

ISED CABid: ES1909
Lab. Company Number: 4621A

Test Report No:
79578RRF.006A1

Partial Test Report

USA FCC Part 15.31, 15.225, 15.247, 15.209
CANADA RSS-210, RSS-247, RSS-Gen

(*) Identification of item tested	Salto Neo Cylinder including all mechanical variants
(*) Trademark	Salto
(*) Model and /or type reference	N1M / Type reference: G1824
Other identification of the product	FCC ID: UKCN1M IC: 10088A-N1M
(*) Features	Bluetooth LE HW version: 1.0 SW version: 0195 (Control FW) + 0186 (FUS FW) + 0187 (BLE FW) + 0148 (Motor FW) + 0197 (HSE FW)
Applicant	SALTO SYSTEMS, S.L. Arkotz 9, Polígono Lanbarren 20180, Oiartzun, Guipúzcoa, Spain
Test method requested, standard	USA FCC Part 15.31 (10-1-23 Edition): Measurement standard. USA FCC Part 15.225 (10-1-23 Edition): Operation within the band 13.110 -14.010. USA FCC Part 15.247 (10-1-23) Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-23) Edition: Radiated emission limits; general requirements. CANADA RSS-210 Issue 11, June 2024. CANADA RSS-247 Issue 3, August 2023. CANADA RSS-Gen Issue 5 Amendment 2 (February 2021) Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05r02 dated April 2, 2019. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices. - Transmitter out of band radiated emissions with simultaneous transmissions.
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager
Date of issue	2024-10-25
Report template No	FDT08_25 (*) "Data provided by the client"

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Competences and guarantees

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

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.
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Uncertainty

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

The total uncertainty of the measurement system for the radiated emissions of the EUT is:

From 9 kHz to 30 MHz:	Measurement uncertainty $\leq \pm 3.04$ dB.
From 30 MHz to 1 GHz:	Measurement uncertainty $\leq \pm 5.03$ dB.
From 1 to 3 GHz:	Measurement uncertainty $\leq \pm 4.11$ dB.
From 3 to 17 GHz:	Measurement uncertainty $\leq \pm 4.32$ dB.
From 17 to 26 GHz:	Measurement uncertainty $\leq \pm 4.58$ dB.

Data provided by the client

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 of the model N1M / 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. The laboratory is not responsible for such information and it is not covered by accreditation.

Usage of samples

Samples undergoing test have been selected by: The client.

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/01	79578/009	Salto Neo Cylinder	N1M	-	2024-07-26	Element Under Test

Notes referenced to samples during the project:

Id	Type
S/01	Radiated tests.

Test sample description

Ports.....:	Port name and description	Cable					
		Specified max length [m]	Attached during test		Shielded		
	-	-	<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 checked="" type="checkbox"/> DC: 6 Vdc (4 x LR1 batteries)						
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) + 0197 (HSE FW)						
Hardware version	1.0						
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 + TAOGLAS		
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		-		-		

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)	2024-08-06
Date (finish)	2024-08-07

Document history

Report number	Date	Description
79578RRF.006	2024-09-03	First release.
79578RRF.006A1	2024-10-25	Second release. Modification due to typos. This report replaces and cancels 79578RRF.006

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 %

Remarks and comments

The tests have been performed by the technical personnel: Rafael Fernández, Pablo Redondo.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
06498	ACTIVE LOOP ANTENNA	FMZB 1519B	SCHWARZBECK	2027-07-08
06143	HYBRID BILOG ANTENNA 30 MHz - 6 GHz	3142E	ETS LINDGREN	2027-01-22
06496	HORN ANTENNA 1-18 GHz	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	2026-12-01
04657	HORN ANTENNA 18-40 GHz	BBHA 9170	SCHWARZBECK MESS-ELEKTRONIK	2026-06-12
07817	EMI TEST RECEIVER 2 Hz - 44 GHz	ESW44	ROHDE AND SCHWARZ	2026-07-01
06791	SEMIANECHOIC ABSORBER LINED CHAMBER IV	FACT 3 200 STP	ETS LINDGREN	N/A
06792	SHIELDED ROOM	S101	ETS LINDGREN	N/A
07758	DIGITAL MULTIMETER	175	FLUKE	2024-11-08
07760	DIGITAL MULTIMETER	175	FLUKE	2024-11-08
06609	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2025-04-22
06615	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2025-04-04
06142	PRE-AMPLIFIER, G>38 dB, 30MHz-6GHz	BLNA 0360-01N	BONN ELEKTRONIK	2025-07-25
03783	PRE-AMPLIFIER G>30 dB, 1-18 GHz	BLMA 0118-3A	BONN ELEKTRONIK	2025-02-07
08856	PRE-AMPLIFIER G>30 dB, 17-40 GHz	BLMA 1840-4A	BONN ELEKTRONIK	2025-02-27
06157	SIGNAL AND SPECTRUM ANALYZER 10 Hz - 40 GHz	FSV40	ROHDE AND SCHWARZ	2025-01-18
04848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A

