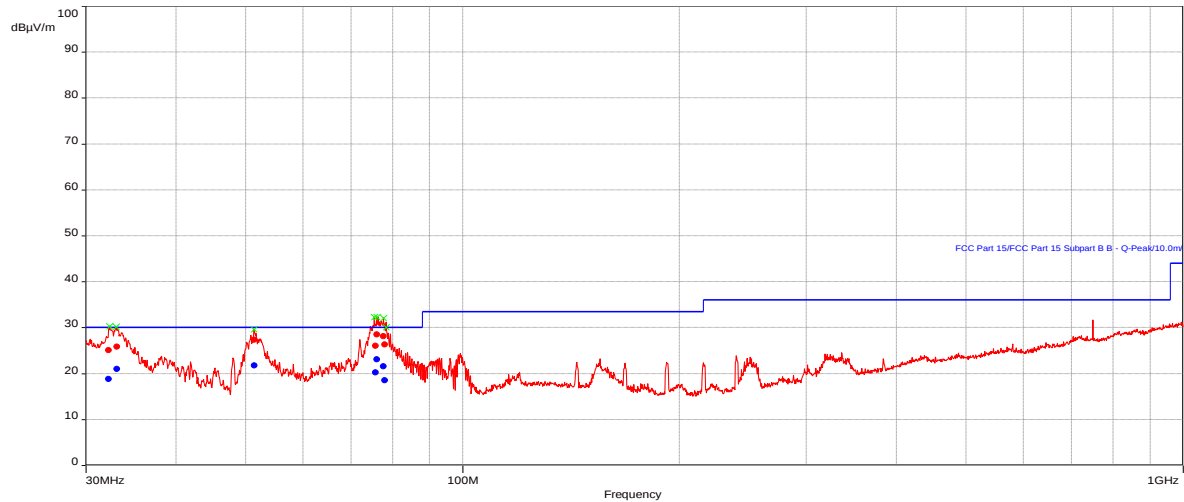
QuasiPeak (PASS) (4)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
24.00056	24.27	69.54	-45.27	33.50	Vertical	9k	0.10	10.24
29.61179	19.89	69.54	-49.65	245.30	Vertical	9k	0.10	9.12
0.52865	40.54	73.15	-32.61	110.00	Vertical	9k	0.10	11.05
1.20542	32.51	65.98	-33.47	158.60	Vertical	9k	0.10	11.47

BLE (NTB-Push Button) Tx High Channel, RE 30-1000 MHz

Test Information:

Date and Time	4/8/2024 10:52:29 AM
Client and Project Number	Sargent/Assa Asabloy G105779861
Engineer	Virginia Moy/ Kouma Sinn
Temperature	23 deg C
Humidity	25%
Atmospheric Pressure	1010mbars
Comments	Scan 3: Push Button Version (2.4 GHz BLE) , Tx High Channel, RE 30-1000MHz

Graph:**Results:**

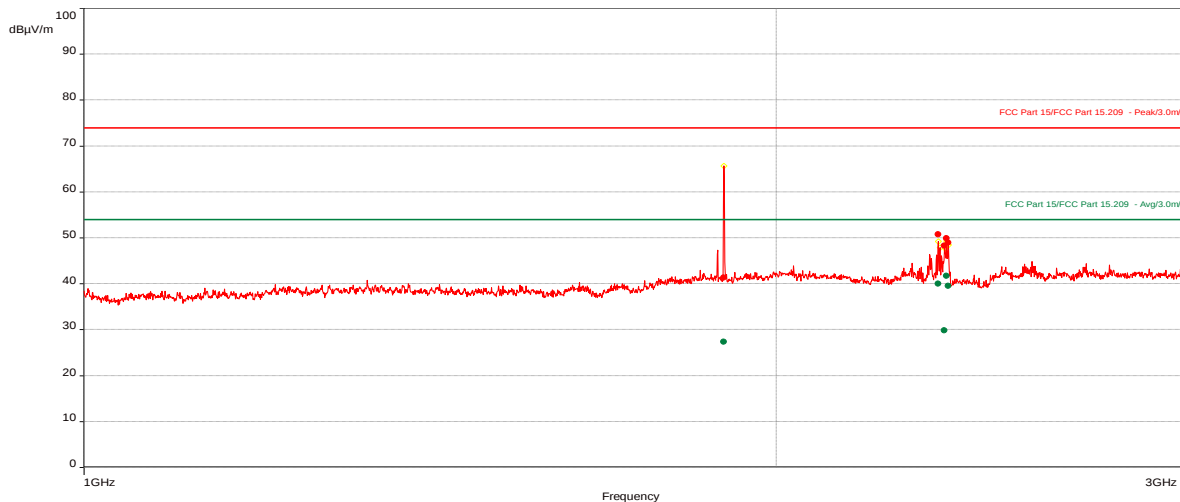
QuasiPeak (PASS) (7)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
32.2787	18.81	30.00	-11.19	39.40	2.31	Vertical	120k	0.10	-14.04
33.1527	21.06	30.00	-8.94	17.50	4.00	Vertical	120k	0.10	-14.57
51.3854	21.76	30.00	-8.24	196.70	1.84	Vertical	120k	0.10	-25.78
75.6923	20.27	30.00	-9.73	164.60	2.15	Vertical	120k	0.10	-25.18
76.0379	23.07	30.00	-6.93	272.10	2.07	Vertical	120k	0.10	-25.21
77.6864	21.61	30.00	-8.39	110.00	4.00	Vertical	120k	0.10	-25.26
78.0291	18.58	30.00	-11.42	39.10	4.00	Vertical	120k	0.10	-25.29

BLE (NTB-Push Button) Tx High Channel, RE 1-3 GHz

Test Information:

Date and Time	4/15/2024 9:44:07 PM
Client and Project Number	Sargent_G105779861
Engineer	Vathana Ven/Virginia Moy
Temperature	22 deg C
Humidity	35%
Atmospheric Pressure	999mbars
Comments	Scan 8 RE 1 to 3GHz Tx High CH_Push Button

Graph:**Results:**

Peak (PASS) (5)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
1897.963	41.34	74.00	-32.66	74.00	4.00	Vertical	1M	-18.98
2352.284	50.77	74.00	-23.23	191.30	1.00	Vertical	1M	-17.87
2367.027	48.33	74.00	-25.67	191.80	1.00	Vertical	1M	-17.82
2372.087	49.88	74.00	-24.12	191.40	1.00	Vertical	1M	-17.79
2375.788	48.93	74.00	-25.07	191.50	1.00	Vertical	1M	-17.75

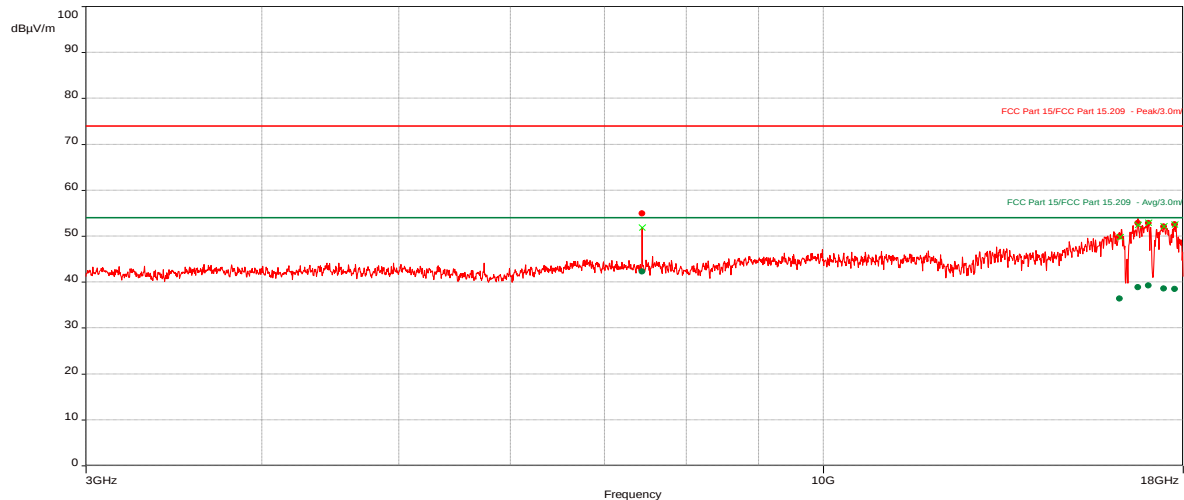
AVG (PASS) (5)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
1897.963	27.34	54.00	-26.66	74.00	4.00	Vertical	1M	-18.98
2352.284	40.00	54.00	-14.00	191.30	1.00	Vertical	1M	-17.87
2367.027	29.87	54.00	-24.13	191.80	1.00	Vertical	1M	-17.82
2372.087	41.71	54.00	-12.29	191.40	1.00	Vertical	1M	-17.79
2375.788	39.53	54.00	-14.47	191.50	1.00	Vertical	1M	-17.75

BLE (NTB-Push Button) Tx High Channel, RE 3-18 GHz

Test Information:

Date and Time	4/15/2024 10:14:47 PM
Client and Project Number	Sargent_G105779861
Engineer	Vathana Ven/Virginia Moy
Temperature	22 deg C
Humidity	35%
Atmospheric Pressure	999mbars
Comments	Scan 9 RE 3 to 18GHz Tx High CH Push Button

