FCC and ISED Test Report

Manufacturer: LEGO System A/S
Model: MOTOR NO. 21

In accordance with FCC 47 CFR Part 15C, ISED RSS-210 and ISED RSS-GEN (NFC)

Prepared for: LEGO System A/S
Aastvej 1
7190 Billund
DENMARK

FCC ID: NPI104905 IC: 3072A-104905

COMMERCIAL-IN-CONFIDENCE

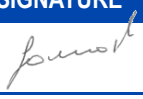
Document 75962744-06 Issue 01

SIGNATURE			
			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Steve Marshall	Senior Engineer	Authorised Signatory	27 March 2025

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15C, ISED RSS-210 and ISED RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Pier-Angelo Lorusso	27 March 2025	

FCC Accreditation
492497/UK2010 Octagon House, Fareham Test Laboratory

ISED Accreditation
12669A/UK0003 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15C, 2023, ISED RSS-210, Issue 11 (06-2024) and ISED RSS-GEN, Issue 05 (2018-04) + A2 (2021-02) for the tests detailed in section 1.3.

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Contents

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	27 March 2025

Table 1

1.2 Introduction

Applicant	LEGO System A/S
Manufacturer	LEGO System A/S
Model Number(s)	MOTOR NO. 21
Serial Number(s)	DM_EP2-0231, DM_EP2-0255 and DM_EP2-0014
Hardware Version(s)	EP2
Software Version(s)	0.3.1
Number of Samples Tested	3
Test Specification/Issue/Date	FCC 47 CFR Part 15C, 2023, ISED RSS-210, Issue 11 (06-2024) ISED RSS-GEN: Issue 05 (2018-04) + A2 (2021-02)
Order Number	7000395228
Date	15-October-2024
Date of Receipt of EUT	20-January-2025
Start of Test	04-February-2025
Finish of Test	27-February-2025
Name of Engineer(s)	Pier-Angelo Lorusso
Related Document(s)	ANSI C63.10 (2020)

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C, ISED RSS-210 and ISED RSS-GEN is shown below.

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	Part 15C	RSS-210	RSS-GEN			
Configuration and Mode: 13.56 MHz NFC - Transmit						
-	15.203	-	-	Antenna Requirements	Pass	The equipment under test uses an integral Antenna.
2.1	15.215 (c)	N/A	6.7	20 dB Bandwidth & 99% Occupied Bandwidth	Pass	ANSI C63.10 (2020)
2.2	15.225 (a)(b)(c)(d)	B.6	6.13	Field Strength of any Emission	Pass	ANSI C63.10 (2020)
2.3	15.225 (e)	B.6	6.11	Frequency Tolerance Under Temperature Variations	Pass	ANSI C63.10 (2020)

Table 2

1.4 Application Form

Equipment Description

Technical Description: *(Please provide a brief description of the intended use of the equipment including the technologies the product supports)*			
Manufacturer:	LEGO System A/S		
Model:	MOTOR NO. 21		
Part Number:	MOTOR NO. 21		
Hardware Version:	EP2		
Software Version:	0.3.1		
FCC ID of the product under test – see guidance here		NPI104905	
IC ID of the product under test – see guidance here		3072A-104905	
Device Category	Mobile ☐	Portable ☒	Fixed ☐
Equipment is fitted with an Audio Low Pass Filter		Yes ☐	No ☒

Table 3

Intentional Radiators

Technology	BLE	RFID				
Frequency Range (MHz to MHz)	2402-2480	13.56				
Conducted Declared Output Power (dBm)	0					
Antenna Gain (dBi)	-7.56					
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	1, 2 MHz	1 KHz				
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	GFSK	ASK				
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)	F1D					
Bottom Frequency (MHz)	2402	13.56				
Middle Frequency (MHz)	2442	13.56				
Top Frequency (MHz)	2480	13.56				

Table 4

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	48 MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	26 kHz
Class A Digital Device (Use in commercial, industrial or business environment) ☐ Class B Digital Device (Use in residential environment only) ☒	

Table 5

~~AC Power Source~~

~~AC supply frequency:~~		~~Hz~~
~~Voltage~~		~~V~~
~~Max current:~~		~~A~~
~~Single Phase ☐ Three Phase ☐~~		

Table 6

~~DC Power Source~~

~~Nominal voltage:~~		~~V~~
~~Extreme upper voltage:~~		~~V~~
~~Extreme lower voltage:~~		~~V~~
~~Max current:~~		~~A~~

Table 7

Battery Power Source

Voltage:	3.85	V
Test Voltage	2.7	V
End-point Voltage:	2.6	V *(Point at which the battery will terminate)*
Alkaline ☐ Leclanche ☐ Lithium ☒ Nickel Cadmium ☐ Lead Acid* ☐ **(Vehicle regulated)*		
Other ☐ Please detail:		

Table 8

Charging

Can the EUT transmit whilst being charged	Yes ☒ No ☐

Table 9

Temperature

Minimum temperature:	0	°C
Maximum temperature:	35	°C

Table 10

Cable Loss

Adapter Cable Loss (Conducted sample)	Cabel + Connector @ 2480MHz 0.5dB+0.5dB = 1dB	1 dB

Table 11

Antenna Characteristics

Antenna connector ☐			State impedance		Ohm
Temporary antenna connector ☒			State impedance	50	Ohm
Integral antenna ☒	Type:	PCB Antenna	Gain	-7.56	dBi
External antenna ☐	Type:		Gain		dBi
For external antenna only: Standard Antenna Jack ☐ If yes, describe how user is prohibited from changing antenna (if not professional installed): Equipment is only ever professionally installed ☐ Non-standard Antenna Jack ☐ All part 15 applications will need to show how the antenna gain was derived either from a manufacturer data sheet or a measurement. Where the gain of the antenna is inherently accounted for as a result of the measurement, such as field strength measurements on a part 15.249 or 15.231 device, so the gain does not necessarily need to be verified. However, enough information regarding the construction of the antenna shall be provided. Such information maybe photographs, length of wire antenna etc.					

Table 12

Ancillaries (if applicable)

Manufacturer:		Part Number:	
Model:		Country of Origin:	

Table 13

The above information was provided by the applicant.

1.5 Product Information

1.5.1 Technical Description

The Equipment under test (EUT) was a LEGO System A/S, Motor NO. 21, Model: MOTOR NO. 21 incorporating Bluetooth Low Energy and NFC transmitters.

The primary function of the EUT is a Toy for use in a classroom.

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Model: MOTOR NO. 21, Serial Number: DM_EP2-0255			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: MOTOR NO. 21, Serial Number: DM_EP2-0231			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: MOTOR NO. 21, Serial Number: DM_EP2-0014			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 14

1.8 Test Location

TÜV SÜD conducted the following tests at our Octagon House Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: 13.56 MHz NFC - Transmit		
20 dB Bandwidth & 99% Occupied Bandwidth	Pier-Angelo Lorusso	UKAS
Field Strength of any Emission	Pier-Angelo Lorusso	UKAS
Frequency Tolerance Under Temperature Variations	Pier-Angelo Lorusso	UKAS

Table 15

Office Address:

TÜV SÜD
Octagon House
Concorde Way
Fareham
Hampshire
PO15 5RL
United Kingdom

2 Test Details

2.1 20 dB Bandwidth & 99% Occupied Bandwidth

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.215 (c)
ISED RSS-210 Clause N/A
ISED RSS-GEN, Clause 6.7

2.1.2 Equipment Under Test and Modification State

MOTOR NO. 21, S/N: DM_EP2-0231 - Modification State 0

2.1.3 Date of Test

06-February-2025

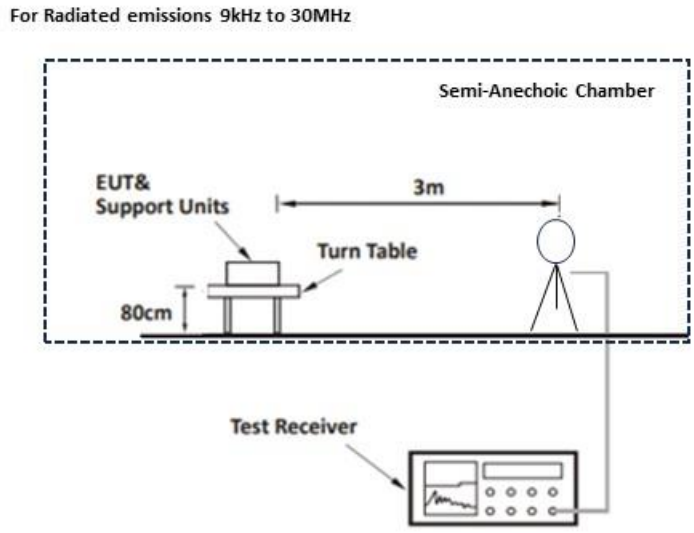
2.1.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.9.2 and 6.9.3.

DUT was powered by internal 3.85 V DC Lithium Battery.

The DUT was configured as per customer setting 13.56 MHz, Continuous Wave. (Setting 31).