Testing verdicts

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

Summary

Bluetooth Low Energy and NFC (13.56 MHz):

FCC PART 15 PARAGRAPH / RSS-210, RSS-247		
Requirement – Test case	Verdict	Remark
FCC 15.31 (h), FCC 15.209 (a), 15.225 (d), 15.247 (d) / RSS-Gen 8.9, RSS-210 B.6 (a)(iv), RSS-247 5.5: - Emission limitations radiated (Transmitter)	P	(1)
<u>Supplementary information and remarks:</u> (1) Co-Location radiated spurious emission test was requested.		

Appendix A: Test results

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FCC 15.31 (h), FCC 15.209 (a), 15.225 (d), 15.247 (d) / RSS-Gen 8.9, RSS-210 B.6 (a)(iv), RSS-247
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TEST CONDITIONS

(*) Declared by the Applicant

POWER SUPPLY (*):

Vnominal: 6 Vdc
Type of Power Supply: DC (4 x LR1 batteries)

ANTENNA (*):

Type of Antenna for Bluetooth Low Energy: Integral (chip).
Maximum Declared Antenna Gain for Bluetooth Low Energy: +1 dBi

Type of Antenna for NFC 13.56 MHz: Integral (PCB).
Maximum Declared Antenna Gain for NFC 13.56 MHz: N/A

TEST FREQUENCIES:

Frequency range	Technologies	Modulations	Worst case
13.56MHz	NFC: ISO A, ISO V	ASK	Single Channel (13.56 MHz)
2400-2483.5 MHz	Bluetooth Low Energy	GFSK	1 Mbps. High Channel (2480 MHz)

The test set-up was made according to the general provisions of FCC 558074 D01 15.247 Meas Guidance v05r02 dated April 2, 2019.

The EUT was tested in the following operating mode during the transmitter tests:

For cellular technologies, the EUT was controlled by a communication tester to transmit at maximum power on the test channels and modes as required.

TEST FREQUENCIES FOR SIMULTANEOUS TRANSMISSION MODE RADIATED TESTS:

The EUT was configured to simultaneously transmit the following signals at maximum output power:

1. Simultaneous transmission mode Bluetooth Low Energy, NFC ISO A:

Bluetooth Low Energy: 1M. high Channel (2480 MHz). GFSK.
NFC ISO A: Single Channel (13.56 MHz).