Graph:**Results:**

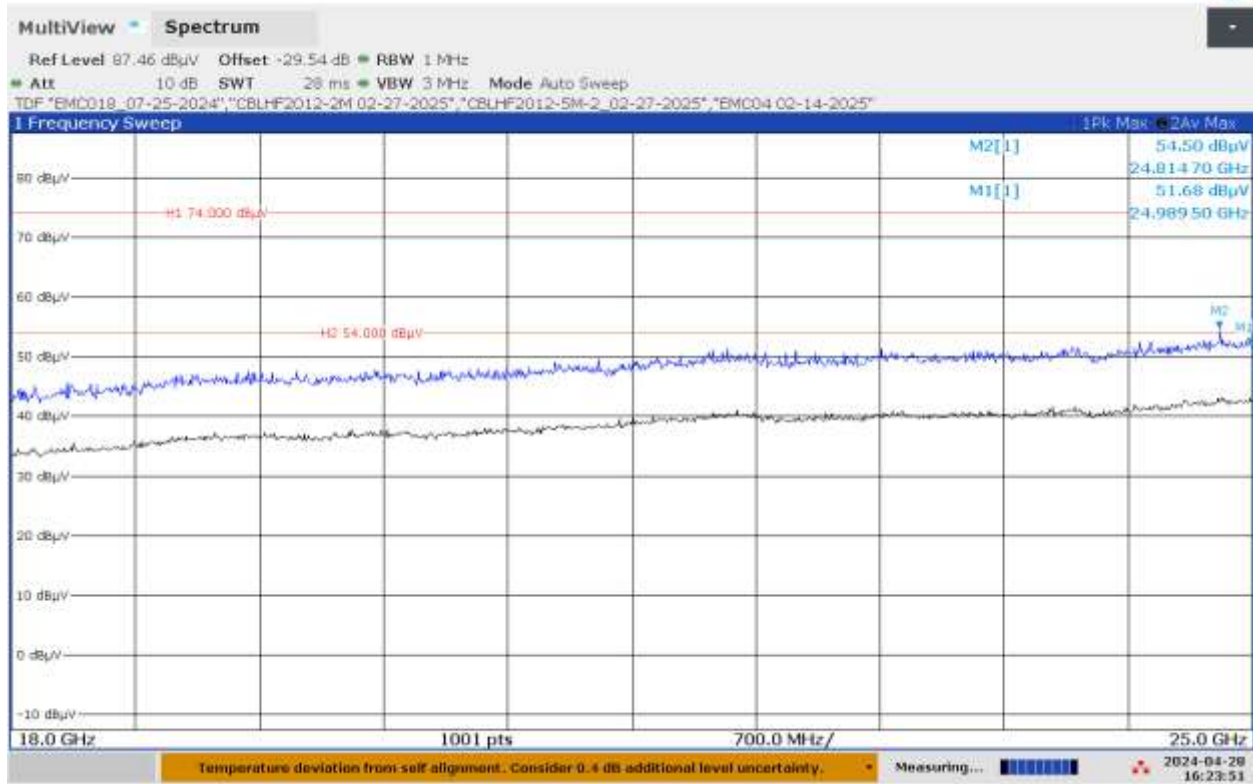
Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
7440.847	54.96	74.00	-19.04	265.50	1.00	Vertical	1M	-10.16
16232.293	49.91	74.00	-24.09	0.00	4.00	Horizontal	1M	0.53
16728.189	52.85	74.00	-21.15	265.40	4.00	Horizontal	1M	1.99
17011.207	52.86	74.00	-21.14	265.50	1.00	Vertical	1M	2.11
17443.644	52.15	74.00	-21.85	0.00	1.00	Vertical	1M	2.11
17760.238	52.54	74.00	-21.46	0.00	4.00	Vertical	1M	2.34

AVG (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
7440.847	42.29	54.00	-11.71	265.50	1.00	Vertical	1M	-10.16
16232.293	36.43	54.00	-17.57	0.00	4.00	Horizontal	1M	0.53
16728.189	38.85	54.00	-15.15	265.40	4.00	Horizontal	1M	1.99
17011.207	39.22	54.00	-14.78	265.50	1.00	Vertical	1M	2.11
17443.644	38.58	54.00	-15.42	0.00	1.00	Vertical	1M	2.11
17760.238	38.48	54.00	-15.52	0.00	4.00	Vertical	1M	2.34

BLE (NTB-Push Button) Tx High Channel, RE 18-25 GHz



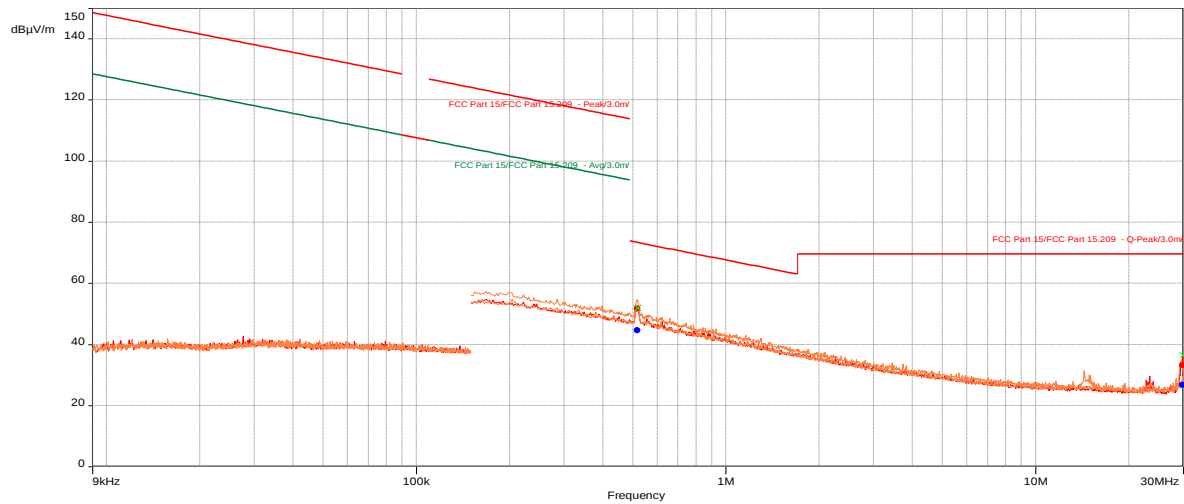
04:23:51 PM 04/28/2024

Notes: Testing was performed manually around the EUT at 10cm distance. No emission was detected above the test instrument noise floor. The cable loss, antenna factor, filter loss, and pre-amp gain were compensated as transducer factor (TDF) and the distance factor was compensated as Reference Offset

BLE (NTB-Touchscreen) Tx Low Channel, RE 9 kHz-30 MHz

Test Information:

Date and Time	4/26/2024 11:46:19 AM
Client and Project Number	Sargent Assa Abloy (Touchscreen/Push Button)_04-26-2024
Engineer	Kouma Sinn
Temperature	23 deg C
Humidity	18 %
Atmospheric Pressure	1022 mbars
Comments	Scan 1: BLE (Touchscreen_Push Button), Low Ch, RE 9kHz-30MHz Red Loop antenna, Electric Field, 3M Location (FCC 15.209)

Graph:**Results:**

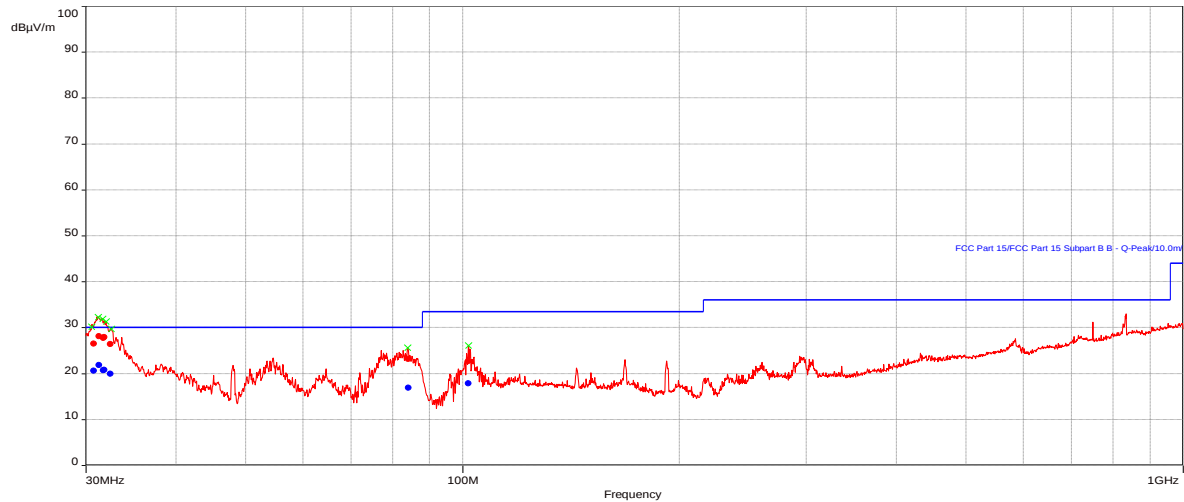
QuasiPeak (PASS) (2)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51642	44.70	73.34	-28.64	66.50	Horizontal	9k	0.10	11.04
29.85208	26.83	69.54	-42.71	12.00	Horizontal	9k	0.10	9.07

BLE (NTB-Touchscreen) Tx Low Channel, RE 30-1000 MHz

Test Information:

Date and Time	4/26/2024 2:33:14 PM
Client and Project Number	Sargent Assa Abloy (Touchscreen/Push Button)_04-26-2024
Engineer	Kouma Sinn
Temperature	23 deg C
Humidity	18 %
Atmospheric Pressure	1022 mbars
Comments	Scan 6 BLE (Touchscreen_Push Button), Low Ch, RE 30-1000 MHz

Graph:**Results:**

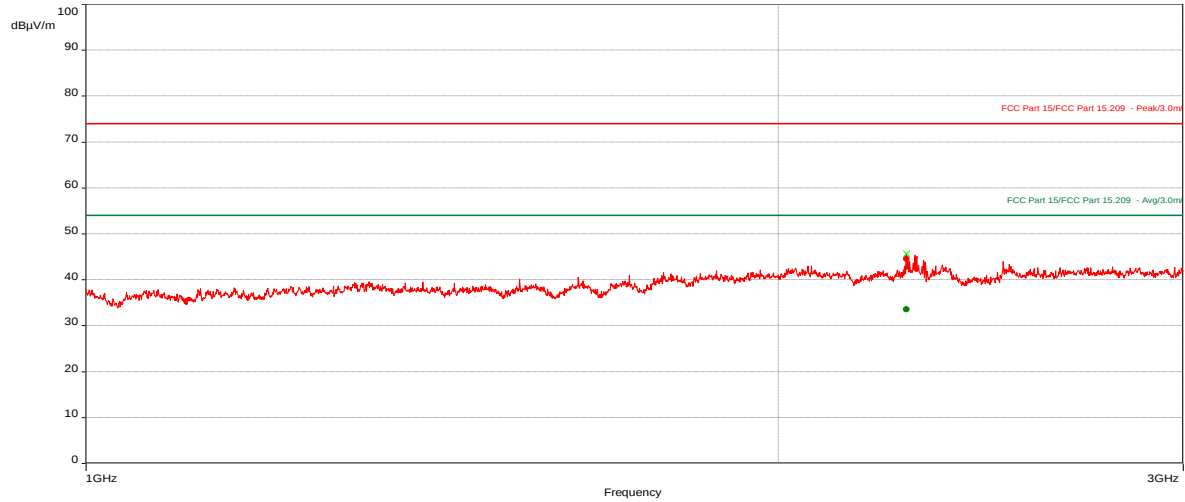
QuasiPeak (PASS) (7)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
30.7511	20.64	30.00	-9.36	99.20	4.00	Vertical	120k	0.10	-13.05
31.2898	21.86	30.00	-8.14	223.70	2.08	Vertical	120k	0.10	-13.39
31.7233	20.74	30.00	-9.26	196.80	2.30	Vertical	120k	0.10	-13.69
31.7945	20.86	30.00	-9.14	180.50	1.47	Vertical	120k	0.10	-13.74
32.4616	19.98	30.00	-10.02	99.00	4.00	Vertical	120k	0.10	-14.15
84.07	16.94	30.00	-13.06	240.50	3.90	Vertical	120k	0.10	-25.51
101.9026	17.86	33.50	-15.64	316.20	4.00	Vertical	120k	0.10	-21.92

BLE (NTB-Touchscreen) Tx Low Channel, RE 1-3 GHz

Test Information:

Date and Time	5/3/2024 8:56:08 AM
Client and Project Number	Sargent Assa Abloy (Touchscreen & Push Button, G105779861)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1013 mbars
Comments	Scan 1 BLE (NTB-Touchscreen) Tx Low Channel, RE 1 to 3 GHz

Graph:**Results:**

Peak (PASS) (1)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
2274.087	44.59	74.00	-29.41	309.20	1.98	Horizontal	1M	-18.07

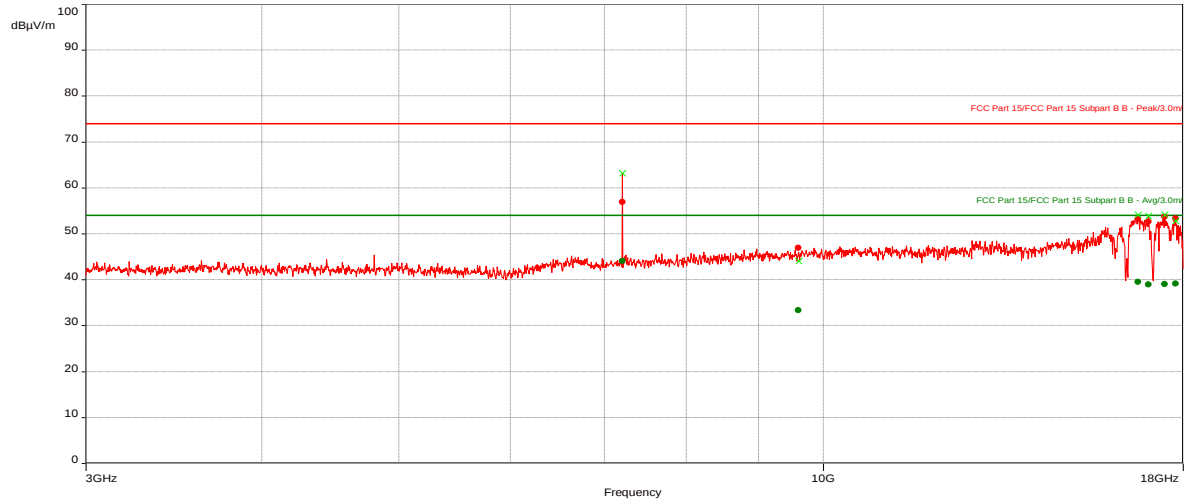
AVG (PASS) (1)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
2274.087	33.59	54.00	-20.41	309.20	1.98	Horizontal	1M	-18.07

BLE (NTB-Touchscreen) Tx Low Channel, RE 3-18 GHz

Test Information:

Date and Time	5/5/2024 12:23:40 PM
Client and Project Number	Sargent Assa Abloy (Touchscreen & Push Button, G105779861)
Engineer	Kouma Sinn
Temperature	23 deg C
Humidity	37 %
Atmospheric Pressure	1017 mbars
Comments	Scan 6 BLE (NTB-Touchscreen) Tx Low Channel, RE 3-18 GHz

Graph:**Results:**

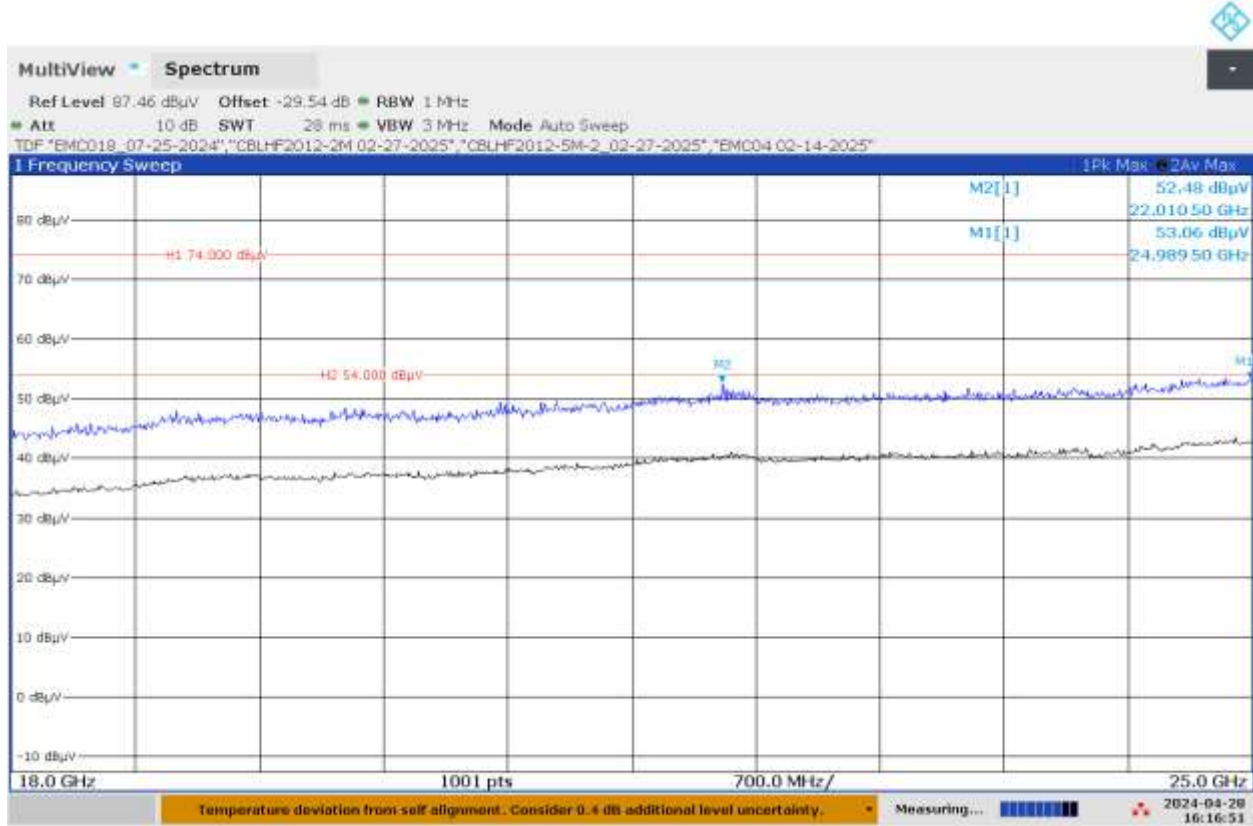
Peak (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
7206.901	56.93	74.00	-17.07	265.70	4.00	Vertical	1M	-10.25
9606.89	46.94	74.00	-27.06	0.00	4.00	Vertical	1M	-8.04
16723.423	53.25	74.00	-20.75	0.00	4.00	Horizontal	1M	1.98
17011.783	52.71	74.00	-21.29	0.00	1.00	Vertical	1M	2.11
17469.449	53.76	74.00	-20.24	360.00	1.00	Horizontal	1M	2.15
17781.838	53.32	74.00	-20.68	360.00	4.00	Horizontal	1M	2.33

AVG (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
7206.901	44.11	54.00	-9.89	265.70	4.00	Vertical	1M	-10.25
9606.89	33.40	54.00	-20.60	0.00	4.00	Vertical	1M	-8.04
16723.423	39.51	54.00	-14.49	0.00	4.00	Horizontal	1M	1.98
17011.783	39.00	54.00	-15.00	0.00	1.00	Vertical	1M	2.11
17469.449	39.08	54.00	-14.92	360.00	1.00	Horizontal	1M	2.15
17781.838	39.16	54.00	-14.84	360.00	4.00	Horizontal	1M	2.33