2.1.5 Test Setup Diagram



2.1.6 Environmental Conditions

Ambient Temperature	20.2 °C
Relative Humidity	33.8 %

2.1.7 Test Results

13.56 MHz NFC - Transmit

Frequency (MHz)	20 dB Bandwidth (Hz)	99% Occupied Bandwidth (Hz)	F_{LOWER} (MHz)	F_{UPPER} (MHz)
13.56	75.42	63.93034	13.56015	13.56022

Table 16

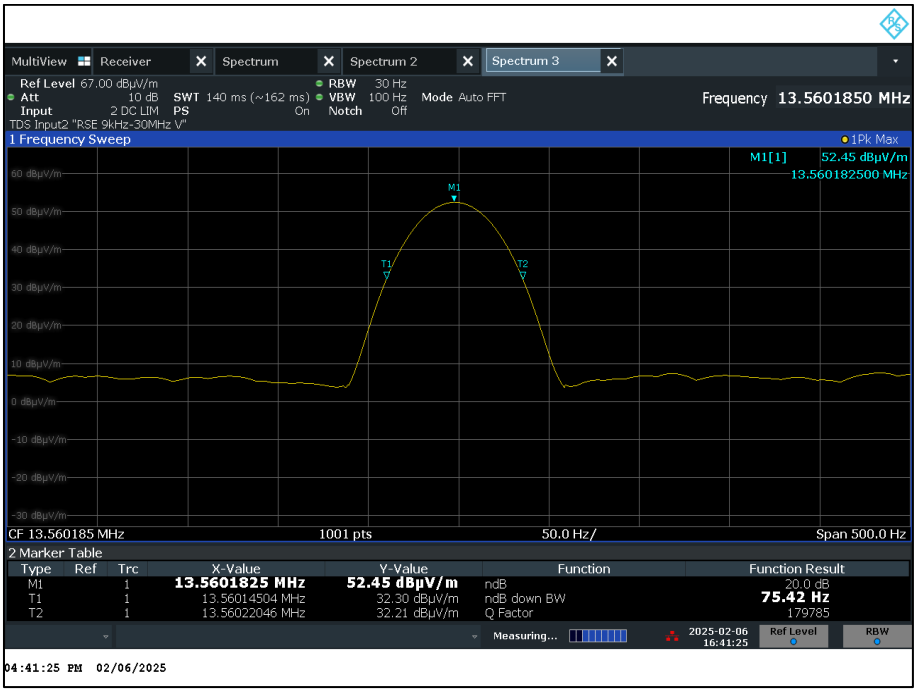


Figure 1 - 20 dB Bandwidth

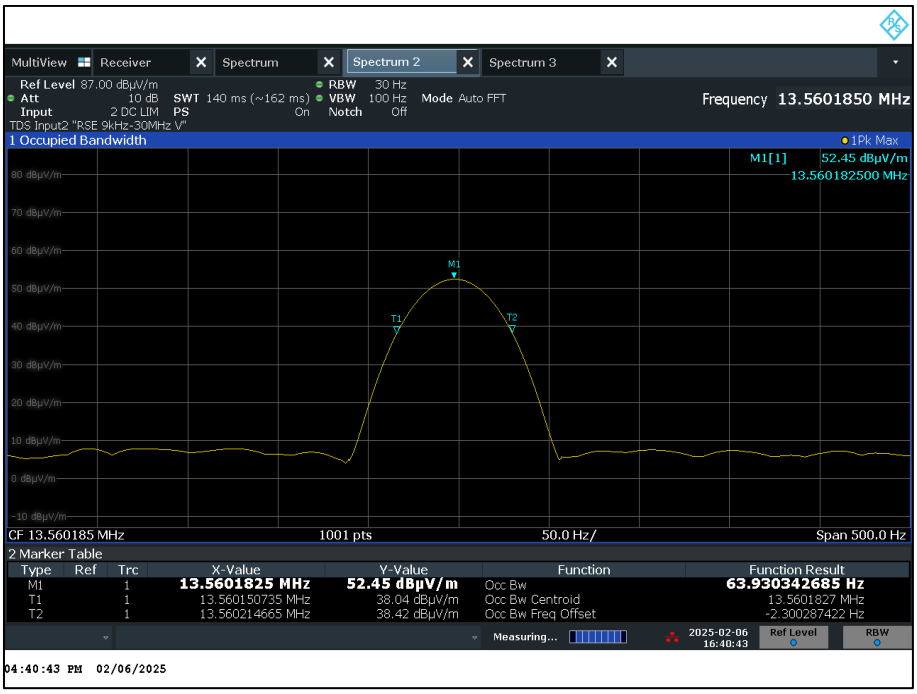


Figure 2 - 99% Occupied Bandwidth

2.1.8 Specification Limits

FCC 47 CFR Part 15C, Limit Clause 15.215 (c)

The 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

ISED RSS 210 and ISED RSS GEN, Limit Clause

None specified.

2.1.9 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
HygroPalm	Rotronic	HygroPalm 0	3484	12	13-Sep-2025
3m Semi-Anechoic Chamber	Rainford	RF Chamber 11	5136	36	14-Nov-2027
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Test Receiver	Rohde & Schwarz	ESW44	5382	12	09-Sep-2025
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5518	12	18-Apr-2025
Antenna (Loop, 9 kHz to 30 MHz)	Teseq	HLA 6121	5616	24	16-Aug-2026
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/B	6330	6	17-Feb-2025

Table 17

TU - Traceability Unscheduled

2.2 Field Strength of any Emission

2.2.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.225 (a)(b)(c)(d)
ISED RSS-210, Clause B.6
ISED RSS-GEN, Clause 6.13

2.2.2 Equipment Under Test and Modification State

MOTOR NO. 21, S/N: DM_EP2-0255 - Modification State 0
MOTOR NO. 21, S/N: DM_EP2-0231 - Modification State 0

2.2.3 Date of Test

04-February-2025 to 26-February-2025

2.2.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.3, 6.4 and 6.5.

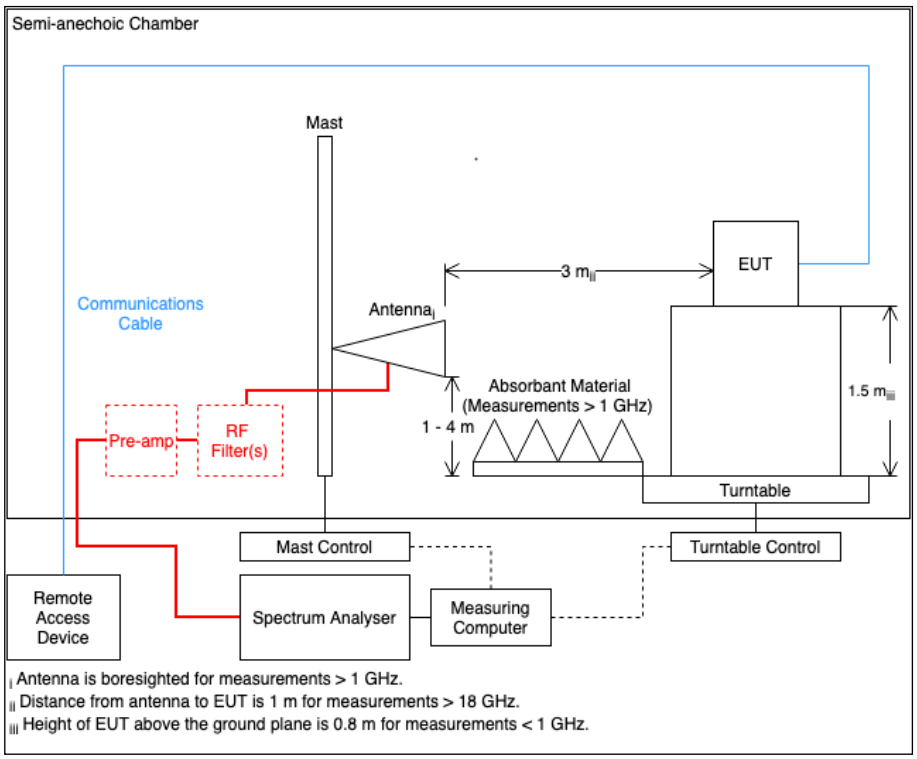
DUT was powered by internal 3.85 V DC Lithium Battery.

The DUT was configured as per customer setting 13.56 MHz, Continuous Wave. (Setting 31).

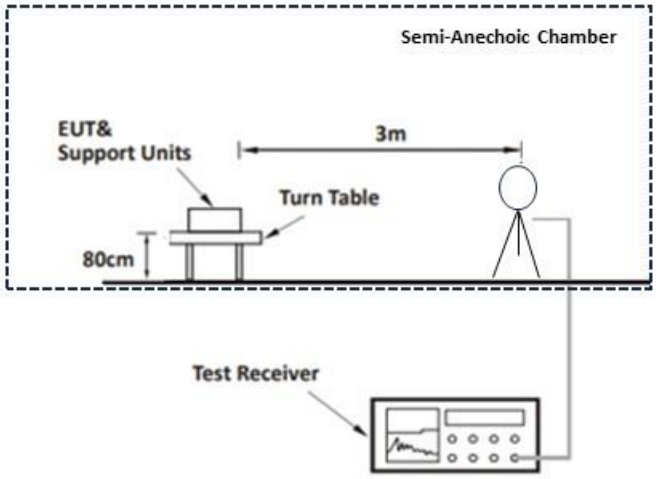
Pre-scan measurements were made at a distance of 3 m as shown by the plots below using a peak detector.

Final emission measurements were then made using a Quasi-Peak detector and recorded in the tables below. The limit lines shown on the plot were extrapolated from either 300 m or 30 m to the measurement distance of 3 m in accordance with ANSI C63.10 Clause 6.4.4.2.