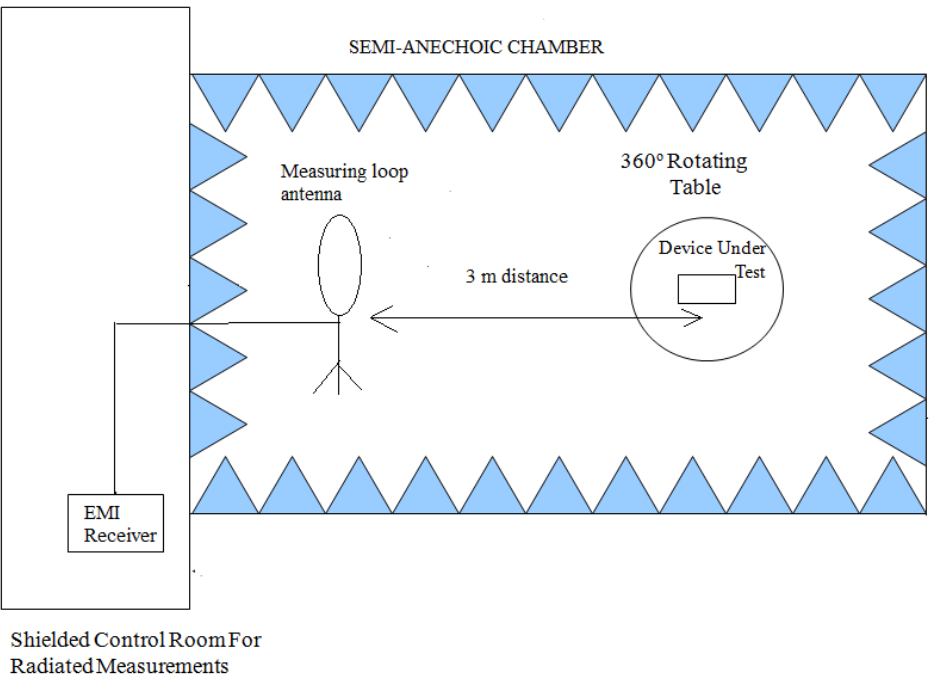
RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m (Loop antenna for the range between 9 kHz to 30 MHz, Bilog antenna for 30 MHz to 1000 MHz, Double ridge horn antenna 1 GHz-17 GHz and horn antenna 17 GHz-26 GHz), at distance of 1.5 m for the frequency range 17 GHz-26 GHz.

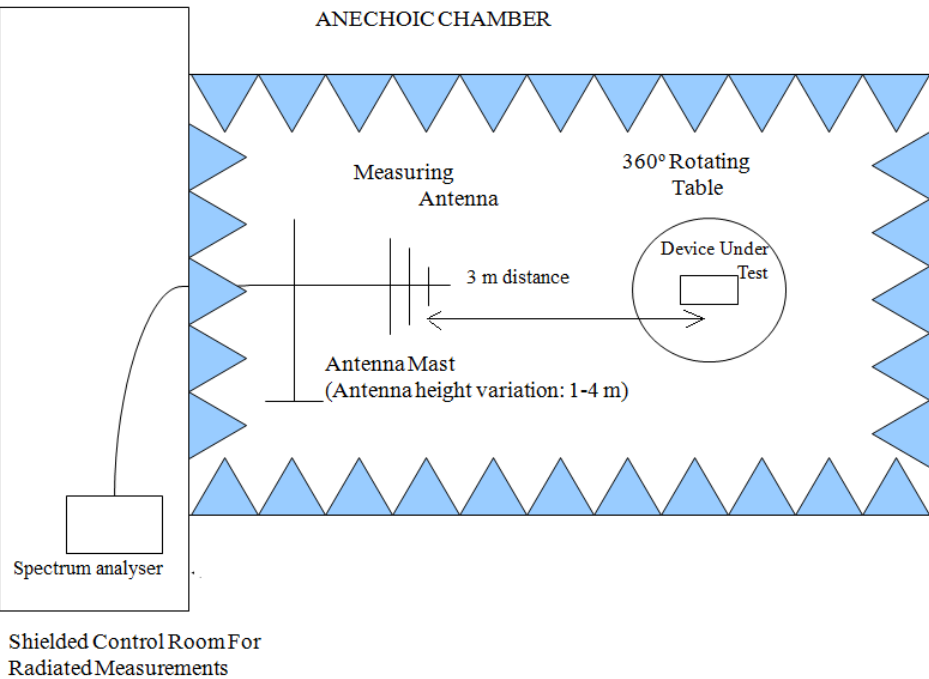
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

