Sargent Manufacturing Company

TEST REPORT

SCOPE OF WORK
Emissions Testing – Accentra NTT-Touch Screen and Accentra NTT- Push Button

REPORT NUMBER
105779713BOX-006

ISSUE DATE
September 18, 2024

[REVISED DATE]
Original issue

DOCUMENT CONTROL NUMBER
Non-Specific Radio Report Shell Rev. October 2022

EMISSIONS TEST REPORT

(FULL COMPLIANCE)

Report Number: 105779713BOX-006
Project Number: G105779713

Report Issue Date: September 18, 2024

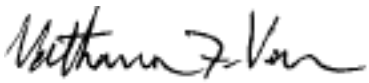
Model(s) Tested:	Accentra NTT-Touch Screen and Accentra NTT- Push Button
Model(s) Partially Tested:	None
Model(s) Not Tested but declared equivalent by the client:	None

Standards:
CFR47 FCC Part 15 Subpart C, Section 15.247: 09/2024
CFR47 FCC Part 15 Subpart C, Section 15.225: 09/2024
CFR47 FCC Part 15 Subpart C, Section 15.209: 09/2024
CFR47 FCC Part 15 Subpart C, Section 15.205: 09/2024
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

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



Vathana Ven / Senior Staff Engineer

Report reviewed by

Kouma / Senior Staff Engineer

Table of Contents

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	Transmitter spurious emissions CFR47 FCC Part 15 Subpart C, Section 15.247 (d): 09/2024 CFR47 FCC Part 15 Subpart C, Section 15.225 (b) (c) (d): 09/2024 RSS-247 Issue 3 August 2023 RSS-210 Issue 10 December 2019	Pass
7	Digital Device Radiated Spurious Emissions CFR47 FCC Part 15 Subpart B 15.109: 09/2024 ISED ICES-003 Issue 7 October 2020	Pass
---	AC Mains Conducted Emissions FCC 47CFR Part 15.107: 09/2024 ISED ICES-003 Issue 7 October 2020	N/A*
8	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 (Touch Screen)	Sargent Manufacturing Company	NTT	RX0VN700777, KL0VN600706
Electronic access control system with (Push Button)	Sargent Manufacturing Company	NTT	KL0VN6000707, 019XNC00002

Receive Date:	05/01/2024, 05/06/2024
Received Condition:	Good
Type:	Production
Test Date(s):	05/01/2024, 05/02/2024, 05/06/2024

Description of Equipment Under Test (provided by client)
Electronics access control system. It contains the radio modules as listed in the Radio/Receiver Characteristics table

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
6 V (4 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-NTT600TSACC and U4A-NTT600PBACC
Modulation Type(s)	See FCC ID: U4A-NTT600TSACC and U4A-NTT600PBACC
Maximum Field Strength (NTT Push Button)	See FCC ID: U4A-NTT600TSACC and U4A-NTT600PBACC
Maximum Field Strength (NTT Touch Screen)	See FCC ID: U4A-NTT600TSACC and U4A-NTT600PBACC
Test Channels	13.56 MHz
Occupied Bandwidth	See FCC ID: U4A-NTT600TSACC and U4A-NTT600PBACC
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	Standalone
Antenna Type and Gain	See FCC ID: U4A-NTT600TSACC and U4A-NTT600PBACC

Bluetooth Low Energy (BLE)

Radio/Receiver Characteristics	
Frequency Band(s)	See FCC ID: U4A-NTT600TSACC and U4A-NTT600PBACC
Modulation Type(s)	See FCC ID: U4A-NTT600TSACC and U4A-NTT600PBACC
Maximum Output Power (NTT Push Button)	See FCC ID: U4A-NTT600TSACC and U4A-NTT600PBACC
Maximum Output Power (NTT Touch Screen)	See FCC ID: U4A-NTT600TSACC and U4A-NTT600PBACC
Test Channels	Low, Mid, and High Channels
Occupied Bandwidth	See FCC ID: U4A-NTT600TSACC and U4A-NTT600PBACC
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	Standalone
Antenna Type and Gain	See FCC ID: U4A-NTT600TSACC and U4A-NTT600PBACC

Notes: PCB changes. No changes to the radio circuitry.

Variant Models:

Intertek does not make any claims of compliance for samples or variants which were not tested.

Pushbutton:
NTT613-ACC
NTT613-NR

Touchscreen:
NTT623-ACC
NTT623-NR

5 System Setup and Method

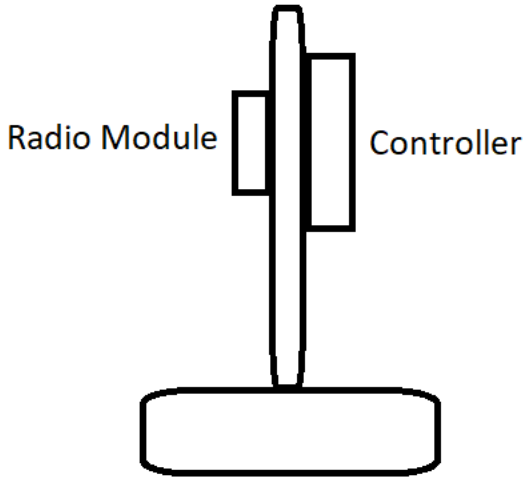
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
--	None	N/A	N/A	N/A	N/A

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None	N/A	N/A	N/A

5.1 Method:

Configuration as required by ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02: 04/2019, RSS-247 Issue 3 August 2023, RSS-210 Issue 10 December 2019, RSS-Gen Issue 5 April 2018 +Amendment 1 March 2019, ANSI C63.4:2014.

5.2 EUT Block Diagram:



6 Transmitter spurious emissions

6.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C 15.247, FCC Part 15 Subpart B, RSS 247, ISED 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)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

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

Sample Calculation

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

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

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

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This

value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/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.

6.2 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.

Limits – FCC Part §15.209 (a) The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100	3
88–216	150	3
216–960	200	3
Above 960	500	3

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

6.3 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	sucoflex 106-11000mm	001	07/19/2023	07/19/2024
145019'	Active Loop Antenna (9 KHz to 30 MHz)	EMCO	6502/1	9902-3267	03/05/2024	03/05/2025
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

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

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	Nexio	2022.0.27.0

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	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
REA008	band reject filter 2.4GHz	Reactel, Inc	12RX7-2441.75-x140 S	17-01	10/31/2023	10/31/2024

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	Nexio	2022.0.27.0

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	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
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
REA006'	18GHz High Pass Filter	Reactel, Inc	7HS-18G/40G K11	(06)1	04/23/2024	04/23/2025
EMC04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	02/13/2024	02/13/2025

Software Utilized:

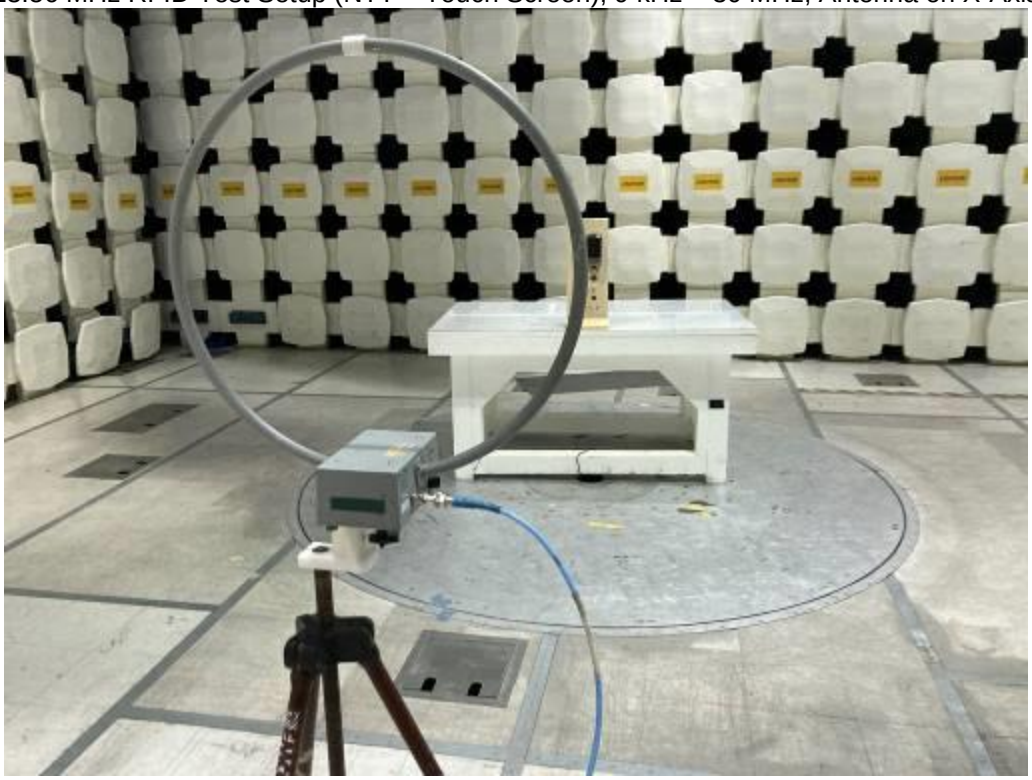
Name	Manufacturer	Version
None	N/A	N/A

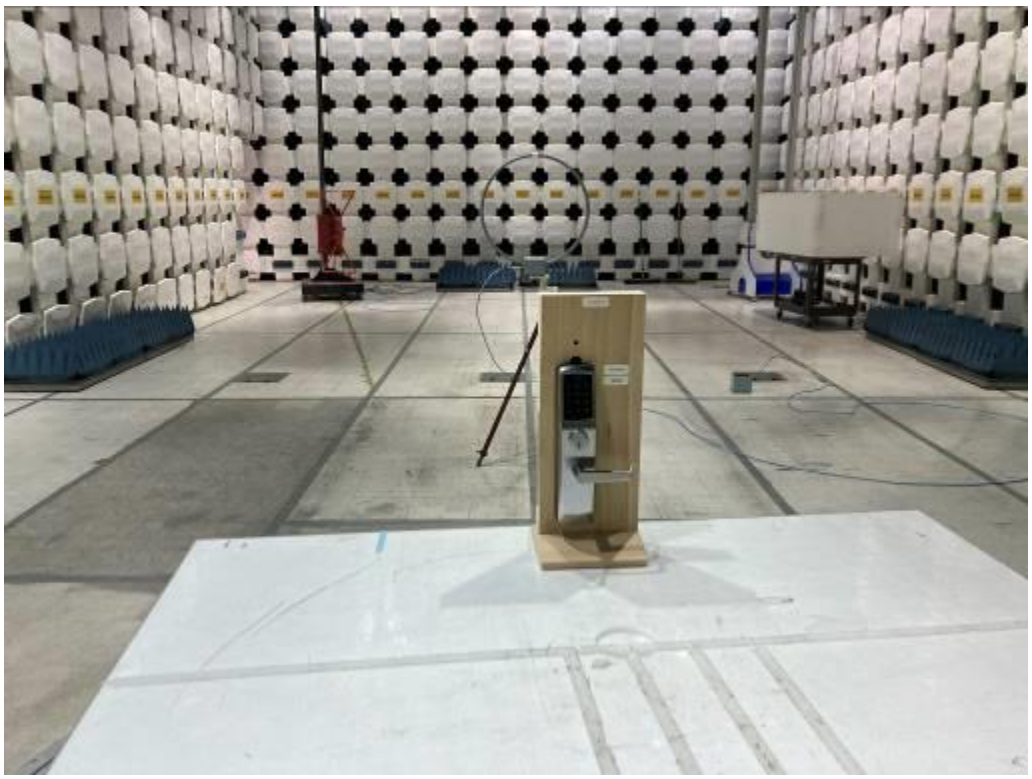
6.4 Results:

The sample tested was found to Comply.

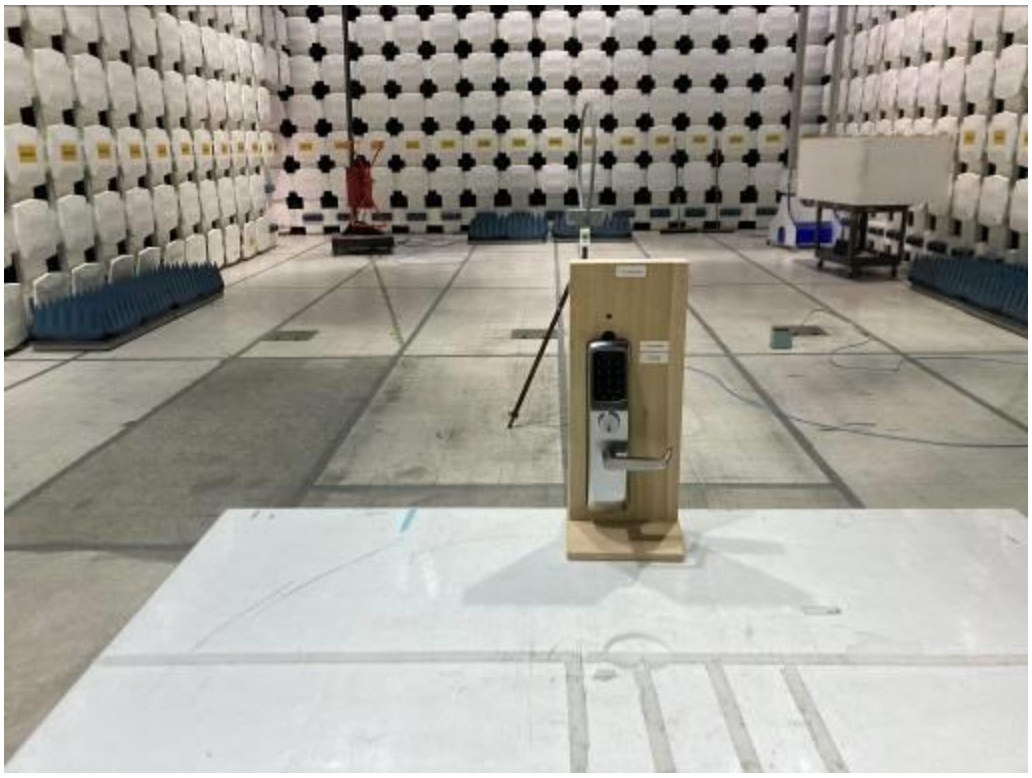
6.5 Setup Photographs:

13.56 MHz RFID Test Setup (NTT – Touch Screen), 9 kHz – 30 MHz, Antenna on X-Axis

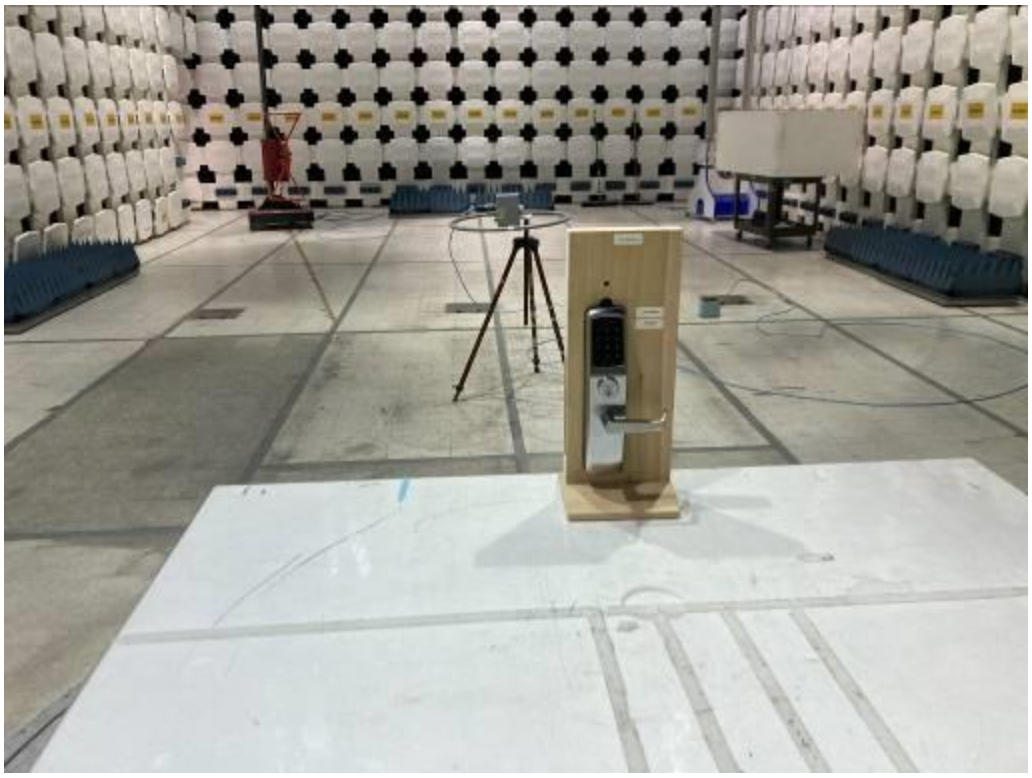




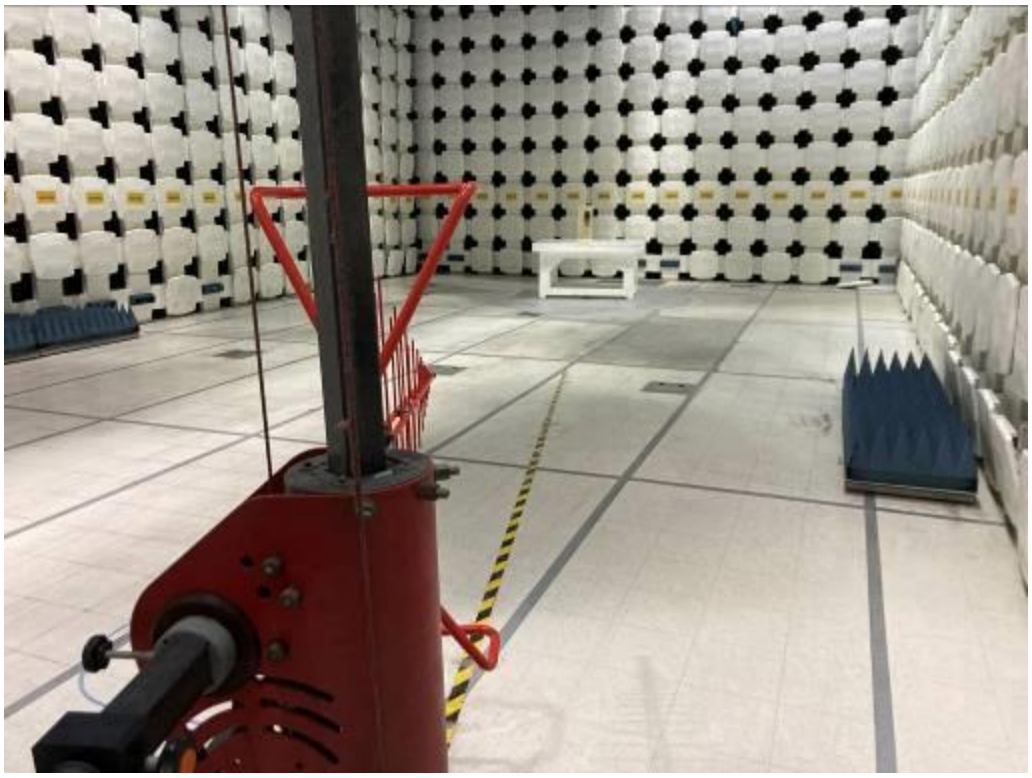
13.56 MHz RFID Test Setup (NTT – Touch Screen), 9 kHz – 30 MHz, Antenna on Y-Axis



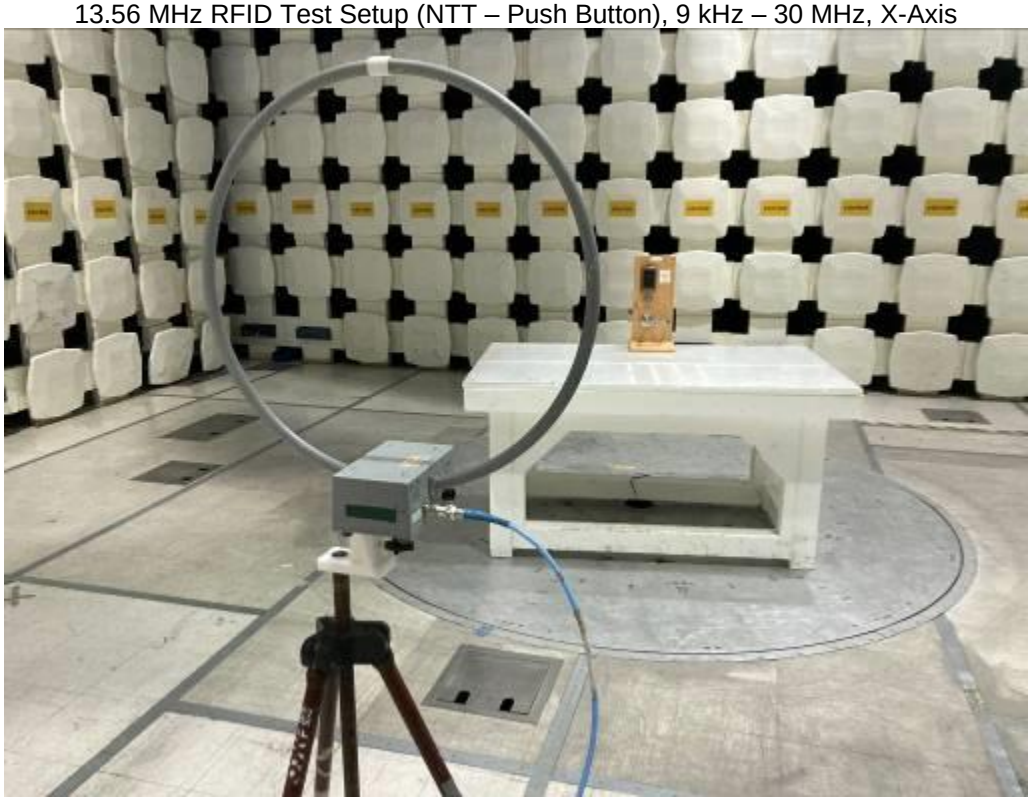
13.56 MHz RFID Test Setup (NTT – Touch Screen), 9 kHz – 30 MHz, Antenna on Z-Axis