2.2.5 Test Setup Diagram



For Radiated emissions 9kHz to 30MHz



2.2.6 Environmental Conditions

Ambient Temperature	19.5 - 20.8 °C
Relative Humidity	33.8 - 44.3 %

2.2.7 Test Results

13.56 MHz NFC - Transmit, Carrier Results

Frequency (MHz)	Quasi-Peak Level (dBµV/m) at 3m	Quasi-Peak Level (dBµV/m) at 30m	Quasi-Peak Level (µV/m) at 3m	Quasi-Peak Level (µV/m) at 30m
13.56	53.45	33.45	470.44	47.044

Table 18 - Fundamental Field Strength

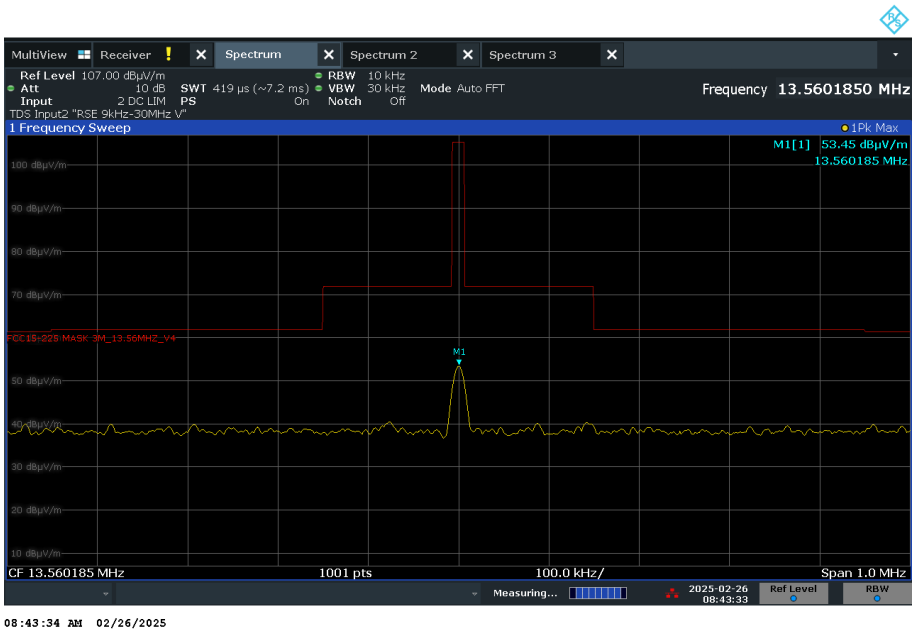


Figure 3 - Plot of the Fundamental - 13.56 MHz

Frequency MHz	Quasi-Peak Level (dBµV/m) at 3 m	Quasi-Peak Level (dBµV/m) at 30 m	Quasi-Peak Level (µV/m) at 3 m	Quasi-Peak Level (µV/m) at 30 m
*				

Table 19 – NFC Transmit Emissions Results - 9 kHz to 30 MHz

No emissions were detected within 10 dB of the limit.