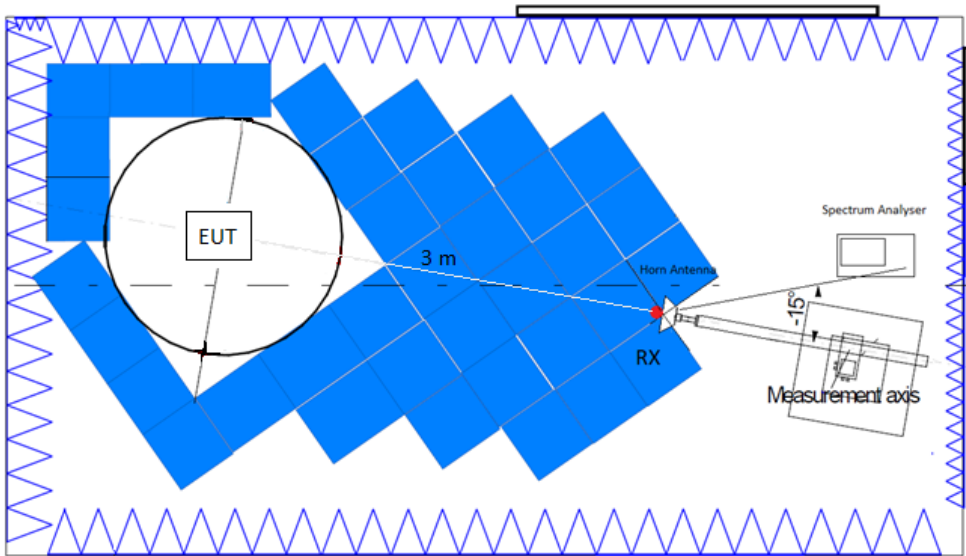
Radiated measurements setup $f < 30\text{ MHz}$:



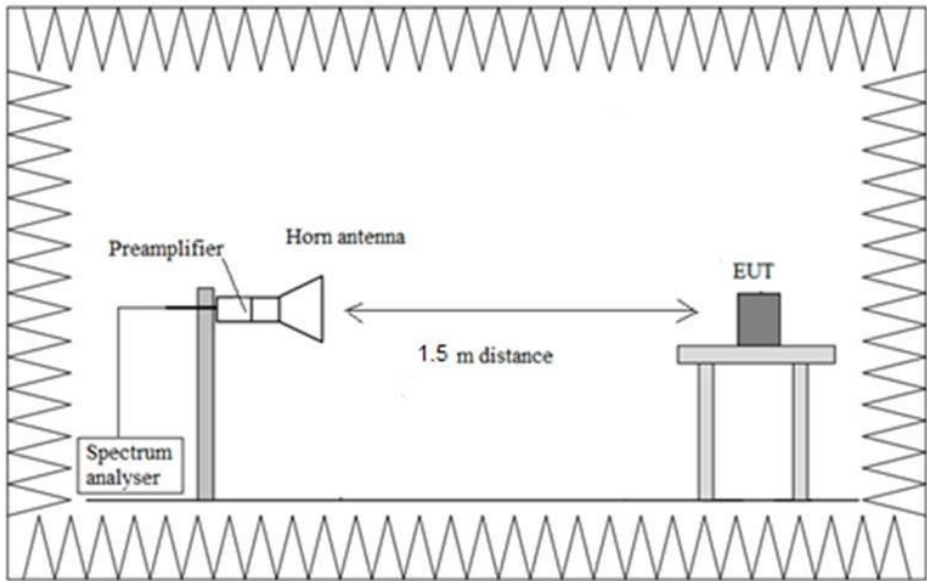
Radiated measurements setup $30\text{ MHz} < f < 1\text{ GHz}$:



Radiated measurements setup $f > 1\text{ GHz}$ up to 17 GHz :



Radiated measurements setup $f > 17\text{ GHz}$:



FCC 15.31 (h), FCC 15.209 (a), 15.225 (d), 15.247 (d) /
RSS-Gen 8.9, RSS-210 B.6 (a)(iv), RSS-247 5.5
Emission limitations radiated (Transmitter)

SPECIFICATION:

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), appearing outside of the band 13.110 MHz - 14.010 MHz band must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c) / 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		30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 40000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 9 KHz-17 GHz and at distance of 1.5 m for the frequency range 17 GHz-26 GHz.

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-amplifiers gain.

A resolution bandwidth / video bandwidth of 100 kHz / 300 kHz was used for frequencies between 30 MHz up to 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

Test performed on the following worst-cases in all relevant tests channels.

1. Simultaneous transmission mode Bluetooth Low Energy, NFC ISO A:

Bluetooth Low Energy: 1M. High Channel (2480 MHz). GFSK.
NFC ISO A: Single Channel (13.56 MHz).