BLE (NTB-Touchscreen) Tx Low Channel, RE 18-25 GHz



04:16:51 PM 04/28/2024

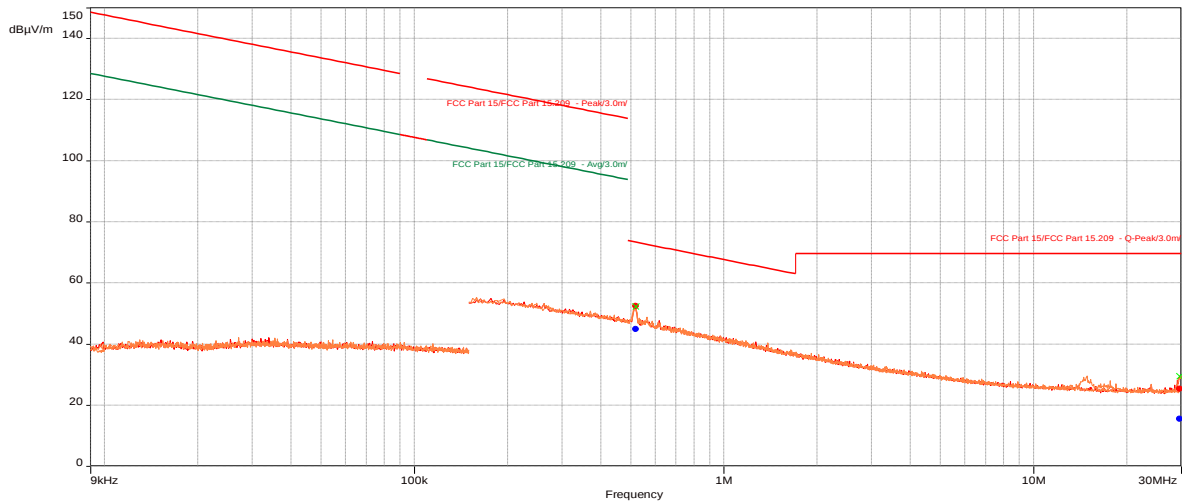
Notes: Testing was performed manually around the EUT at 10cm distance. No emission was detected above the test instrument noise floor. The cable loss, antenna factor, filter loss, and pre-amp gain were compensated as transducer factor (TDF) and the distance factor was compensated as Reference Offset

BLE (NTB-Touchscreen) Tx Mid Channel, RE 9 kHz-30 MHz

Test Information:

Date and Time	4/26/2024 12:14:49 PM
Client and Project Number	Sargent Assa Abloy (Touchscreen/Push Button)_04-26-2024
Engineer	Kouma Sinn
Temperature	23 deg C
Humidity	18 %
Atmospheric Pressure	1022 mbars
Comments	Scan 2_BLE (Touchscreen_Push Button), Mid Ch, RE 9kHz-30MHz Red Loop antenna, Electric Field, 3M Location (FCC 15.209)

Graph:



Results:

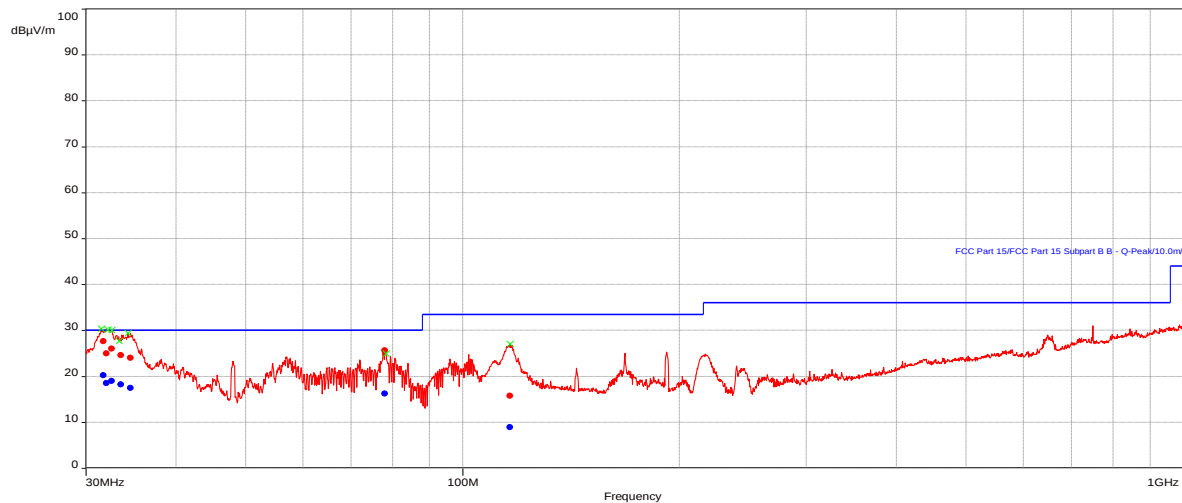
QuasiPeak (PASS) (2)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51866	44.91	73.30	-28.39	186.00	Horizontal	9k	0.10	11.04
29.59082	15.51	69.54	-54.03	120.60	Horizontal	9k	0.10	9.13

BLE (NTB-Touchscreen) Tx Mid Channel, RE 30-1000 MHz

Test Information:

Date and Time	4/26/2024 1:56:38 PM
Client and Project Number	Sargent Assa Abloy (Touchscreen/Push Button)_04-26-2024
Engineer	Kouma Sinn
Temperature	23 deg C
Humidity	18 %
Atmospheric Pressure	1022 mbars
Comments	Scan 5_BLE (Touchscreen_Push Button), Mid Ch, RE 30-1000 MHz

Graph:**Results:**

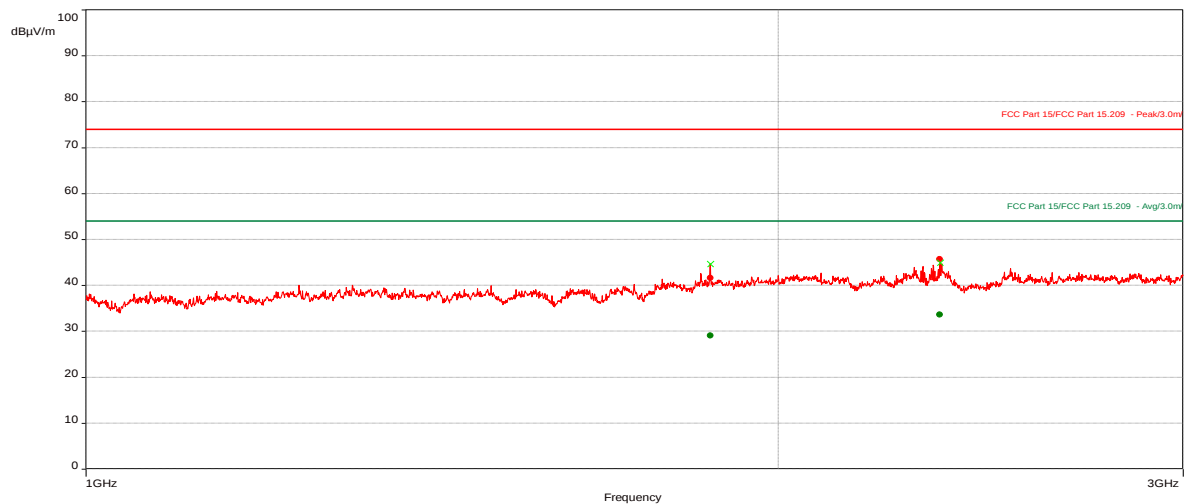
QuasiPeak (PASS) (7)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
31.6975	20.21	30.00	-9.79	61.00	1.54	Vertical	120k	0.10	-13.67
32.0508	18.55	30.00	-11.45	66.10	4.00	Vertical	120k	0.10	-13.91
32.58	18.98	30.00	-11.02	251.10	4.00	Vertical	120k	0.10	-14.22
33.5726	18.30	30.00	-11.70	125.90	4.00	Vertical	120k	0.10	-14.85
34.6028	17.54	30.00	-12.46	120.90	4.00	Vertical	120k	0.10	-15.50
77.9993	16.22	30.00	-13.78	1.30	1.70	Vertical	120k	0.10	-25.29
116.3701	8.91	33.50	-24.59	1.30	4.00	Horizontal	120k	0.10	-19.06

BLE (NTB-Touchscreen) Tx Mid Channel, RE 1-3 GHz

Test Information:

Date and Time	5/3/2024 9:09:14 AM
Client and Project Number	Sargent Assa Abloy (Touchscreen & Push Button, G105779861)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1013 mbars
Comments	Scan 2 BLE (NTB-Touchscreen) Tx Mid Channel, RE 1 to 3 GHz

Graph:**Results:**

Peak (PASS) (2)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
1868.701	41.67	74	-32.33	230.80	3.05	Vertical	1M	0.00	-19.16
2351.689	45.70	74	-28.3	74.40	1.00	Horizontal	1M	0.00	-17.88

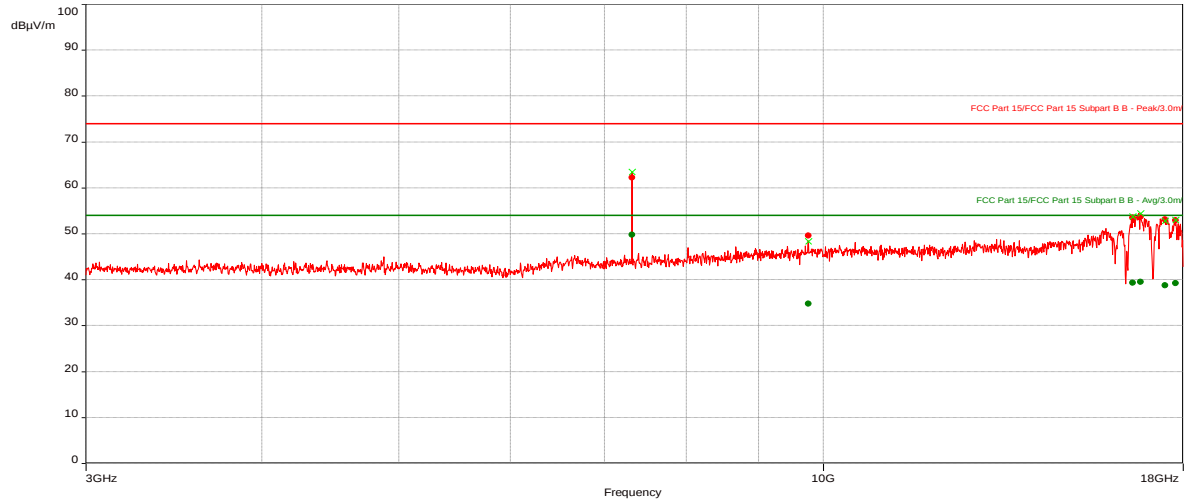
AVG (PASS) (2)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
1868.701	29.10	54.00	-24.90	230.80	3.05	Vertical	1M	0.00	-19.16
2351.689	33.62	54.00	-20.38	74.40	1.00	Horizontal	1M	0.00	-17.88

BLE (NTB-Touchscreen) Tx Mid Channel, RE 3-18 GHz

Test Information:

Date and Time	5/5/2024 11:33:18 AM
Client and Project Number	Sargent Assa Abloy (Touchscreen & Push Button, G105779861)
Engineer	Kouma Sinn
Temperature	23 deg C
Humidity	37 %
Atmospheric Pressure	1017 mbars
Comments	Scan 5_BLE (NTB-Touchscreen) Tx Mid Channel, RE 3-18 GHz

Graph:**Results:**

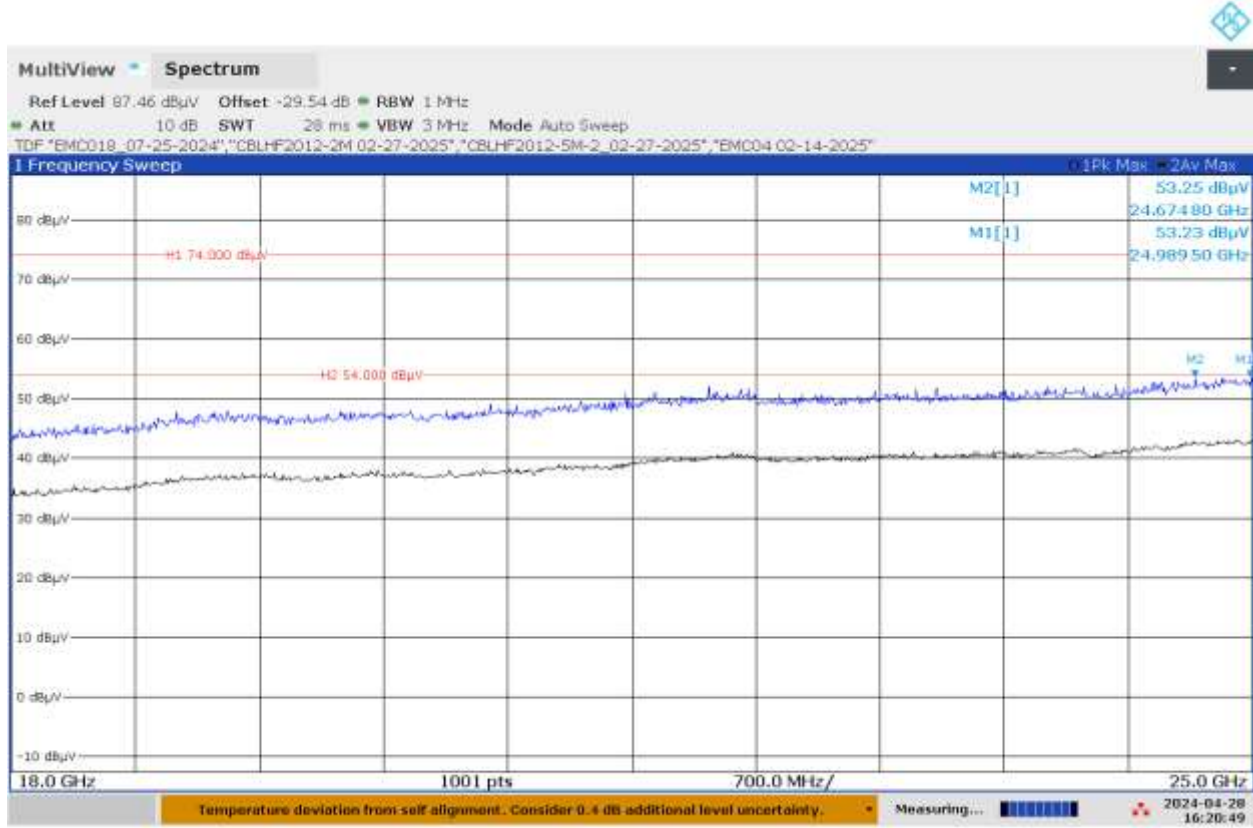
Peak (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
7320.913	62.28	74.00	-11.72	265.60	4.00	Vertical	1M	-10.18
9760.112	49.67	74.00	-24.33	0.00	1.00	Horizontal	1M	-7.69
16583.146	53.53	74.00	-20.47	360.00	4.00	Horizontal	1M	1.58
16789.54	53.71	74.00	-20.29	265.70	1.00	Horizontal	1M	2.12
17481.463	53.15	74.00	-20.85	360.00	1.00	Vertical	1M	2.16
17779.917	52.92	74.00	-21.08	265.60	4.00	Vertical	1M	2.33

AVG (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
7320.913	49.78	54.00	-4.22	265.60	4.00	Vertical	1M	-10.18
9760.112	34.82	54.00	-19.18	0.00	1.00	Horizontal	1M	-7.69
16583.146	39.38	54.00	-14.62	360.00	4.00	Horizontal	1M	1.58
16789.54	39.53	54.00	-14.47	265.70	1.00	Horizontal	1M	2.12
17481.463	38.82	54.00	-15.18	360.00	1.00	Vertical	1M	2.16
17779.917	39.28	54.00	-14.72	265.60	4.00	Vertical	1M	2.33

BLE (NTB-Touchscreen) Tx Mid Channel, RE 18-25 GHz



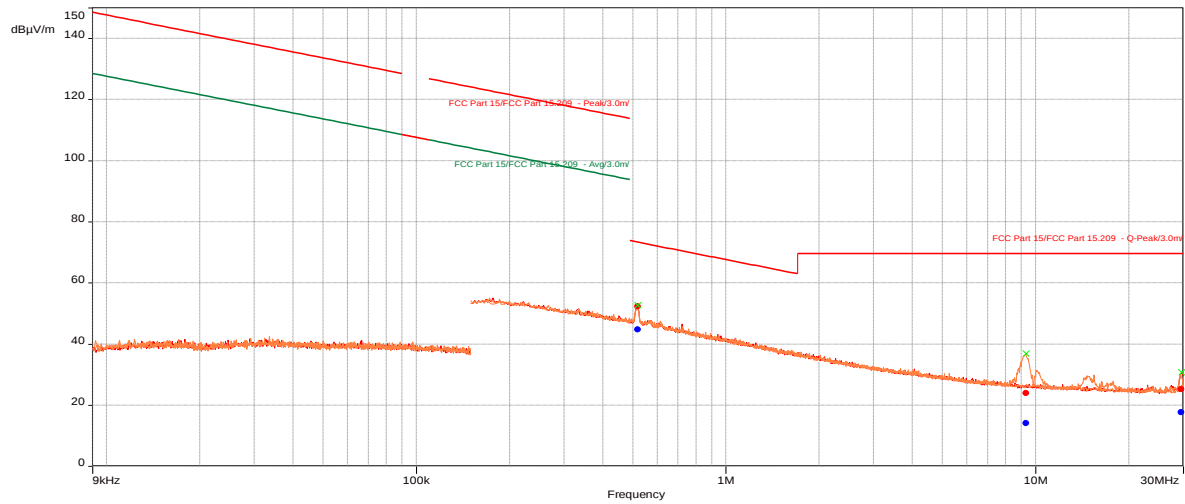
04:20:49 PM 04/28/2024

Notes: Testing was performed manually around the EUT at 10cm distance. No emission was detected above the test instrument noise floor. The cable loss, antenna factor, filter loss, and pre-amp gain were compensated as transducer factor (TDF) and the distance factor was compensated as Reference Offset

BLE (NTB-Touchscreen) Tx High Channel, RE 9 kHz-30 MHz

Test Information:

Date and Time	4/26/2024 12:34:35 PM
Client and Project Number	Sargent Assa Abloy (Touchscreen/Push Button)_04-26-2024
Engineer	Kouma Sinn
Temperature	23 deg C
Humidity	18 %
Atmospheric Pressure	1022 mbars
Comments	Scan 3_BLE (Touchscreen_Push Button), High Ch, RE 9kHz-30MHz Red Loop antenna, Electric Field, 3M Location (FCC 15.209)

Graph:**Results:**

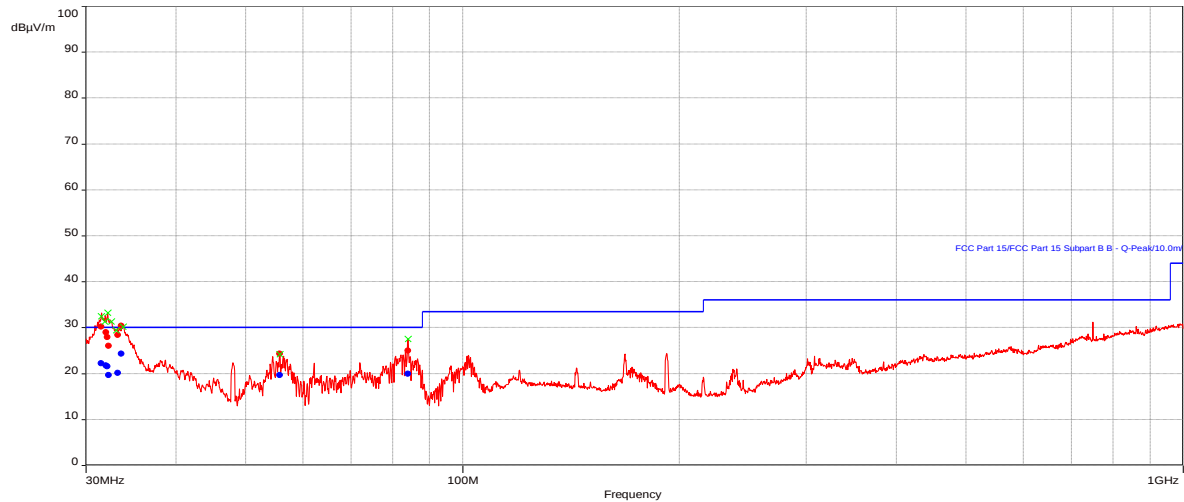
QuasiPeak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
9.30594	14.19	69.54	-55.35	142.30	Vertical	9k	0.10	11.23
0.51844	44.80	73.30	-28.50	207.30	Horizontal	9k	0.10	11.04
29.54788	17.63	69.54	-51.91	39.30	Horizontal	9k	0.10	9.14

BLE (NTB-Touchscreen) Tx High Channel, RE 30-1000 MHz

Test Information:

Date and Time	4/26/2024 1:50:10 PM
Client and Project Number	Sargent Assa Abloy (Touchscreen/Push Button)_04-26-2024
Engineer	Kouma Sinn
Temperature	23 deg C
Humidity	18 %
Atmospheric Pressure	1022 mbars
Comments	Scan 4 BLE (Touchscreen_Push Button), High Ch, RE 30-1000 MHz

Graph:**Results:**

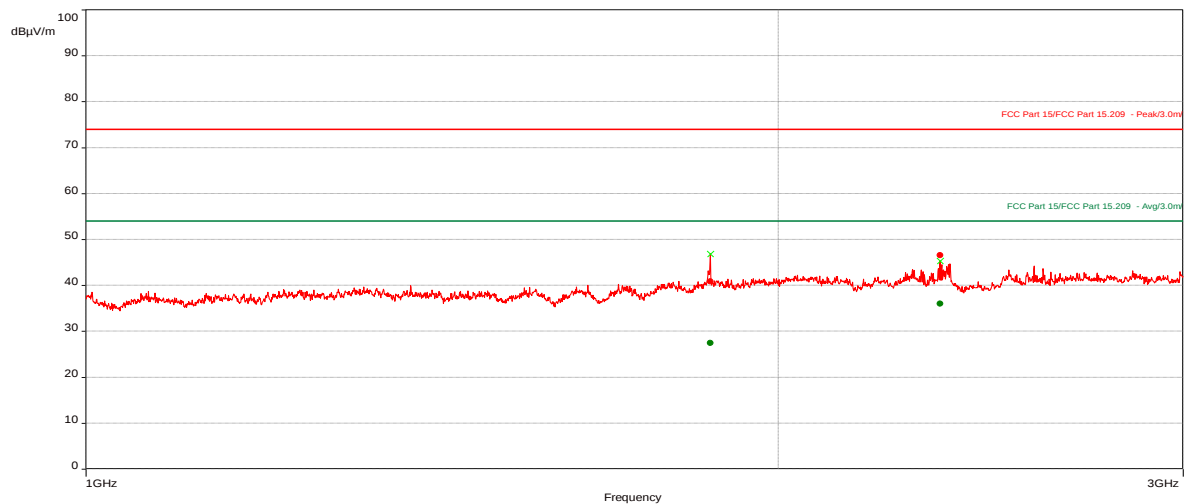
QuasiPeak (PASS) (8)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
31.5121	22.27	30.00	-7.73	6.80	1.54	Vertical	120k	0.10	-13.54
32.0246	21.77	30.00	-8.23	6.60	1.70	Vertical	120k	0.10	-13.90
32.1331	21.63	30.00	-8.37	12.20	1.62	Vertical	120k	0.10	-13.96
32.2821	19.73	30.00	-10.27	272.90	3.21	Vertical	120k	0.10	-14.04
33.2514	20.20	30.00	-9.80	147.60	1.47	Vertical	120k	0.10	-14.63
33.6005	24.38	30.00	-5.62	121.10	1.76	Vertical	120k	0.10	-14.87
55.7594	19.69	30.00	-10.31	109.90	2.77	Vertical	120k	0.10	-26.15
83.931	19.94	30.00	-10.06	153.20	4.00	Vertical	120k	0.10	-25.51

BLE (NTB-Touchscreen) Tx High Channel, RE 1-3 GHz

Test Information:

Date and Time	5/3/2024 9:29:26 AM
Client and Project Number	Sargent Assa Abloy (Touchscreen & Push Button, G105779861)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1013 mbars
Comments	Scan 3 BLE (NTB-Touchscreen) Tx High Channel, RE 1 to 3 GHz

Graph:**Results:**

Peak (PASS) (2)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
1869.174	40.91	74	-33.09	0.00	4.00	Vertical	1M	-19.16
2352.101	46.62	74	-27.38	309.30	2.51	Horizontal	1M	-17.88

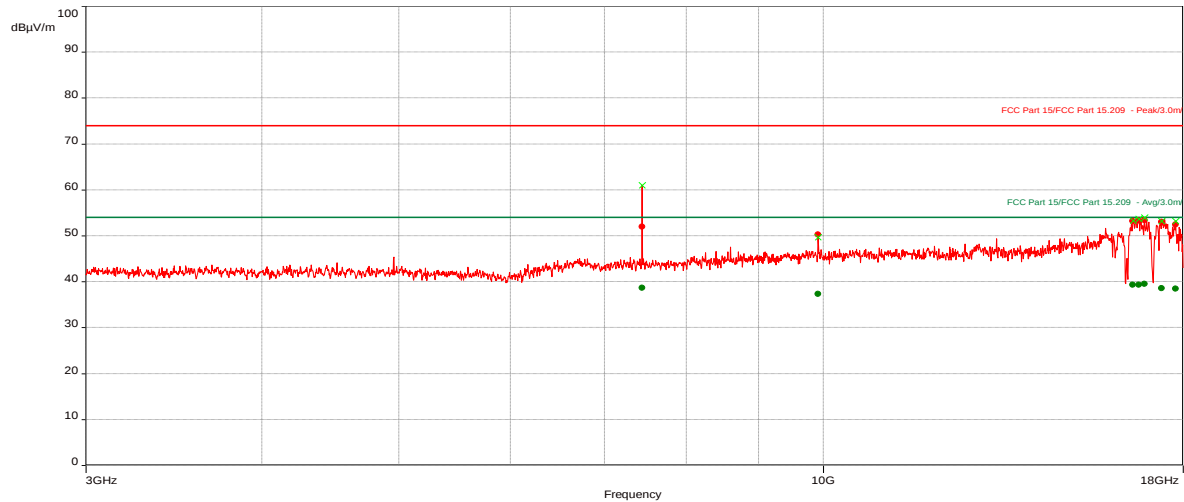
AVG (PASS) (2)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
1869.174	27.50	54.00	-26.50	0.00	4.00	Vertical	1M	-19.16
2352.101	36.03	54.00	-17.97	309.30	2.51	Horizontal	1M	-17.88

BLE (NTB-Touchscreen) Tx High Channel, RE 3-18 GHz

Test Information:

Date and Time	5/3/2024 10:46:31 AM
Client and Project Number	Sargent Assa Abloy (Touchscreen & Push Button, G105779861)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1013 mbars
Comments	Scan 4 BLE (NTB-Touchscreen) Tx High Channel, RE 3-18 GHz

Graph:**Results:**

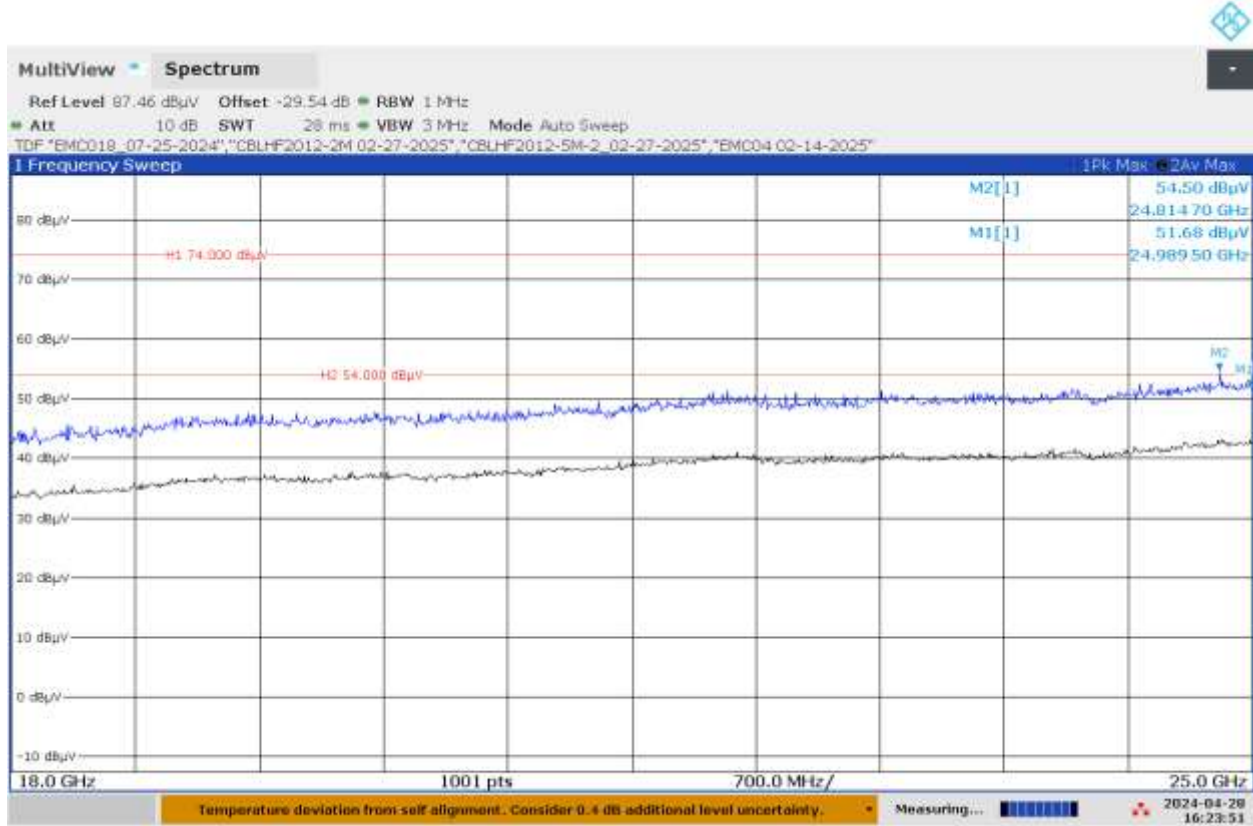
Peak (PASS) (7)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
7440.9	51.99	74	-22.01	0.00	4.00	Vertical	1M	-10.16
9919.138	50.26	74	-23.74	360.00	1.00	Horizontal	1M	-7.40
16585.31	53.26	74	-20.74	265.60	1.00	Horizontal	1M	1.58
16743.097	53.29	74	-20.71	0.00	1.00	Vertical	1M	2.05
16899.128	53.43	74	-20.57	360.00	1.00	Vertical	1M	2.13
17381.974	53.05	74	-20.95	0.00	1.00	Vertical	1M	1.99
17780.851	52.50	74	-21.5	0.00	1.00	Horizontal	1M	2.33

AVG (PASS) (7)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
7440.9	38.70	54.00	-15.30	0.00	4.00	Vertical	1M	-10.16
9919.138	37.32	54.00	-16.68	360.00	1.00	Horizontal	1M	-7.40
16585.31	39.36	54.00	-14.64	265.60	1.00	Horizontal	1M	1.58
16743.097	39.41	54.00	-14.59	0.00	1.00	Vertical	1M	2.05
16899.128	39.52	54.00	-14.48	360.00	1.00	Vertical	1M	2.13
17381.974	38.57	54.00	-15.43	0.00	1.00	Vertical	1M	1.99
17780.851	38.52	54.00	-15.48	0.00	1.00	Horizontal	1M	2.33

BLE (NTB-Touchscreen) Tx High Channel, RE 18-25 GHz



04:23:51 PM 04/28/2024

Notes: Testing was performed manually around the EUT at 10cm distance. No emission was detected above the test instrument noise floor. The cable loss, antenna factor, filter loss, and pre-amp gain were compensated as transducer factor (TDF) and the distance factor was compensated as Reference Offset

Product Standard: CFR47 FCC Part 15.247, CFR47 FCC Part 15 15.225 CFR47 FCC Part 15 15.209, CFR47 FCC Part 15.205, RSS-247 RSS-210					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
04/08/2024	Kouma Sinn <i>KPS</i>	Vathana F. Ven <i>VSV</i>	Battery Powered	Continuous Transmitting	23	25	1010
04/15/2024	Vathana F. Ven <i>VSV</i>	Kouma Sinn <i>KPS</i>	Battery Powered	Continuous Transmitting	22	35	999
04/17/2024	Vathana F. Ven <i>VSV</i>	Kouma Sinn <i>KPS</i>	Battery Powered	Continuous Transmitting	23	28	1008
04/26/2024	Kouma Sinn <i>KPS</i>	Vathana F. Ven <i>VSV</i>	Battery Powered	Continuous Transmitting	23	18	1022
04/28/2024	Kouma Sinn <i>KPS</i>	Vathana F. Ven <i>VSV</i>	Battery Powered	Continuous Transmitting	23	29	1012
05/03/2024	Kouma Sinn <i>KPS</i>	Vathana F. Ven <i>VSV</i>	Battery Powered	Continuous Transmitting	22	42	1013
05/05/2024	Kouma Sinn <i>KPS</i>	Vathana F. Ven <i>VSV</i>	Battery Powered	Continuous Transmitting	23	37	1017

Deviations, Additions, or Exclusions: None

11 Digital Device Radiated Spurious Emissions

11.1 Method

Tests are performed in accordance with FCC Part 15 Subpart B, ISED ICES-003, 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 dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

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 dB μ V 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.

11.2 Limit

§15.109 Radiated emission limits.

The field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values.

Frequency of emission (MHz)	Field strength (microvolts/meter)	Field strength (dB μ V/m)
30-88	100	40.00
88-216	150	43.52
216-960	200	46.02
Above 960	500	54.00

Notes: The limits for ISSED ICES-003 are the same as the FCC limits above.

11.3 Test Equipment Used:

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
IW001'	2 meter cable	Insulated Wire	2801-NPS	001	07/19/2023	07/19/2024
145-406'	10m Track A In-floor Cable #1	Huber + Suhner	sucoflex 160-19220mm	001	07/19/2023	07/19/2024
145-414'	Cable 145-414	Huber + Suhner	3m Track A cable	145-414	07/19/2023	07/19/2024
147-326'	Immunity Cable	Huber + Suhner	Sucoflex 106	233089-005	07/19/2023	07/19/2024
PRE11'	50dB gain pre-amp	Pasternack	PRE11	PRE11	09/15/2023	09/15/2024
145106'	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	09/14/2023	09/14/2024
ROS011'	ESW44 receiver 1Hz-44GHz	Rhode and Schwarz	ESW44	103296	06/28/2023	06/28/2024

Test equipment used from 1-13 GHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007'	Weather Station Vantage Vue	Davis	6250	MS191212003	03/27/2024	03/27/2025
IW001'	2 meter cable	Insulated Wire	2801-NPS	001	07/19/2023	07/19/2024
HS001'	DC-18GHz cable 1.5m long	Huber & Suhner	SucoFlex 106A	HS001	01/30/2024	01/30/2025
HS002'	DC-18GHz cable 1.5M long	Huber & Suhner	SucoFlex 106A	HS002	07/19/2023	07/19/2024
145-408'	10m Chamber - 3m Track B In-floor Cable	Huber + Suhner	sucoflex 106-11000mm	001	07/19/2023	07/19/2024
PRE12'	Pre-amplifier	Com Power	PAM-118A	18040117	12/26/2023	12/26/2024
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	10/16/2023	10/16/2024
ROS011'	ESW44 receiver 1Hz-44GHz	Rhode and Schwarz	ESW44	103296	06/28/2023	06/28/2024

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	Nexio	2022.0.27.0

11.4 Results:

The sample tested was found to Comply.

11.5 Setup Photographs:

BLE (NTB-Push Button), 30-1000 MHz



BLE (NTB-Push Button), 1-13 GHz



BLE (NTB-Touchscreen), RE 30-1000 MHz



BLE (NTB-Touchscreen), RE 1-13 GHz

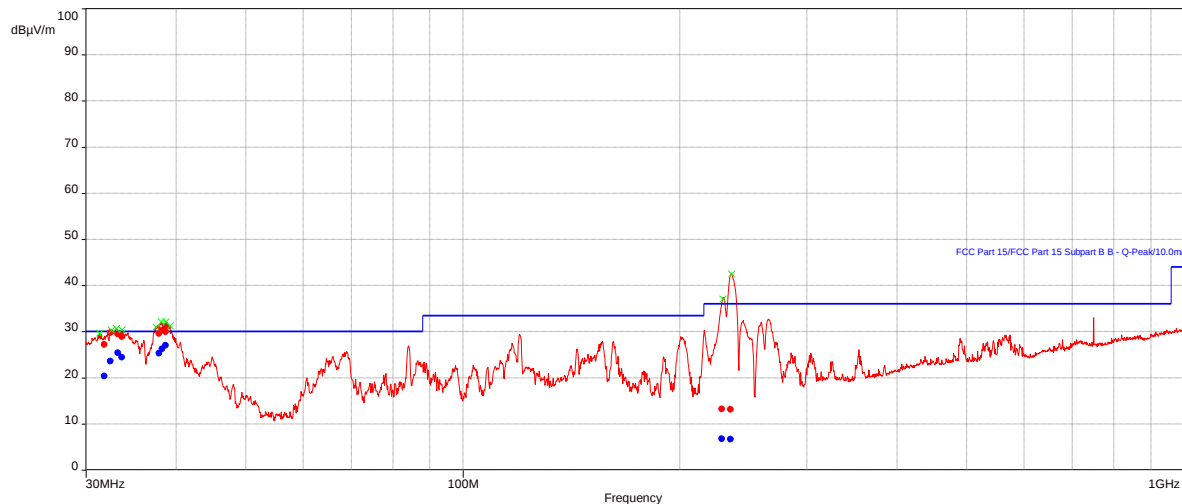
--Photo not available--

11.6 Plots/Data:

BLE (NTB-Push Button), Rx High Channel, RE 30-1000 MHz

Test Information:

Date and Time	4/28/2024 5:49:51 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	23 deg C
Humidity	29 %
Atmospheric Pressure	1012 mbars
Comments	Scan 3_ferrite on cable, BLE (Push Button), Rx High Ch RE 30-1000MHz Receiver mode

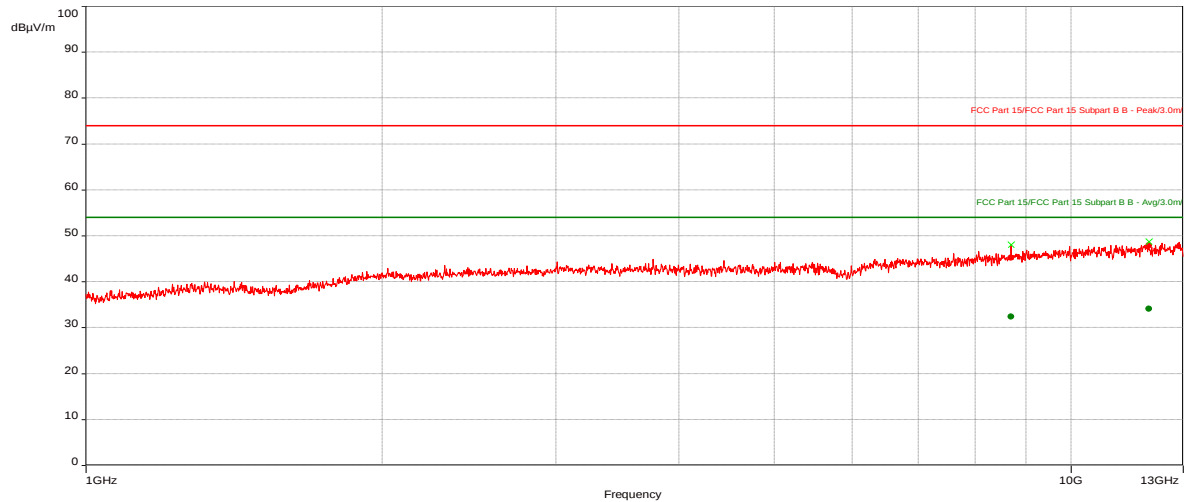
Graph:**Results:****QuasiPeak (PASS) (9)**

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
31.7973	20.34	30.00	-9.66	338.20	1.70	Vertical	120k	0.10	-13.74
32.4587	23.55	30.00	-6.45	213.40	1.93	Vertical	120k	0.10	-14.15
33.1977	25.43	30.00	-4.57	110.10	1.00	Vertical	120k	0.10	-14.60
33.6376	24.42	30.00	-5.58	28.30	1.60	Vertical	120k	0.10	-14.90
37.925	25.30	30.00	-4.70	164.60	1.47	Vertical	120k	0.10	-17.75
38.2692	26.23	30.00	-3.77	55.70	1.31	Vertical	120k	0.10	-17.97
38.7149	27.00	30.00	-3.00	28.30	1.00	Vertical	120k	0.10	-18.28
228.7783	6.74	36.00	-29.26	82.80	1.31	Vertical	120k	0.10	-20.83
235.2251	6.66	36.00	-29.34	218.60	3.13	Vertical	120k	0.10	-20.47

BLE (NTB-Push Button), Rx High Channel, RE 1-13 GHz

Test Information:

Date and Time	5/5/2024 1:40:18 PM
Client and Project Number	Sargent Assa Abloy (Touchscreen & Push Button, G105779861)
Engineer	Kouma Sinn
Temperature	23 deg C
Humidity	37 %
Atmospheric Pressure	1017 mbars
Comments	Scan 8 BLE (NTB-Push Button) Rx High Channel, RE 1-13 GHz

Graph:**Results:**

Peak (PASS) (2)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
8698.034	45.23	74	-28.77	0.00	3.94	Vertical	1M	-9.30
11999.587	47.93	74	-26.07	0.00	3.94	Vertical	1M	-4.60

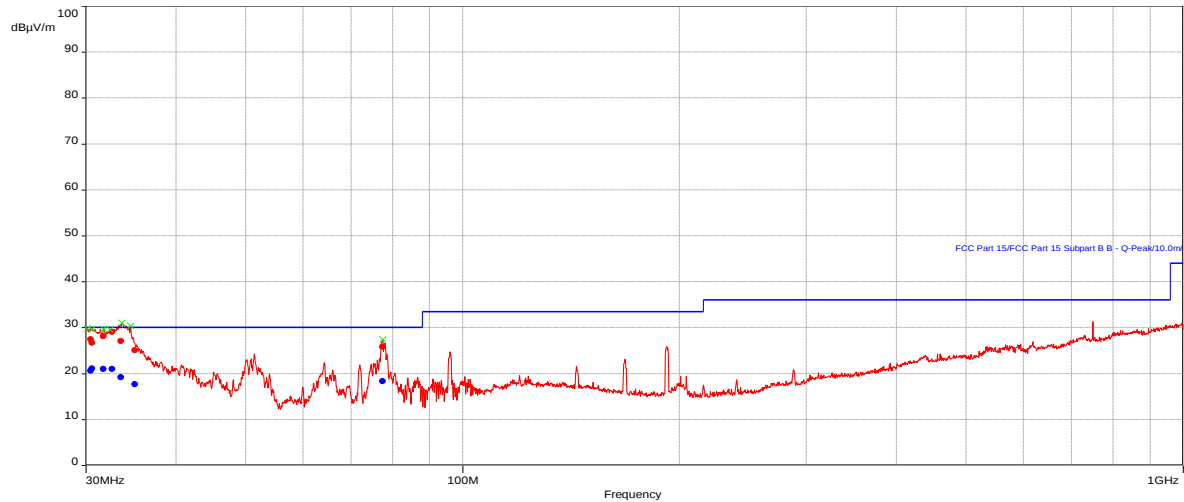
AVG (PASS) (2)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
8698.034	32.39	54.00	-21.61	0.00	3.94	Vertical	1M	-9.30
11999.587	34.11	54.00	-19.89	0.00	3.94	Vertical	1M	-4.60

BLE (NTB-Touchscreen), Rx High Channel, RE 30-1000 MHz

Test Information:

Date and Time	4/26/2024 3:09:52 PM
Client and Project Number	Sargent Assa Abloy (Touchscreen/Push Button)_04-26-2024
Engineer	Kouma Sinn
Temperature	23 deg C
Humidity	18 %
Atmospheric Pressure	1022 mbars
Comments	Scan 7 BLE (Touchscreen_Push Button), Rx High Ch, RE 30-1000 MHz

Graph:**Results:**

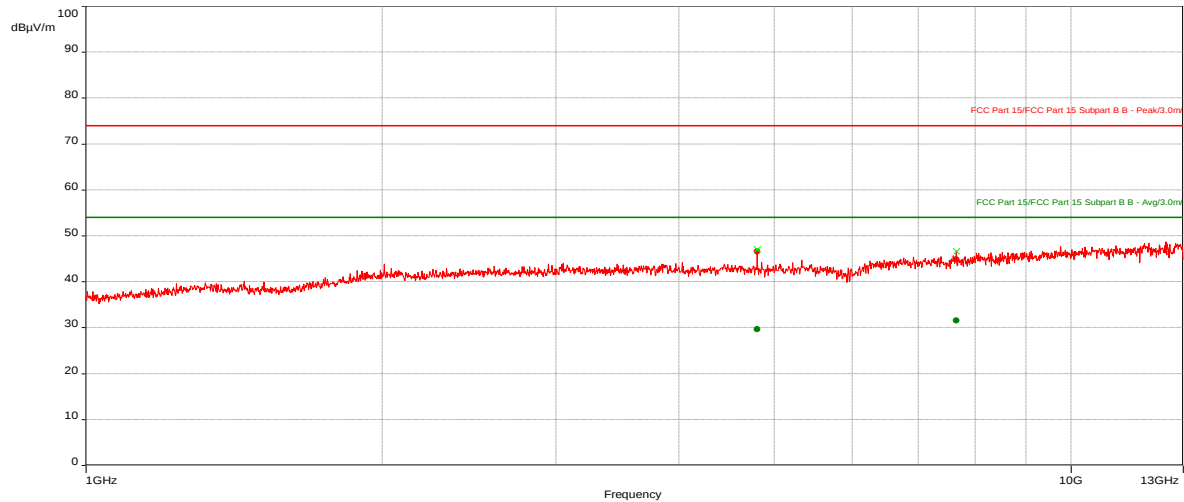
QuasiPeak (PASS) (7)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
30.475	20.65	30.00	-9.35	310.90	4.00	Vertical	120k	0.10	-12.89
30.5955	21.15	30.00	-8.85	245.60	3.45	Vertical	120k	0.10	-12.96
31.7445	20.98	30.00	-9.02	22.90	1.32	Vertical	120k	0.10	-13.70
32.6379	21.06	30.00	-8.94	6.70	1.63	Vertical	120k	0.10	-14.25
33.5358	19.22	30.00	-10.78	186.00	4.00	Vertical	120k	0.10	-14.83
35.0719	17.66	30.00	-12.34	66.30	2.85	Vertical	120k	0.10	-15.79
77.3956	18.34	30.00	-11.66	82.80	4.00	Vertical	120k	0.10	-25.23

BLE (NTB-Touchscreen), Rx High Channel, RE 1-13 GHz

Test Information:

Date and Time	5/5/2024 1:12:52 PM
Client and Project Number	Sargent Assa Abloy (Touchscreen & Push Button, G105779861)
Engineer	Kouma Sinn
Temperature	23 deg C
Humidity	37 %
Atmospheric Pressure	1017 mbars
Comments	Scan 7 BLE (NTB-Touchscreen) Rx High Channel, RE 1-13 GHz

Graph:**Results:**

Peak (PASS) (2)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
4804.549	46.62	74.00	-27.38	360.00	1.00	Vertical	1M	-13.55
7648.389	44.86	74.00	-29.14	212.40	4.00	Horizontal	1M	-10.00

AVG (PASS) (2)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
4804.549	29.64	54.00	-24.36	360.00	1.00	Vertical	1M	-13.55
7648.389	31.53	54.00	-22.47	212.40	4.00	Horizontal	1M	-10.00

Product Standard: FCC 47CFR15 Part 15 Subpart B, ISSED ICES-003					Limit applied: See Report Section 11.2 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
04/08/2024	Kouma Sinn <i>KPS</i>	Vathana Ven <i>VSV</i>	Internal battery	Receive	23	25	1010
04/26/2024	Kouma Sinn <i>KPS</i>	Vathana Ven <i>VSV</i>	Internal battery	Receive	23	18	1022
05/05/2024	Kouma Sinn <i>KPS</i>	Vathana Ven <i>VSV</i>	Internal battery	Receive	23	37	1017

Deviations, Additions, or Exclusions: None

12 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	05/13/2024	105779861BOX-006	KPS <i>KPS</i>	VFV <i>VFV</i>	Original Issue