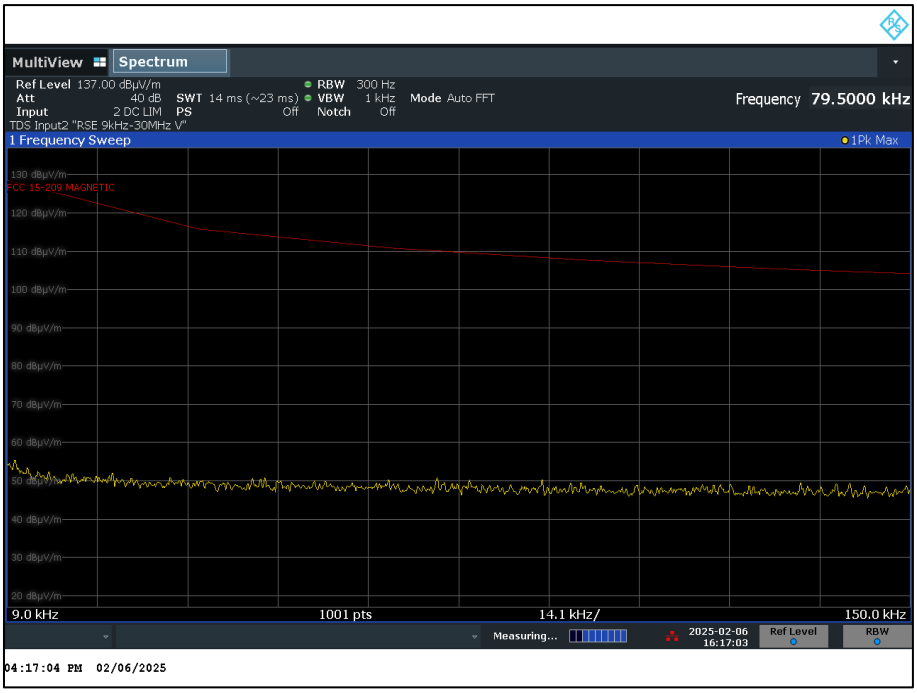


Figure 4 - NFC Transmit - 9 kHz to 150 kHz - X Orientation Front on

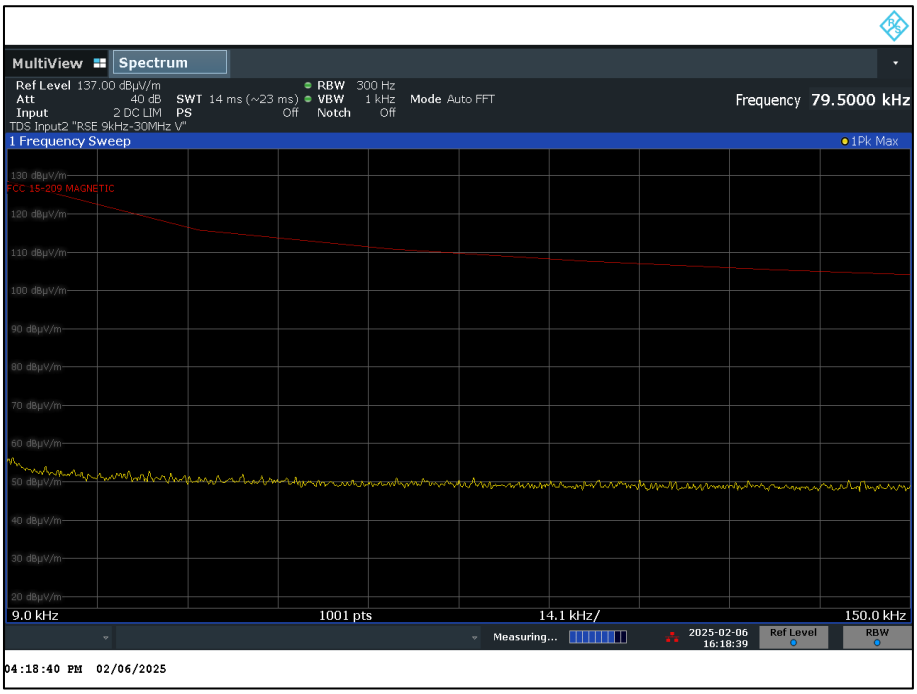


Figure 5 - NFC Transmit - 9 kHz to 150 kHz - X Orientation Side on

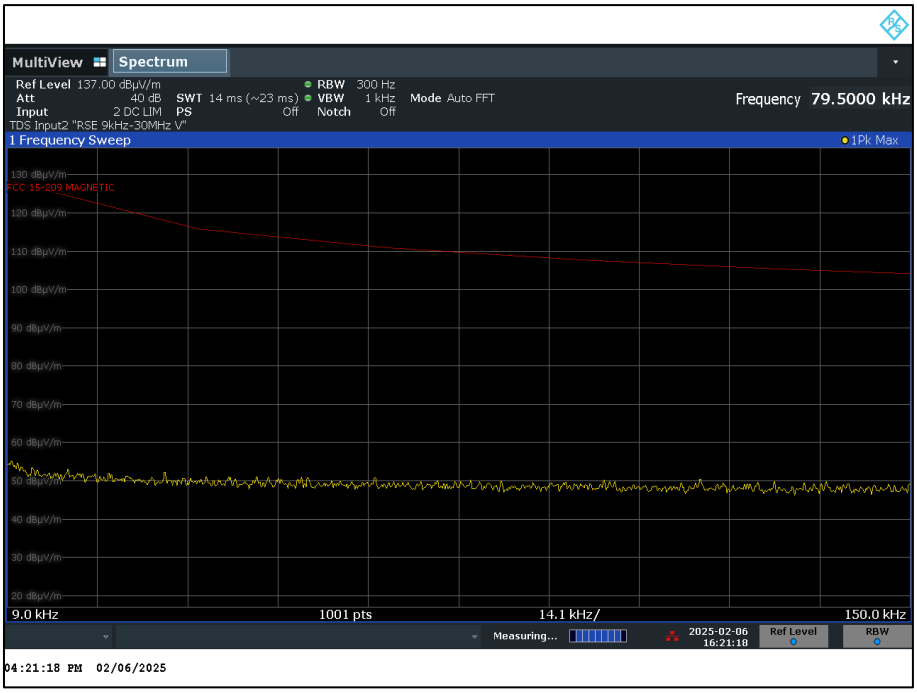


Figure 6 - NFC Transmit - 9 kHz to 150 kHz - Y Orientation Front on

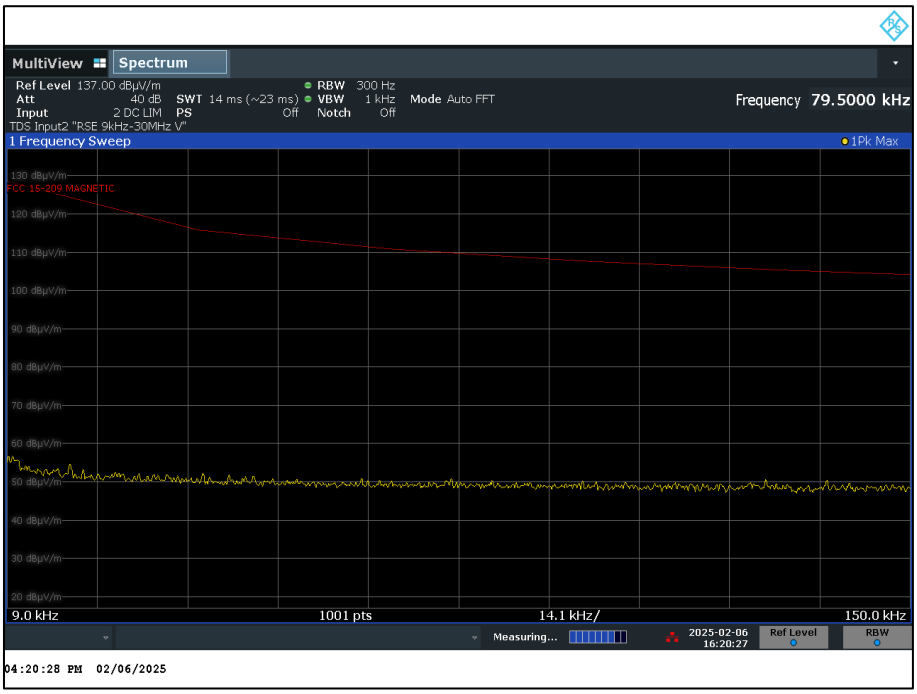


Figure 7 - NFC Transmit - 9 kHz to 150 kHz - Y Orientation Side on

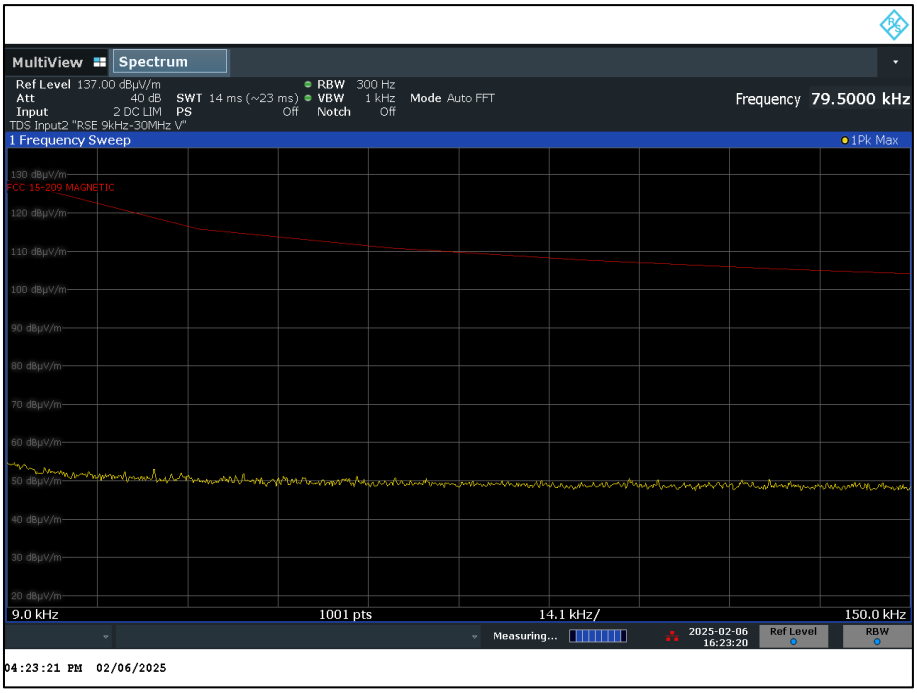


Figure 8 - NFC Transmit - 9 kHz to 150 kHz - Z Orientation Front on

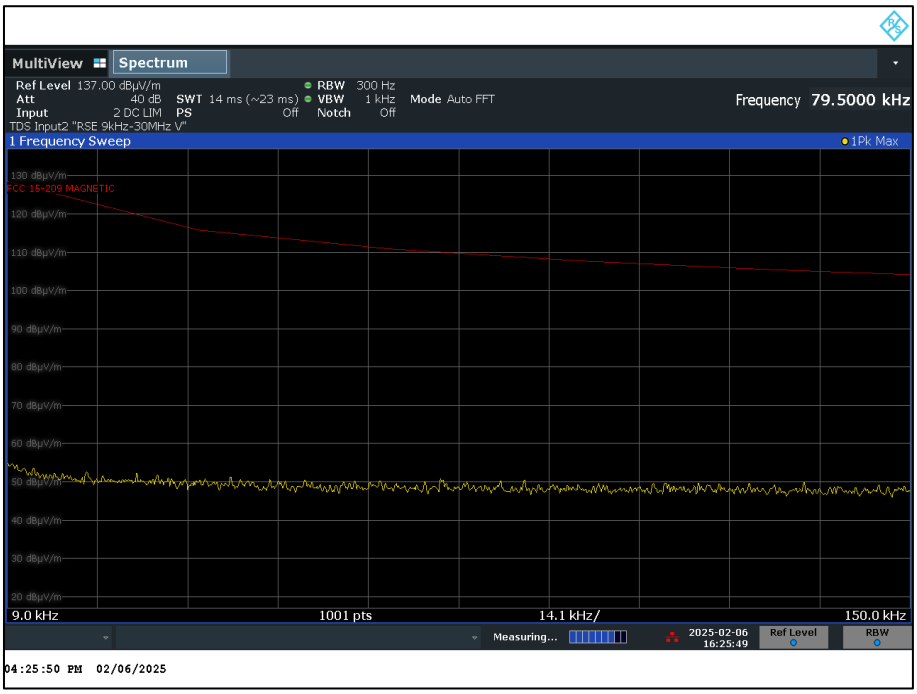


Figure 9 - NFC Transmit - 9 kHz to 150 kHz - Z Orientation Side on

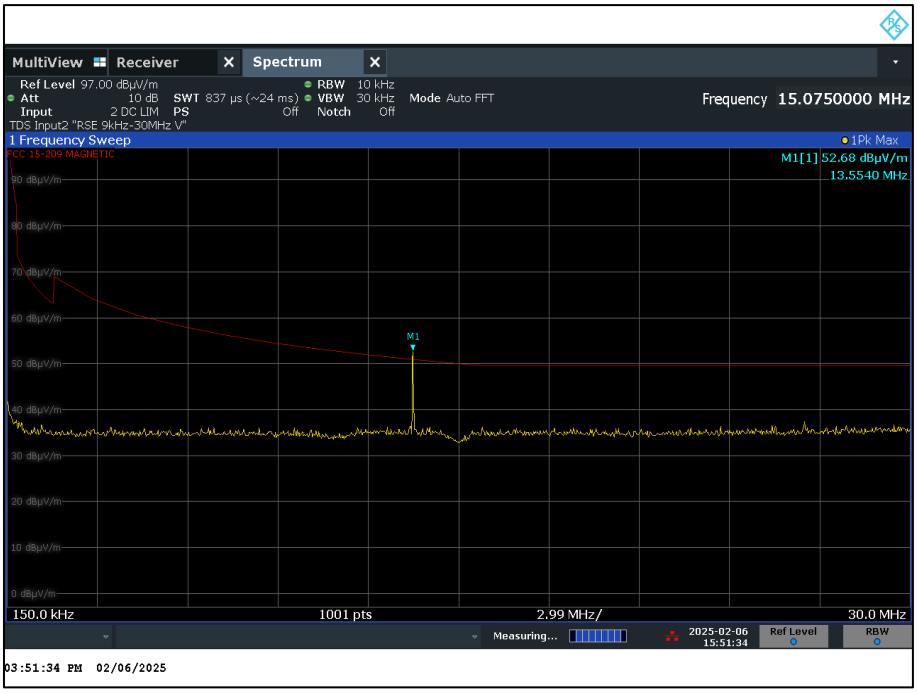


Figure 10 - NFC Transmit - 150 kHz to 30 MHz - X Orientation Front on

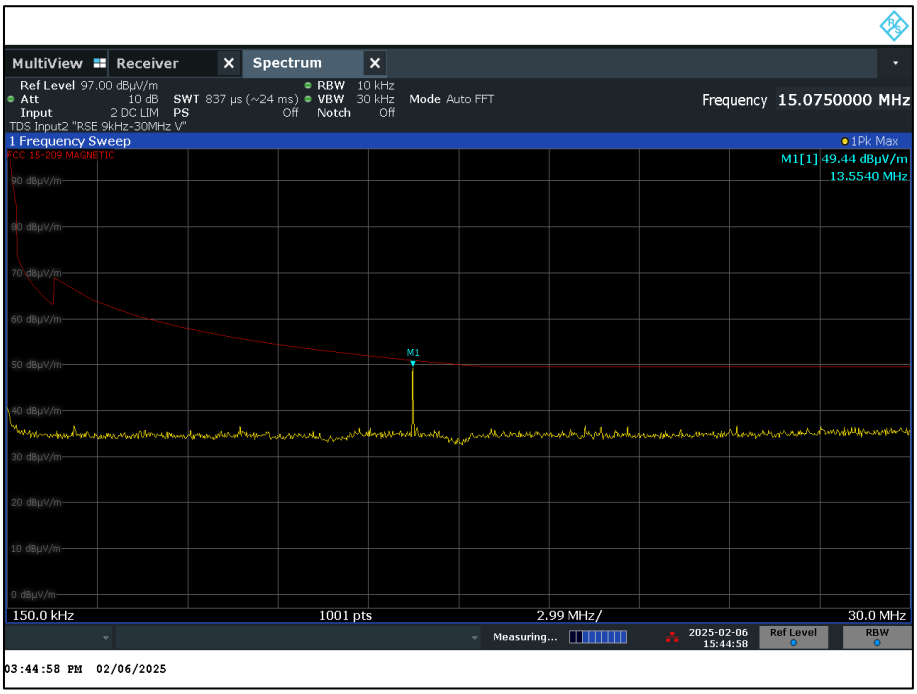


Figure 11 - NFC Transmit - 150 kHz to 30 MHz - X Orientation Side on

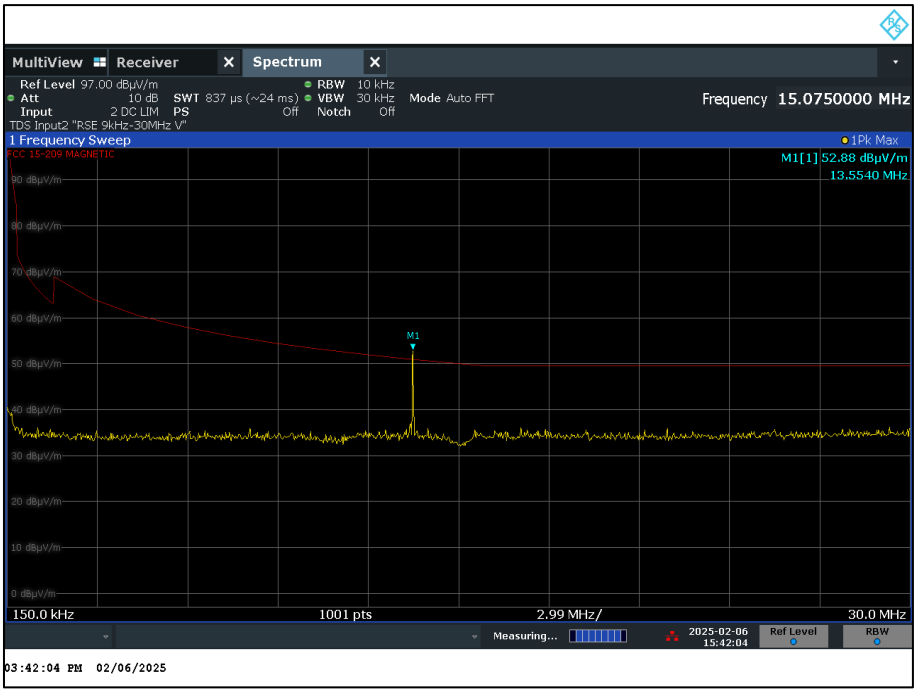


Figure 12 - NFC Transmit - 150 kHz to 30 MHz - Y Orientation Front on

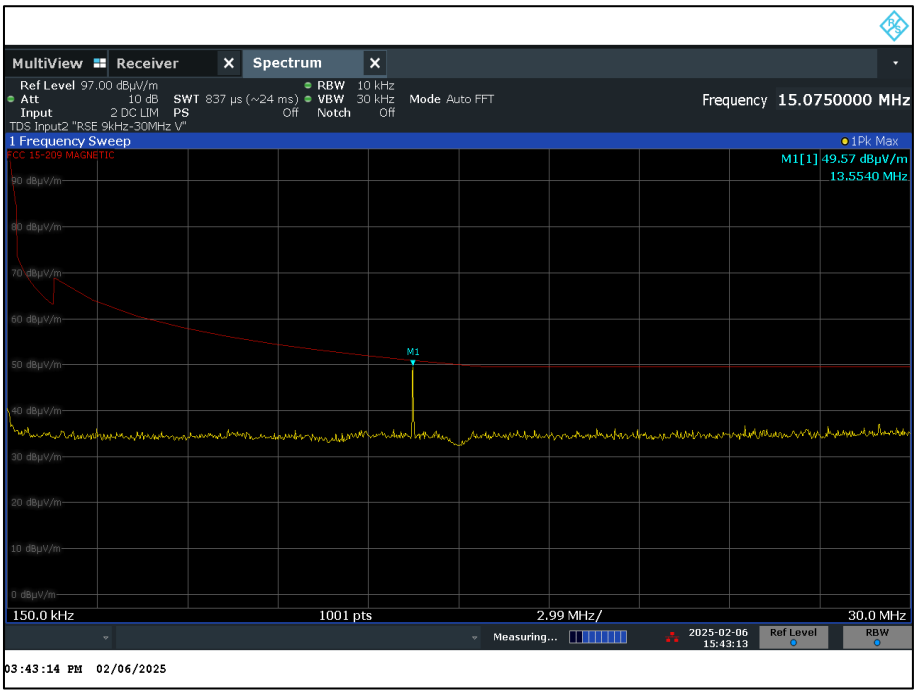


Figure 13 - NFC Transmit - 150 kHz to 30 MHz - Y Orientation Side on

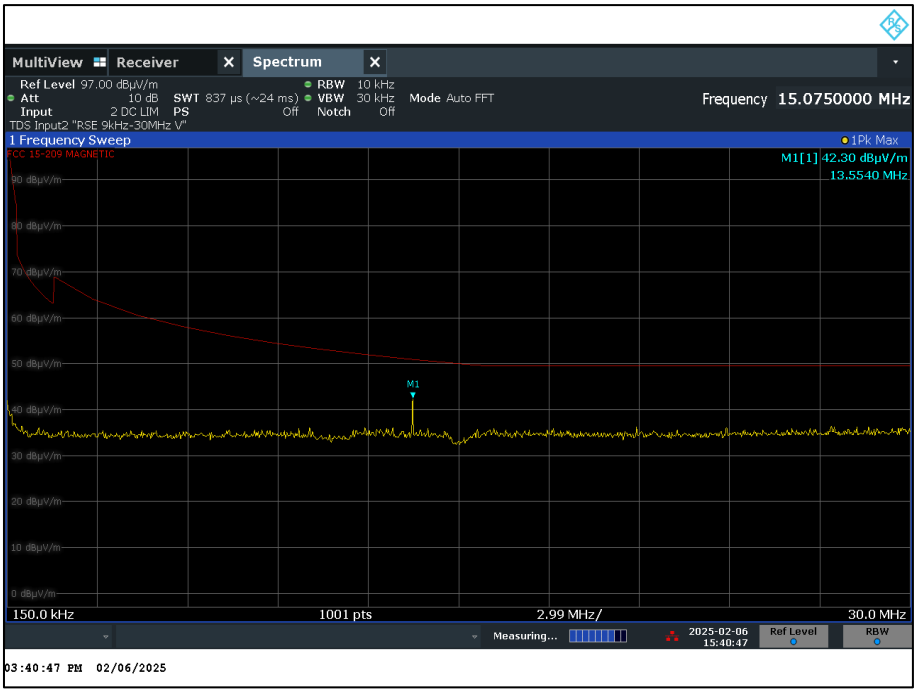


Figure 14 - NFC Transmit - 150 kHz to 30 MHz - Z Orientation Front on

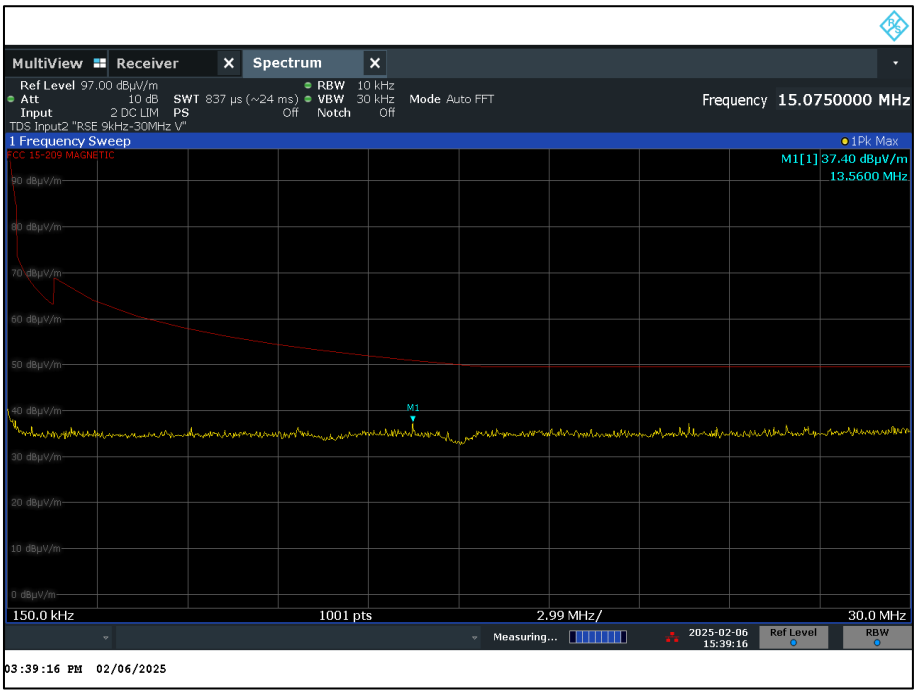


Figure 15 - NFC Transmit - 150 kHz to 30 MHz - Z Orientation Side on

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 20 - NFC Transmit - X Plane, Emissions Results – 30 MHz to 1 GHz

No emissions were detected within 10 dB of the limit.

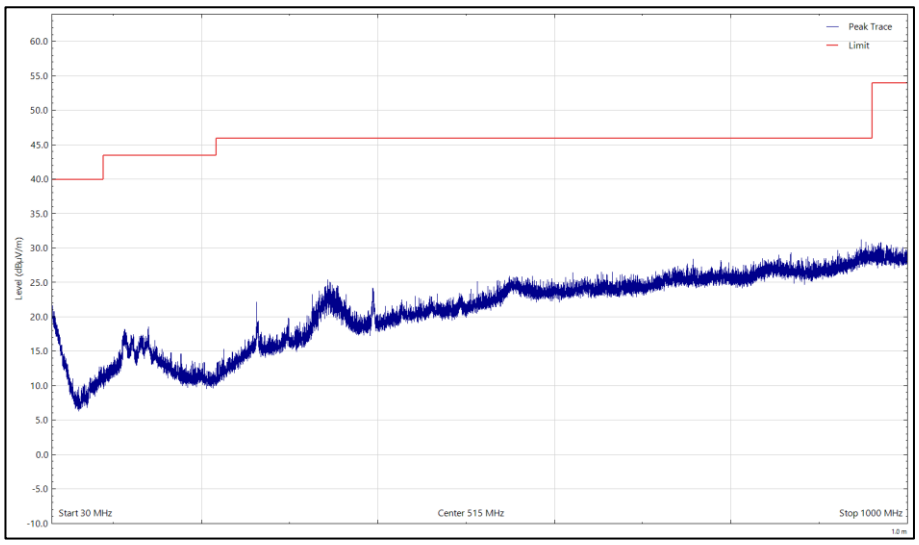


Figure 16 - NFC Transmit - X Plane, 13.56MHz, 30 MHz to 1 GHz, Horizontal (Peak)

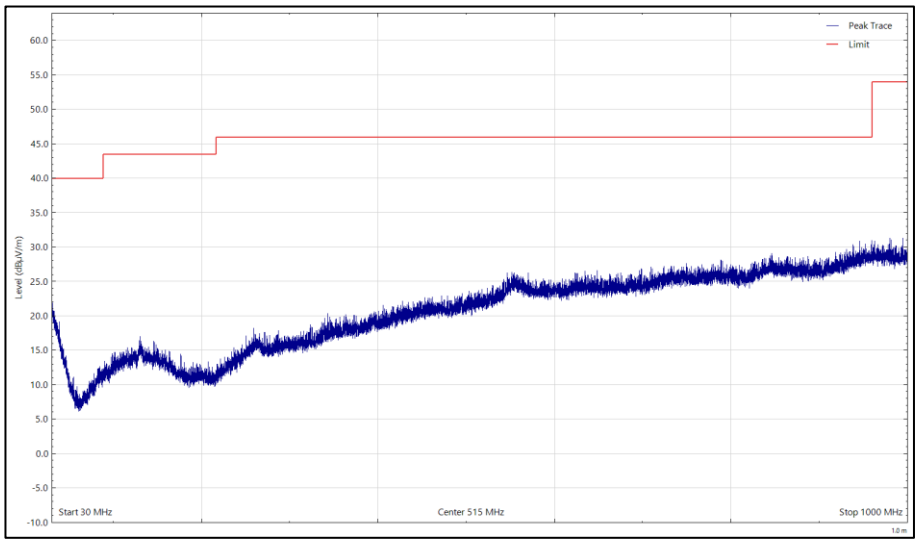


Figure 17 - NFC Transmit - X Plane, 13.56MHz, 30 MHz to 1 GHz, Vertical (Peak)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 21 - NFC Transmit - Y Plane, Emissions Results – 30 MHz to 1 GHz

No emissions were detected within 10 dB of the limit.

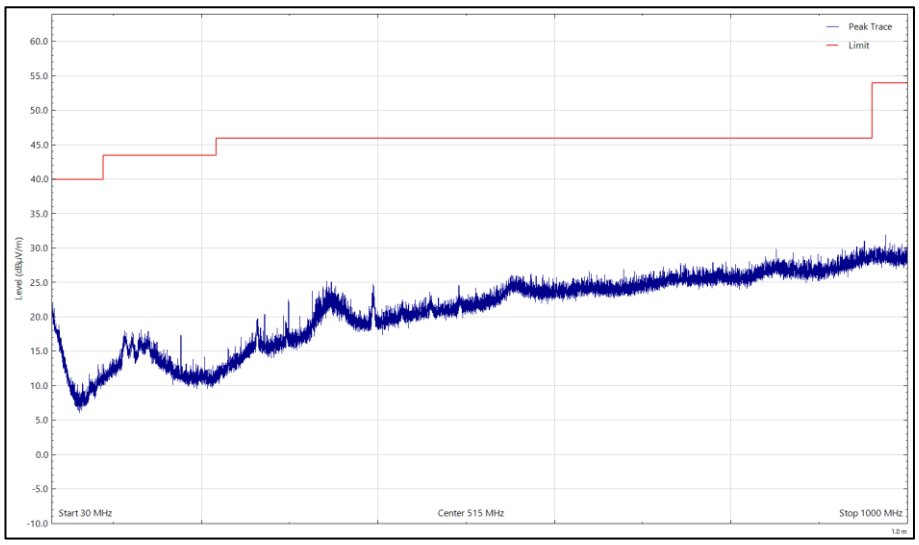


Figure 18 - NFC Transmit - Y Plane, 13.56MHz, 30 MHz to 1 GHz, Horizontal (Peak)

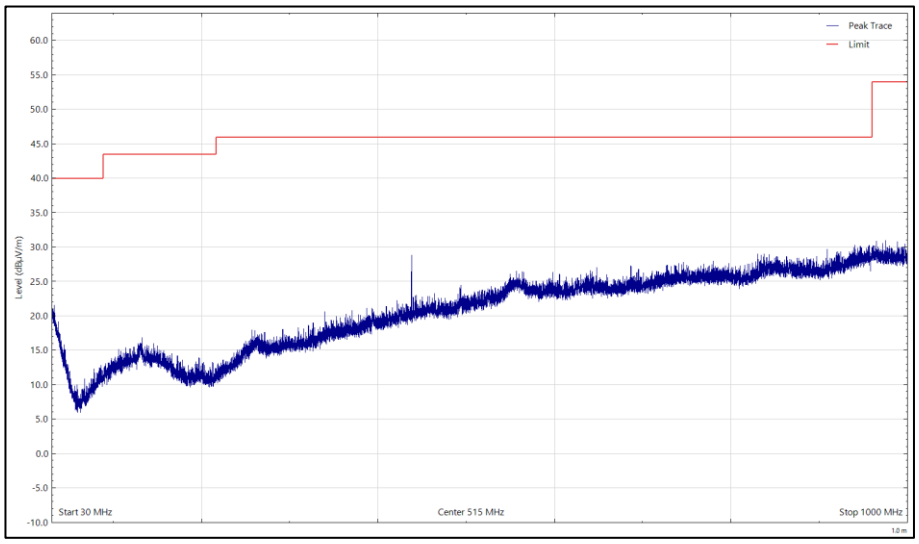


Figure 19 - NFC Transmit - Y Plane, 13.56MHz, 30 MHz to 1 GHz, Vertical (Peak)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 22 - NFC Transmit - Z Plane, Emissions Results – 30 MHz to 1 GHz

No emissions were detected within 10 dB of the limit.

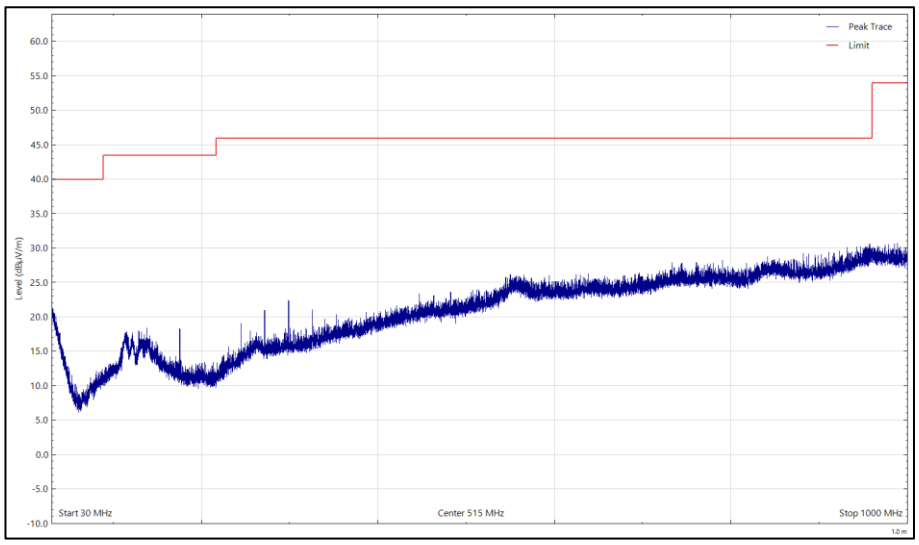


Figure 20 - NFC Transmit - Z Plane, 13.56MHz, 30 MHz to 1 GHz, Horizontal (Peak)

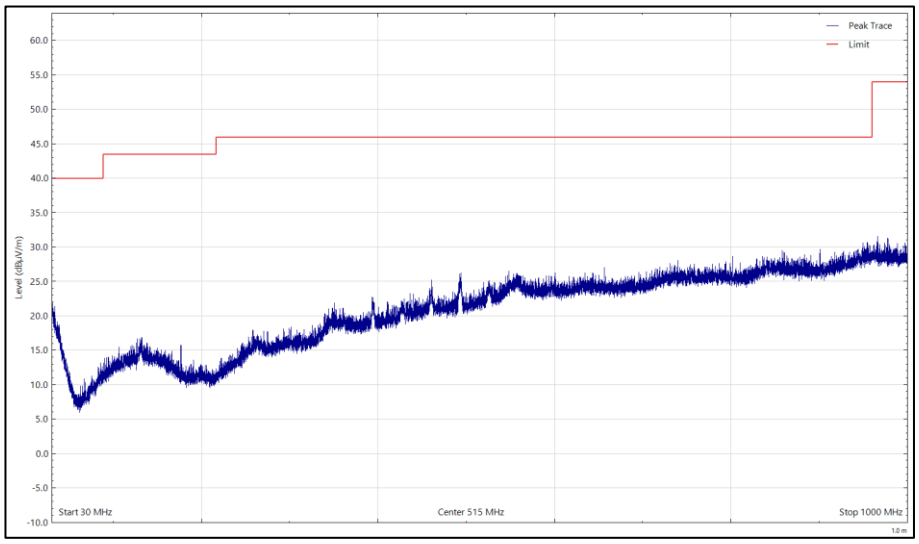


Figure 21 - NFC Transmit - Z Plane, 13.56MHz, 30 MHz to 1 GHz, Vertical (Peak)

2.2.8 Specification Limits

FCC 47 CFR Part 15, Limit Clause 15.225 (a)(b)(c)(d)

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

(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 m.

(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 m.

(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 § 15.209.

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (m)
0.009 to 0.490	2400/F (kHz)	300
0.490 to 1.705	24000/F (kHz)	30
1.705 to 30	30	30
30 to 88	100**	3
88 to 216	150**	3
216 to 960	200**	3
Above 960	500	5

Table 23 - FCC Radiated Emission Limit

ISED RSS-210, Limit Clause B.6

The field strength of any emission shall not exceed the following limits:

(a) 15.848 mV/m (84 dBµV/m) at 30 m, within the band 13.553 – 13.567 MHz.

(b) 334 µV/m (50.5 dBµV/m) at 30 m, withing the bands 13.410 – 13.553 MHz and 13.567 – 13.710 MHz.

(c) 106 µV/m (40.5 dBµV/m) at 30 m, within the bands 13.110 – 13.410 MHz and 13.710 – 14.010 MHz.

(d) RSS-GEN general field strength limits for frequencies outside the band 13.110 – 14.010 MHz.

ISED RSS-GEN, Limit Clause

Frequency	Electric Field Strength (µV/m)	Magnetic Field Strength (H-Field) (µA/m)	Measurement Distance (m)
9 - 490 kHz	2,400/F (F in kHz)	2,400/377F (F in kHz)	300
490 - 1,705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1,705 kHz - 30 MHz	30	N/A	30

Table 24 - ISED Radiated Emission Limit - Less than 30 MHz

Frequency (MHz)	Field Strength (µV/m at 3 m)
30 - 88	100
88 - 216	150
216 - 960	200
> 960	500

Table 25 - ISED Radiated Emission Limit - 30 MHz to 1 GHz

2.2.9 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
HygroPalm	Rotronic	HygroPalm 0	3484	12	13-Sep-2025
Emissions Software	TUV SUD	EmX V3.4.2	5125	-	Software
3m Semi-Anechoic Chamber	Rainford	RF Chamber 11	5136	36	14-Nov-2027
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Test Receiver	Rohde & Schwarz	ESW44	5382	12	09-Sep-2025
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5518	12	18-Apr-2025
Antenna (Bi-Log, 30 MHz to 1 GHz)	Teseq	CBL6111D	5615	24	15-Mar-2025
Antenna (Loop, 9 kHz to 30 MHz)	Teseq	HLA 6121	5616	24	16-Aug-2026
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/B	6330	6	17-Feb-2025
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/B	6330	6	20-Aug-2025
Cable (N to N 8m)	Scott Cables	SCB800-A-NMNM-08.00M	6715	6	01-Aug-2025

Table 26

TU - Traceability Unscheduled

2.3 Frequency Tolerance Under Temperature Variations

2.3.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.225 (e),
ISED RSS-210 Clause B.6
ISED RSS-GEN, Clause 6.11

2.3.2 Equipment Under Test and Modification State

MOTOR NO. 21, S/N: DM_EP2-0231 - Modification State 0
MOTOR NO. 21, S/N: DM_EP2-0014 - Modification State 0

2.3.3 Date of Test

20-February-2025 to 27 February 2025

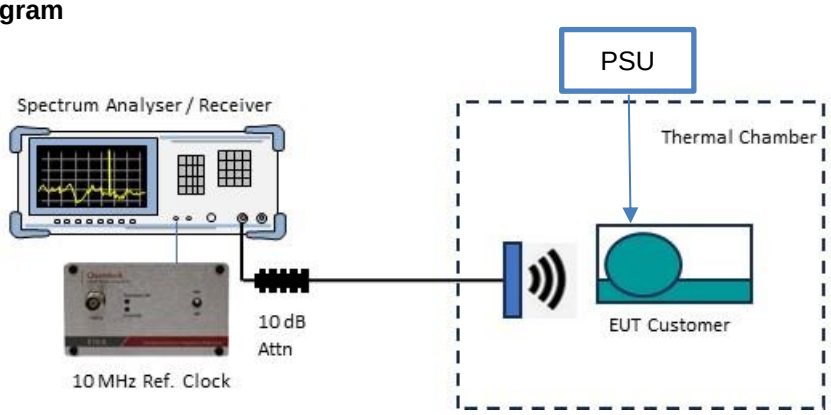
2.3.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.8 and RSS-GEN Clause 6.11.

DUT was powered by a variable DC Power supply for extreme voltage variations.

The DUT was configured as per customer setting 13.56 MHz, Continuous Wave. (Setting 31).

2.3.5 Test Setup Diagram



2.3.6 Environmental Conditions

Ambient Temperature	19.3 – 20.3 °C
Relative Humidity	33.6 – 33.8 %

2.3.7 Test Results

13.56 MHz NFC - Transmit

Temperature	Voltage	Measured Frequency (MHz)	Frequency Deviation (%)	Frequency Error (ppm)
-20.0 °C	3.85 VDC	13.5602288	0.0016873	16.8731563
-10.0 °C	3.85 VDC	13.5602169	0.0015996	15.9955752
0.0 °C	3.85 VDC	13.5602000	0.0014749	14.7492625
+10.0 °C	3.85 VDC	13.5601865	0.0013754	13.7536873
+20.0 °C	3.85 VDC	13.5601806	0.0013319	13.3185841
+30.0 °C	3.85 VDC	13.5601835	0.0013533	13.5324484
+40.0 °C	3.85 VDC	13.5601925	0.0014195	14.1954277
+50.0 °C	3.85 VDC	13.5601945	0.0014344	14.3436578

Table 27 - Frequency Tolerance Under Temperature Variation

Temperature	Voltage	Measured Frequency (MHz)	Frequency Deviation (%)	Frequency Error (ppm)
+20.0 °C	2.7 V DC	13.5601477	0.00108901	10.8901180
+20.0 °C	3.85 V DC *	13.5601515	0.00111704	11.1703540

Table 28 - Frequency Tolerance Under Voltage Variation

* Note: Upper end point and Nominal Voltage are the same (3.85 V DC)

2.3.8 Specification Limits

FCC 47 CFR Part 15, Limit Clause 15.225 (e)

The frequency tolerance of the carrier signal shall be maintained within ± 0.01 % of the operating frequency.

ISED RSS-210, Limit Clause B.6

Carrier frequency stability shall be maintained to ±0.01% (±100 ppm)

2.3.9 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
DLP_RFID-ANT	DLP Designs Inc.	DLP_RFID-ANT	-	-	TU
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Thermocouple Thermometer	Fluke	51	3173	12	31-May-2025
HygroPalm	Rotronic	HygroPalm 0	3484	12	13-Sep-2025
True RMS Multimeter	Fluke	179	4006	12	22-03-2025
1 MHz / 10 MHz reference	Quartzlock	E10-X	4973	12	03-Sep-2025
3m Semi-Anechoic Chamber	Rainford	RF Chamber 11	5136	36	14-Nov-2027
Test Receiver	Rohde & Schwarz	ESW44	5382	12	09-Sep-2025
Attenuator 5W 10dB DC-18GHz	Aaren	AT40A-4041-D18-10	5487	12	11-Oct-2025
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5518	12	18-Apr-2025