Frequency range 9 kHz - 30 MHz:

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

Frequency range 30 MHz - 1 GHz:

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

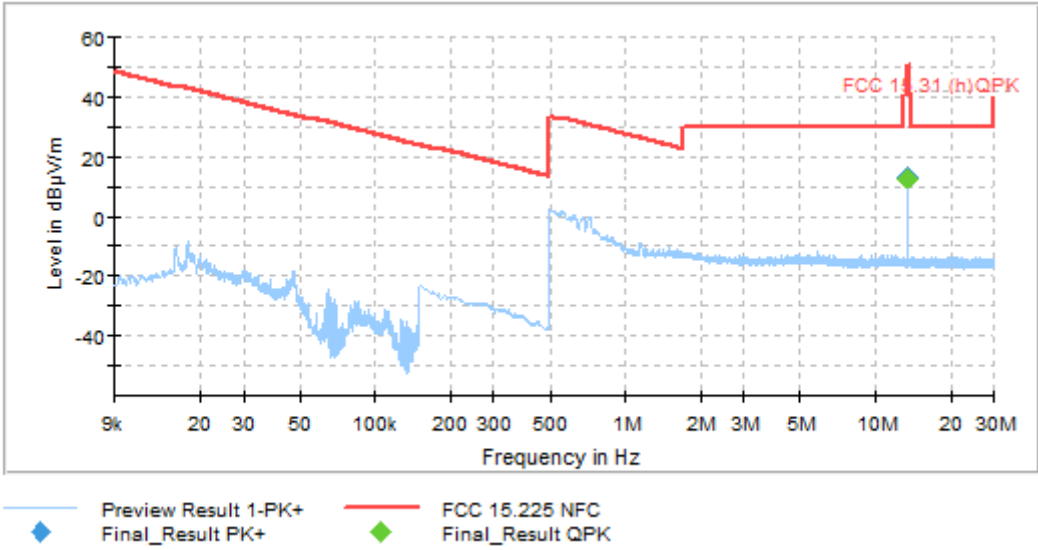
Frequency range 1 - 26 GHz:

Spurious frequencies with peak levels above the average limit (54 dB μ V/m at 3 m) are measured with average detector for checking compliance with the average limit.

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

Verdict: PASS

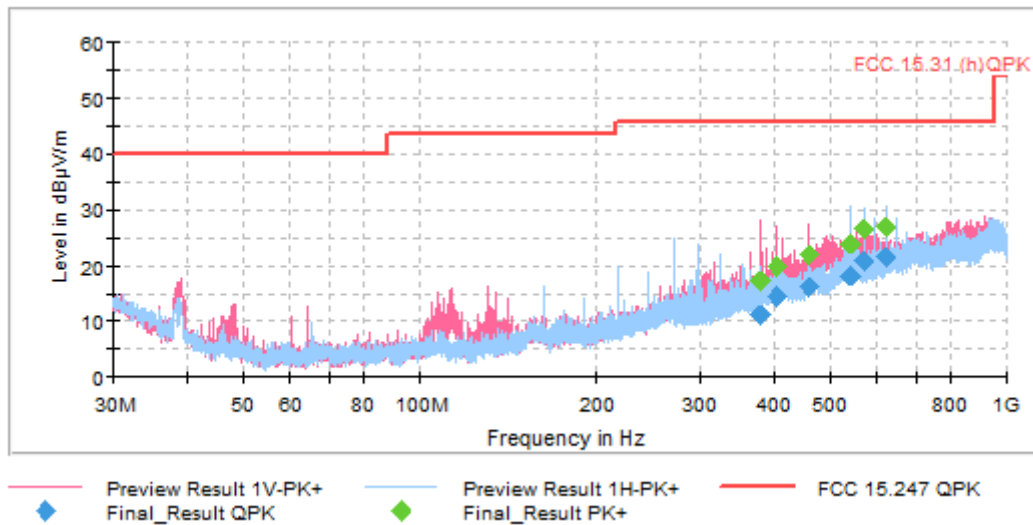
FREQUENCY RANGE 9 kHz - 30 MHz:



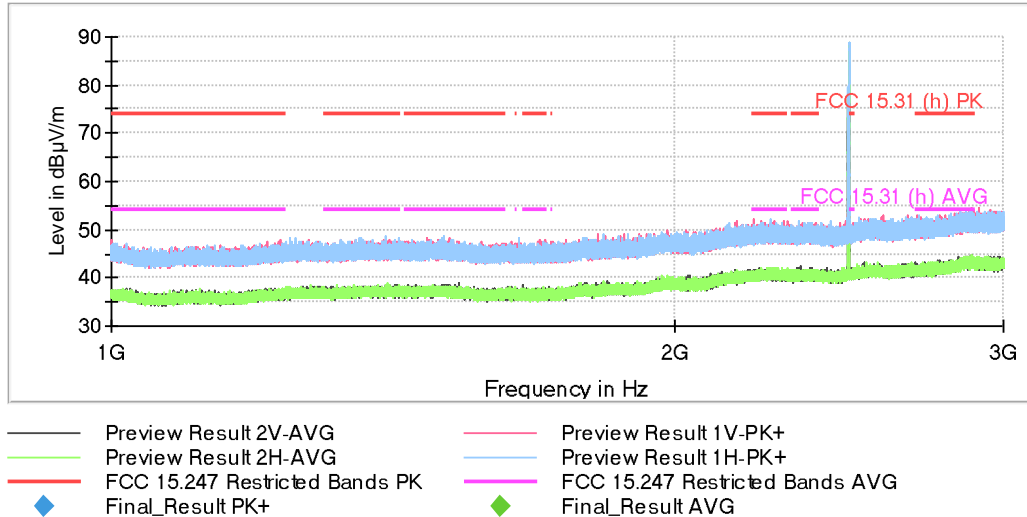
The highest peak is the NFC ISO A (13.56 MHz) carrier frequency.

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	30.312 kHz	PK+	100 kHz	1 s	0 dB
1 GHz - 3 GHz	30.769 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
3 GHz - 17 GHz	140 kHz	PK+ ; AVG	1 MHz	1 s	30 dB
17 GHz - 26 GHz	300 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

FREQUENCY RANGE 30 MHz - 1 GHz:

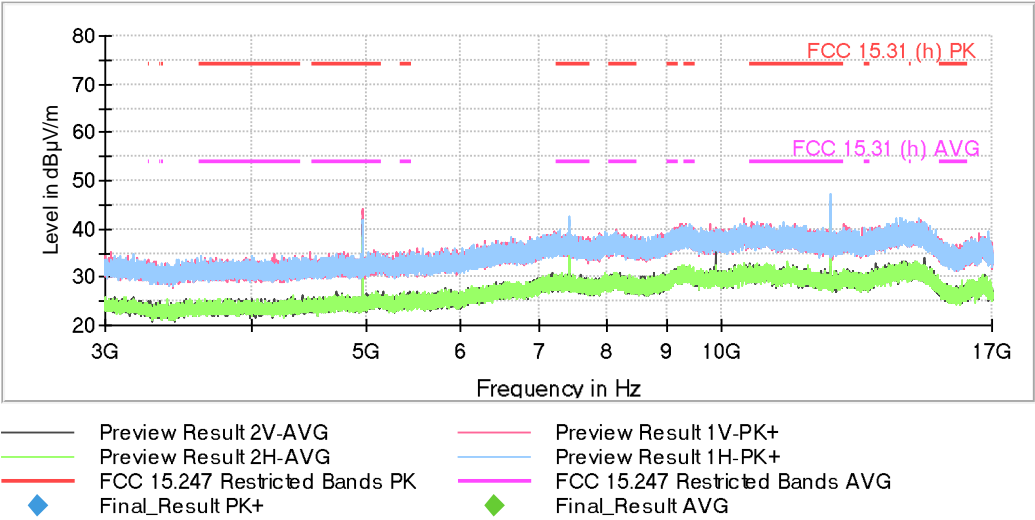


FREQUENCY RANGE 1 - 3 GHz:



The peak above the limit is the Bluetooth Low Energy (2480 MHz) carrier frequency.

FREQUENCY RANGE 3 - 17 GHz:



FREQUENCY RANGE 17 - 26 GHz:

