

ISED CABid: ES1909  
 Lab. Company Number: 4621A

Test Report No:  
 NIE: 73128RRF.006

## Test Report

### USA FCC 15.225, 15.209

### CANADA RSS-210, RSS-Gen

(*) Identification of item tested	SALTO Neo Cylinder including all mechanical variants
(*) Trademark	SALTO
(*) Model and /or type reference	N0M (Type reference: G1824)
Other identification of the product	FCC ID: UKCN0M IC ID: 10088A-N0M
(*) Features	Bluetooth LE HW version: 2.0 SW version: 0195 (Control FW) + 0186 (FUS FW) + 0187 (BLE FW) + 0148 (Motor FW)
Applicant	SALTO SYSTEMS, S.L. Arkotz 9, Polígono Lanbarren 20180, Oiartzun (Guipúzcoa), Spain
Test method requested, standard	USA FCC Part 15.225 (10-1-21 Edition): Operation within the band 13.110 -14.010. USA FCC Part 15.209 (10-1-21 Edition): Radiated emission limits, general requirements. CANADA RSS-210 Issue 10 (December 2019). CANADA RSS-Gen Issue 5 (March 2019). ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López EMC Consumer & RF Lab. Manager
Date of issue	2022-01-25
Report template No	FDT08_24 (*) "Data provided by the client"

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## Competences and guarantees

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DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC - Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification S.A.U. is an FCC-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

DEKRA Testing and Certification S.A.U. is an ISED-recognized accredited testing laboratory, CABid: ES1909, Company Number: 4621A, with the appropriate scope of accreditation that covers the performed tests in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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## General conditions

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1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification and the Accreditation Bodies.

## Uncertainty

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Uncertainty (factor  $k=2$ ) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

## Data provided by the client

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The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample model N0M (Type reference: G1824) is a SALTO Neo Cylinder with RFID Mifare (ISO 14443A & ISO 15693 standard based) and Bluetooth LE technology.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

## Usage of samples

Samples undergoing test have been selected by: The client.

- Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Reception
73128C/001	SALTO Neo Cylinder including all mechanical variants	NOM (Type reference: G1824)	-	18/08/2022

Sample S/01 has undergone the test(s): The Conducted tests indicated in the Appendix A.

- Sample S/02 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Reception
73128C/006	SALTO Neo Cylinder including all mechanical variants	NOM (Type reference: G1824)	-	18/08/2022

Sample S/02 has undergone the test(s): The Radiated tests indicated in the Appendix A.

## Test sample description

Ports.....:	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient <sup>(3)</sup>		
	-	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Supplementary information to the ports.....:	-						
Rated power supply .....	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	DC: 6 Vdc (4 x LR1 batteries)					
<input type="checkbox"/>	DC:						
Rated Power .....	-						
Clock frequencies .....	27.12 MHz, 32 MHz, 32.768 KHz						
Other parameters.....:	N/A						
Software version .....	0195 (Control FW) + 0186 (FUS FW) + 0187 (BLE FW) + 0148 (Motor FW)						
Hardware version.....:	2.0						
Dimensions in cm (W x H x D).....:	3.1 x 3.8 x 7.6 cm						
Mounting position.....:	<input type="checkbox"/>	Table top equipment					
	<input type="checkbox"/>	Wall/Ceiling mounted equipment					
	<input type="checkbox"/>	Floor standing equipment					
	<input type="checkbox"/>	Hand-held equipment					
	<input checked="" type="checkbox"/>	Other: Door mounting					
Modules/parts .....	Module/parts of test item		Type	Manufacturer			

	SoC + Antenna	BLE	ST + JOHANSON
Accessories (not part of the test item) .....	Description	Type	Manufacturer
	-	-	-
Documents as provided by the applicant.....	Description	File name	Issue date
	User manual	-	-
	FW Explanation	-	-

<sup>(3)</sup> Only for Medical Equipment

## Identification of the client

SALTO SYSTEMS, S.L.

Arkotz 9, Polígono Lanbarren, 20180, Oiartzun (Guipúzcoa), Spain

## Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2022-08-31
Date (finish)	2022-12-02

## Document history

Report number	Date	Description
73128RRF.006	2022-01-25	First release.

## Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

## Remarks and comments

The tests have been performed by the technical personnel: Victoria Olmedo, José Manuel Jiménez.

Used instrumentation:

### Conducted Measurements:

	Last Calibration	Due Calibration
1. Climatic Chamber BINDER MK 56	2022-03	2023-03
2. DC Power Supply 30V/5A, KEYSIGHT TECHNOLOGIES U8002A	N/A	N/A
3. Digital Multimeter FLUKE 175	2022/11	2023-11
4. Signal and Spectrum Analyzer 10 Hz - 40 GHz ROHDE AND SCHWARZ FSV40	2021-02	2023-02
5. EMC/RF Testing SW ROHDE AND SCHWARZ WMS32	N/A	N/A

### Radiated Measurements:

	Last Calibration	Due Calibration
1. Semianechoic Absorber Lined Chamber VI ALBATROSS P29419	2020-01	2023-01
2. Shielded Room ALBATROSS PROJECTS GMBH P29419	N/A	N/A
3. Ultralog Antenna 30MHz-6GHz, ROHDE AND SCHWARZ HL562E_UPG	2019-10	2022-10
4. EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2020-12	2022-12
5. Active Loop Antenna 9kHz-30MHz SCHWARZBECK FMZB 1519B	2019-11	2022-11
6. EMC/RF Testing SW ROHDE AND SCHWARZ EMC32	N/A	N/A

## Testing verdicts

Not applicable:	N/A
Pass:	P
Fail:	F
Not measured:	N/M

## Summary

### RFID (NFC 13.56 MHz) ISO 14443A, ISO 15693:

FCC PART 15 PARAGRAPH / RSS-210			
Requirement – Test case		Verdict	Remark
FCC 15.225 (a) / RSS-210 B.6 (a)(i)	Field strength of emissions within the band 13.553 MHz -13.567 MHz	P	
FCC 15.225 (b) / RSS-210 B.6 (a)(ii)	Field strength of emissions within the band 13.410 - 13.553 MHz and 13.567 – 13.710 MHz	P	
FCC 15.225 (c) / RSS-210 B.6 (a)(iii)	Field strength of emissions within the band 13.110 - 13.410 MHz and 13.710 – 14.010 MHz	P	
FCC 15.225 (d) / RSS-210 B.6 (a)(iv)	Field strength of emissions outside of the band 13.110 MHz -14.010 MHz	P	
FCC 15.225 (e) / RSS-210 B.6 (b)	Frequency tolerance of the carrier signal	P	
<u>Supplementary information and remarks:</u>			
None.			

## Appendix A: Test results



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## TEST CONDITIONS

(\*) Data provided by the Applicant.