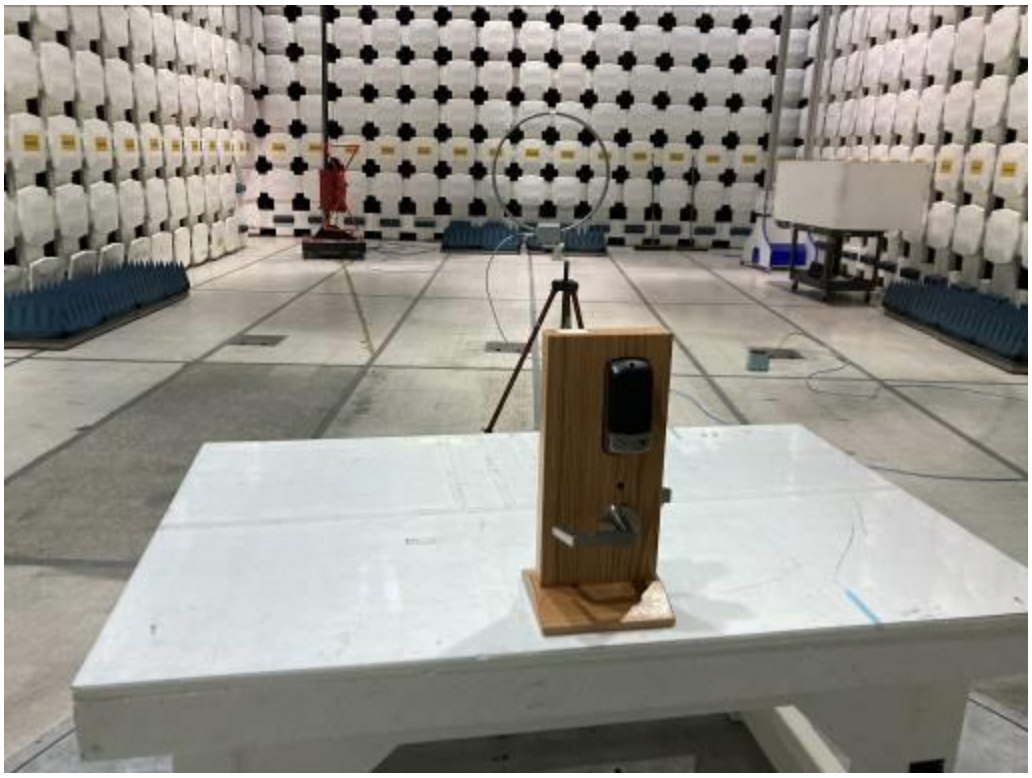


13.56 MHz RFID Test Setup (NTT – Touch Screen), 30 - 1000 MHz

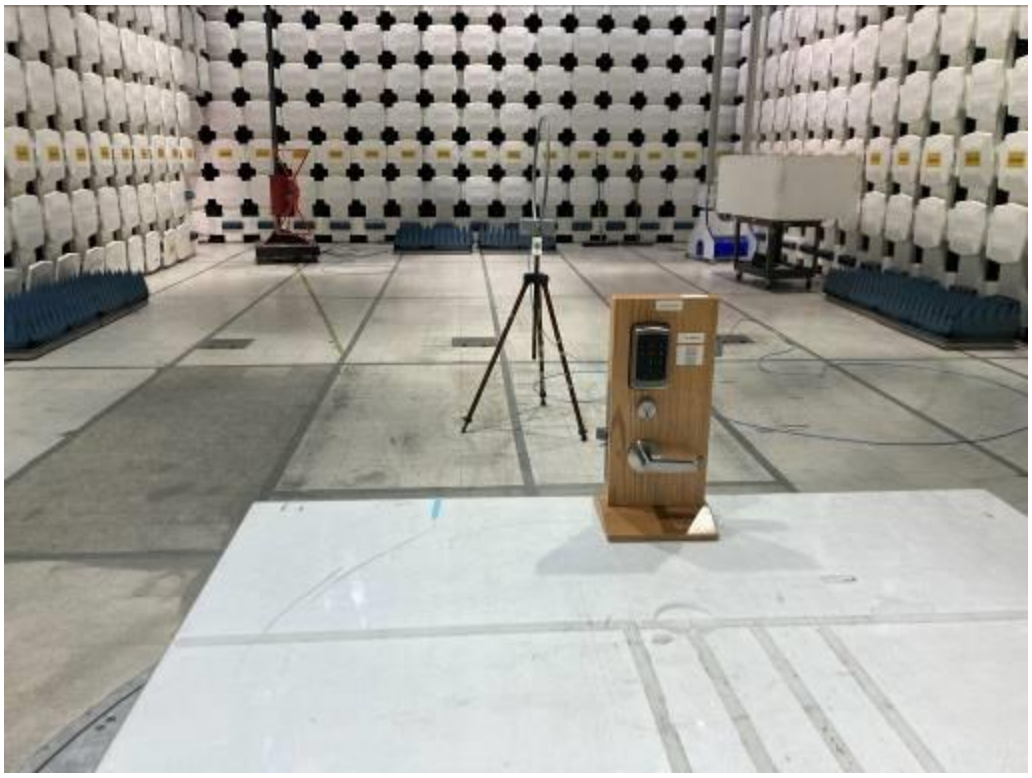


13.56 MHz RFID Test Setup (NTT – Push Button), 9 kHz – 30 MHz, X-Axis

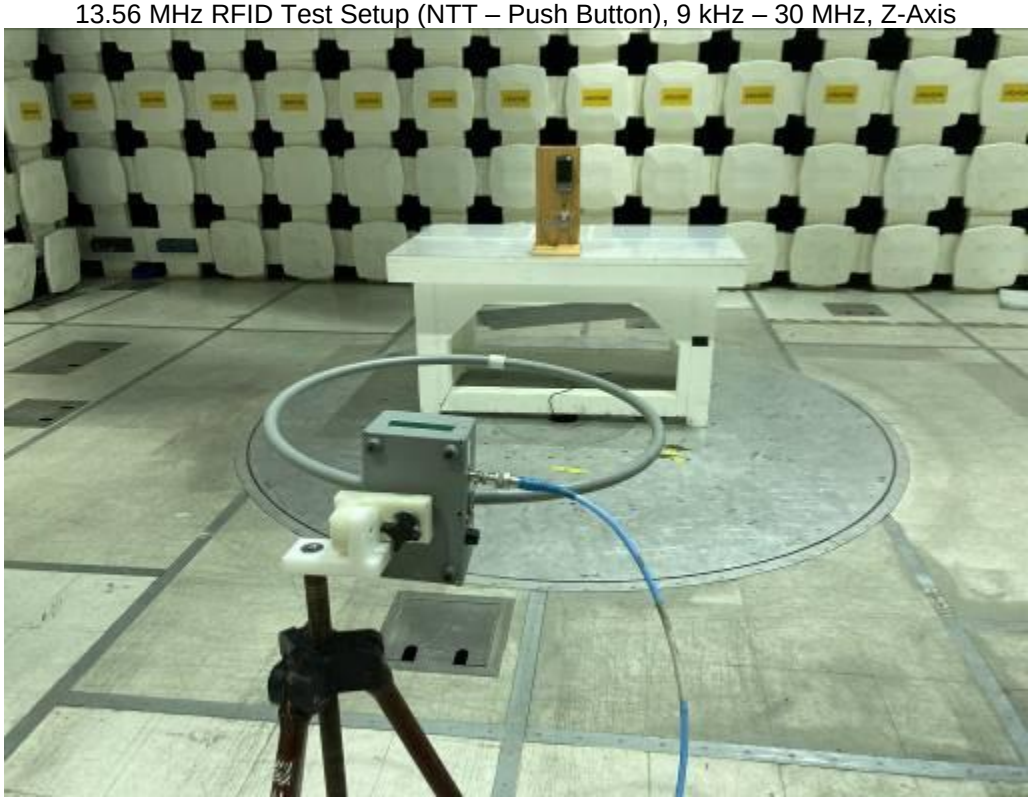




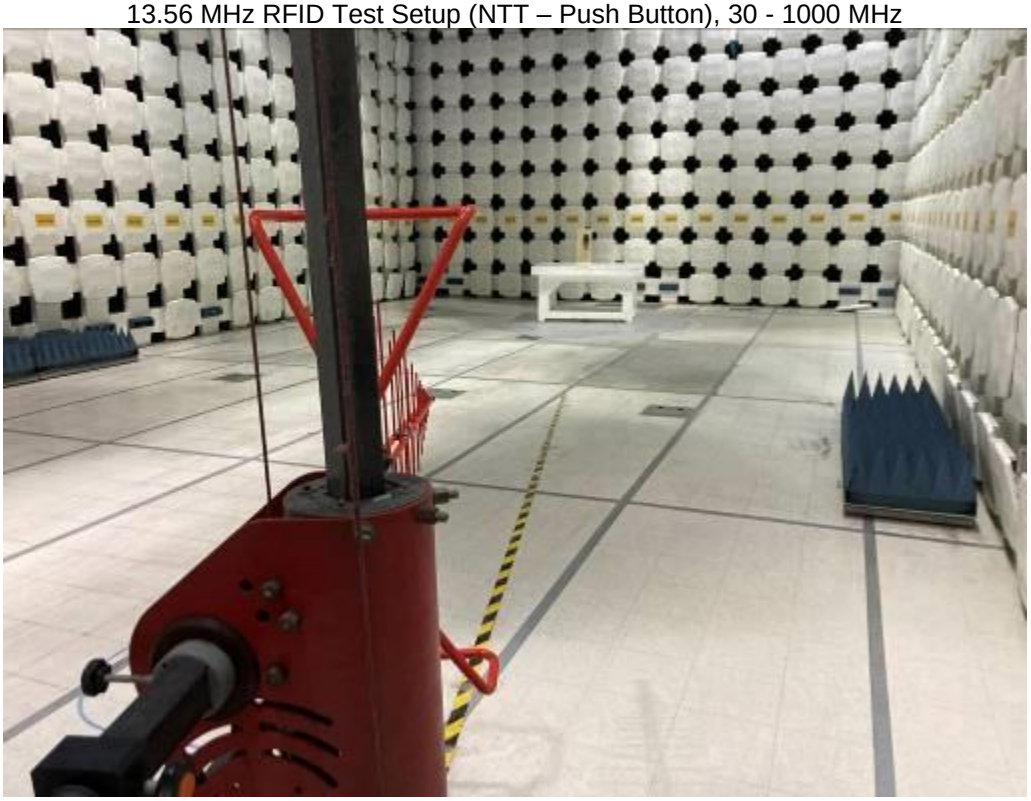
13.56 MHz RFID Test Setup (NTT – Push Button), 9 kHz – 30 MHz, Y-Axis



13.56 MHz RFID Test Setup (NTT – Push Button), 9 kHz – 30 MHz, Z-Axis

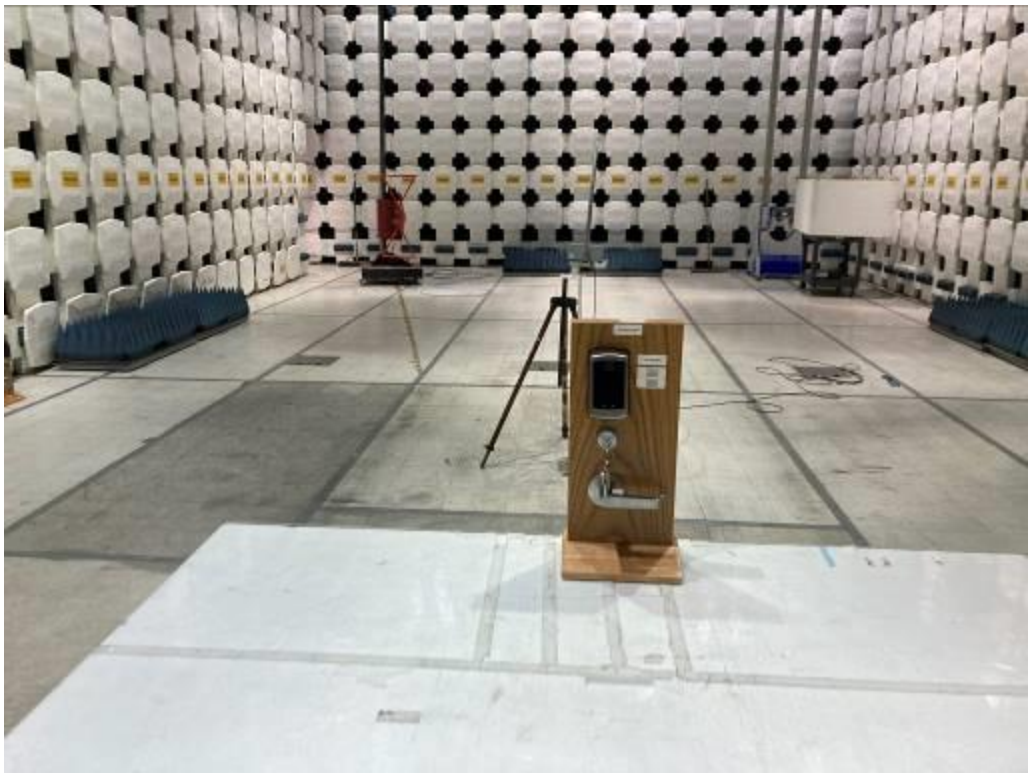


13.56 MHz RFID Test Setup (NTT – Push Button), 30 - 1000 MHz

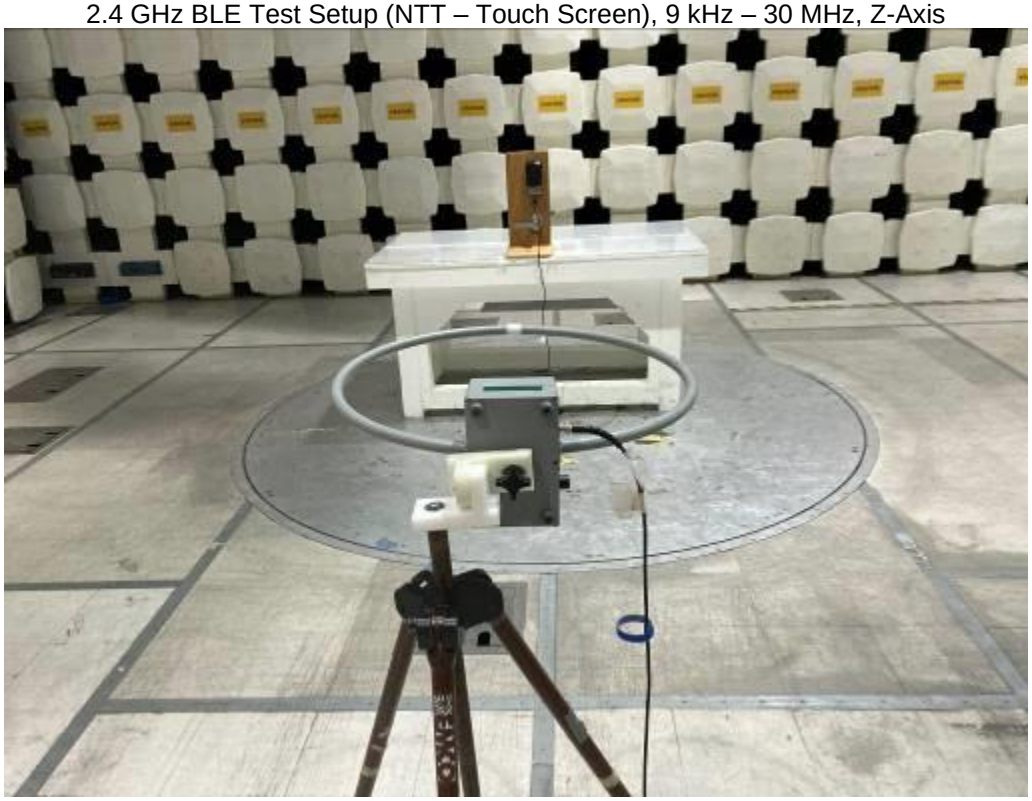


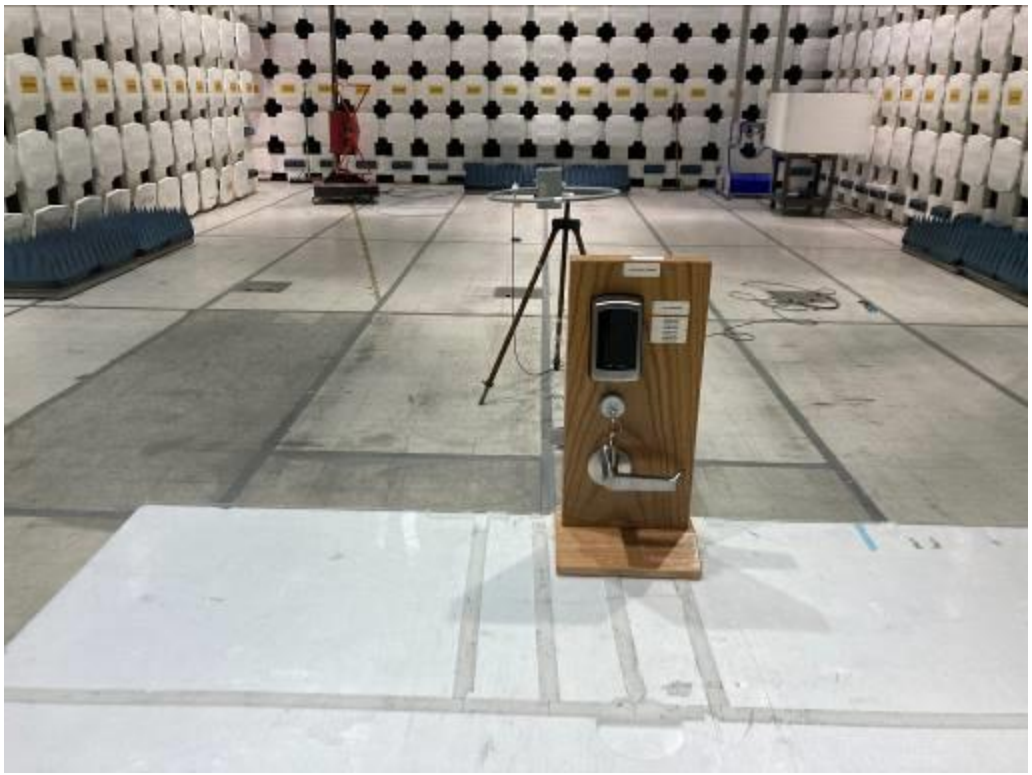
2.4 GHz BLE Test Setup (NTT – Touch Screen), 9 kHz – 30 MHz, X-Axis

2.4 GHz BLE Test Setup (NTT – Touch Screen), 9 kHz – 30 MHz, Y-Axis

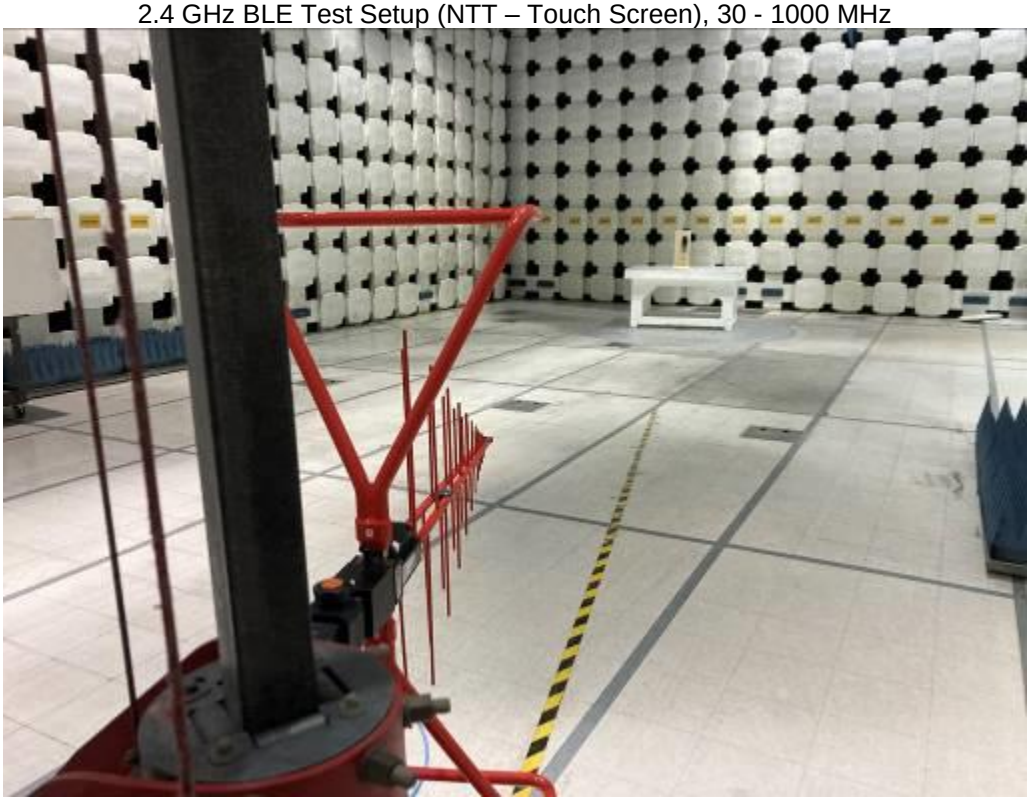


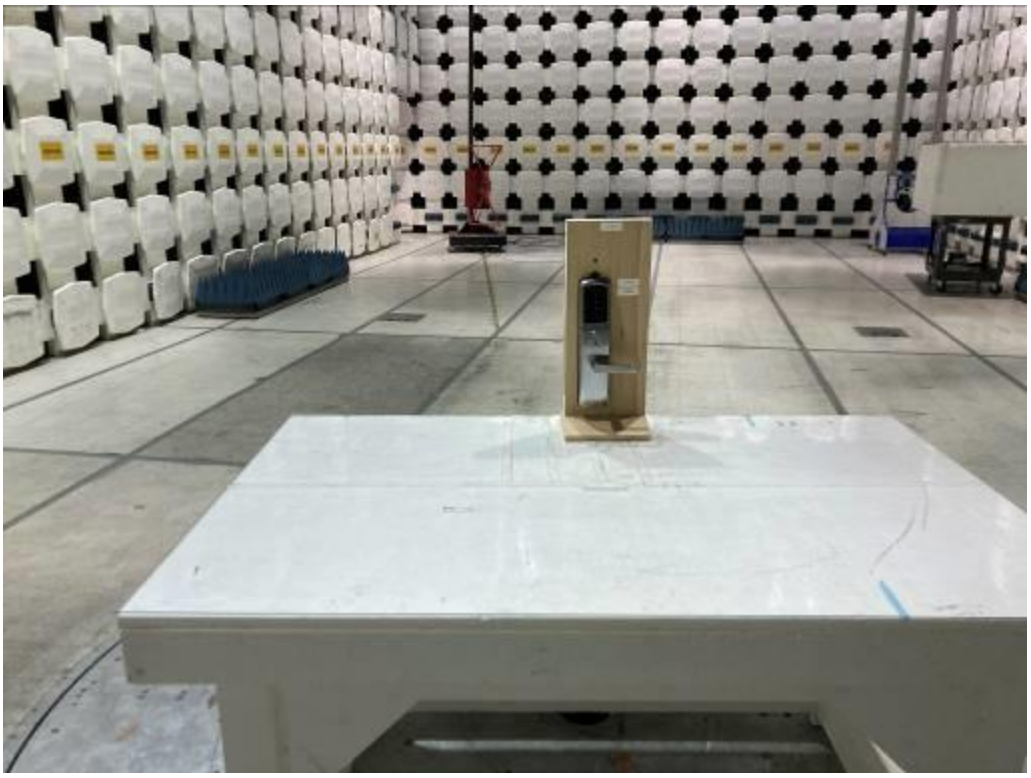
2.4 GHz BLE Test Setup (NTT – Touch Screen), 9 kHz – 30 MHz, Z-Axis



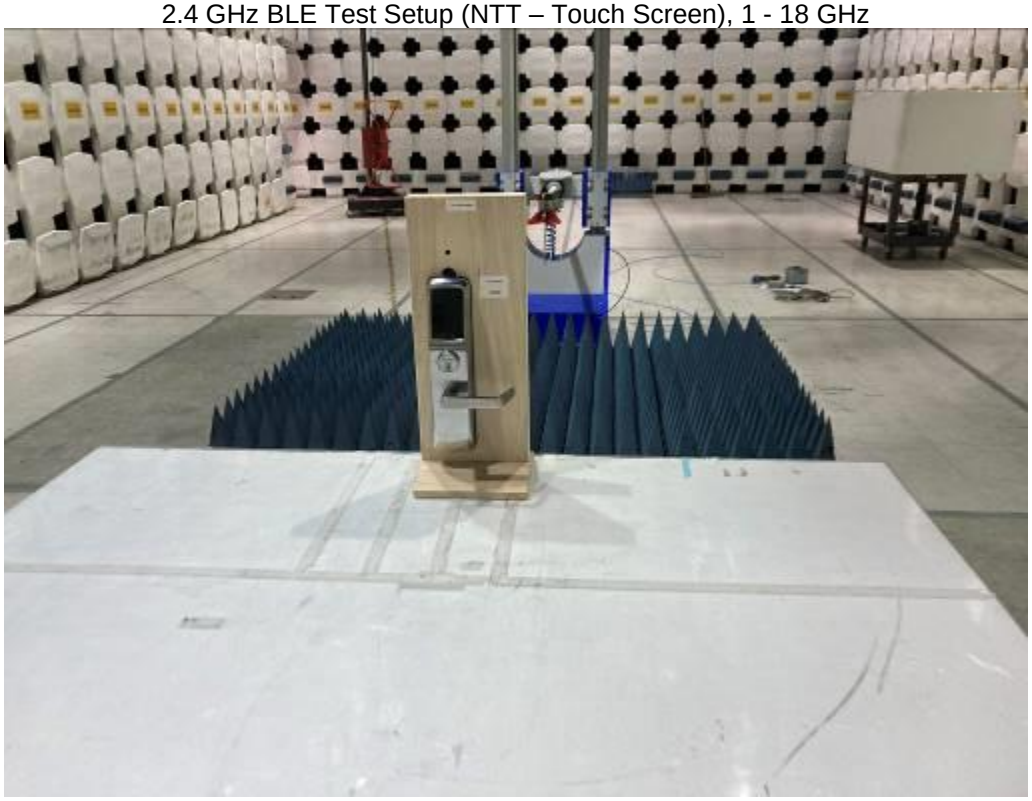


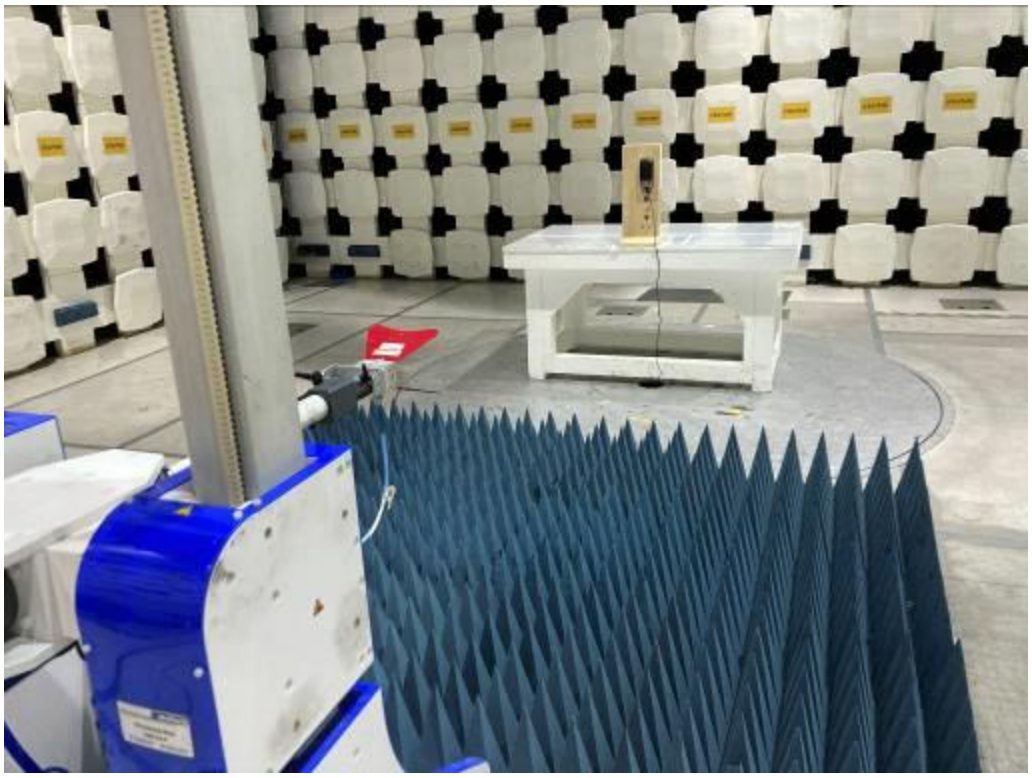
2.4 GHz BLE Test Setup (NTT – Touch Screen), 30 - 1000 MHz



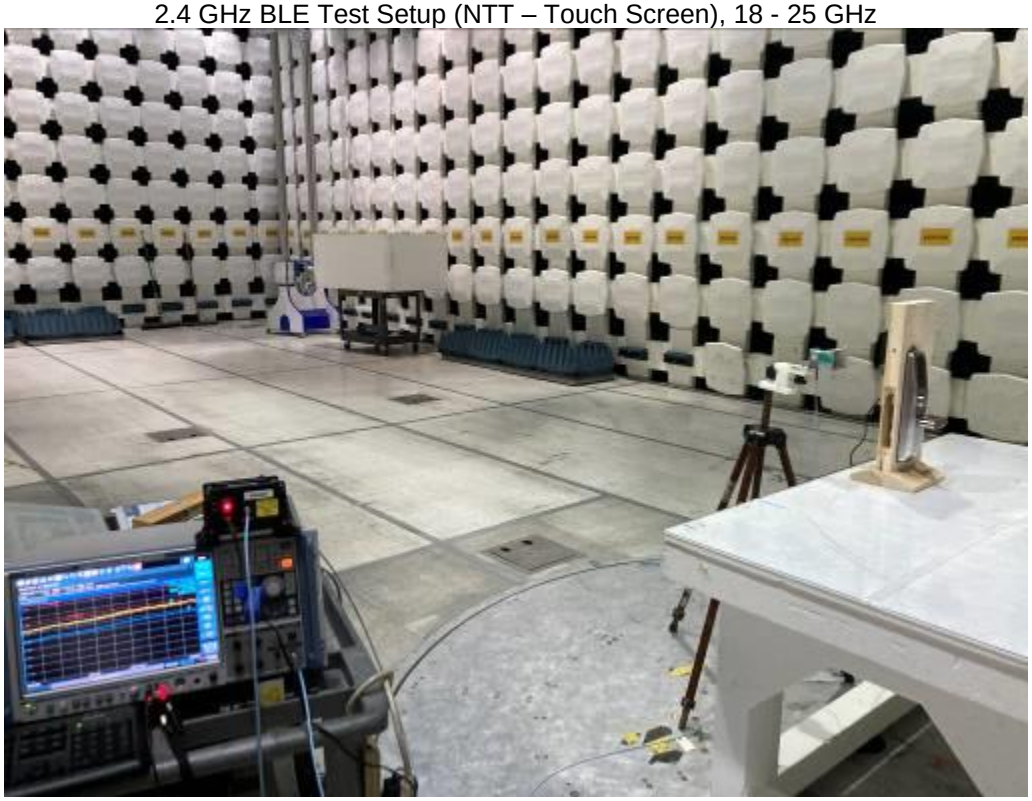


2.4 GHz BLE Test Setup (NTT – Touch Screen), 1 - 18 GHz

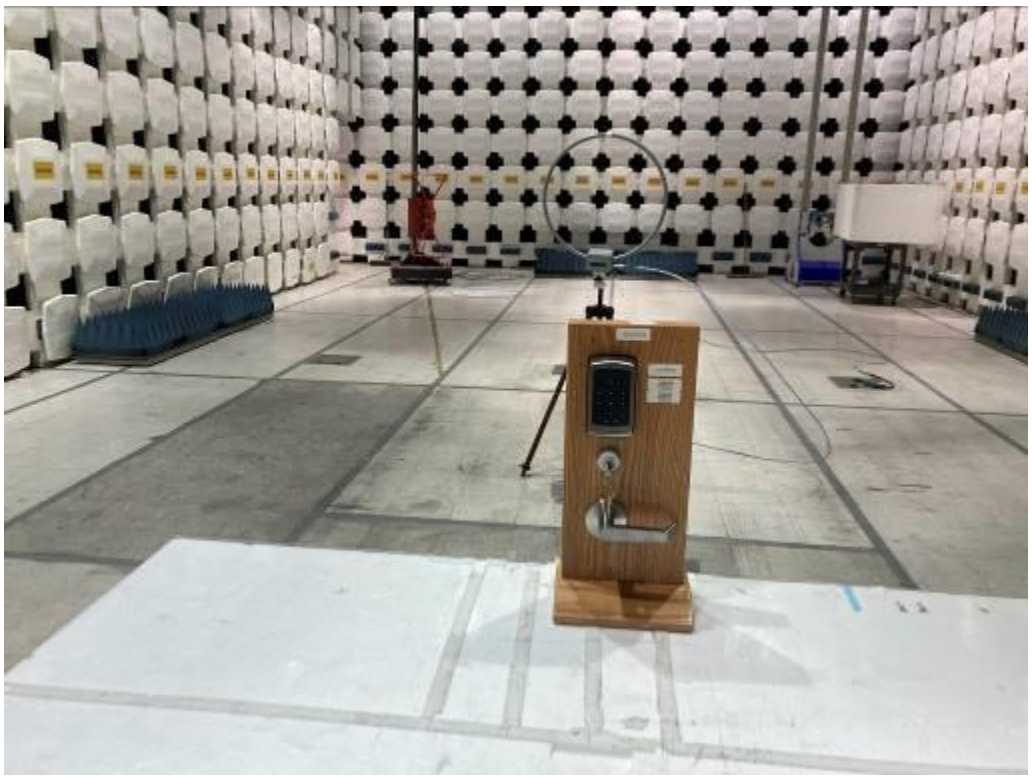




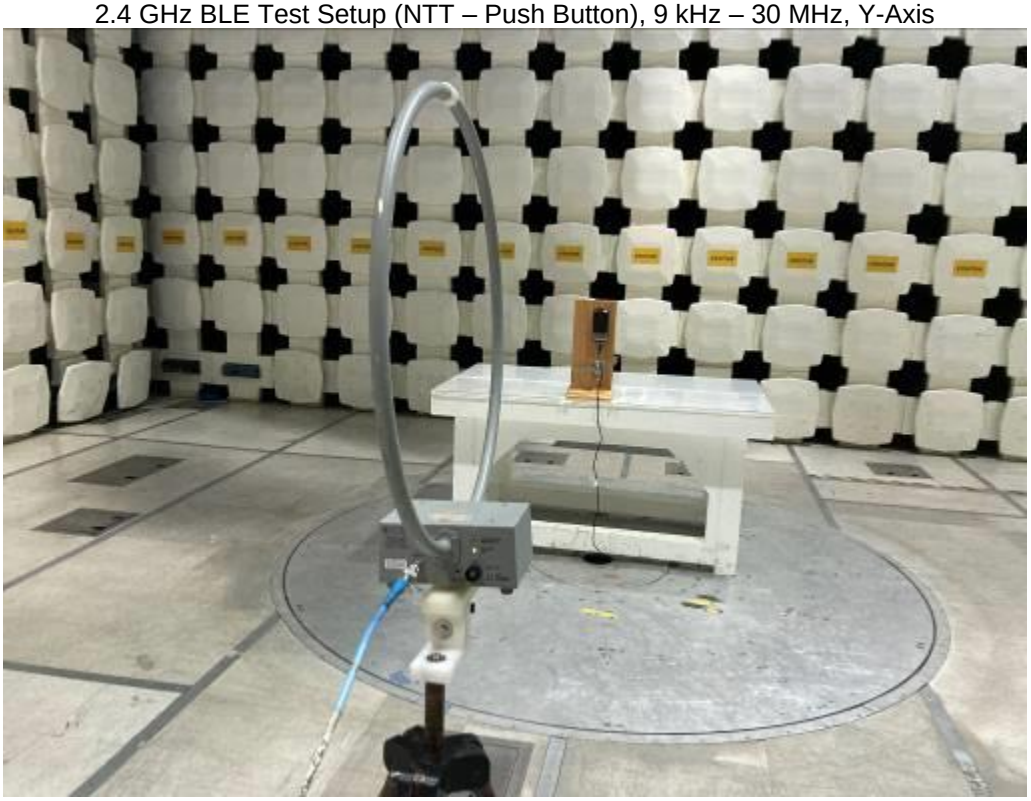
2.4 GHz BLE Test Setup (NTT – Touch Screen), 18 - 25 GHz



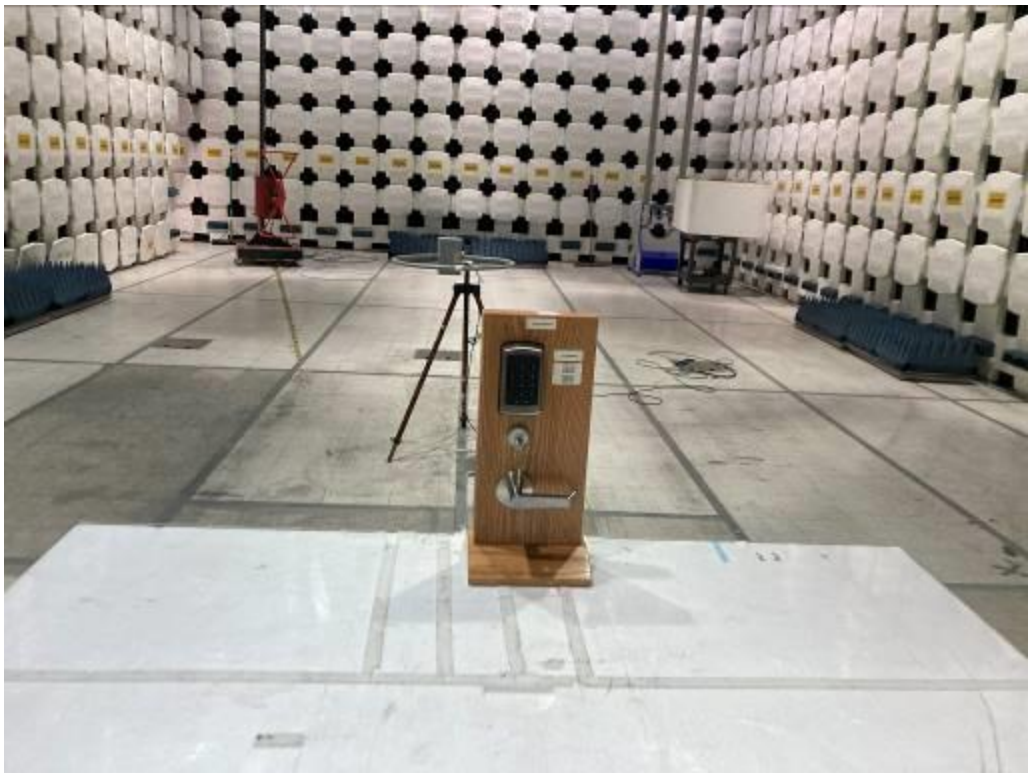
2.4 GHz BLE Test Setup (NTT – Push Button), 9 kHz – 30 MHz, X-Axis



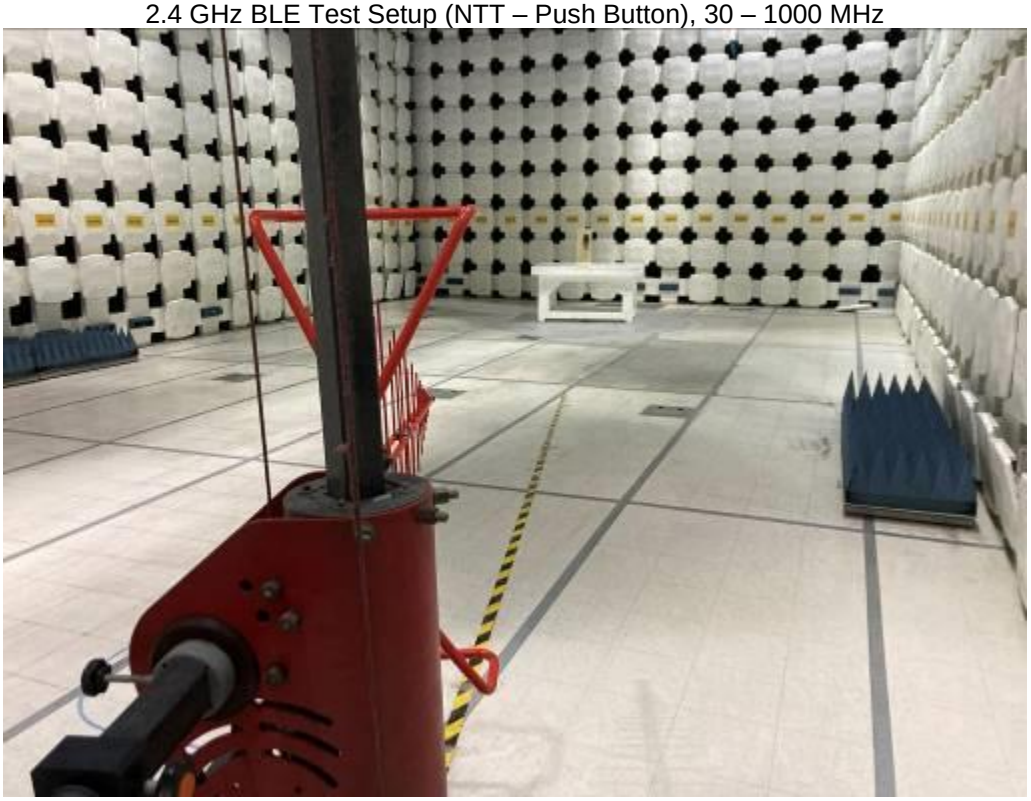
2.4 GHz BLE Test Setup (NTT – Push Button), 9 kHz – 30 MHz, Y-Axis



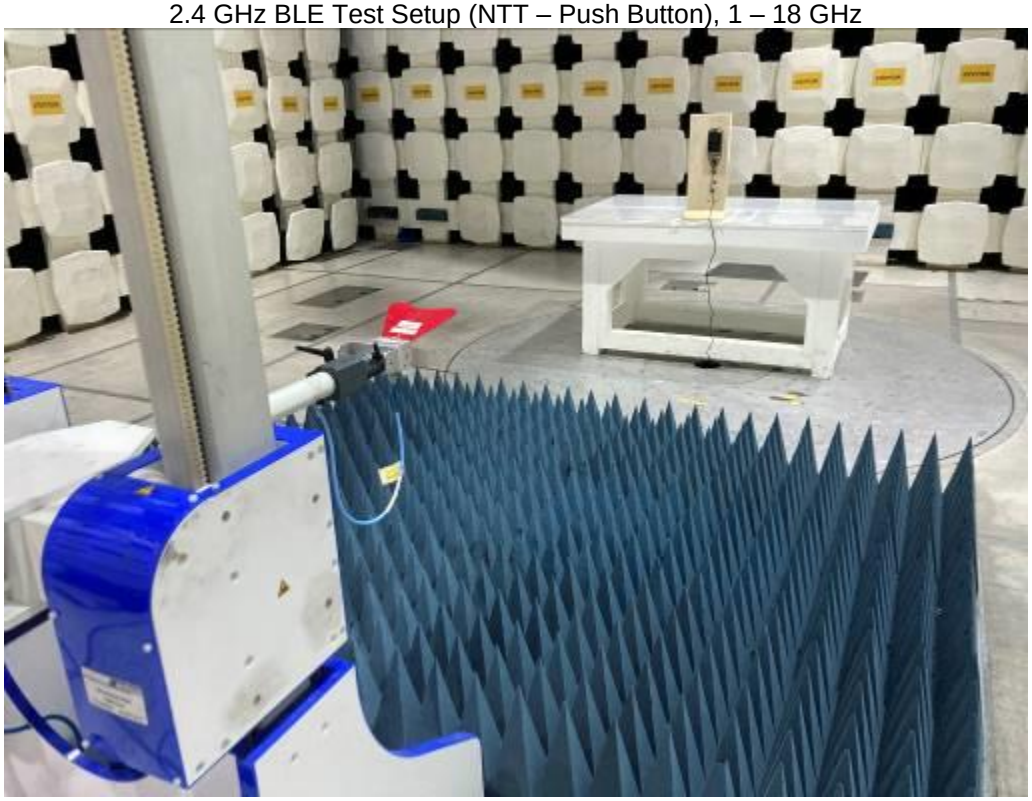
2.4 GHz BLE Test Setup (NTT – Push Button), 9 kHz – 30 MHz, Z-Axis



2.4 GHz BLE Test Setup (NTT – Push Button), 30 – 1000 MHz



2.4 GHz BLE Test Setup (NTT – Push Button), 1 – 18 GHz



2.4 GHz BLE Test Setup (NTT – Push Button), 18 - 25 GHz

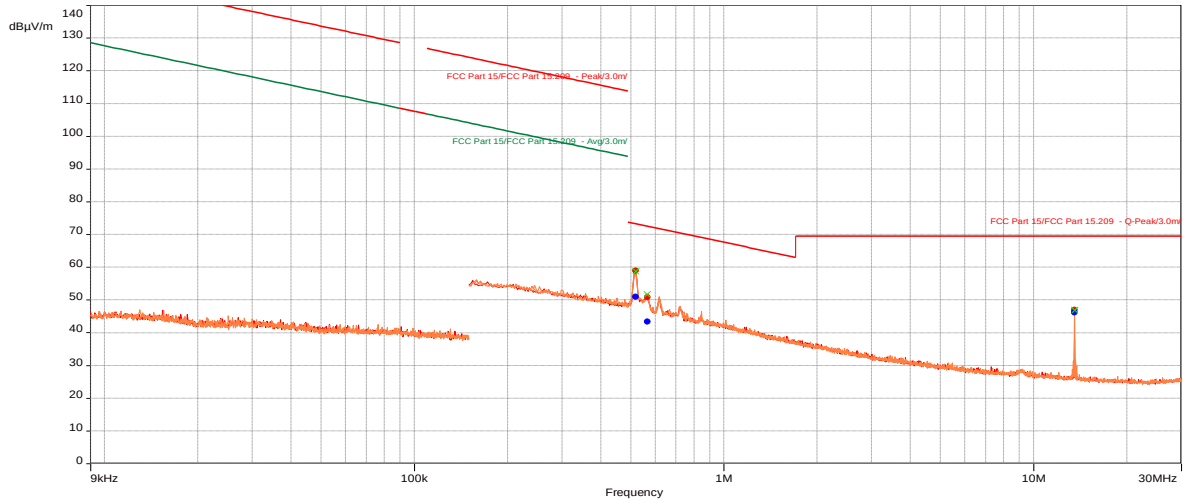
6.6 Plots/Data:

13.56 MHz RFID Test Setup (NTT – Touch Screen), 9 kHz- 30 MHz

Test Information:

Date and Time	5/6/2024 5:06:05 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Vathana Ven
Temperature	25 deg C
Humidity	41 %
Atmospheric Pressure	1001 mbars
Comments	Scan 51_RFID - NTT- Touch Screen, Tx (Worst-case)_RE 9kHz-30MHz_(FCC 15.209)

Graph:



Results:

Peak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51799	58.99	73.30	-14.31	17.60	Vertical	9k	0.10	13.25
0.5659	50.83	72.54	-21.71	343.30	Vertical	9k	0.10	13.20
13.56022	46.96	69.54	-22.58	164.30	Vertical	9k	0.10	12.01

QuasiPeak (PASS) (3)

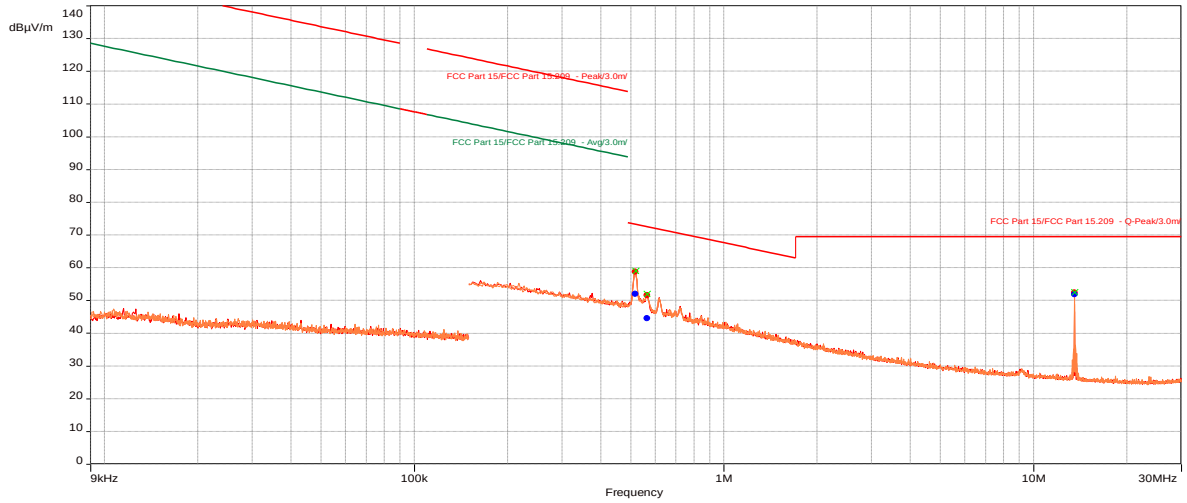
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51799	50.93	73.30	-22.37	17.60	Vertical	9k	0.10	13.25
0.5659	43.37	72.54	-29.17	343.30	Vertical	9k	0.10	13.20
13.56022	46.26	69.54	-23.28	164.30	Vertical	9k	0.10	12.01

13.56 MHz RFID Test Setup (NTT – Push Button), 9 kHz- 30 MHz

Test Information:

Date and Time	5/6/2024 6:23:44 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Vathana Ven
Temperature	25 deg C
Humidity	41 %
Atmospheric Pressure	1001 mbars
Comments	Scan 54_RFID - NTM- Push Button, Tx (Worst-case)_RE 9kHz-30MHz_(FCC 15.209)

Graph:



Results:

Peak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51743	58.84	73.34	-14.50	39.10	Vertical	9k	0.10	13.25
0.56433	51.62	72.58	-20.96	288.80	Vertical	9k	0.10	13.21
13.56023	52.41	69.54	-17.13	169.20	Vertical	9k	0.10	12.01

QuasiPeak (PASS) (3)

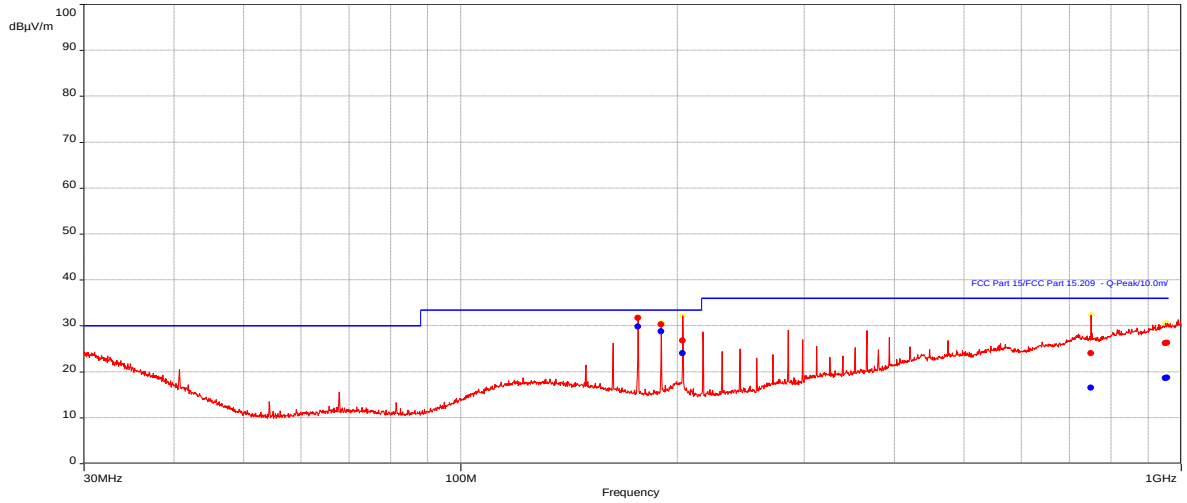
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51743	52.10	73.34	-21.24	39.10	Vertical	9k	0.10	13.25
0.56433	44.64	72.58	-27.94	288.80	Vertical	9k	0.10	13.21
13.56023	51.98	69.54	-17.56	169.20	Vertical	9k	0.10	12.01

13.56 MHz RFID Test Setup (NTT – Touch Screen), 30 – 1000 MHz

Test Information:

Date and Time	5/1/2024 8:42:02 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Vathana Ven
Temperature	22 deg C
Humidity	41 %
Atmospheric Pressure	1005 mbars
Comments	Scan 18_RFID - NTT Touch Screen, RE 30-1000 MHz

Graph:



Results:

QuasiPeak (PASS) (6)

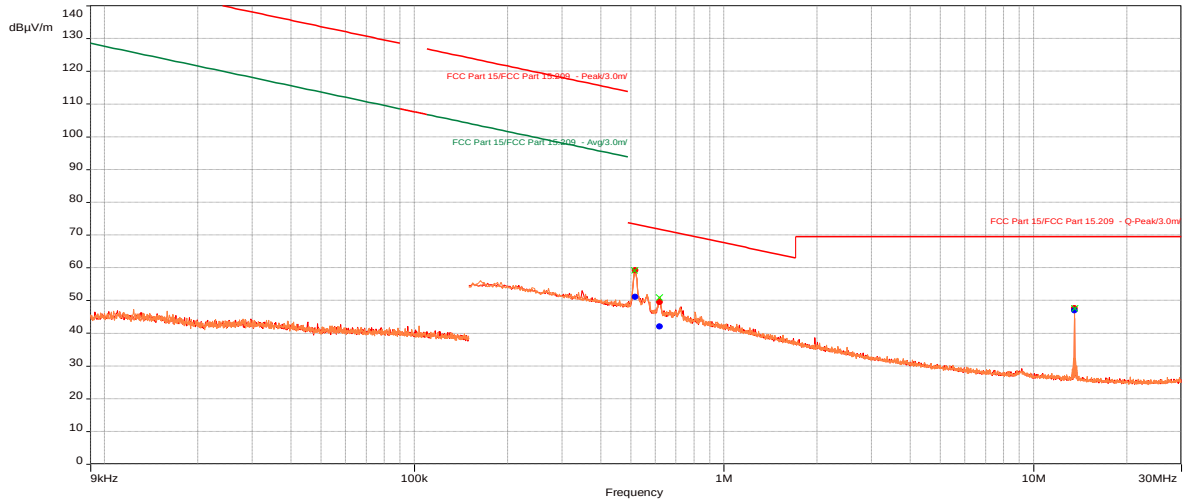
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
176.268	29.89	33.50	-3.61	0.00	1.00	Vertical	120k	0.10	-20.77
189.8325	28.83	33.50	-4.67	338.00	1.38	Vertical	120k	0.10	-20.69
203.397	24.05	33.50	-9.45	310.60	2.23	Vertical	120k	0.10	-20.18
749.7052	16.53	36.00	-19.47	294.40	4.00	Vertical	120k	0.10	-8.64
951.1233	18.60	36.00	-17.40	109.80	4.00	Vertical	120k	0.10	-5.40
956.702	18.75	36.00	-17.25	17.50	4.00	Vertical	120k	0.10	-5.21

13.56 MHz RFID Test Setup (NTT – Push Button), 9 kHz – 30 MHz

Test Information:

Date and Time	5/6/2024 5:33:26 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Vathana Ven
Temperature	25 deg C
Humidity	41 %
Atmospheric Pressure	1001 mbars
Comments	Scan 52_RFID - NTT- Push Button, Tx (Worst-case)_RE 9kHz-30MHz_(FCC 15.209)

Graph:



Results:

Peak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51742	59.19	73.34	-14.15	169.70	Vertical	9k	0.10	13.25
0.62002	49.51	71.75	-22.24	218.30	Vertical	9k	0.10	13.16
13.56034	47.68	69.54	-21.86	326.70	Vertical	9k	0.10	12.01

QuasiPeak (PASS) (3)

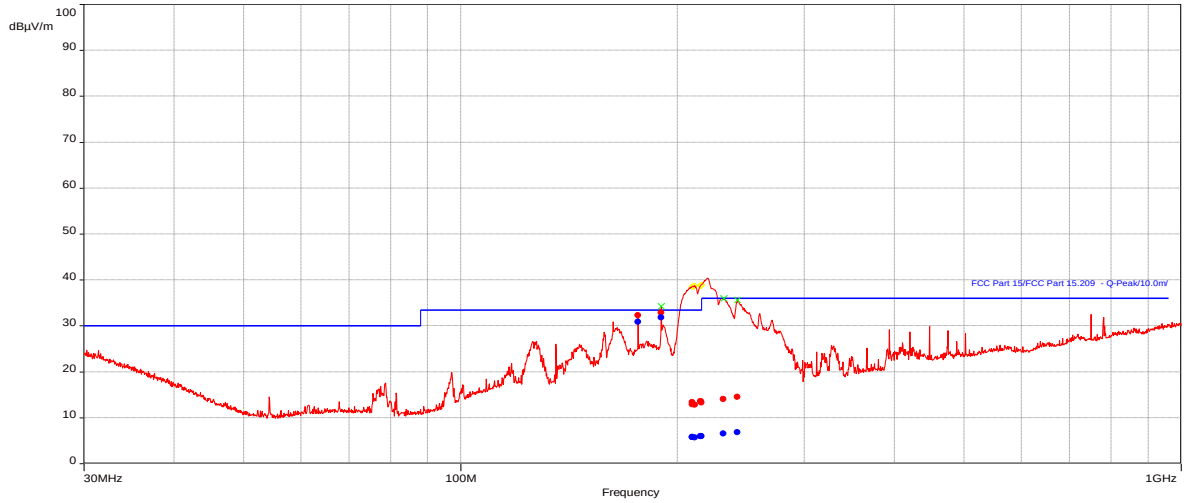
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time	Correction (dB)
0.51742	51.13	73.34	-22.21	169.70	Vertical	9k	0.10	13.25
0.62002	42.03	71.75	-29.73	218.30	Vertical	9k	0.10	13.16
13.56034	47.00	69.54	-22.54	326.70	Vertical	9k	0.10	12.01

13.56 MHz RFID Test Setup (NTT – Push Button), 30 - 1000 MHz

Test Information:

Date and Time	5/1/2024 7:57:34 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Vathana Ven
Temperature	22 deg C
Humidity	41 %
Atmospheric Pressure	1005 mbars
Comments	Scan 17_RFID - NTT Push Button, RE 30-1000 MHz

Graph:



Results:

QuasiPeak (PASS) (10)

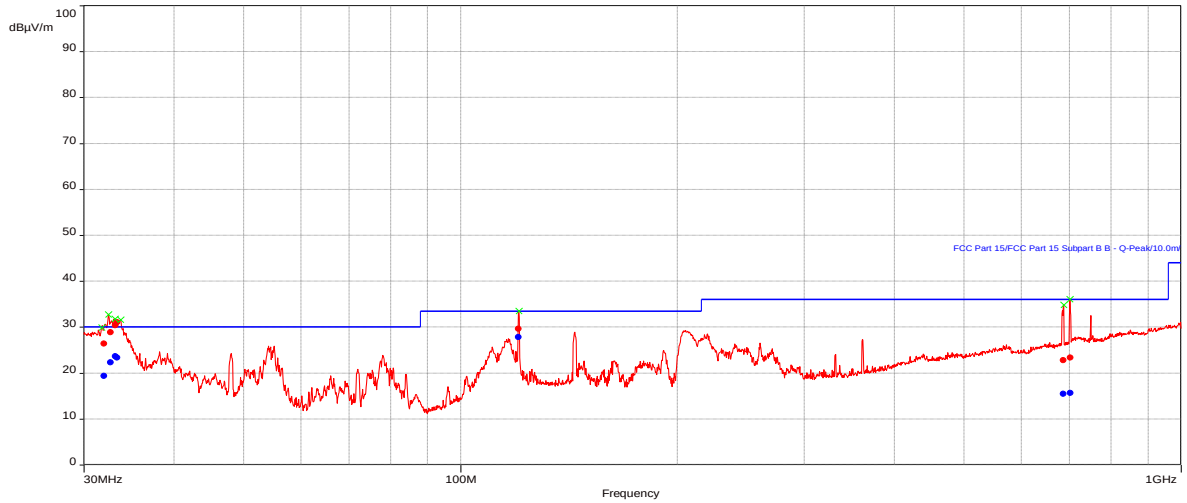
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
176.2815	30.94	33.50	-2.56	327.00	1.00	Vertical	120k	0.10	-20.77
189.8385	31.84	33.50	-1.66	353.60	1.62	Vertical	120k	0.10	-20.69
209.5965	5.81	33.50	-27.69	142.30	4.00	Horizontal	120k	0.10	-21.41
209.6771	5.81	33.50	-27.69	109.90	4.00	Horizontal	120k	0.10	-21.41
211.2929	5.71	33.50	-27.79	326.90	4.00	Horizontal	120k	0.10	-21.37
215.3517	6.00	33.50	-27.50	289.10	4.00	Horizontal	120k	0.10	-21.18
215.7042	6.00	33.50	-27.50	164.00	4.00	Horizontal	120k	0.10	-21.18
215.7486	5.97	33.50	-27.53	218.40	4.00	Horizontal	120k	0.10	-21.18
231.701	6.54	36.00	-29.46	142.50	4.00	Horizontal	120k	0.10	-20.64
242.2247	6.85	36.00	-29.15	50.00	4.00	Horizontal	120k	0.10	-20.16

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

Test Information:

Date and Time	5/1/2024 12:00:31 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	41 %
Atmospheric Pressure	1005 mbars
Comments	Scan 5_BLE - NTM Touchscreen, Tx Low Ch, RE 30-1000 MHz

Graph:



Results:

QuasiPeak (PASS) (7)

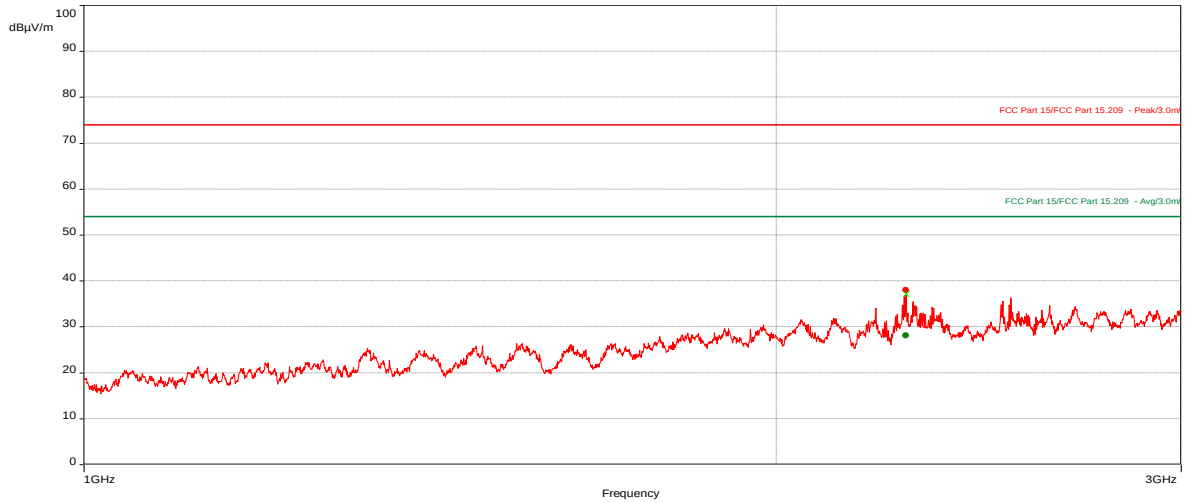
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
32.0109	19.42	30.00	-10.58	33.80	4.00	Vertical	120k	0.10	-13.89
32.6605	22.36	30.00	-7.64	93.80	4.00	Vertical	120k	0.10	-14.26
33.1948	23.67	30.00	-6.33	262.00	4.00	Vertical	120k	0.10	-14.60
33.3983	23.39	30.00	-6.61	277.70	1.46	Vertical	120k	0.10	-14.73
120.3646	27.83	33.50	-5.67	169.50	4.00	Vertical	120k	0.10	-18.67
686.7352	15.52	36.00	-20.48	0.00	4.00	Vertical	120k	0.10	-9.90
701.573	15.69	36.00	-20.31	245.80	1.48	Vertical	120k	0.10	-9.51

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

Test Information:

Date and Time	5/2/2024 1:37:57 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 33_BLE - NTT-Touchscreen, Tx Low Channel, RE 1-3 GHz

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
2277.838	37.99	74.00	-36.01	34.90	4.00	Vertical	1M	0.10	-18.04

AVG (PASS) (1)

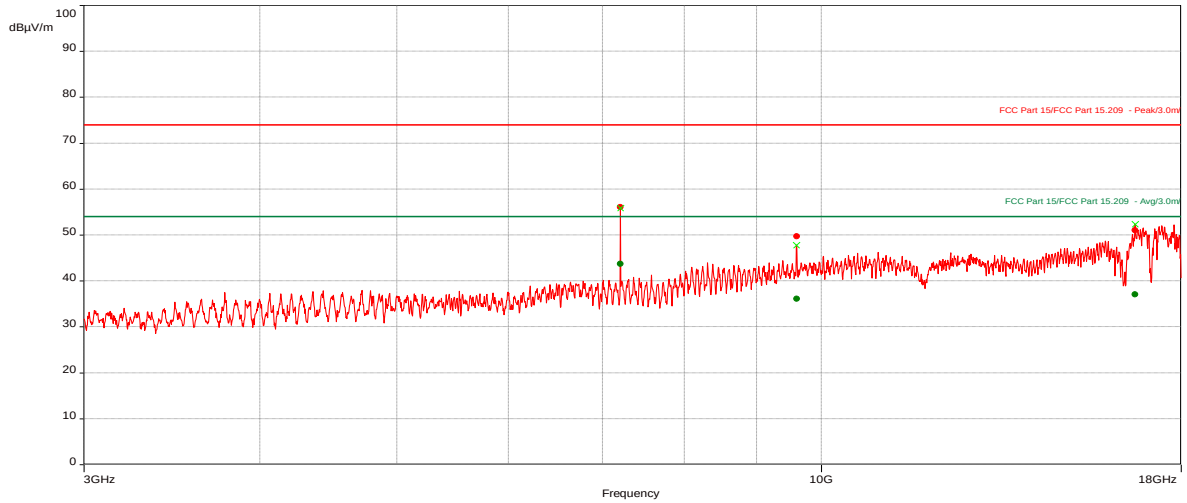
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
2277.838	28.15	54.00	-25.85	34.90	4.00	Vertical	1M	0.10	-18.04

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

Test Information:

Date and Time	5/2/2024 2:55:25 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 38_BLE - NTT-Touchscreen, Tx Low Channel, RE 3-18 GHz

Graph:



Results:

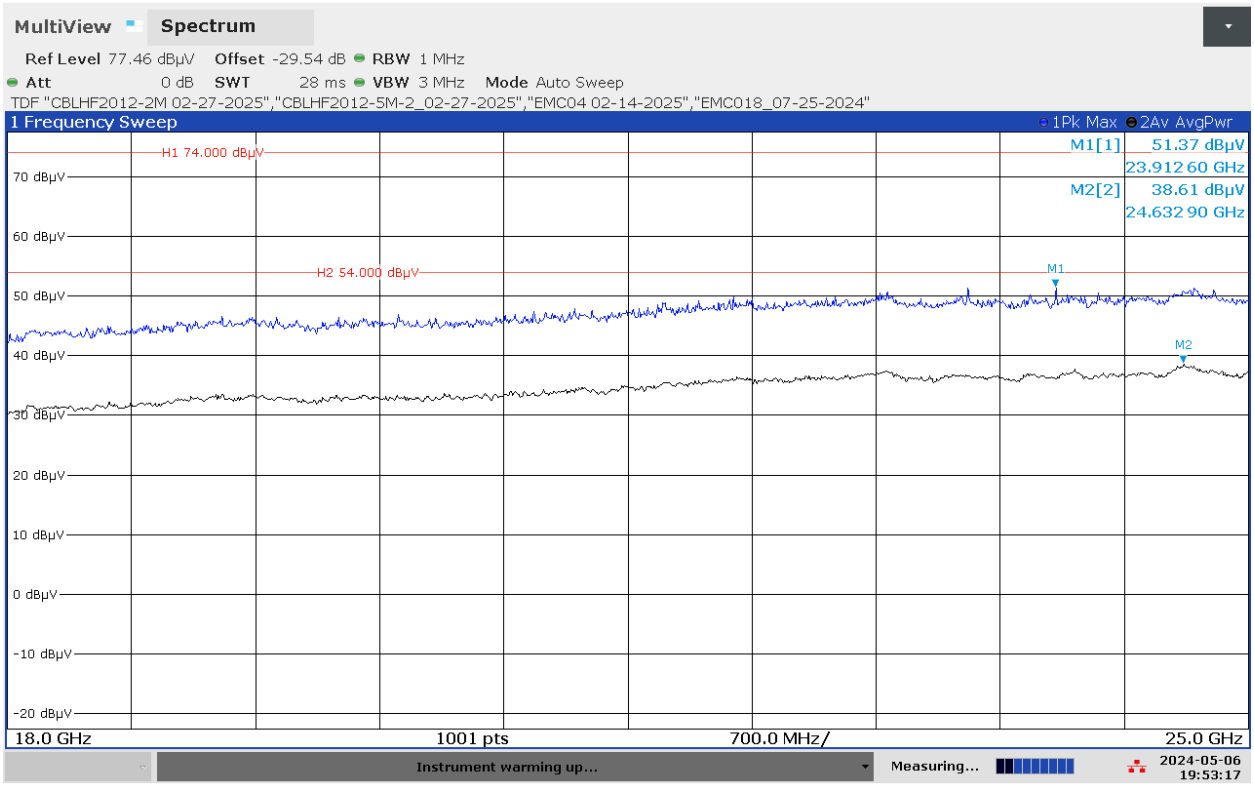
Peak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
7206.885	56.06	74.00	-17.94	0.00	4.00	Vertical	1M	0.10	-10.25
9609.044	49.70	74.00	-24.30	360.00	1.00	Vertical	1M	0.10	-8.04
16700.666	51.01	74.00	-22.99	0.00	1.00	Horizontal	1M	0.10	1.90

AVG (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
7206.885	43.70	54.00	-10.30	0.00	4.00	Vertical	1M	0.10	-10.25
9609.044	36.15	54.00	-17.85	360.00	1.00	Vertical	1M	0.10	-8.04
16700.666	37.08	54.00	-16.92	0.00	1.00	Horizontal	1M	0.10	1.90

BLE (Plastic Enclosure) Tx Low Channel, RE 18-25 GHz



07:53:18 PM 05/06/2024

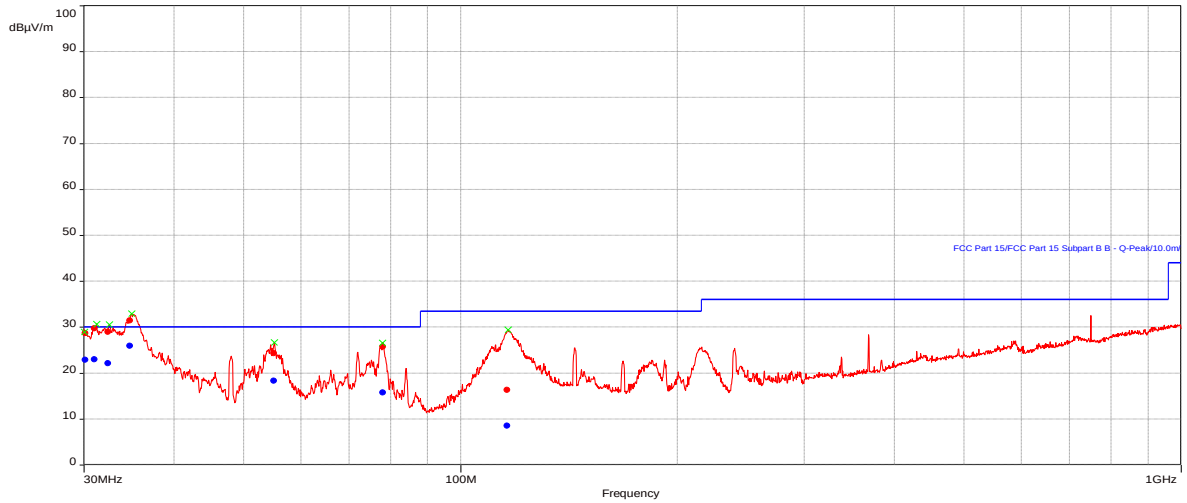
Notes: Testing was performed manually around the EUT at 10cm distance. No emission was detected above the test instrument noise floor. The cable loss, antenna factor, filter loss, and pre-amp gain were compensated as transducer factor (TDF) and the distance factor was compensated as Reference Offset.

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

Test Information:

Date and Time	5/1/2024 3:11:00 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	41 %
Atmospheric Pressure	1005 mbars
Comments	Scan 10_BLE - NTT Touchscreen, Tx Mid Ch, RE 30-1000 MHz

Graph:



Results:

QuasiPeak (PASS) (7)

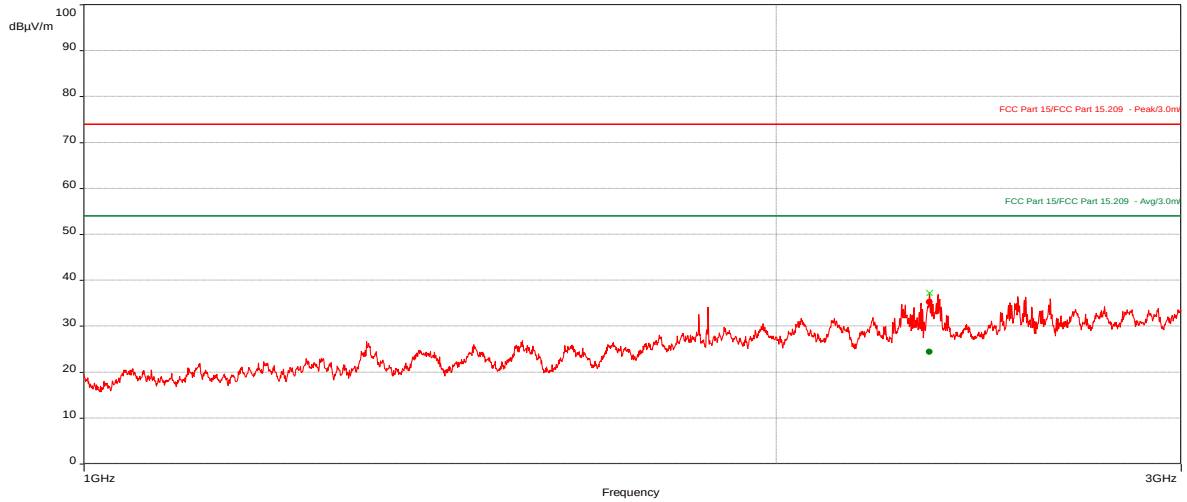
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
30.1055	22.92	30.00	-7.08	142.60	1.00	Vertical	120k	0.10	-12.67
31.0101	23.04	30.00	-6.96	229.60	1.32	Vertical	120k	0.10	-13.20
32.3943	22.20	30.00	-7.80	34.00	2.85	Vertical	120k	0.10	-14.11
34.7524	25.98	30.00	-4.02	191.20	1.62	Vertical	120k	0.10	-15.59
55.0876	18.31	30.00	-11.69	326.70	4.00	Vertical	120k	0.10	-26.16
78.0251	15.81	30.00	-14.19	131.50	1.85	Vertical	120k	0.10	-25.29
115.9899	8.59	33.50	-24.91	55.60	4.00	Horizontal	120k	0.10	-19.10

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

Test Information:

Date and Time	5/2/2024 1:47:51 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 34_BLE - NTT-Touchscreen, Tx Mid Channel, RE 1-3 GHz

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
2331.8	35.24	74.00	-38.76	309.40	1.44	Horizontal	1M	0.10	-17.91

AVG (PASS) (1)

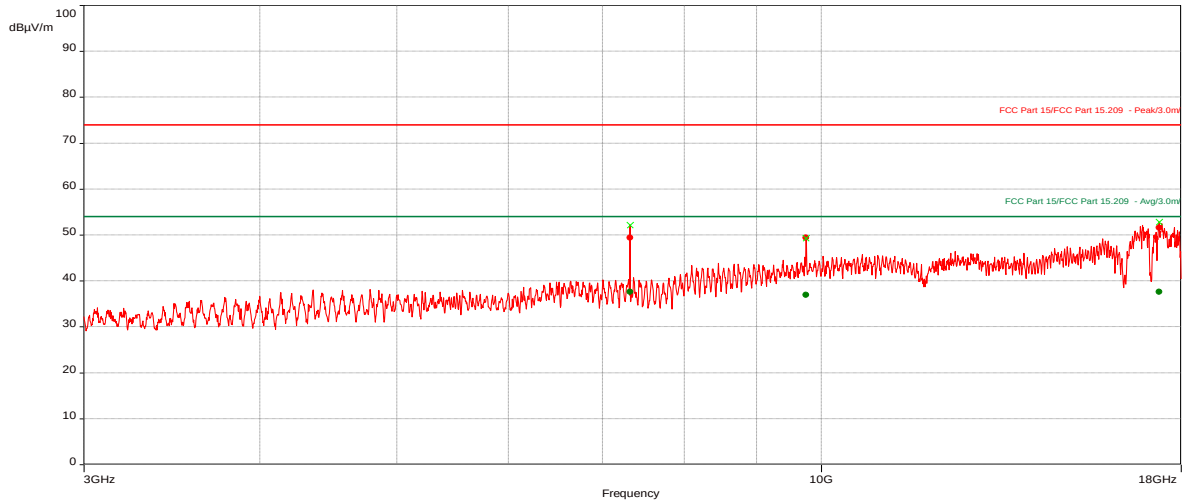
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
2331.8	24.40	54.00	-29.60	309.40	1.44	Horizontal	1M	0.10	-17.91

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

Test Information:

Date and Time	5/2/2024 2:31:23 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 37_BLE - NTT-Touchscreen, Tx Mid Channel, RE 3-18 GHz

Graph:



Results:

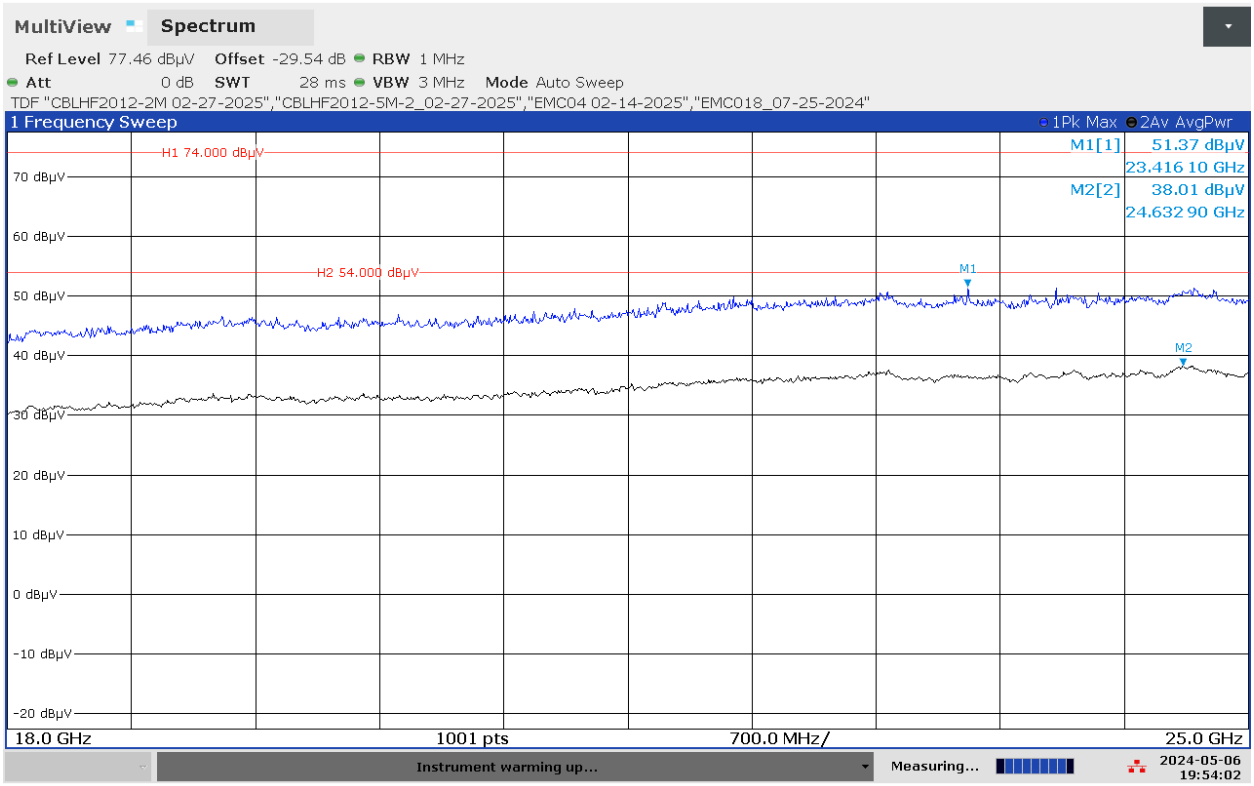
Peak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
7319.304	49.41	74.00	-24.59	265.50	4.00	Vertical	1M	0.10	-10.18
9759.2	49.47	74.00	-24.53	0.00	4.00	Horizontal	1M	0.10	-7.70
17364.591	51.62	74.00	-22.38	360.00	1.00	Vertical	1M	0.10	1.96

AVG (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
7319.304	37.65	54.00	-16.35	265.50	4.00	Vertical	1M	0.10	-10.18
9759.2	36.96	54.00	-17.04	0.00	4.00	Horizontal	1M	0.10	-7.70
17364.591	37.62	54.00	-16.38	360.00	1.00	Vertical	1M	0.10	1.96

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



07:54:02 PM 05/06/2024

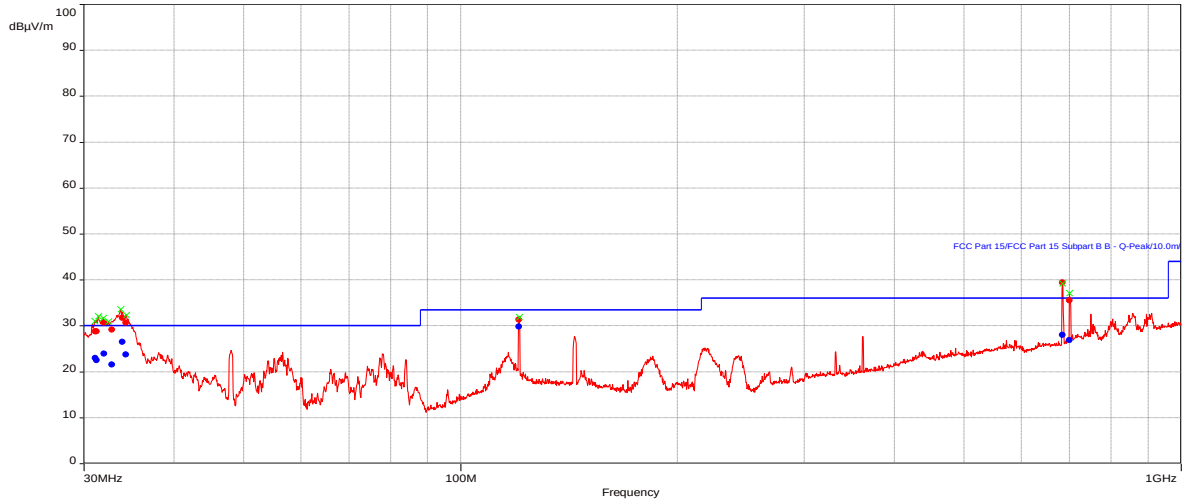
Notes: Testing was performed manually around the EUT at 10 cm distance. No emission was detected above the test instrument noise floor. The cable loss, antenna factor, filter loss, and pre-amp gain were compensated as transducer factor (TDF) and the distance factor was compensated as Reference Offset

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

Test Information:

Date and Time	5/1/2024 1:09:47 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	41 %
Atmospheric Pressure	1005 mbars
Comments	Scan 7_BLE - NTM Touchscreen, Tx High Ch, RE 30-1000 MHz

Graph:



Results:

QuasiPeak (PASS) (9)

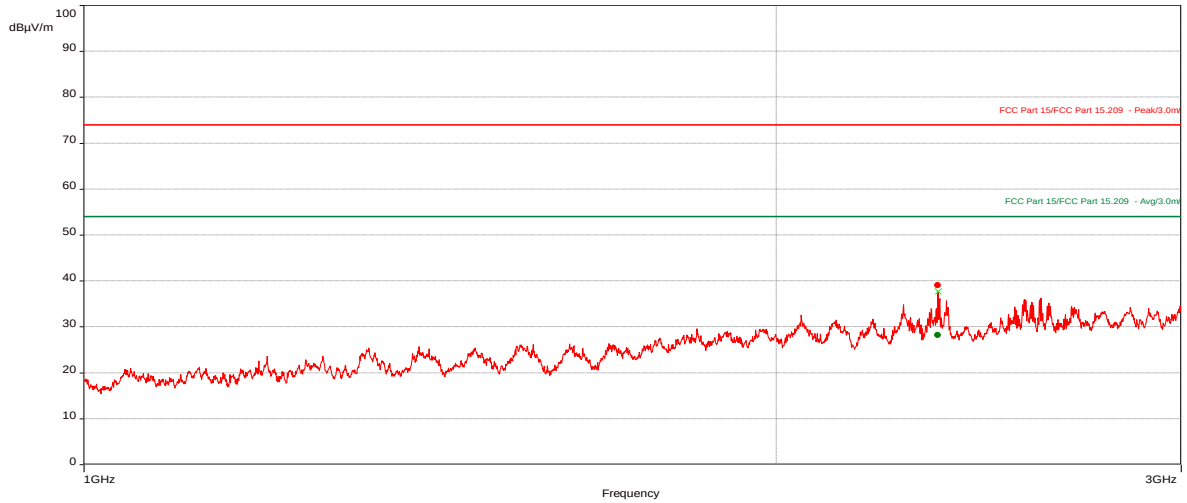
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
31.1084	23.02	30.00	-6.98	12.00	2.38	Vertical	120k	0.10	-13.27
31.2469	22.50	30.00	-7.50	272.80	1.70	Vertical	120k	0.10	-13.36
32.0173	23.98	30.00	-6.02	120.80	1.32	Vertical	120k	0.10	-13.89
32.8101	21.59	30.00	-8.41	164.40	2.39	Vertical	120k	0.10	-14.35
33.934	26.55	30.00	-3.45	39.20	1.85	Vertical	120k	0.10	-15.10
34.3202	23.81	30.00	-6.19	88.20	2.90	Vertical	120k	0.10	-15.33
120.5147	29.83	33.50	-3.67	175.30	2.47	Vertical	120k	0.10	-18.67
684.6187	28.07	36.00	-7.93	278.60	4.00	Vertical	120k	0.10	-9.95
700.0211	26.93	36.00	-9.07	294.50	4.00	Vertical	120k	0.10	-9.52

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

Test Information:

Date and Time	5/2/2024 1:56:54 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 35_BLE - NTT-Touchscreen, Tx High Channel, RE 1-3 GHz

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
2351.788	39.05	74.00	-34.95	348.50	1.00	Vertical	1M	0.10	-17.88

AVG (PASS) (1)

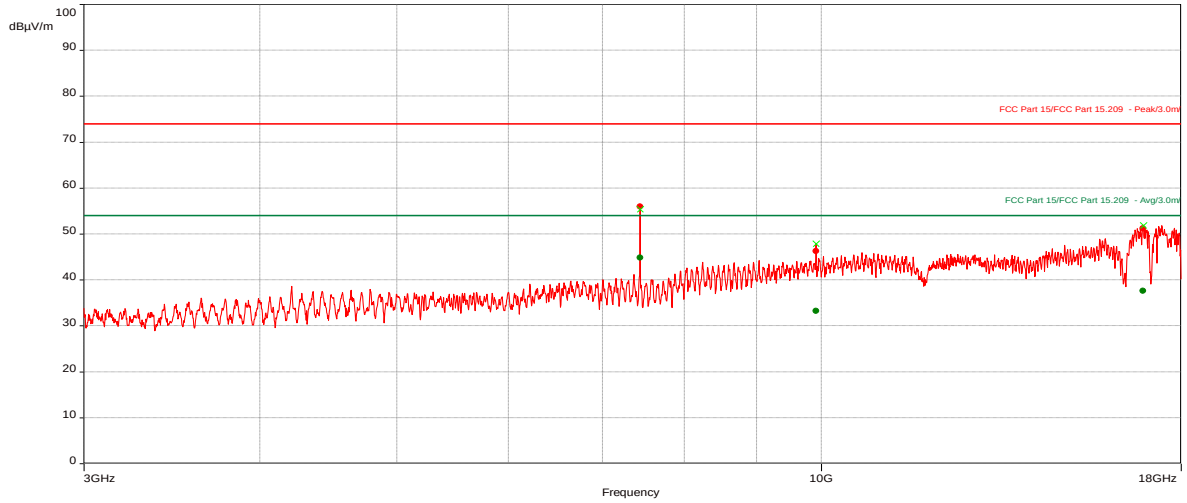
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
2351.788	28.24	54.00	-25.76	348.50	1.00	Vertical	1M	0.10	-17.88

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

Test Information:

Date and Time	5/2/2024 2:07:57 PM
Client and Project Number	Sargent Assa Abloy (NTM & NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 36_BLE - NTT-Touchscreen, Tx High Channel, RE 3-18 GHz

Graph:



Results:

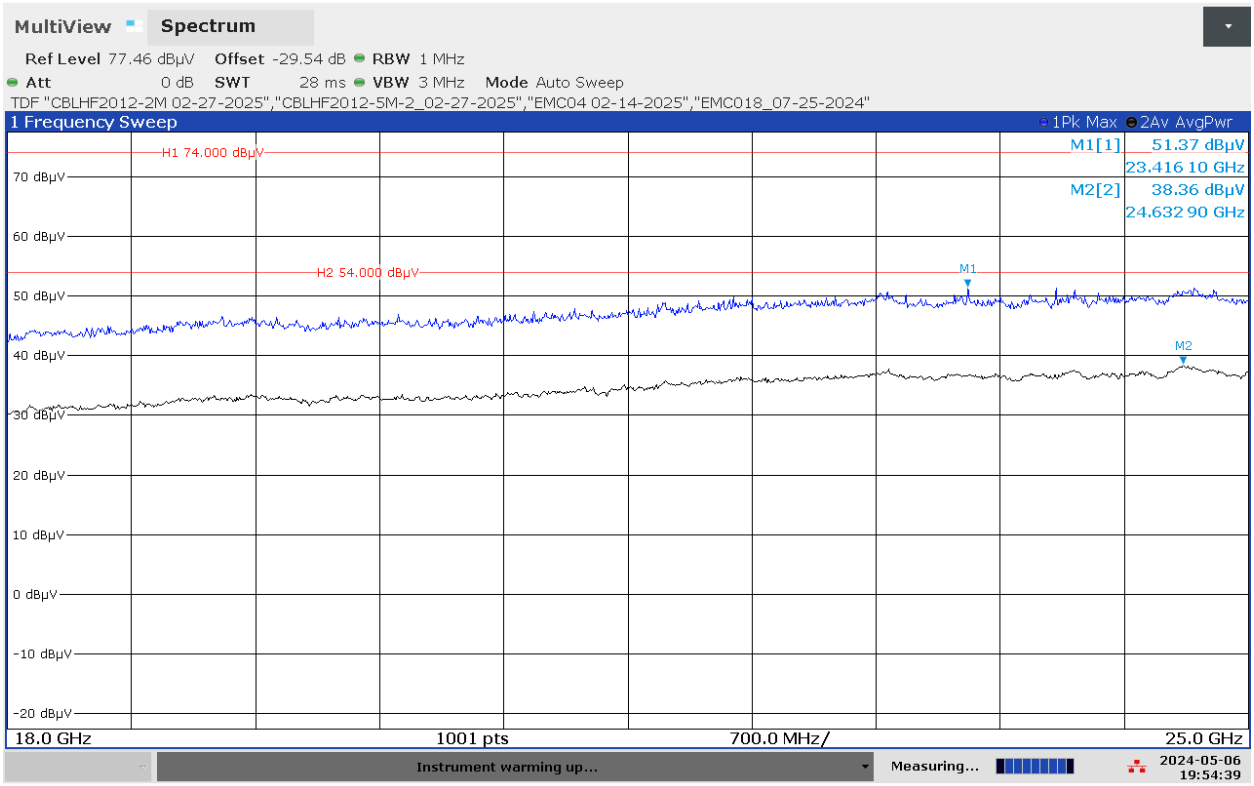
Peak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
7439.35	56.04	74.00	-17.96	0.00	4.00	Vertical	1M	0.10	-10.16
9919.214	46.31	74.00	-27.69	0.00	4.00	Horizontal	1M	0.10	-7.40
16920.342	51.27	74.00	-22.73	265.60	4.00	Vertical	1M	0.10	2.11

AVG (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
7439.35	44.86	54.00	-9.14	0.00	4.00	Vertical	1M	0.10	-10.16
9919.214	33.24	54.00	-20.76	0.00	4.00	Horizontal	1M	0.10	-7.40
16920.342	37.61	54.00	-16.39	265.60	4.00	Vertical	1M	0.10	2.11

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



07:54:40 PM 05/06/2024

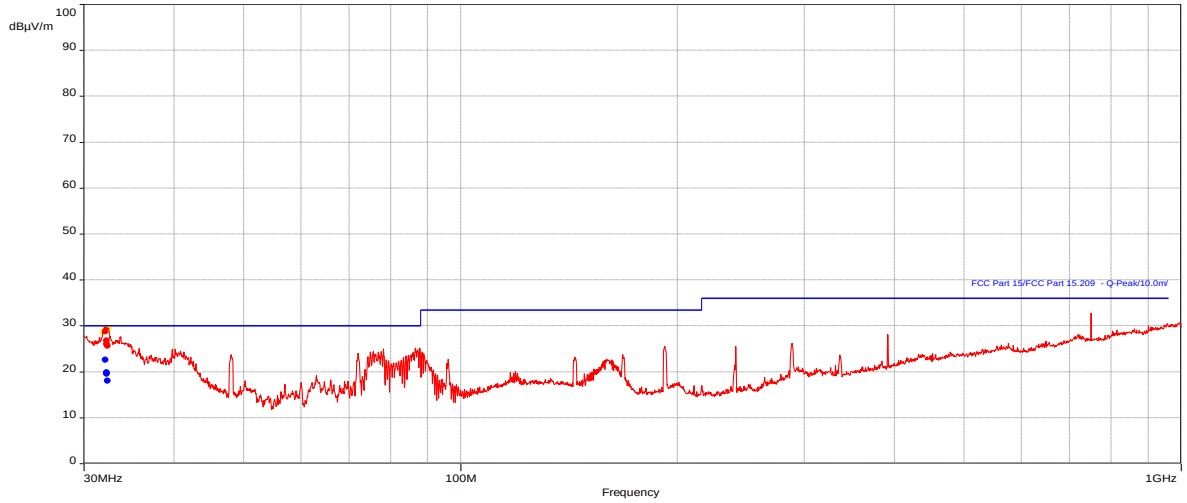
Notes: Testing was performed manually around the EUT at 10cm distance. No emission was detected above the test instrument noise floor. The cable loss, antenna factor, filter loss, and pre-amp gain were compensated as transducer factor (TDF) and the distance factor was compensated as Reference Offset

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

Test Information:

Date and Time	5/1/2024 4:56:38 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Vathana Ven
Temperature	22 deg C
Humidity	41 %
Atmospheric Pressure	1005 mbars
Comments	Scan 12_BLE - NTT Push Button, Tx Low Ch, RE 30-1000 MHz

Graph:



Results:

QuasiPeak (PASS) (4)

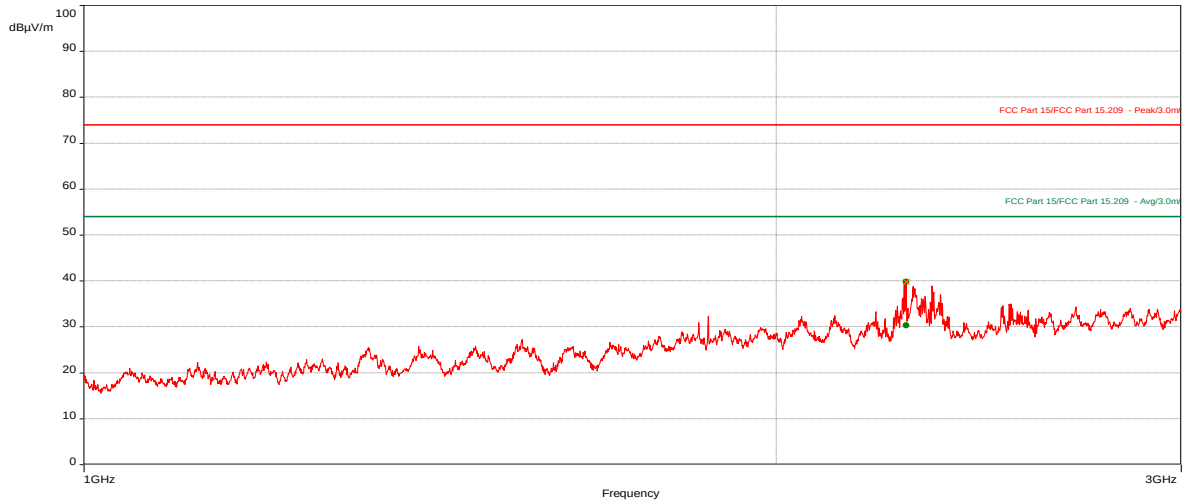
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
32.1322	22.65	30.00	-7.35	310.90	2.78	Vertical	120k	0.10	-13.96
32.2385	19.85	30.00	-10.15	267.40	4.00	Vertical	120k	0.10	-14.02
32.2775	19.63	30.00	-10.37	349.00	4.00	Vertical	120k	0.10	-14.04
32.3486	18.09	30.00	-11.91	164.40	4.00	Vertical	120k	0.10	-14.08

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

Test Information:

Date and Time	5/2/2024 1:21:30 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 32_BLE - NTM-Push Button, Tx Low Channel, RE 1-3 GHz

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
2278.287	39.88	74.00	-34.12	35.00	1.00	Vertical	1M	0.10	-18.04

AVG (PASS) (1)

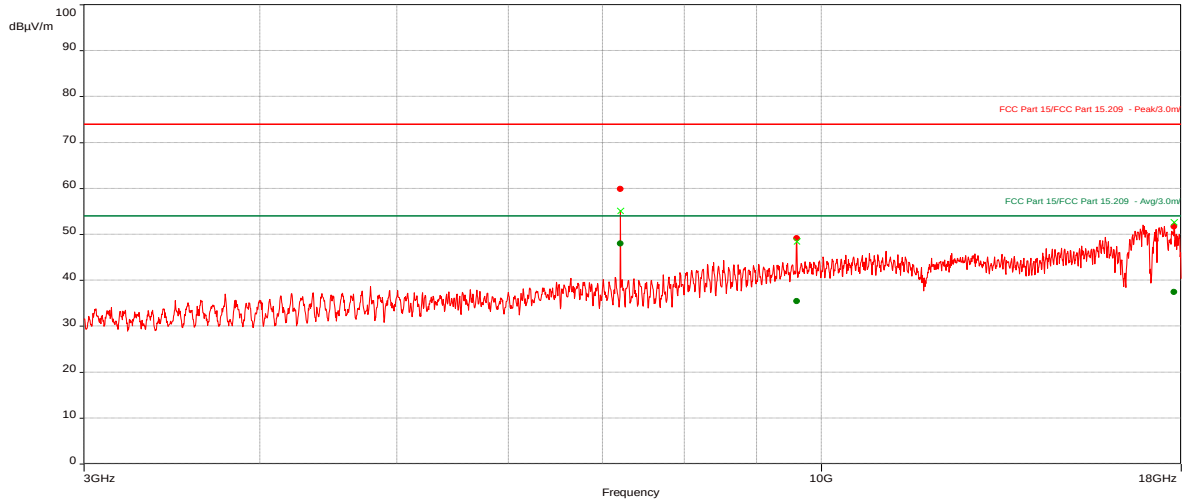
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
2278.287	30.36	54.00	-23.64	35.00	1.00	Vertical	1M	0.10	-18.04

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

Test Information:

Date and Time	5/2/2024 3:25:38 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 39_BLE - NTT-Push Button, Tx Low Channel, RE 3-18 GHz

Graph:



Results:

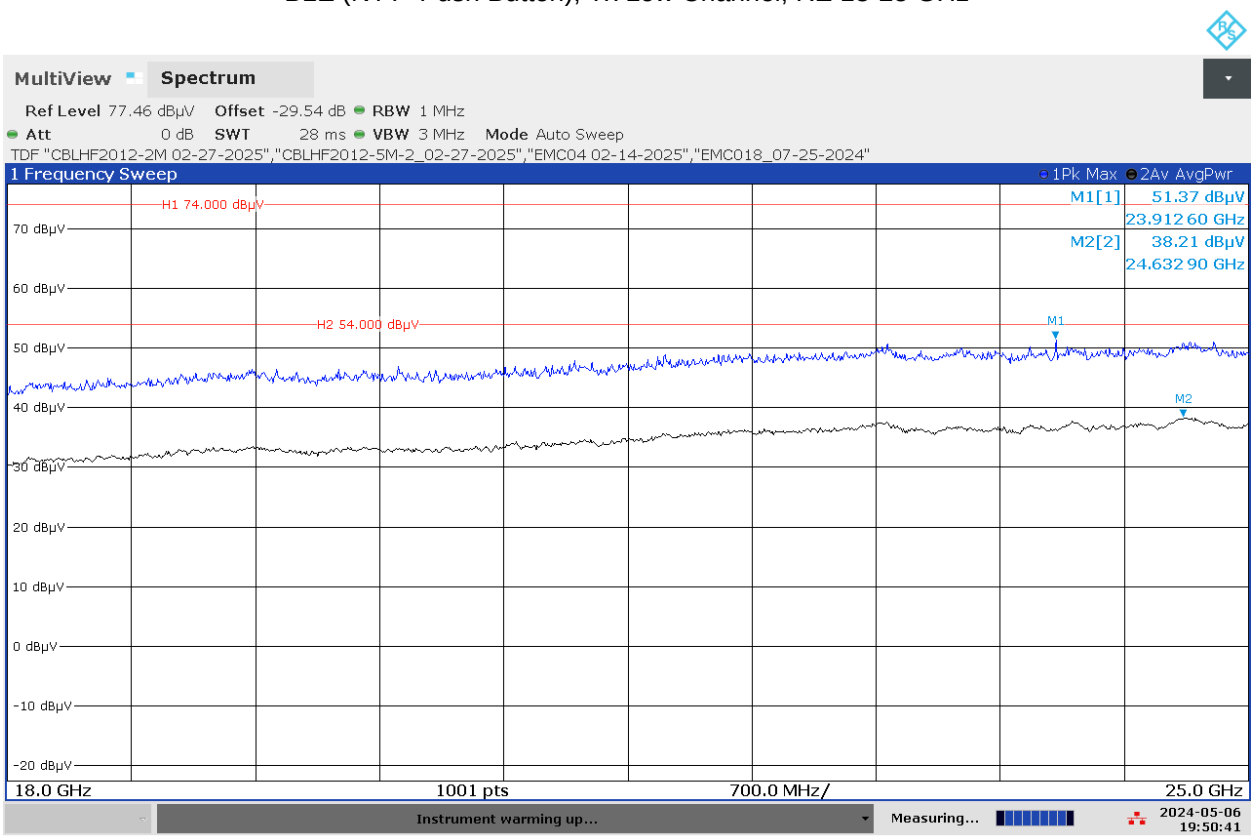
Peak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
7206.788	59.92	74.00	-14.08	0.00	4.00	Vertical	1M	0.10	-10.25
9609.037	49.13	74.00	-24.87	0.00	4.00	Horizontal	1M	0.10	-8.04
17800.251	51.67	74.00	-22.33	265.50	1.00	Vertical	1M	0.10	2.32

AVG (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
7206.788	48.00	54.00	-6.00	0.00	4.00	Vertical	1M	0.10	-10.25
9609.037	35.46	54.00	-18.54	0.00	4.00	Horizontal	1M	0.10	-8.04
17800.251	37.47	54.00	-16.53	265.50	1.00	Vertical	1M	0.10	2.32

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



07:50:41 PM 05/06/2024

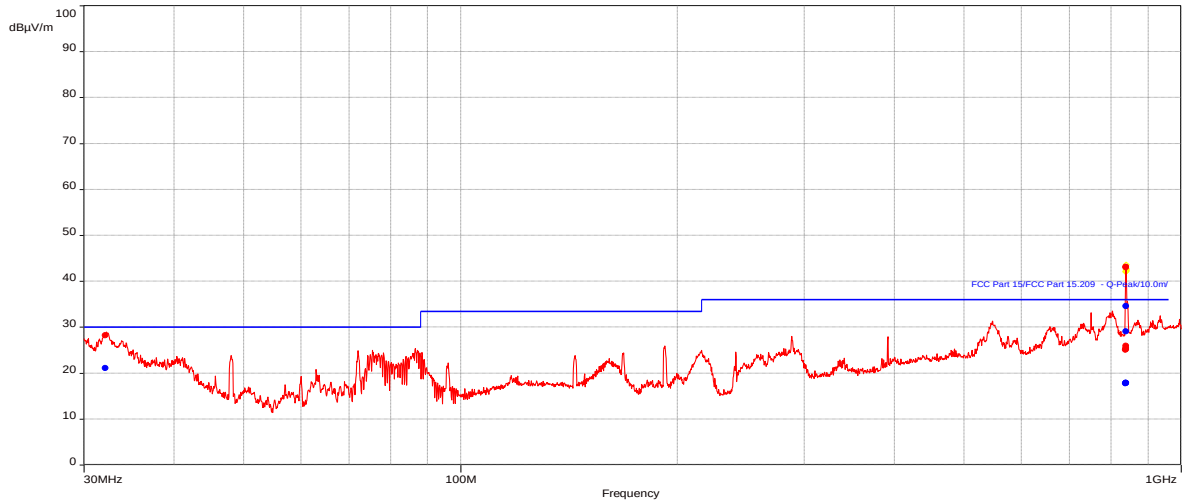
Notes: Testing was performed manually around the EUT at 10cm distance. No emission was detected above the test instrument noise floor. The cable loss, antenna factor, filter loss, and pre-amp gain were compensated as transducer factor (TDF) and the distance factor was compensated as Reference Offset

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

Test Information:

Date and Time	5/1/2024 5:26:46 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Vathana Ven
Temperature	22 deg C
Humidity	41 %
Atmospheric Pressure	1005 mbars
Comments	Scan 13_BLE - NTT Push Button, Mid Ch, RE 30-1000 MHz

Graph:



Results:

QuasiPeak (PASS) (7)

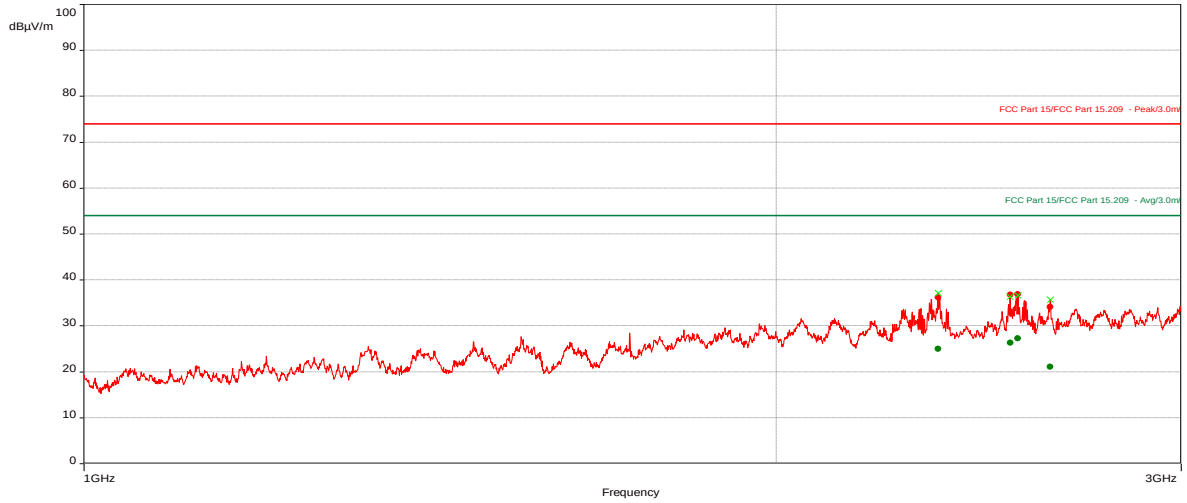
Frequency (MHz)	SR	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
32.1422	1	21.08	30.00	-8.92	278.40	2.84	Vertical	120k	0.10	-13.96
837.3792	1	17.83	36.00	-18.17	93.40	3.30	Vertical	120k	0.10	-6.80
837.9432	1	17.87	36.00	-18.13	33.90	3.60	Vertical	120k	0.10	-6.80
837.963	1	29.13	36.00	-6.87	267.60	2.38	Vertical	120k	0.10	-6.80
838.0339	1	17.88	36.00	-18.12	229.40	2.54	Vertical	120k	0.10	-6.80
838.2931	1	17.85	36.00	-18.15	137.10	3.36	Vertical	120k	0.10	-6.80
838.4825	1	34.63	36.00	-1.37	283.90	2.84	Vertical	120k	0.10	-6.80

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

Test Information:

Date and Time	5/2/2024 5:14:23 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 43_BLE - NTT-Push Button, Tx Mid Channel, RE 1-3 GHz

Graph:



Results:

Peak (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
2352.275	36.26	74.00	-37.74	360.00	1.44	Horizontal	1M	0.10	-17.88
2528.25	36.80	74.00	-37.20	0.00	1.00	Vertical	1M	0.10	-17.12
2547.913	36.91	74.00	-37.09	0.00	1.00	Vertical	1M	0.10	-17.06
2631.887	34.14	74.00	-39.86	230.90	3.59	Horizontal	1M	0.10	-17.00

AVG (PASS) (4)

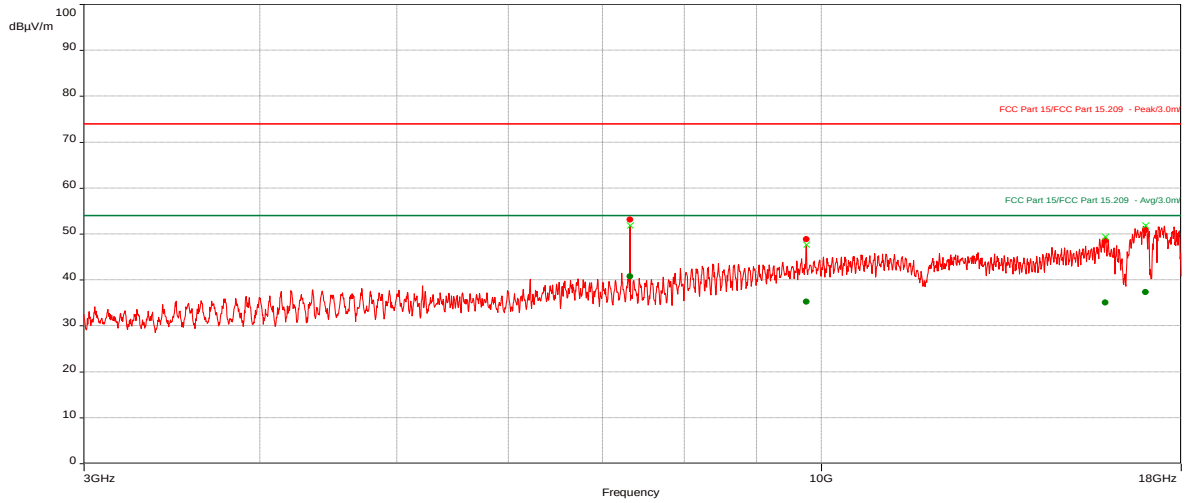
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
2352.275	25.01	54.00	-28.99	360.00	1.44	Horizontal	1M	0.10	-17.88
2528.25	26.33	54.00	-27.67	0.00	1.00	Vertical	1M	0.10	-17.12
2547.913	27.34	54.00	-26.66	0.00	1.00	Vertical	1M	0.10	-17.06
2631.887	21.13	54.00	-32.87	230.90	3.59	Horizontal	1M	0.10	-17.00

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

Test Information:

Date and Time	5/2/2024 3:54:29 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 40_BLE - NTT-Push Button, Tx Mid Channel, RE 3-18 GHz

Graph:



Results:

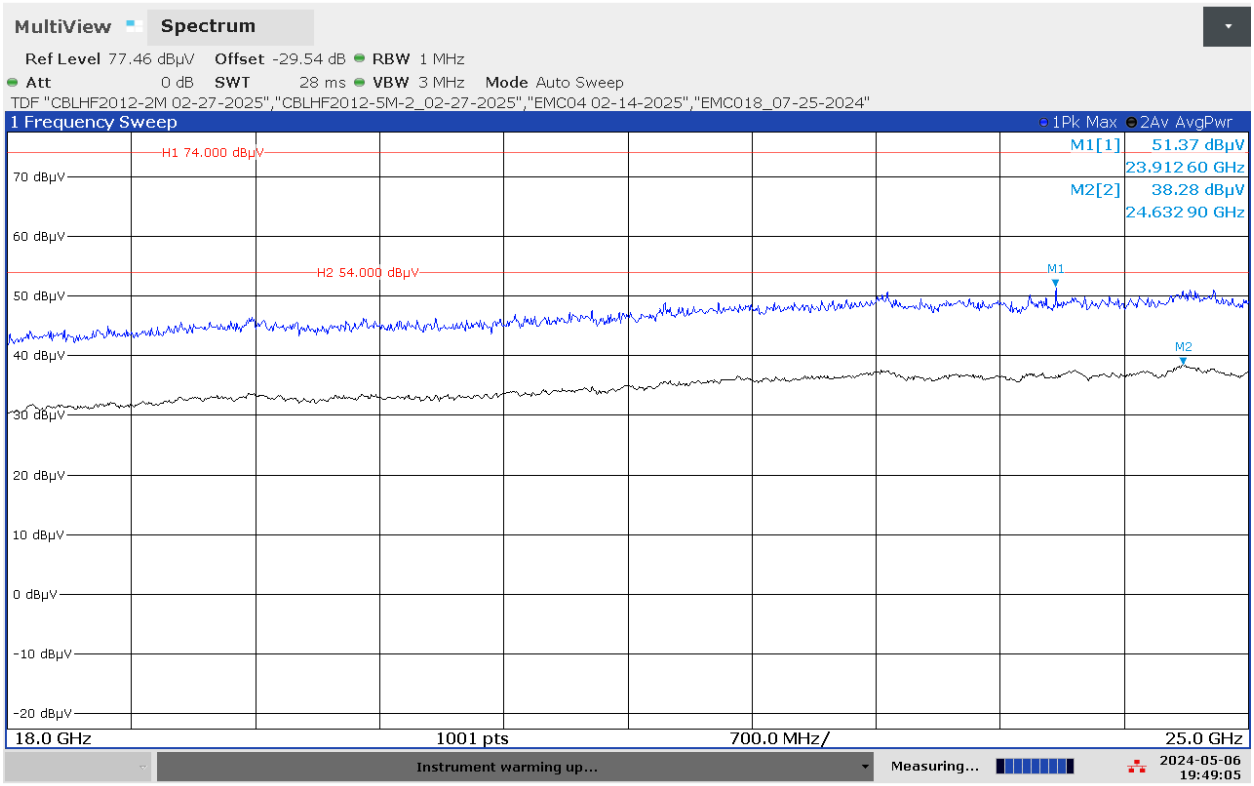
Peak (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
7320.038	53.16	74.00	-20.84	360.00	4.00	Vertical	1M	0.10	-10.18
9761.075	48.90	74.00	-25.10	0.00	4.00	Horizontal	1M	0.10	-7.69
15903.894	48.56	74.00	-25.44	0.00	4.00	Vertical	1M	0.10	-0.19
16992.01	50.85	74.00	-23.15	265.70	1.00	Horizontal	1M	0.10	2.12

AVG (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
7320.038	40.76	54.00	-13.24	360.00	4.00	Vertical	1M	0.10	-10.18
9761.075	35.29	54.00	-18.71	0.00	4.00	Horizontal	1M	0.10	-7.69
15903.894	35.05	54.00	-18.95	0.00	4.00	Vertical	1M	0.10	-0.19
16992.01	37.36	54.00	-16.64	265.70	1.00	Horizontal	1M	0.10	2.12

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



07:49:05 PM 05/06/2024

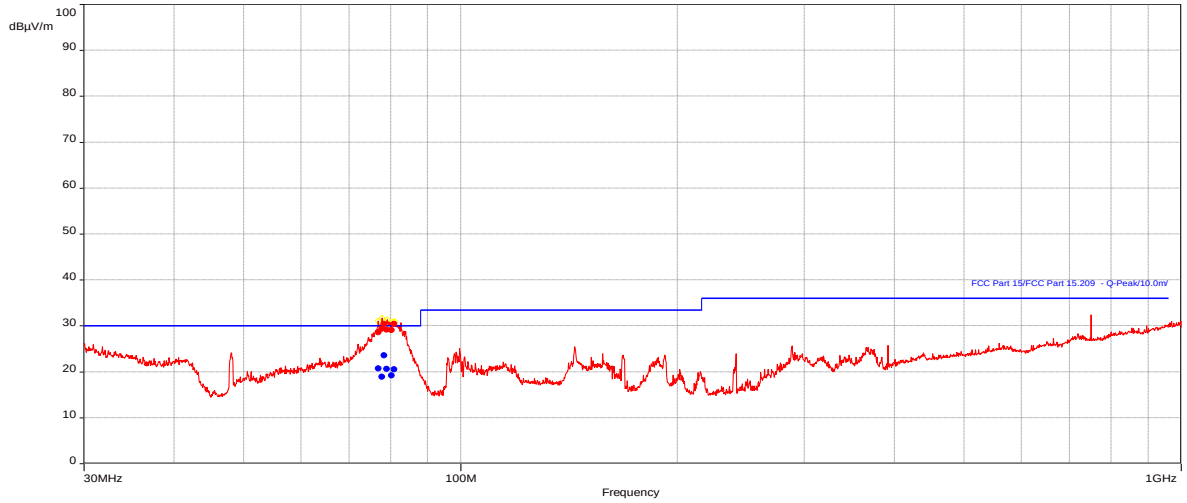
Notes: Testing was performed manually around the EUT at 10cm distance. No emission was detected above the test instrument noise floor. The cable loss, antenna factor, filter loss, and pre-amp gain were compensated as transducer factor (TDF) and the distance factor was compensated as Reference Offset

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

Test Information:

Date and Time	5/1/2024 6:07:07 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Vathana Ven
Temperature	22 deg C
Humidity	41 %
Atmospheric Pressure	1005 mbars
Comments	Scan 14_BLE - NTT Push Button, High Ch, RE 30-1000 MHz

Graph:



Results:

QuasiPeak (PASS) (6)

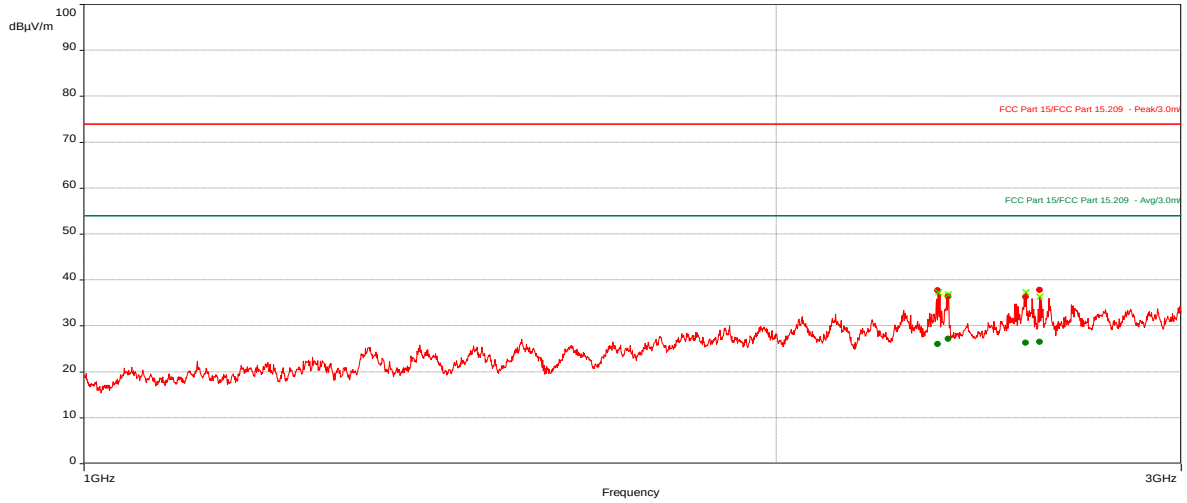
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
76.8928	20.69	30.00	-9.31	158.80	1.46	Vertical	120k	0.10	-25.20
77.8169	18.94	30.00	-11.06	327.10	2.00	Vertical	120k	0.10	-25.27
78.3332	23.54	30.00	-6.46	1.30	4.00	Vertical	120k	0.10	-25.32
78.9932	20.62	30.00	-9.38	6.90	3.46	Vertical	120k	0.10	-25.38
80.1651	19.25	30.00	-10.75	284.00	4.00	Vertical	120k	0.10	-25.46
80.9026	20.54	30.00	-9.46	93.50	4.00	Vertical	120k	0.10	-25.45

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

Test Information:

Date and Time	5/2/2024 4:52:13 PM
Client and Project Number	Sargent Assa Abloy (NTM & NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 42_BLE - NTT-Push Button, Tx High Channel, RE 1-3 GHz

Graph:



Results:

Peak (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
2351.813	37.74	74.00	-36.26	360.00	1.44	Horizontal	1M	0.10	-17.88
2376.137	36.40	74.00	-37.60	360.00	1.44	Horizontal	1M	0.10	-17.74
2568.137	36.28	74.00	-37.72	74.10	2.51	Horizontal	1M	0.10	-17.03
2603.739	37.82	74.00	-36.18	74.00	2.51	Horizontal	1M	0.10	-17.04

AVG (PASS) (4)

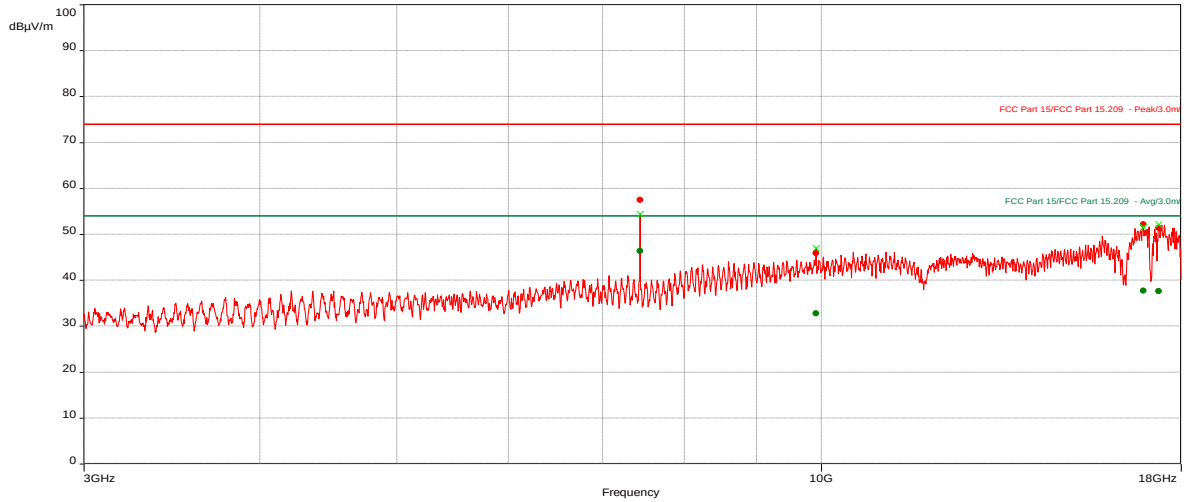
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
2351.813	26.05	54.00	-27.95	360.00	1.44	Horizontal	1M	0.10	-17.88
2376.137	27.15	54.00	-26.85	360.00	1.44	Horizontal	1M	0.10	-17.74
2568.137	26.38	54.00	-27.62	74.10	2.51	Horizontal	1M	0.10	-17.03
2603.739	26.49	54.00	-27.51	74.00	2.51	Horizontal	1M	0.10	-17.04

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

Test Information:

Date and Time	5/2/2024 4:22:32 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 41_BLE - NTT-Push Button, Tx High Channel, RE 3-18 GHz

Graph:



Results:

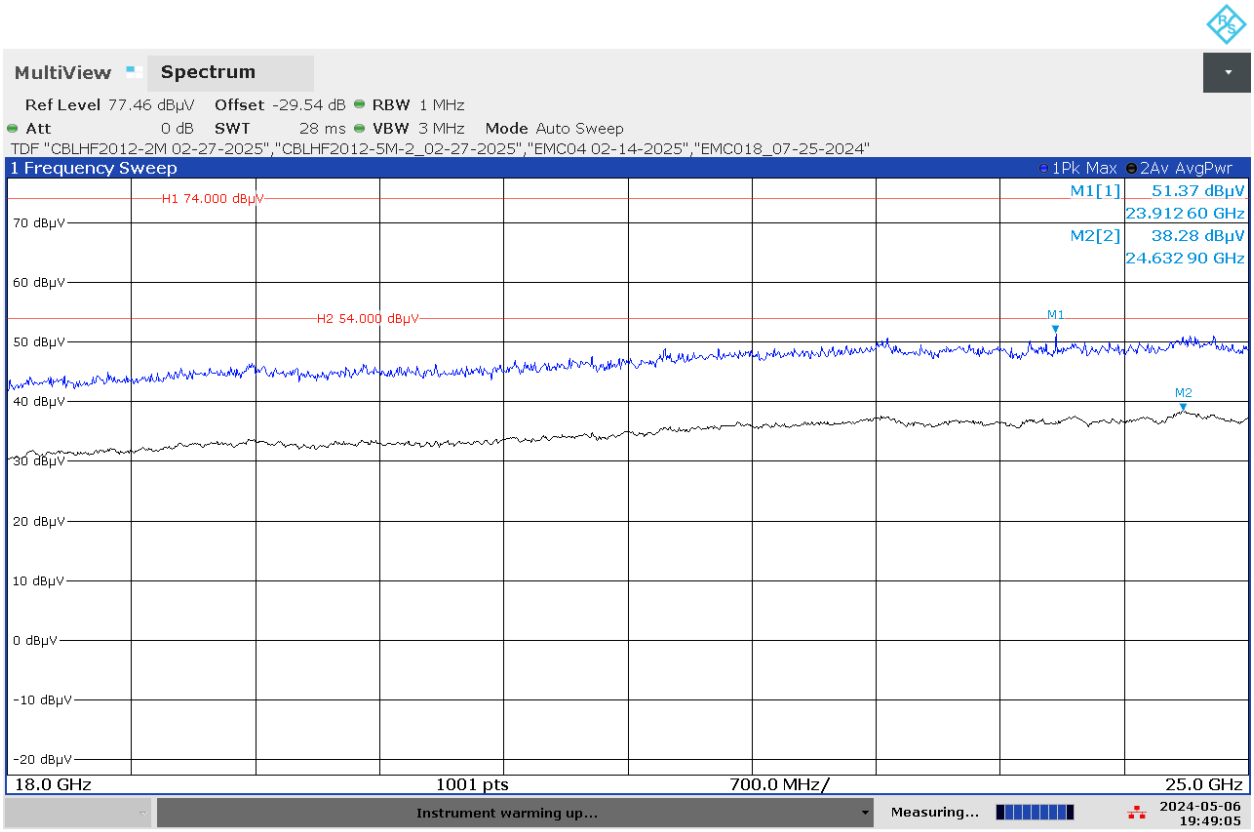
Peak (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
7439.301	57.55	74.00	-16.45	0.00	4.00	Vertical	1M	0.10	-10.16
9919.025	45.93	74.00	-28.07	360.00	4.00	Horizontal	1M	0.10	-7.40
16923.665	52.15	74.00	-21.85	265.70	4.00	Vertical	1M	0.10	2.11
17362.36	51.44	74.00	-22.56	360.00	4.00	Vertical	1M	0.10	1.95

AVG (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
7439.301	46.43	54.00	-7.57	0.00	4.00	Vertical	1M	0.10	-10.16
9919.025	32.80	54.00	-21.20	360.00	4.00	Horizontal	1M	0.10	-7.40
16923.665	37.72	54.00	-16.28	265.70	4.00	Vertical	1M	0.10	2.11
17362.36	37.66	54.00	-16.34	360.00	4.00	Vertical	1M	0.10	1.95

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



07:49:05 PM 05/06/2024

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 6.2 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
05/01/2024	Kouma Sinn	N/A	Battery Powered	Continuous Transmitting	22	41	1005
05/02/2024	Kouma Sinn	N/A	Battery Powered	Continuous Transmitting	22	42	1004
05/01/2024 (2nd shift)	Vathana Ven	N/A	Battery Powered	Continuous Transmitting	22	28	984
05/06/2024 (2nd shift)	Vathana Ven	N/A	Battery Powered	Continuous Transmitting	25	41	1001

Deviations, Additions, or Exclusions: None

7 Digital Device Radiated Spurious Emissions

7.1 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)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

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

Sample Calculation

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

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

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

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This

value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/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.

7.2 Limit

§15.109 Radiated emission limits.

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

Frequency of emission (MHz)	Field strength (microvolts/meter)	Field strength (dBμV/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 ISED ICES-003 are the same as the FCC limits above.

7.3 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

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	Nexio	2022.0.27.0

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:

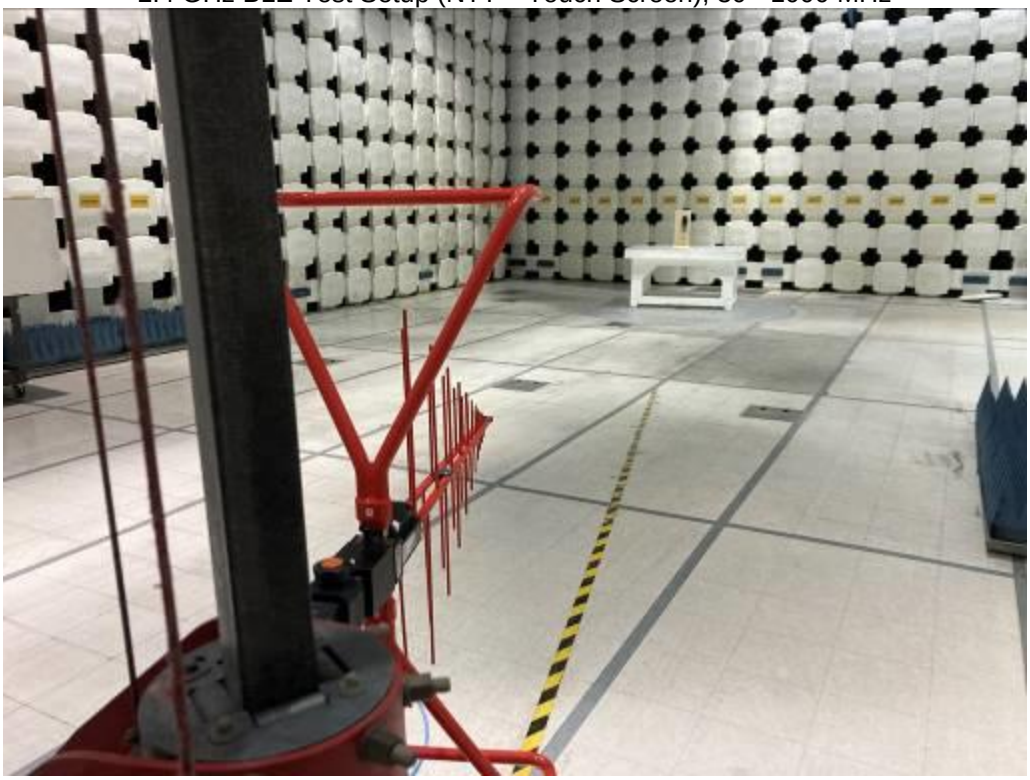
Name	Manufacturer	Version
BAT-EMC	Nexio	2022.0.27.0

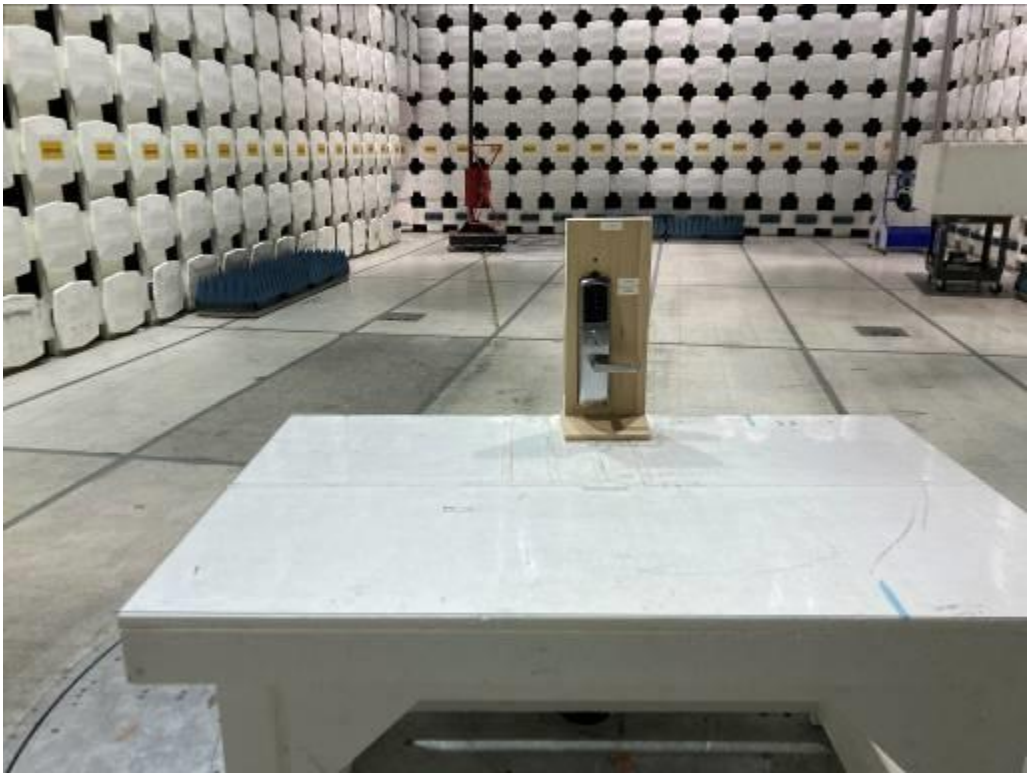
7.4 Results:

The sample tested was found to Comply.

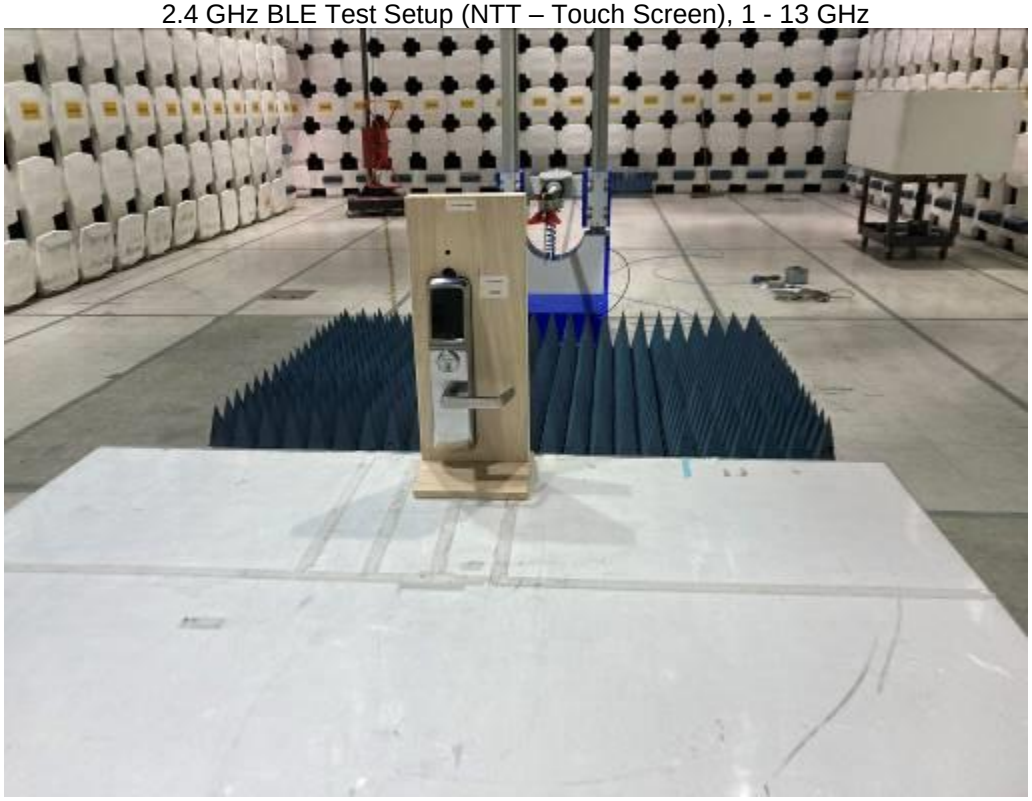
7.5 Setup Photographs:

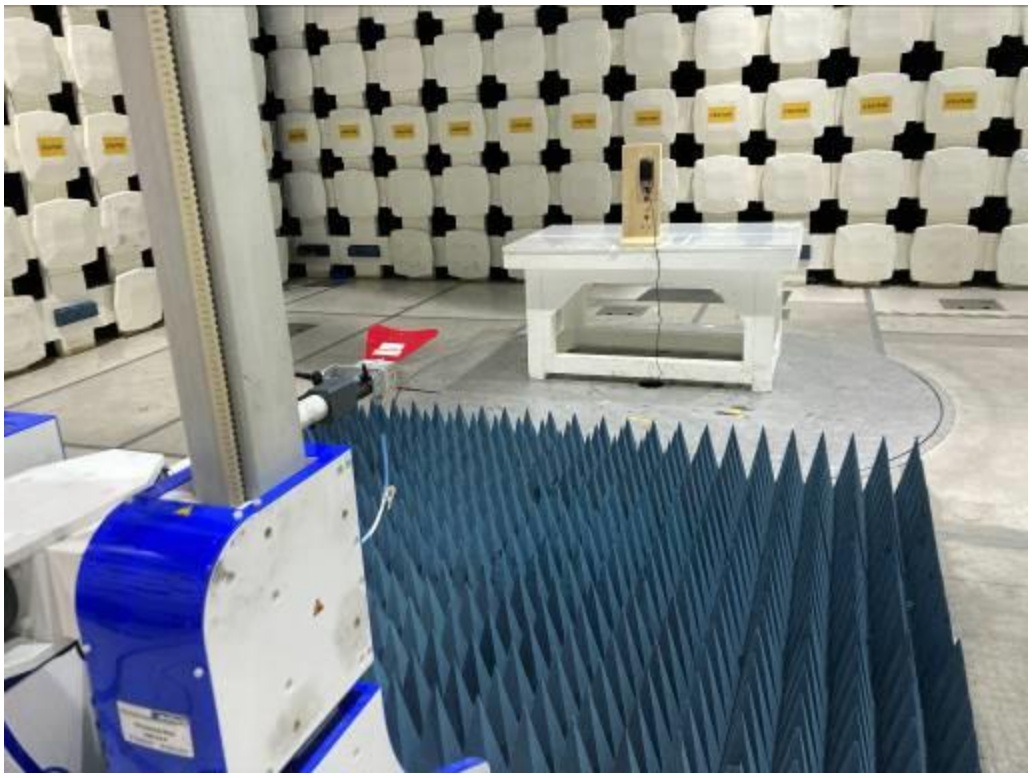
2.4 GHz BLE Test Setup (NTT – Touch Screen), 30 - 1000 MHz



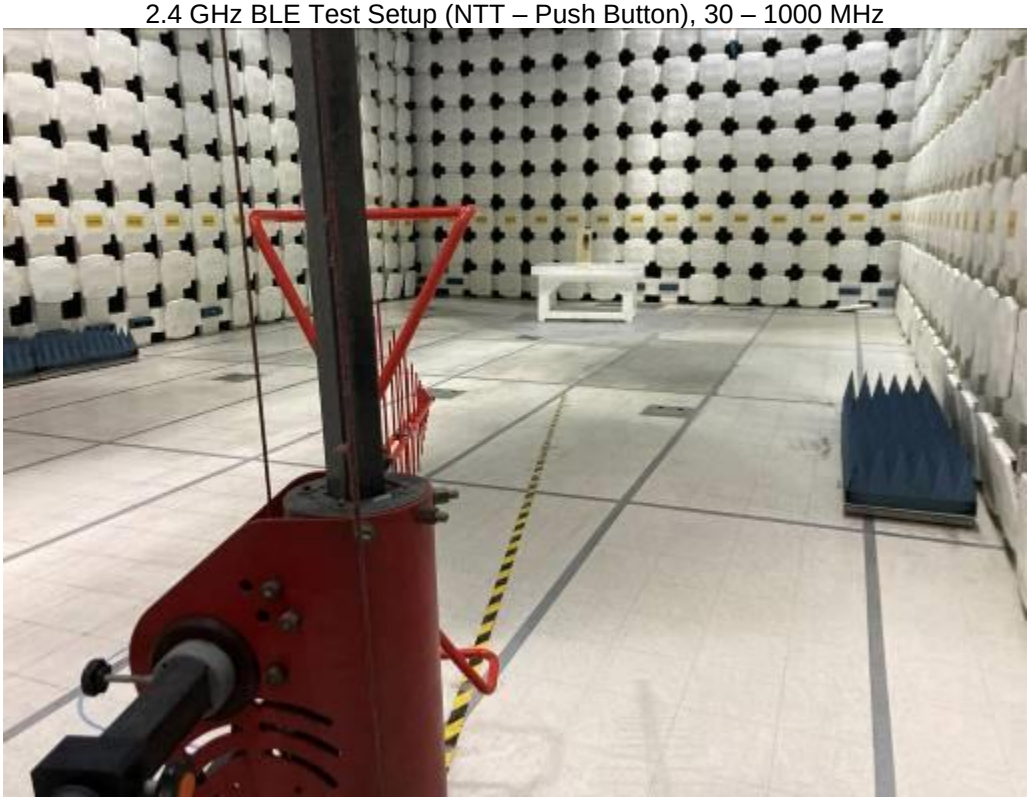


2.4 GHz BLE Test Setup (NTT – Touch Screen), 1 - 13 GHz

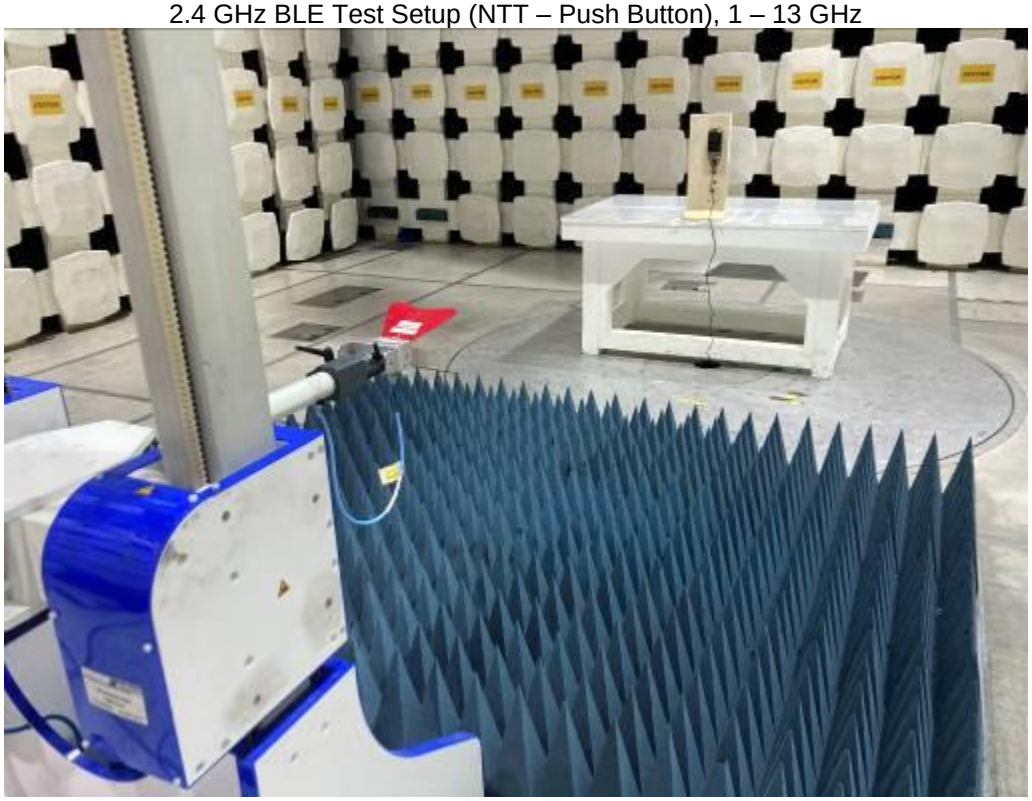




2.4 GHz BLE Test Setup (NTT – Push Button), 30 – 1000 MHz



2.4 GHz BLE Test Setup (NTT – Push Button), 1 – 13 GHz



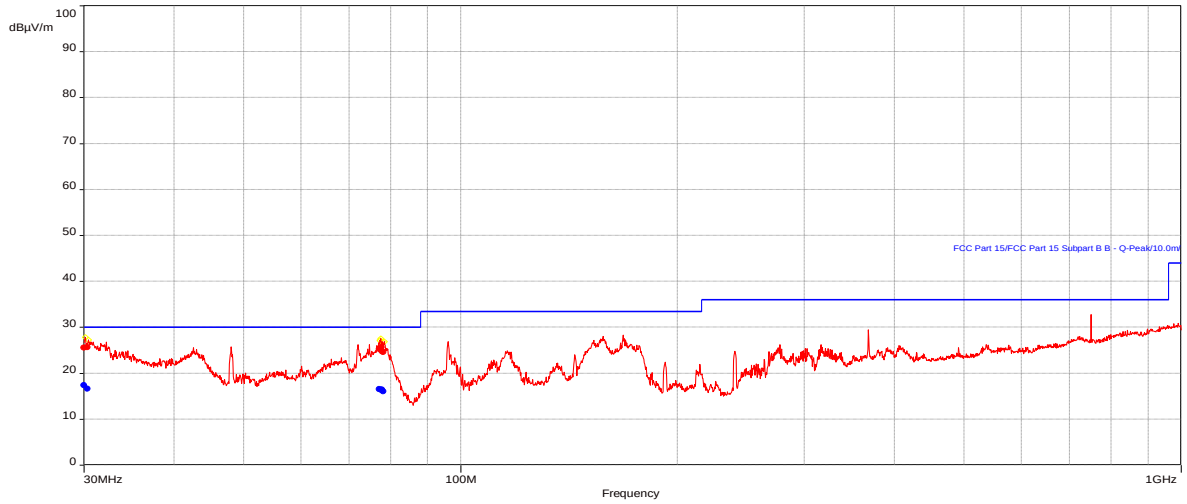
7.6 Plots/Data:

BLE (NTT – Touch Screen), Radiated Emissions From 30-1000 MHz With Radio in Standby Mode

Test Information:

Date and Time	5/1/2024 7:22:49 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Vathana Ven
Temperature	22 deg C
Humidity	41 %
Atmospheric Pressure	1005 mbars
Comments	Scan 16_BLE - NTT Touchscreen, Rx mode, RE 30-1000 MHz

Graph:



Results:

QuasiPeak (PASS) (6)

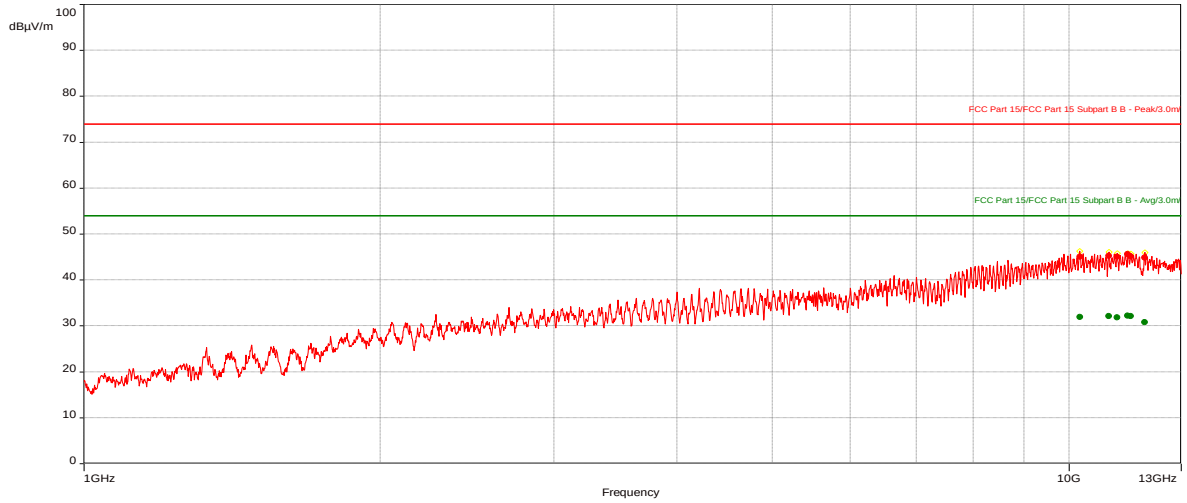
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
30.0022	17.43	30.00	-12.57	267.70	4.00	Vertical	120k	0.10	-12.62
30.315	16.61	30.00	-13.39	115.20	4.00	Vertical	120k	0.10	-12.79
77.1498	16.50	30.00	-13.50	354.30	4.00	Vertical	120k	0.10	-25.21
77.6842	16.38	30.00	-13.62	61.20	4.00	Vertical	120k	0.10	-25.26
77.7511	16.43	30.00	-13.57	337.90	4.00	Vertical	120k	0.10	-25.27
78.122	16.08	30.00	-13.92	326.90	4.00	Vertical	120k	0.10	-25.30

BLE (NTT – Touch Screen), Radiated Emissions From 1-13 GHz With Radio in Standby Mode

Test Information:

Date and Time	5/2/2024 6:42:47 PM
Client and Project Number	Sargent Assa Abloy (NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 44_BLE - NTT- Touch Screen, Rx mode, RE 1-13 GHz

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
10261.443	45.02	74.00	-28.98	360.00	1.00	Vertical	1M	0.10	-6.90
10979.074	45.26	74.00	-28.74	0.00	1.00	Horizontal	1M	0.10	-6.04
11199.973	45.04	74.00	-28.96	360.00	1.00	Horizontal	1M	0.10	-5.76
11480.374	45.63	74.00	-28.37	0.00	1.00	Vertical	1M	0.10	-5.43
11560.82	45.20	74.00	-28.80	360.00	4.00	Horizontal	1M	0.10	-5.27
11936.629	44.83	74.00	-20.17	360.00	1.00	Horizontal	1M	0.10	-4.57

AVG (PASS) (6)

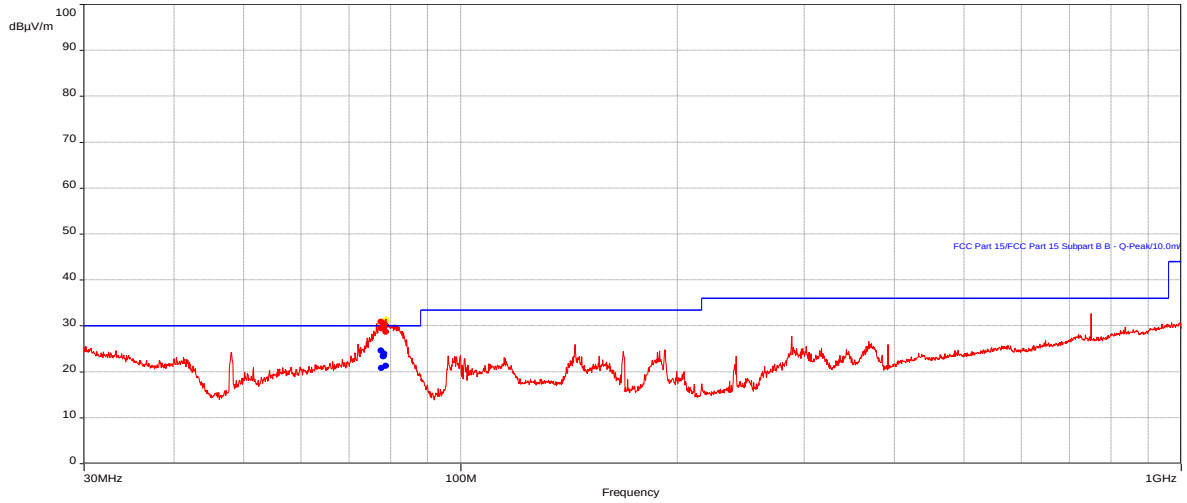
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
10261.443	31.90	54.00	-22.10	360.00	1.00	Vertical	1M	0.10	-6.90
10979.074	32.16	54.00	-21.84	0.00	1.00	Horizontal	1M	0.10	-6.04
11199.973	31.83	54.00	-22.17	360.00	1.00	Horizontal	1M	0.10	-5.76
11480.374	32.21	54.00	-21.79	0.00	1.00	Vertical	1M	0.10	-5.43
11560.82	32.14	54.00	-21.86	360.00	4.00	Horizontal	1M	0.10	-5.27
11936.629	30.77	54.00	-23.23	360.00	1.00	Horizontal	1M	0.10	-4.57

BLE (NTT – Push Button), Radiated Emissions From 30-1000 MHz With Radio in Standby Mode

Test Information:

Date and Time	5/1/2024 6:36:23 PM
Client and Project Number	Sargent Assa Abloy
Engineer	Vathana Ven
Temperature	22 deg C
Humidity	41 %
Atmospheric Pressure	1005 mbars
Comments	Scan 15_BLE - NTT Push Button, Rx mode, RE 30-1000 MHz

Graph:



Results:

QuasiPeak (PASS) (6)

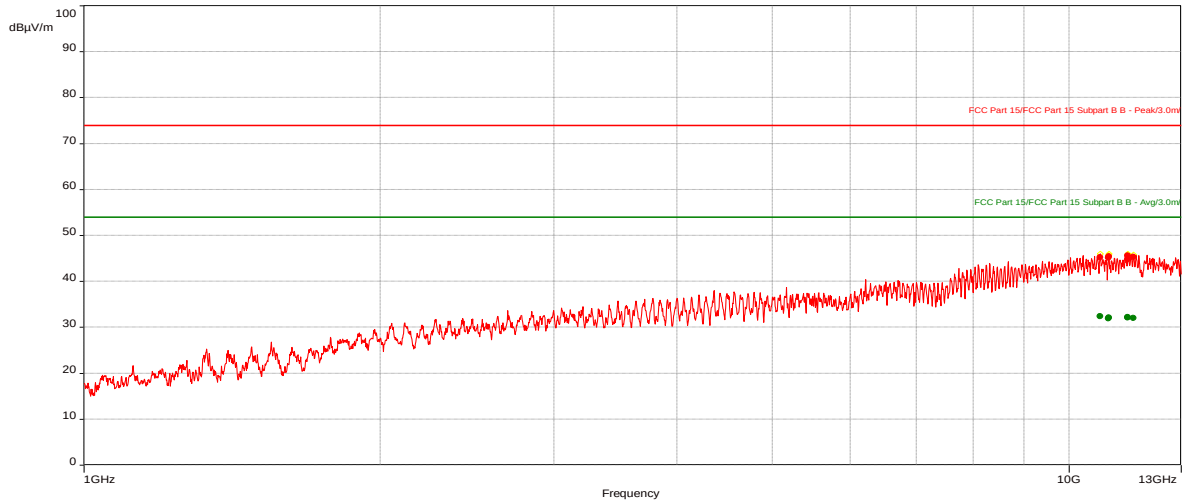
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
77.5906	24.61	30.00	-5.39	261.80	2.61	Vertical	120k	0.10	-25.25
77.7041	20.84	30.00	-9.16	202.10	2.62	Vertical	120k	0.10	-25.26
78.089	23.44	30.00	-6.56	327.00	3.83	Vertical	120k	0.10	-25.30
78.2291	23.36	30.00	-6.64	12.20	2.91	Vertical	120k	0.10	-25.31
78.2946	23.97	30.00	-6.03	159.00	1.40	Vertical	120k	0.10	-25.31
78.7304	21.30	30.00	-8.70	327.00	4.00	Vertical	120k	0.10	-25.35

BLE (NTT – Push Button), Radiated Emissions From 1-13 GHz With Radio in Standby Mode

Test Information:

Date and Time	5/2/2024 6:02:55 PM
Client and Project Number	Sargent Assa Abloy (NTM & NTT-Touchscreen & Push Button)
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	42 %
Atmospheric Pressure	1004 mbars
Comments	Scan 43_BLE - NTT-Push Button, Rx mode, RE 1-13 GHz

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
10761.766	45.26	74.00	-28.74	212.20	4.00	Vertical	1M	0.00	-6.26
10974.105	45.20	74.00	-28.80	360.00	3.94	Vertical	1M	0.00	-6.05
10980.796	45.47	74.00	-28.53	360.00	3.94	Horizontal	1M	0.00	-6.04
11478.641	44.82	74.00	-29.18	212.30	3.94	Vertical	1M	0.00	-5.44
11480.795	45.61	74.00	-28.39	360.00	3.94	Horizontal	1M	0.00	-5.43
11630.904	45.31	74.00	-28.69	212.30	3.94	Vertical	1M	0.00	-5.16

AVG (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time	Correction (dB)
10761.766	32.42	54.00	-21.58	212.20	4.00	Vertical	1M	0.00	-6.26
10974.105	31.91	54.00	-22.09	360.00	3.94	Vertical	1M	0.00	-6.05
10980.796	32.18	54.00	-21.82	360.00	3.94	Horizontal	1M	0.00	-6.04
11478.641	32.17	54.00	-21.83	212.30	3.94	Vertical	1M	0.00	-5.44
11480.795	32.25	54.00	-21.75	360.00	3.94	Horizontal	1M	0.00	-5.43
11630.904	32.09	54.00	-21.91	212.30	3.94	Vertical	1M	0.00	-5.16

Product Standard: FCC 47CFR15 Part 15 Subpart B, ISED ICES-003				Limit applied: See Report Section 7.2 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
05/01/2024	Vathana Ven VJV	Kouma Sinn KPS	Internal battery	Standby	22	41	1001
05/02/2024	Kouma Sinn KPS	Vathana Ven VJV	Internal battery	Standby	22	42	1004

Deviations, Additions, or Exclusions: None

8 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	09/18/2024	105779713BOX-006	VFV	KPS	Original Issue