Table 29

O/P Mon – Output Monitored using calibrated equipment

3 Photographs

3.1 Test Setup Photographs

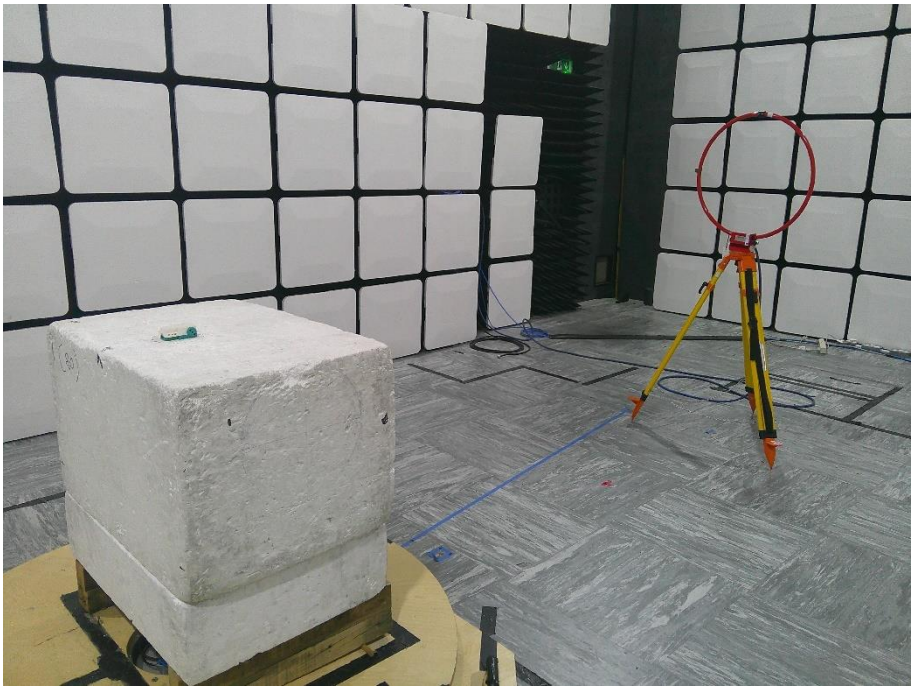


Figure 22 – Below 30GHz Front on

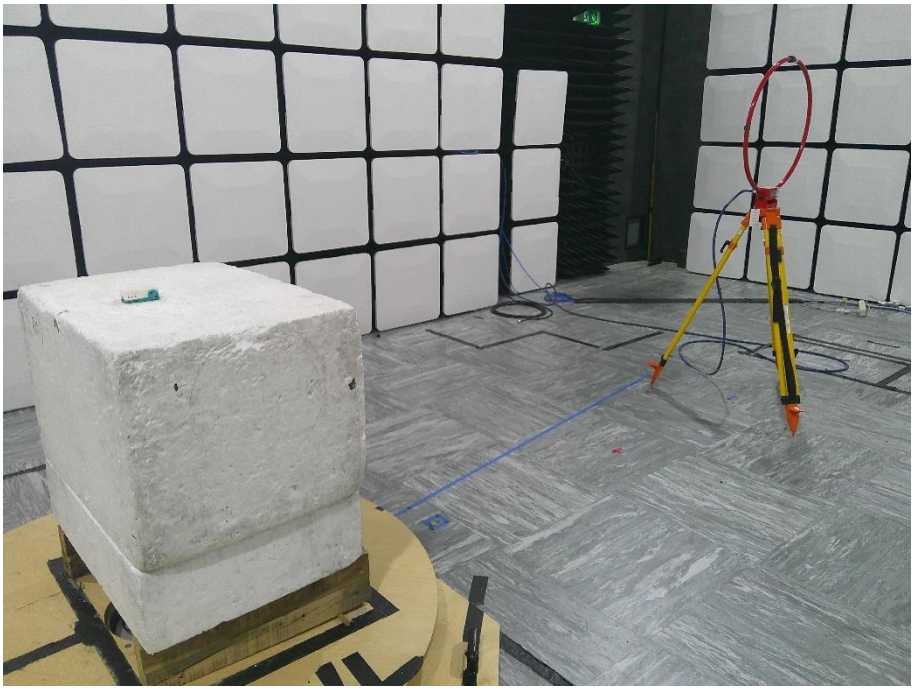


Figure 23 – Below 30GHz Side on

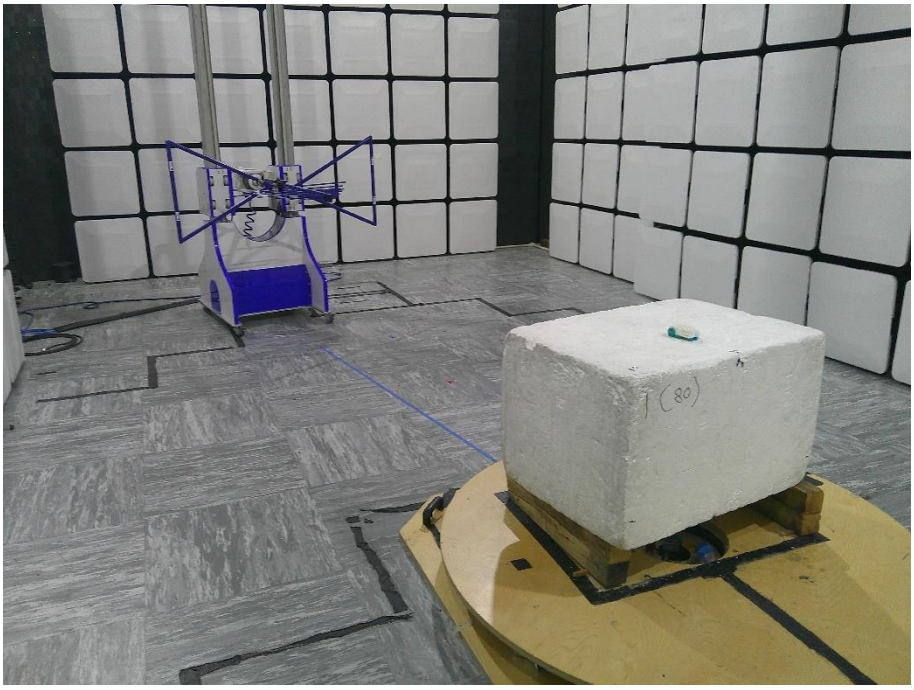


Figure 24 – 30 MHz to 1 GHz X Plane

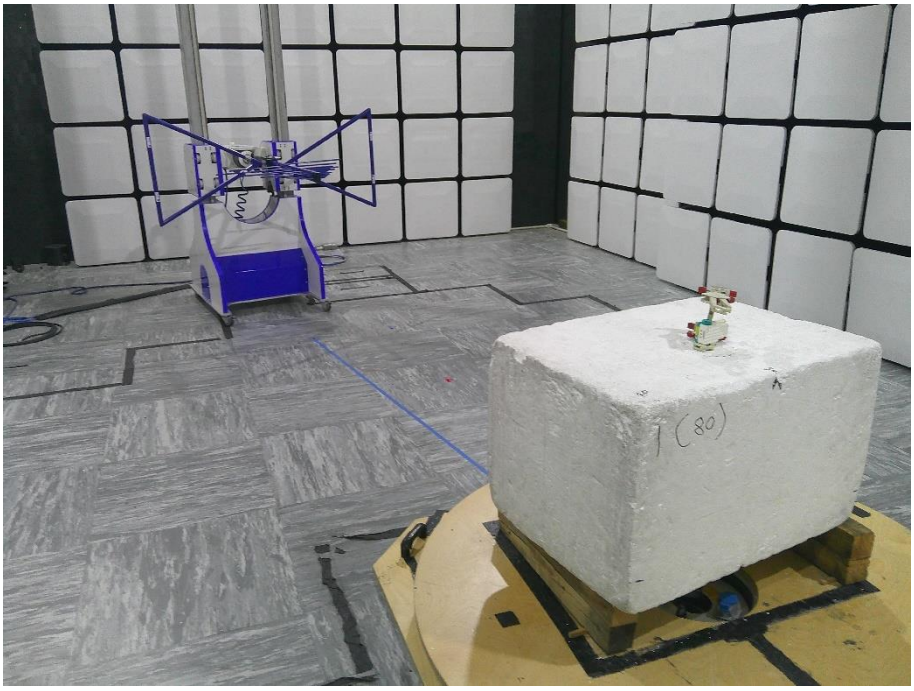


Figure 25 – 30 MHz to 1 GHz Y Plane

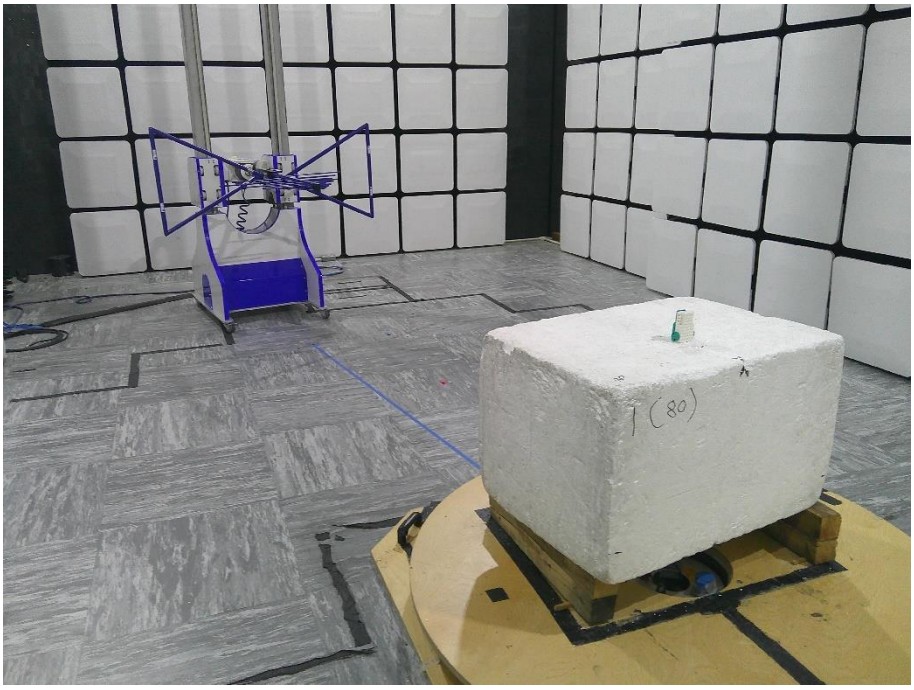


Figure 26 – 30 MHz to 1 GHz Z Plane

4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
20 dB Bandwidth & 99% Occupied Bandwidth	± 9.89 Hz
Field Strength of any Emission	9 kHz to 30 MHz: ± 3.4 dB 30 MHz to 1 GHz: ± 5.2 dB
Frequency Tolerance Under Temperature Variations	± 6.54 Hz

Table 30

Measurement Uncertainty Decision Rule – Accuracy Method

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2021, Clause 4.4.3 (Procedure 2). The measurement results are directly compared with the test limit to determine conformance with the requirements of the standard.

Risk: The uncertainty of measurement about the measured result is negligible with regard to the final pass/fail decision. The measurement result can be directly compared with the test limit to determine conformance with the requirement (compare IEC Guide 115). The level of risk to falsely accept and falsely reject items is further described in ILAC-G8.