### POWER SUPPLY (\*):

Vnominal: 6 Vdc  
Vminimum: 5.1 Vdc  
Vmaximum: 6.9 Vdc  
Type of Power Supply: DC (4 x LR1 batteries)

### ANTENNA (\*):

Type of Antenna: Integral (PCB).  
Maximum Declared Antenna Gain: N/A

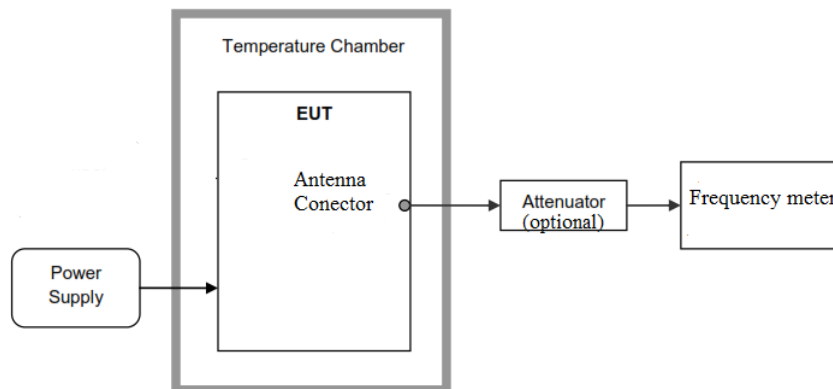
### TEST FREQUENCY (\*):

Nominal Operating Frequency: 13.56 MHz  
Types: ISO 14443A, ISO 15693.

### CONDUCTED MEASUREMENTS:

The equipment under test was set up in a shielded room and it is directly connected to the spectrum analyzer.

For frequency stability test the EUT was placed inside a climatic chamber and connected to a frequency meter using a low loss cable. An external DC power supply was connected to the EUT for voltage variation test.



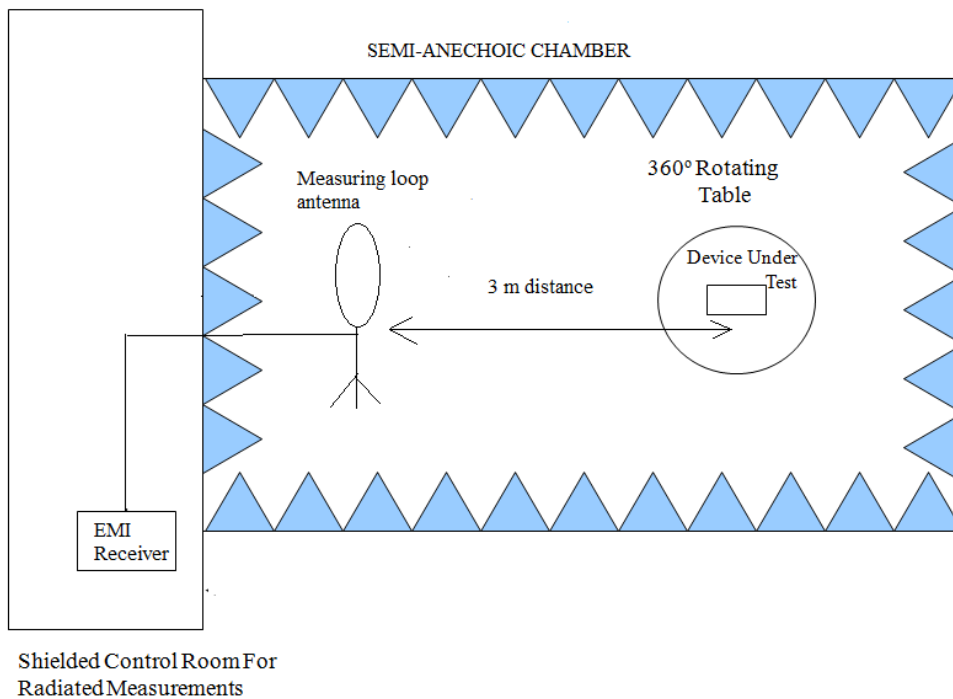
**RADIATED MEASUREMENTS:**

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Loop antenna for the range between 9 kHz to 30 MHz and Bilog antenna for the range between 30 MHz to 200 MHz) is situated at a distance of 3 m.

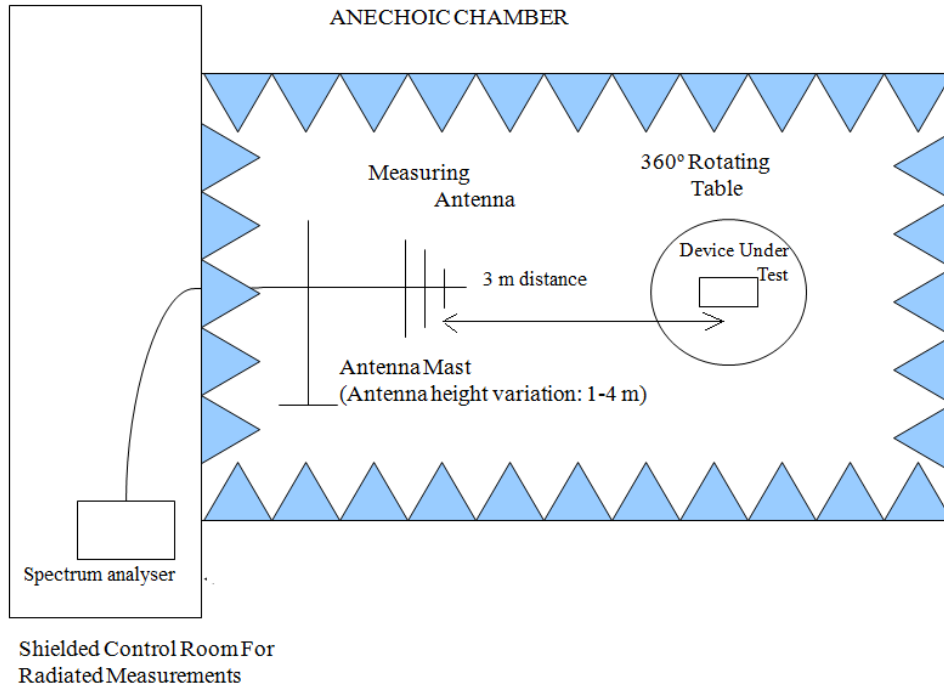
For radiated emissions in the range 9 kHz to 30 MHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 40 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and in the range between 30 MHz and 200 MHz the antenna height was varied from 1 to 4 meters to find the maximum radiated emission. In the range between 9 kHz and 30 MHz the measurements were made in the three different orientation planes of the loop antenna to determine the maximum received field. In the range between 30 MHz and 200 MHz the measurements were made in both horizontal and vertical planes of polarization.

Radiated measurements setup 9 kHz to 30 MHz:



Radiated measurements setup 30 MHz to 200 MHz:



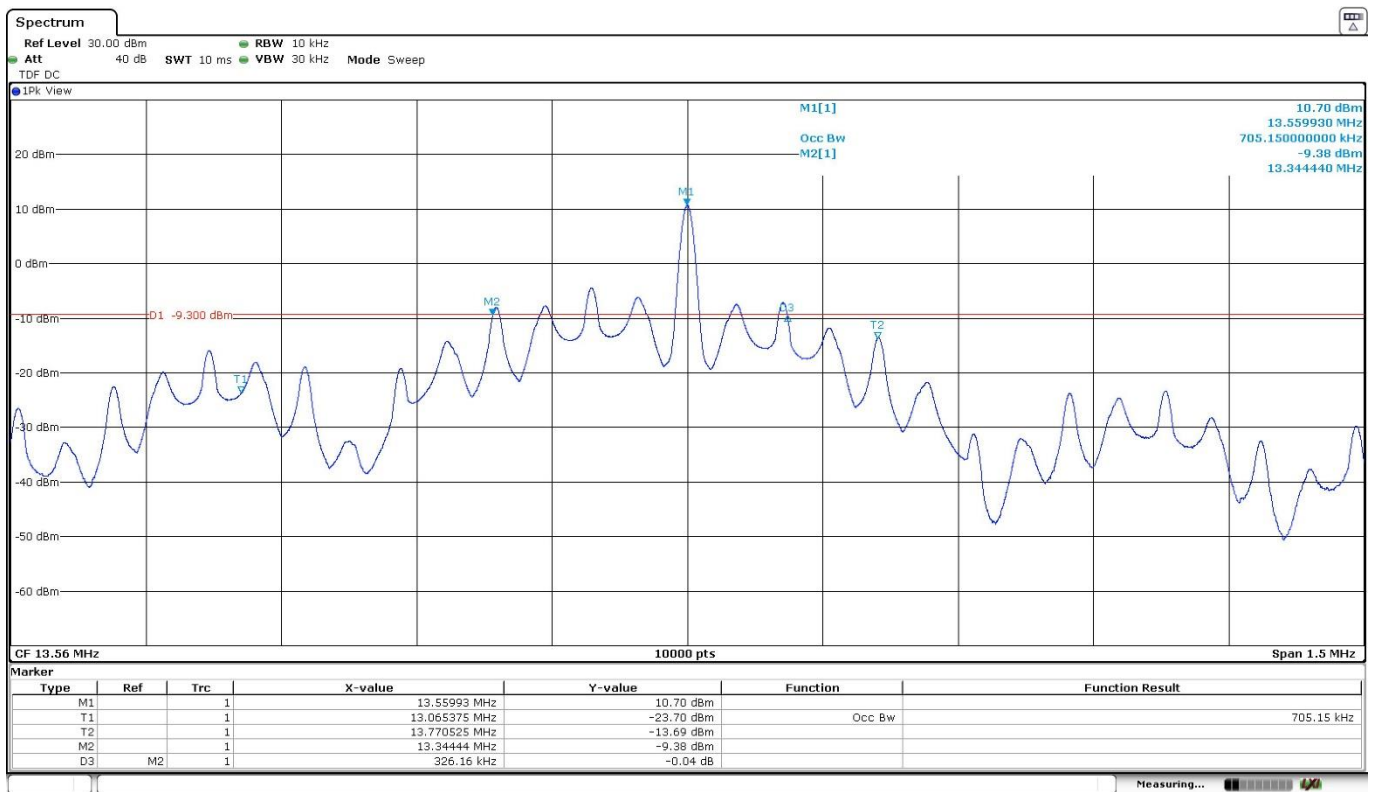
## Occupied Bandwidth

### RESULTS:

99 % Occupied Bandwidth and 20 dB Bandwidth.

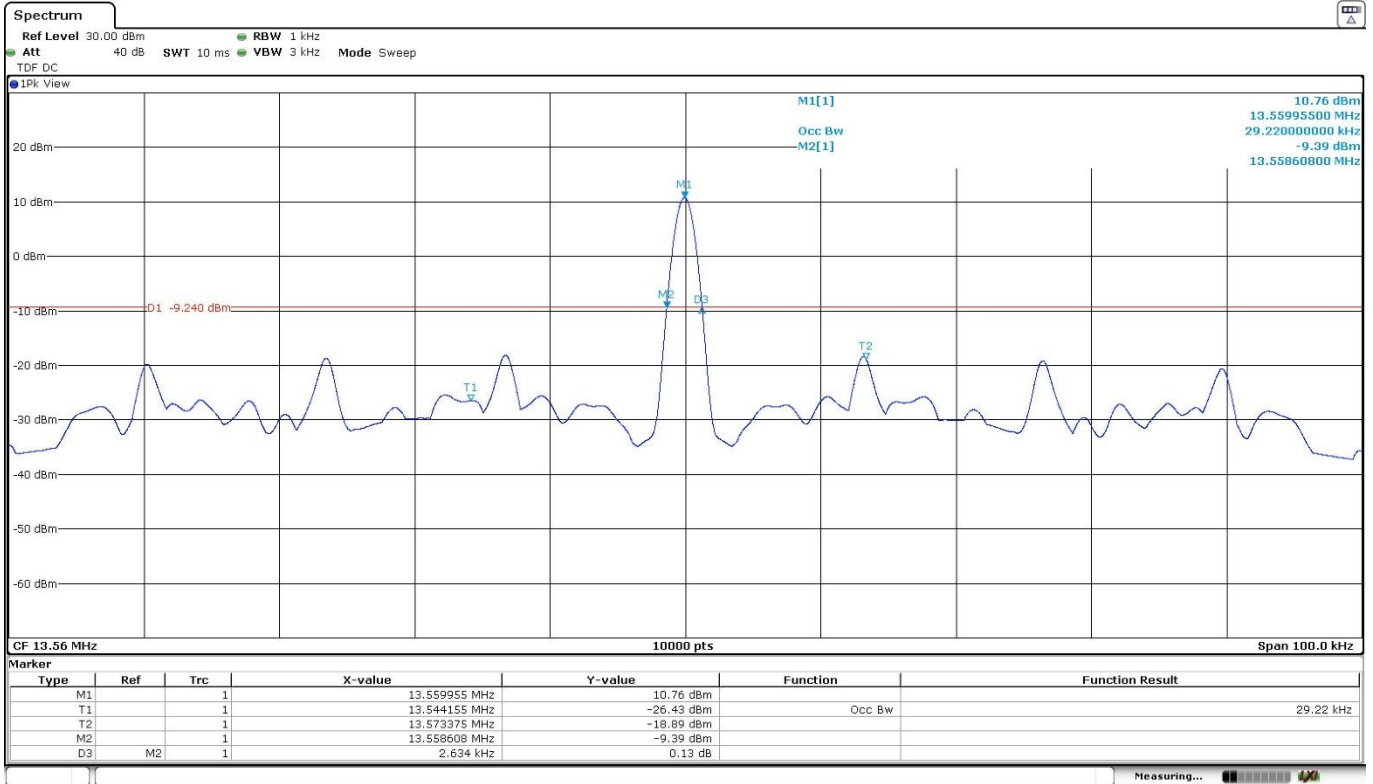
- **NFC mode ISO 14443A:**

Operation mode	99% Occupied Bandwidth (kHz)	20 dB Bandwidth (kHz)
NFC mode ISO 14443A	705.15	326.16
Measurement uncertainty (kHz)	<±0.38	



- NFC mode ISO 15693:**

Operation mode	99% Occupied Bandwidth (kHz)	20 dB Bandwidth (kHz)
NFC mode ISO 15693	29.22	2.634
Measurement uncertainty (kHz)	<±0.38	



Verdict: PASS

## FCC 15.225 (a) / RSS-210 B.6 (a)(i) Field Strength of Emissions within the band 13.553 MHz - 13.567 MHz

**SPECIFICATION:**

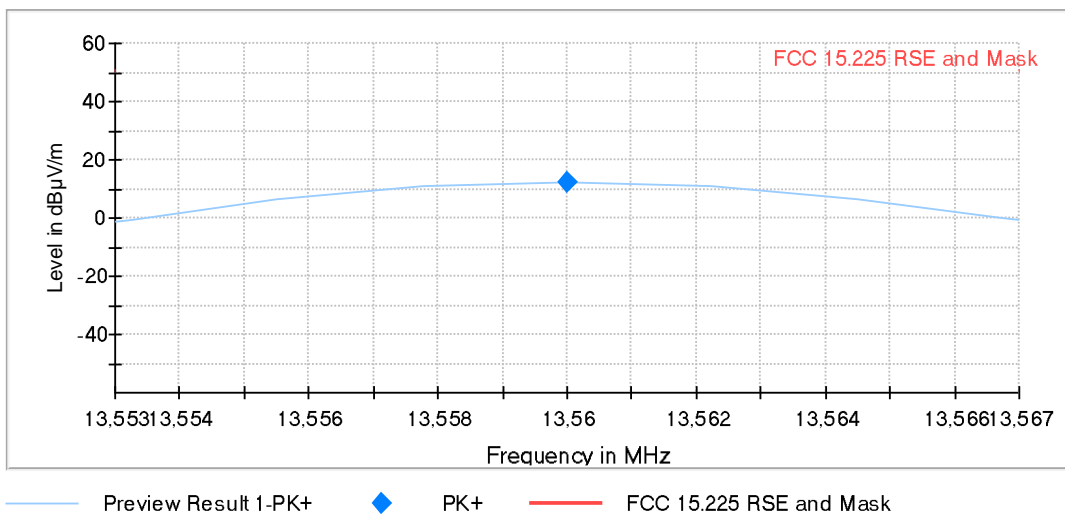
The field strength of any emissions within the band 13.553 – 13.567 MHz shall not exceed 15,848 microvolts/meter (84 dB $\mu$ V/m) at 30 meters.

**RESULTS:**

- **NFC mode ISO 14443A:**

Measurement distance: 3 meters.

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
150 kHz - 30 MHz	2.25 kHz	PK+	9 kHz	0.1 s	0 dB



The limit shown in the above plot is extrapolated to 3 meters.

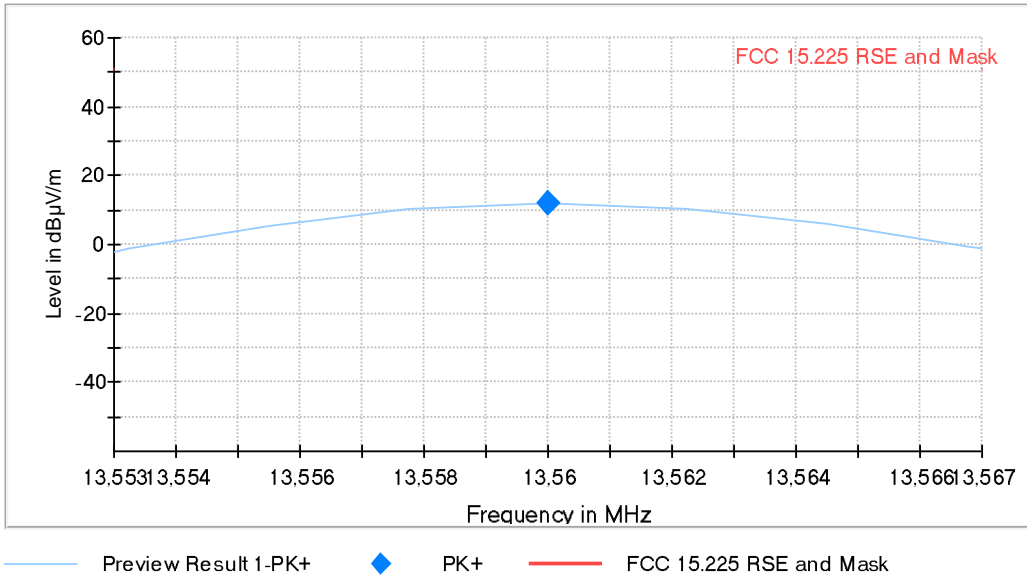
Frequency (MHz)	Maximum field strength (dB $\mu$ V/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dB $\mu$ V/m) extrapolated to 30 m (40 dB/decade)
13.56	12.24	-27.76
Measurement uncertainty (dB)	$\pm 3.04$	

Verdict: PASS

- **NFC mode ISO 15693:**

Measurement distance: 3 meters.

<b>Subrange</b>	<b>Step Size</b>	<b>Detectors</b>	<b>Bandwidth</b>	<b>Sweep Time</b>	<b>Preamp</b>
150 kHz - 30 MHz	2.25 kHz	PK+	9 kHz	0.1 s	0 dB



The limit shown in the above plot is extrapolated to 3 meters.

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.56	11.79	-28.21
Measurement uncertainty (dB)	<±3.04	

Verdict: PASS



## FCC 15.225 (b) / RSS-210 B.6 (a)(ii) Field Strength of Emissions within the band 13.410 MHz -13.553 MHz and 13.567 MHz - 13.710 MHz

**SPECIFICATION:**

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 (50.47 dBμV/m) at 30 meters.

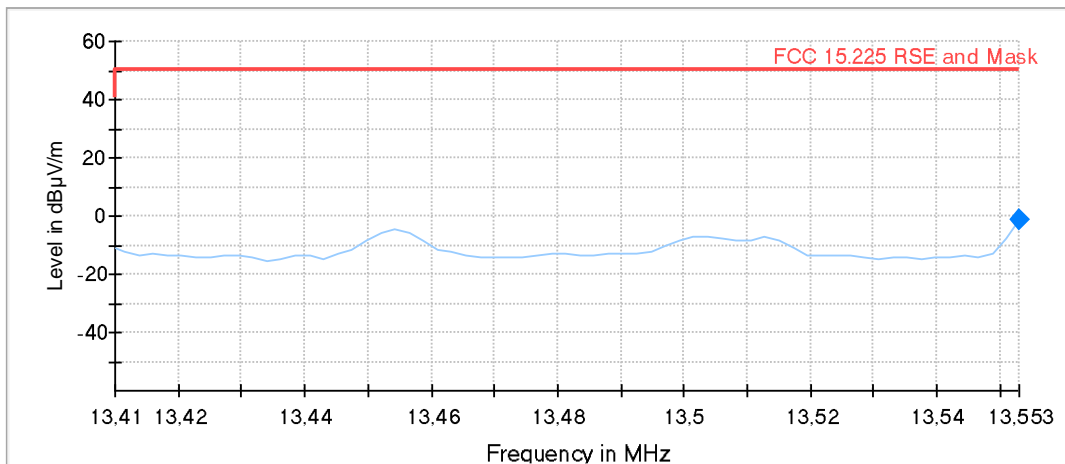
**RESULTS:**

Measurement distance: 3 meters.

- **NFC mode ISO 14443A:**

**Band 13.410 - 13.553 MHz:**

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
150 kHz - 30 MHz	2.25 kHz	PK+	9 kHz	0.1 s	0 dB



— Preview Result 1-PK+    ◆ PK+    — FCC 15.225 RSE and Mask

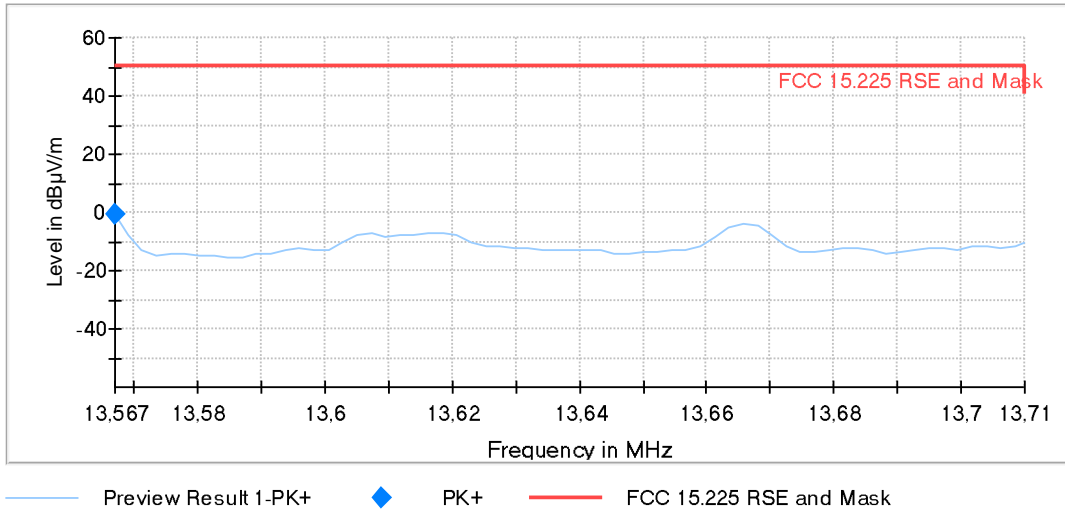
The limit shown in the above plot is extrapolated to 3 meters.

Frequency (MHz)	Maximum field strength (dBμV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBμV/m) extrapolated to 30 m (40 dB/decade)
13.553	-1.25	-41.25
Measurement uncertainty (dB)	<±3.04	

Verdict: PASS

**Band 13.567 - 13.710 MHz:**

<b>Subrange</b>	<b>Step Size</b>	<b>Detectors</b>	<b>Bandwidth</b>	<b>Sweep Time</b>	<b>Preamp</b>
150 kHz - 30 MHz	2.25 kHz	PK+	9 kHz	0.1 s	0 dB



The limit shown in the above plot is extrapolated to 3 meters.

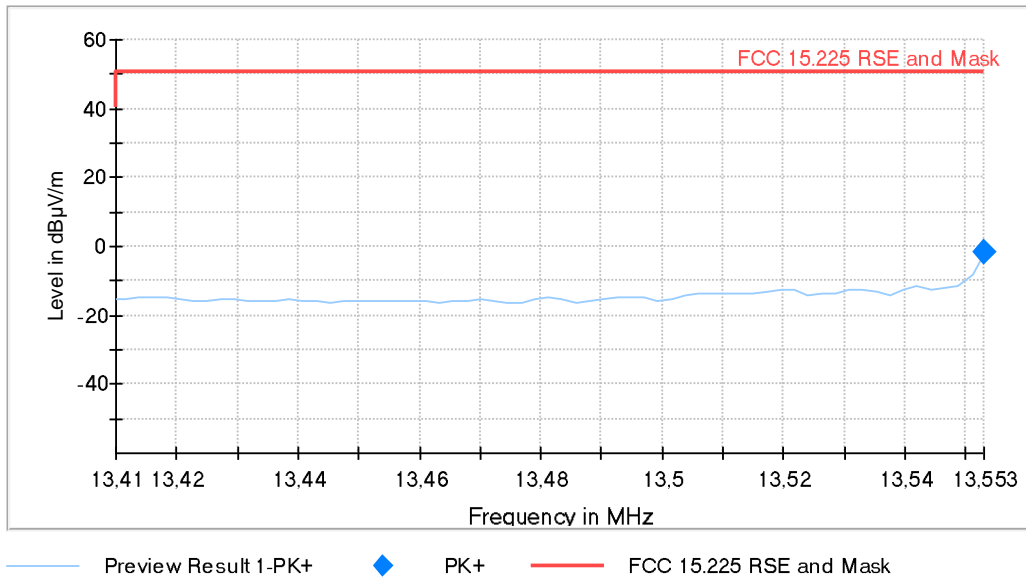
Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.567	-0.85	-40.85
Measurement uncertainty (dB)	<±3.04	

Verdict: PASS

- **NFC mode ISO 15693:**

**Band 13.410 - 13.553 MHz:**

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
150 kHz - 30 MHz	2.25 kHz	PK+	9 kHz	0.1 s	0 dB



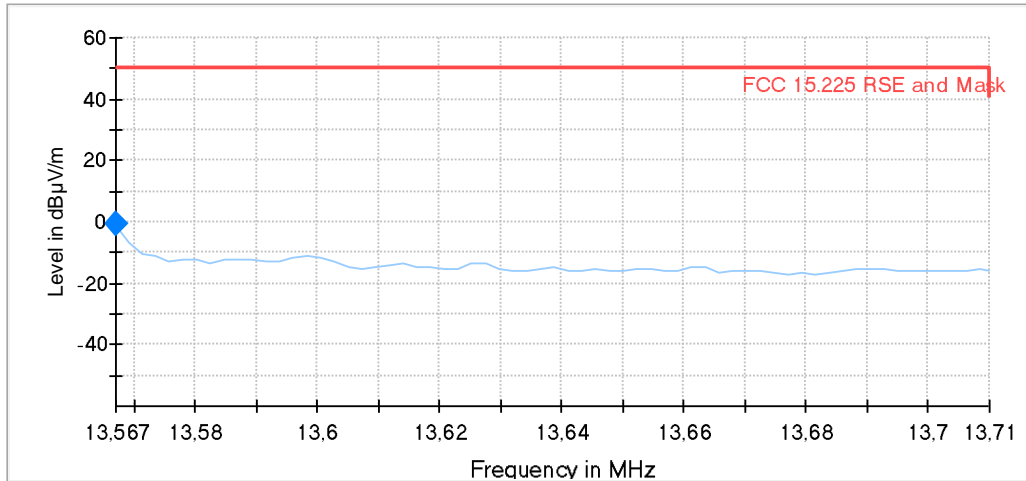
The limit shown in the above plot is extrapolated to 3 meters.

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.553	-1.87	-41.87
Measurement uncertainty (dB)	<±3.04	

Verdict: PASS

**Band 13.567 - 13.710 MHz:**

<b>Subrange</b>	<b>Step Size</b>	<b>Detectors</b>	<b>Bandwidth</b>	<b>Sweep Time</b>	<b>Preamp</b>
150 kHz - 30 MHz	2.25 kHz	PK+	9 kHz	0.1 s	0 dB



<span style="color: blue;">—</span> Preview Result 1-PK+	<span style="color: blue;">◆</span> PK+
<span style="color: red;">—</span> FCC 15.225 RSE and Mask	<span style="color: blue;">◆</span> Final_Result PK+
<span style="color: green;">◆</span> Final_Result QPK	

The limit shown in the above plot is extrapolated to 3 meters.

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.567	-0.54	-40.54
Measurement uncertainty (dB)	<±3.04	

Verdict: PASS

## FCC 15.225 (c) / RSS-210 B.6 (a)(iii) Field Strength of Emissions within the band 13.110 MHz -13.410 MHz and 13.710 MHz - 14.010 MHz

**SPECIFICATION:**

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 (40.51 dBμV/m) at 30 meters.

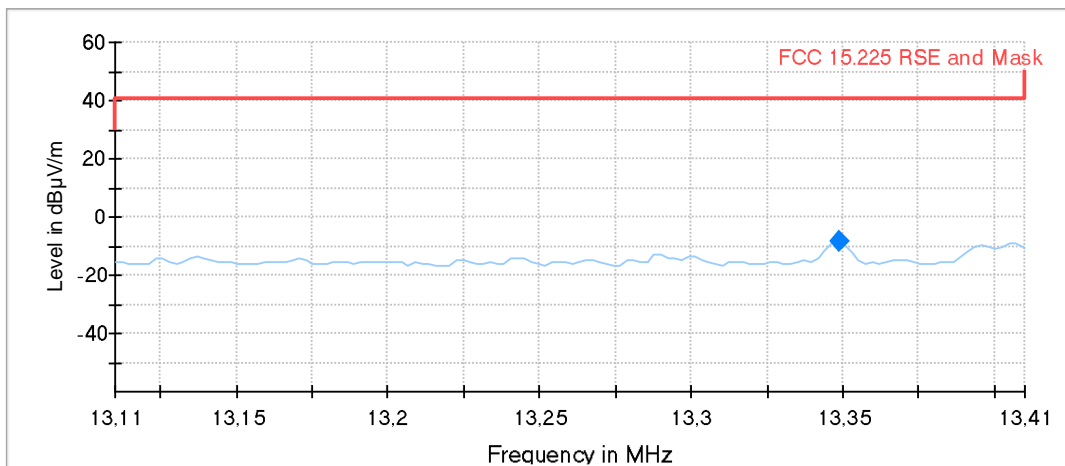
**RESULTS:**

Measurement distance: 3 meters.

- **NFC mode ISO 14443A:**

**Band 13.110 - 13.410 MHz:**

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
150 kHz - 30 MHz	2.25 kHz	PK+	9 kHz	0.1 s	0 dB



— Preview Result 1-PK+    ◆ PK+    — FCC 15.225 RSE and Mask

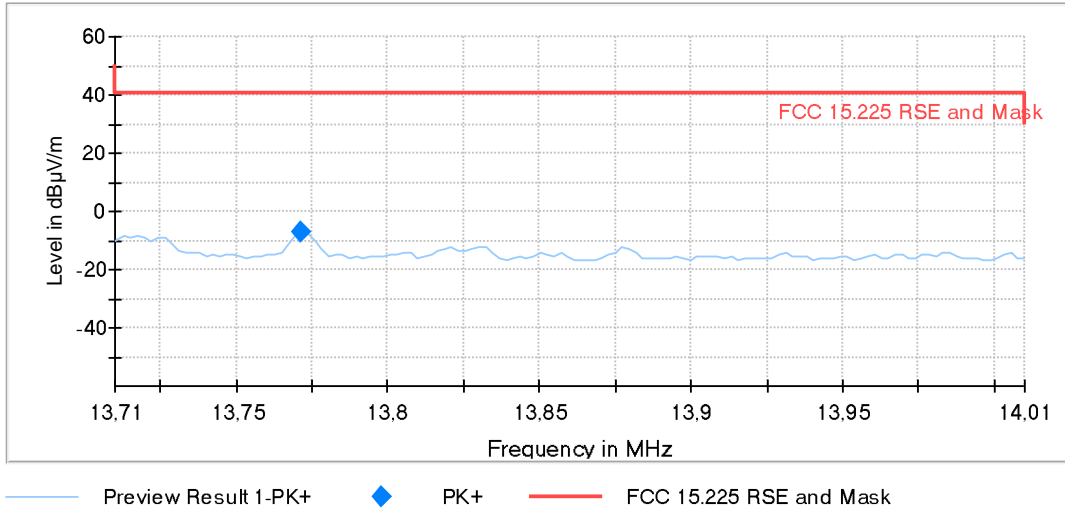
The limit shown in the above plot is extrapolated to 3 meters.

Frequency (MHz)	Maximum field strength (dBμV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBμV/m) extrapolated to 30 m (40 dB/decade)
13.3485	-8.35	-48.35
Measurement uncertainty (dB)	<±3.04	

Verdict: PASS

**Band 13.710 - 14.010 MHz:**

**Subrange** 150 kHz - 30 MHz      **Step Size** 2.25 kHz      **Detectors** PK+      **Bandwidth** 9 kHz      **Sweep Time** 0.1 s      **Preamp** 0 dB



The limit shown in the above plot is extrapolated to 3 meters.

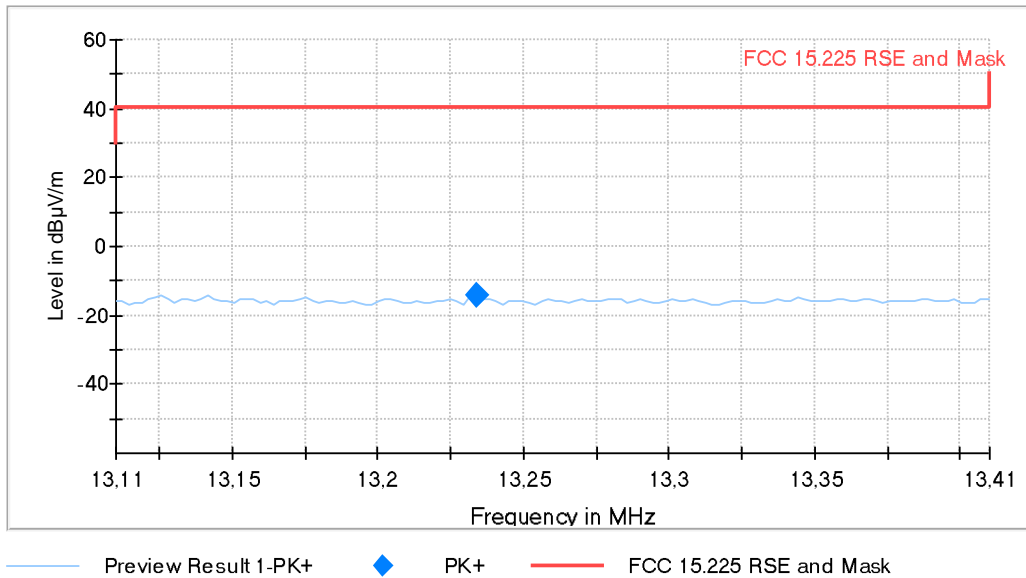
Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.7715	-7.18	-47.18
Measurement uncertainty (dB)	±3.04	

Verdict: PASS

- **NFC mode ISO 15693:**

**Band 13.110 - 13.410 MHz:**

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
150 kHz - 30 MHz	2.25 kHz	PK+	9 kHz	0.1 s	0 dB



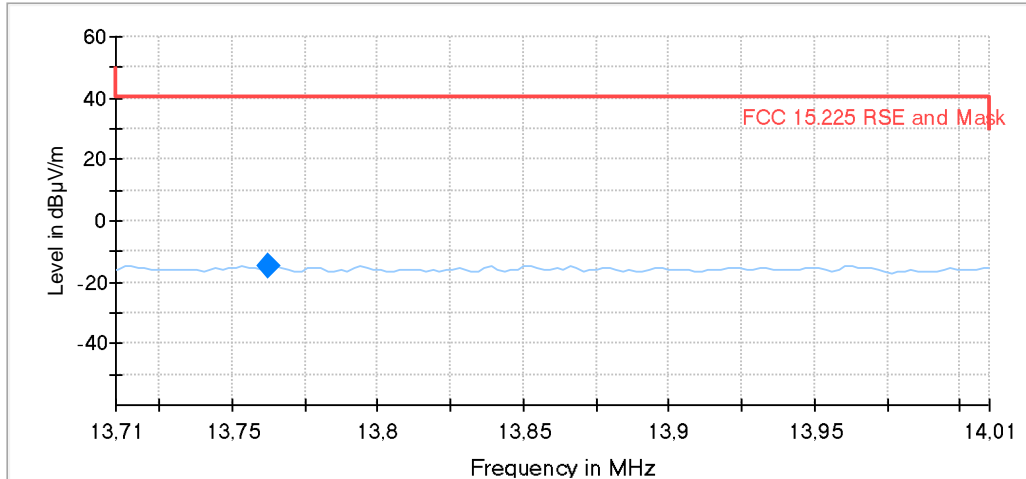
The limit shown in the above plot is extrapolated to 3 meters.

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.23375	-14.28	-54.28
Measurement uncertainty (dB)	<±3.04	

Verdict: PASS

**Band 13.710 - 14.010 MHz:**

<b>Subrange</b>	<b>Step Size</b>	<b>Detectors</b>	<b>Bandwidth</b>	<b>Sweep Time</b>	<b>Preamp</b>
150 kHz - 30 MHz	2.25 kHz	PK+	9 kHz	0.1 s	0 dB



<span style="color: blue;">—</span> Preview Result 1-PK+	<span style="color: blue;">◆</span> PK+
<span style="color: red;">—</span> FCC 15.225 RSE and Mask	<span style="color: blue;">◆</span> Final_Result PK+
<span style="color: green;">◆</span> Final_Result QPK	

The limit shown in the above plot is extrapolated to 3 meters.

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.7715	-16.32	-56.32
Measurement uncertainty (dB)	±3.04	

Verdict: PASS



## FCC 15.225 (d) / RSS-210 B.6 (a)(iv) Field Strength of Emissions outside of the band 13.110 MHz - 14.010 MHz

### SPECIFICATION:

Field strength of any emissions appearing outside of the band 13.110 MHz - 14.010 MHz band shall not exceed the general radiated emission limits in 15.209/RSS-Gen:

Frequency Range (MHz)	Field strength ( $\mu\text{V/m}$ )	Field strength ( $\text{dB}\mu\text{V/m}$ )	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	29.54	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

### RESULTS:

All tests were performed in a semi-anechoic chamber at a distance of 3 m.

The spectrum was inspected from 9 kHz to 200 MHz searching for spurious signals.

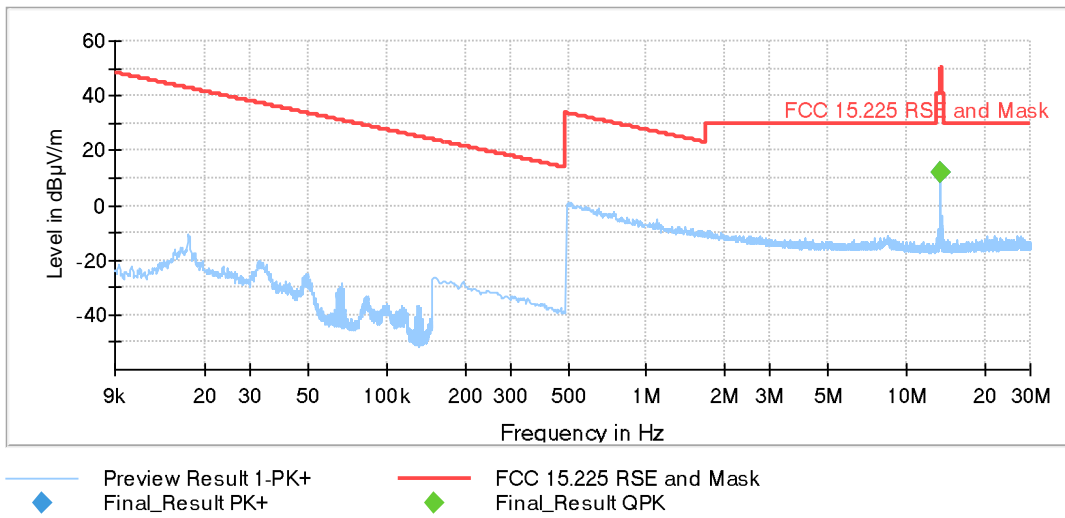
The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifier gain.

- **NFC mode ISO 14443A:**

**Frequency range 9 kHz - 30 MHz:**

No spurious frequencies detected at less than 20 dB below the limit.

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	50 Hz	PK+	200 Hz	0.1 s	0 dB
150 kHz - 30 MHz	2.25 kHz	PK+	9 kHz	0.1 s	0 dB



The limits shown in this plot are extrapolated to 3 m. The highest peak is the carrier frequency.

Resolution bandwidth:  
 200 Hz for 9 kHz ≤ f ≤ 150 kHz  
 9 kHz for 150 kHz ≤ f ≤ 30 MHz

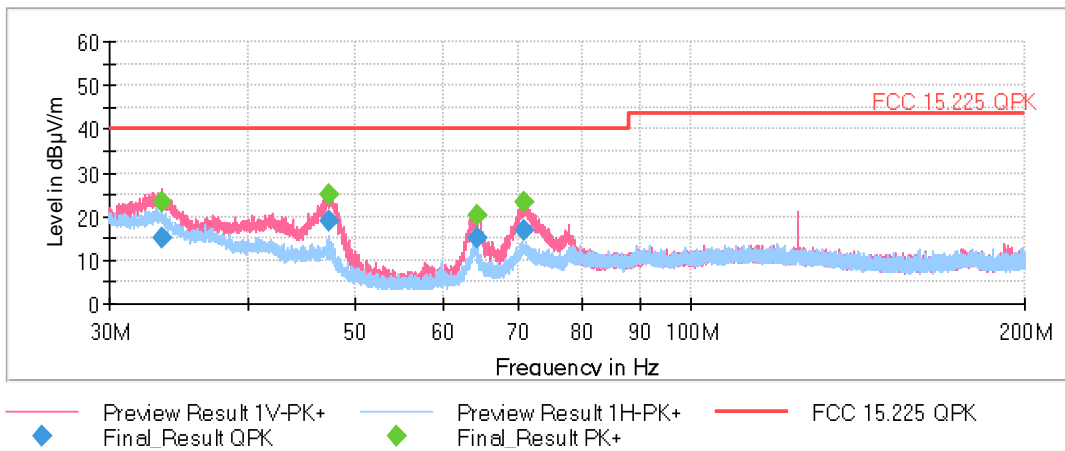
Measurement Uncertainty (dB) <± 3.04

**Frequency range 30 - 200 MHz:**

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	Emission Level (dBµV/m)	Polarization	Detector
33.4170	15.28	V	Quasi peak
47.1870	18.79	V	Quasi peak
64.2040	15.24	V	Quasi peak
70.8765	16.76	V	Quasi peak

**Subrange** 30 MHz - 200 MHz      **Step Size** 8.5 kHz      **Detectors** PK+      **Bandwidth** 100 kHz      **Sweep Time** 1 s      **Preamp** 20 dB



This plot shows the results of the scan using peak detector.

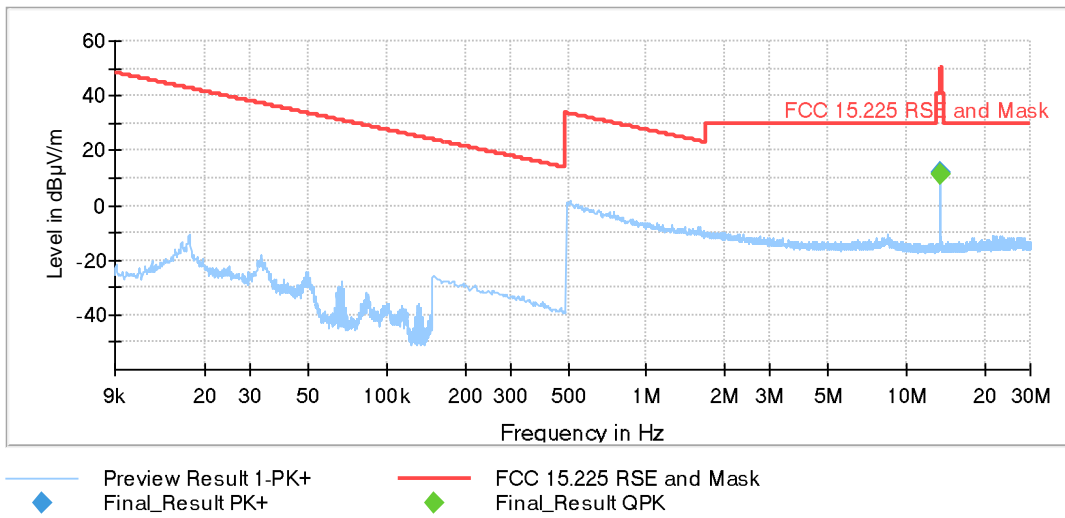
Measurement Uncertainty (dB)  $\lt \pm 4.68$

- **NFC mode ISO 15693:**

**Frequency range 9 kHz - 30 MHz:**

No spurious frequencies detected at less than 20 dB below the limit.

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	50 Hz	PK+	200 Hz	0.1 s	0 dB
150 kHz - 30 MHz	2.25 kHz	PK+	9 kHz	0.1 s	0 dB



The limits shown in this plot are extrapolated to 3 m. The highest peak is the carrier frequency.

Resolution bandwidth:  
 200 Hz for 9 kHz ≤ f ≤ 150 kHz  
 9 kHz for 150 kHz ≤ f ≤ 30 MHz

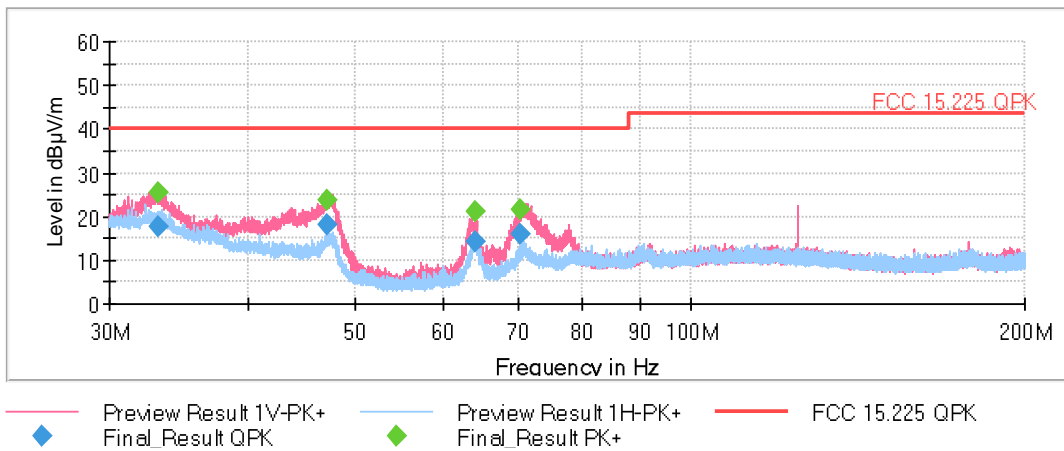
Measurement Uncertainty (dB) <± 3.04

**Frequency range 30 - 200 MHz:**

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	Emission Level (dBµV/m)	Polarization	Detector
33.1450	17.81	V	Quasi peak
47.0850	18.05	V	Quasi peak
64.1275	14.23	V	Quasi peak
70.2560	15.78	V	Quasi peak

**Subrange** 30 MHz - 200 MHz      **Step Size** 8.5 kHz      **Detectors** PK+      **Bandwidth** 100 kHz      **Sweep Time** 1 s      **Preamp** 20 dB



This plot shows the results of the scan using peak detector.

Measurement Uncertainty (dB)  $\leq \pm 4.68$

Verdict: PASS

## FCC 15.225 (e) / RSS-210 B.6 (b) Frequency Tolerance of the Carrier Signal

**SPECIFICATION:**

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

**RESULTS:**

Nominal Operating Frequency: 13.56 MHz.

- **NFC mode ISO 14443A:**
  - **Frequency Stability over Temperature Variations:**

Temperature (°C)	Frequency Error (kHz)	Frequency Error (%)
+50	0.050850	0.000375
+40	0.046350	0.000342
+30	0.026850	0.000198
+20	0.009000	0.000066
+10	0.043650	0.000322
0	0.075150	0.000554
-10	0.093150	0.000687
-20	0.072150	0.000532

- **Frequency Stability over Voltage Variations:**

DC Voltage	Voltage (V)	Temperature (°C)	Frequency Error (kHz)	Frequency Error (%)
Vmax	6.9	20	0.025650	0.000189
Vmin	5.1	20	0.028650	0.000211

- **NFC mode ISO 15693:**

- **Frequency Stability over Temperature Variations:**

Temperature (°C)	Frequency Error (kHz)	Frequency Error (%)
+50	0.053850	0.000397
+40	0.049350	0.000364
+30	0.019500	0.000144
+20	0.006000	0.000044
+10	0.054150	0.000399
0	0.067650	0.000499
-10	0.094650	0.000698
-20	0.090150	0.000665

- **Frequency Stability over Voltage Variations:**

DC Voltage	Voltage (V)	Temperature (°C)	Frequency Error (kHz)	Frequency Error (%)
Vmax	6.9	20	0.024150	0.000178
Vmin	5.1	20	0.024150	0.000178

Verdict: PASS