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C.I.F. A29507456

ISED CABid: ES1909

Lab. Company Number: 4621A

Test Report No:
75856RRF.011

Partial Test Report

USA FCC Part 15.225, 15.209
CANADA RSS-210, RSS-Gen

(*) Identification of item tested	GAT ECO.Lock Series including all mechanical variants
(*) Trademark	GANTNER
(*) Model and /or type reference	GAT ECO.Lock 7102 NW F/ISO ICLS
Other identification of the product	FCC ID: NC4-LM100 IC: 11873A-LM100
(*) Features	Bluetooth LE HW version: 1.2 SW version: 0221 (Control FW) + 0186 (FUS FW) + 0187 (BLE FW)
Applicant	SALTO SYSTEMS, S.L. Arkotz 9, Polígono Lanbarren 20180, Oiartzun, Gipuzkoa, 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 Amendment 2 (February 2021). ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager Firmado digitalmente por 53680346W JOSE MANUEL GOMEZ (C:A29507456)
Date of issue	2024-04-25
Report template No	FDT08_24 (*) “Data provided by the client”

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Acronyms

Acronym ID	Acronym Description
Freq	Frequency
Freq Rng	Frequency Range
Mod	Modulation
Pol	Polarization
QuasiPeak	Radiated Quasi Peak Level

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 is an FCC-recognized accredited testing laboratory with appropriate scope of accreditation that covers the performed tests in this report.

DEKRA Testing and Certification 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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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 S.A.U. and the Accreditation Bodies.

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 EUT from 9 kHz to 30 MHz is: Measurement uncertainty ≤ ± 3.08 dB (with factor k = 2).

The total uncertainty of the measurement system for the radiated emissions of EUT for the field strength of emissions within the band ≤ ± 3.08 dB

The total uncertainty of the measurement system for the radiated emissions of EUT from 30 MHz to 200 MHz is: Measurement uncertainty ≤ ± 5.35 dB (with factor k = 2).

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 consists of a GAT ECO.Lock Series with RFID HID iCLASS (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.

Id	Control Number	Description	Model	Serial Nº	Date of Reception	Application
S/01	77994_2.1	GAT ECO.Lock	GAT ECO.Lock 7102 NW F/ISO ICLS	2344070001	2023-12-26	Element Under Test

Notes referenced to samples during the project:

Id	Type
S/01	Sample used for radiated tests

Test sample description

Ports…… :	Port name and description	Cable				
		Specified max length [m]	Attached during test	Shielded	Coupled to patient(3)	
	.....	.....	[ ]	[ ]	[ ]	
Supplementary information to the ports…… :	N/A					
Rated power supply .....:	Voltage and Frequency		Reference poles			
			L1	L2	L3	N	PE
	[ ]	AC:	[ ]	[ ]	[ ]	[ ]	[ ]
	[X]	DC: 4.5 Vdc (3 x LR6 batteries)					
Rated Power .....:	N/A					
Clock frequencies.....:	32MHz, 32.768 kHz, 27.12 MHz					
Other parameters .....:	N/A					
Software version .....:	0221 (Control FW) + 0186 (FUS FW) + 0187 (BLE FW)					
Hardware version .....:	1.2					
Dimensions in cm (W x H x D) ....:	External part: 10.9 x 10.9 x 8.0 cm					
Mounting position .....:	[ ]	Table top equipment				
	[ ]	Wall/Ceiling mounted equipment				
	[ ]	Floor standing equipment				
	[ ]	Hand-held equipment				
	[X]	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		.....	.....		
	.....		.....	.....		

(3) Only for Medical Equipment

Identification of the client

SALTO SYSTEMS, S.L.
Arkotz 9, Polígono Lanbarren
20180, Oiartzun, Gipuzkoa, SPAIN

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2024-01-17
Date (finish)	2024-02-07

Document history

Report number	Date	Description
75856RRF.011	2024-04-25	First release.

Environmental conditions

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

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

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

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

Remarks and comments

The tests have been performed by the technical personnel: Rafael Fernandez.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
06791	SEMIANECHOIC ABSORBER LINED CHAMBER IV	FACT 3 200 STP	ETS LINDGREN	N/A
06792	SHIELDED ROOM	S101	ETS LINDGREN	N/A
06609	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2024-04-25
06615	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2024-04-25
00242	ACTIVE LOOP ANTENNA 9 KHZ-30 MHz	11966A	HEWLETT PACKARD	2024-08-18
02942	EMI TEST RECEIVER 20Hz-40GHz	ESU40	ROHDE AND SCHWARZ	2026-02-22
03541	HYBRID BILOG ANTENNA 30MHz-6GHz	JB6	SUNOL SCIENCES CORPORATION	2024-11-15
06144	PRE-AMPLIFIER G>40dB 10MHz-6GHz	BLNA 0160-01N	BONN ELEKTRONIK	2024-07-25
04848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A

Testing verdicts

Fail	F
Inconclusive	I
Not applicable	N/A
Not measured	N/M
Pass	P

Summary

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	N/M	(1)
Supplementary information and remarks: 1. Test not requested by the client		

Appendix A: Test results

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 4.5Vdc

Type of Power Supply: 3 x LR6 batteries

ANTENNA (*):

Type of Antenna: Integral antenna (PCB)

Maximum Declared Antenna Gain: N/A

TEST FREQUENCIES AND OPERATION MODE (*):

Technology	Modulation	Frequency:
RFID	ISO 14443A	13.56 MHz
RFID	ISO 15693	13.56 MHz

During transmitter test the EUT was controlled by a SW tool provided by the client to operate in a continuous transmit mode on the modulation schemes as required. The equipment has no standby mode.

TEST SETUP

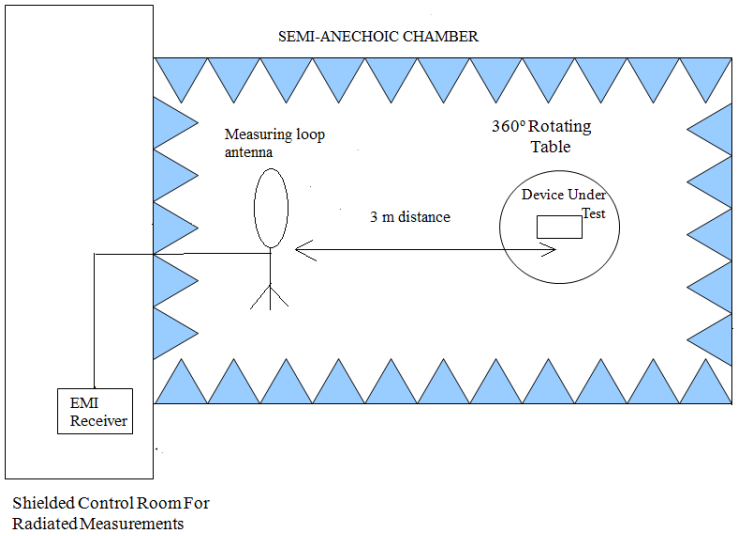
RADIATED MEASUREMENTS

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.

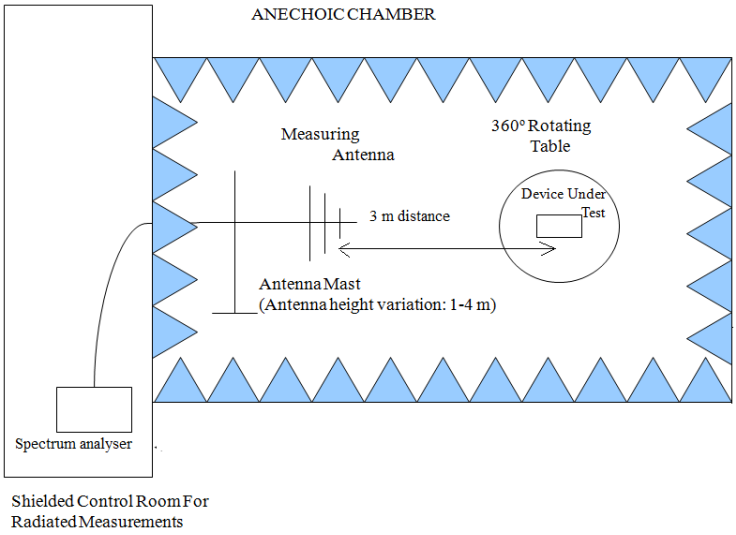
For radiated emissions in the range 9 kHz to 30 MHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 40 dB per decade is used to normalize the measured data for determining compliance.

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 360º 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:



TEST CASES DETAILS

FCC 15.225 (a) (b) (c) / RSS-210 B.6 (a) (b) (c). Field strength of emissions within the band 13.553 -13.567 MHz, 13.410 - 13.553 MHz and 13.567 - 13.710 MHz, 13.110 - 13.410 MHz and 13.710 - 14.010 MHz

Specification

- **FCC 15.225 (a) / RSS-210 B.6 (a). Field strength of emissions within the band 13.553 -13.567 MHz**

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

- **FCC 15.225 (b) / RSS-210 B.6 (b). Field strength of emissions within the band 13.410 - 13.553 MHz and 13.567 - 13.710 MHz**

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.

- **FCC 15.225 (c) / RSS-210 B.6 (c). Field strength of emissions within the band 13.110 - 13.410 MHz and 13.710 - 14.010 MHz**

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.

Modulation: ISO 14443A

Results

- Band 13.553 -13.567 MHz

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)
13.560	18.23	-21.77

- Band 13.410 - 13.553 MHz

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)
13.454	-1.56	-41.56

- Band 13.567-13.710 MHz

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)
13.666	-0.44	-40.44

- Band 13.110-13.410 MHz

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)
13.349	-5.53	-45.53

- Band 13.710-14.010 MHz

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)
13.772	-3.33	-43.33

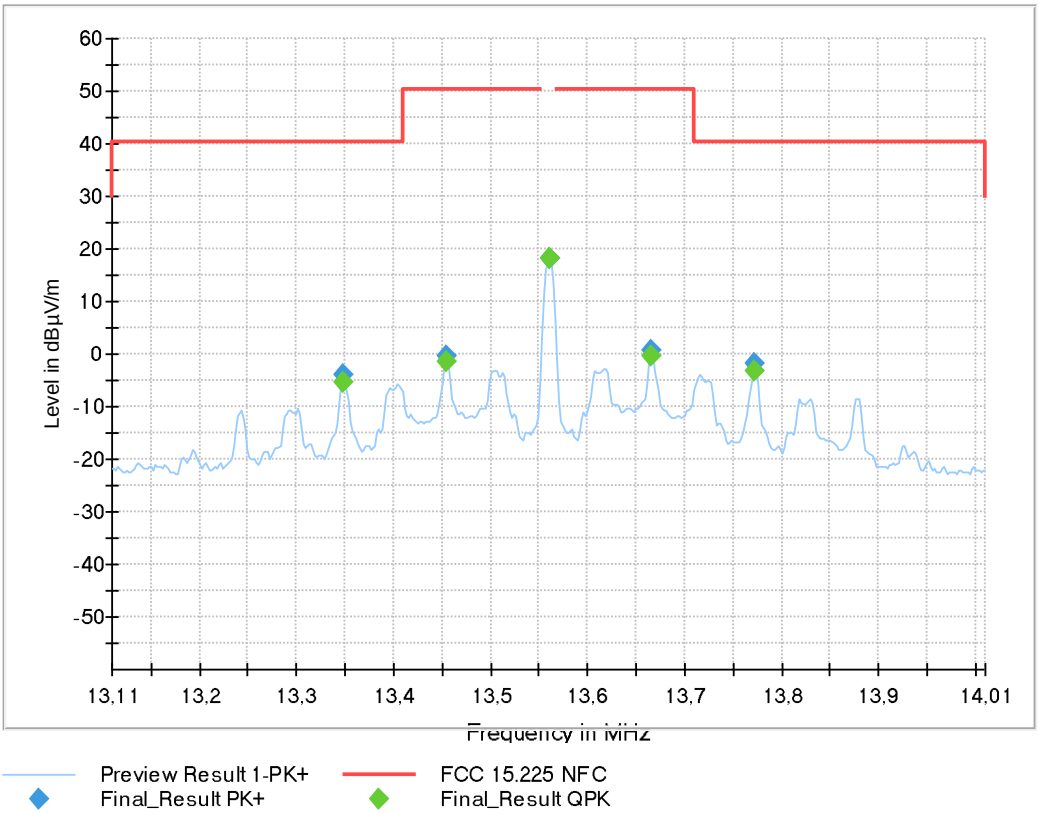
Verdict

Pass

Attachments

Modulation = ISO 14443A Frequency MHz = 13.56

Images:



Spectrum analyzer parameters:

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

Modulation: ISO 15693

Results

- Band 13.553 -13.567 MHz

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)
13.560	16.33	-23.67

- Band 13.410 - 13.553 MHz

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)
13.551	-7.21	-47.21

- Band 13.567-13.710 MHz

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)
13.569	-5.07	-45.07

- Band 13.110-13.410 MHz

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)
13.403	-22.35	-62.35

- Band 13.710-14.010 MHz

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)
13.718	-23.91	-63.91

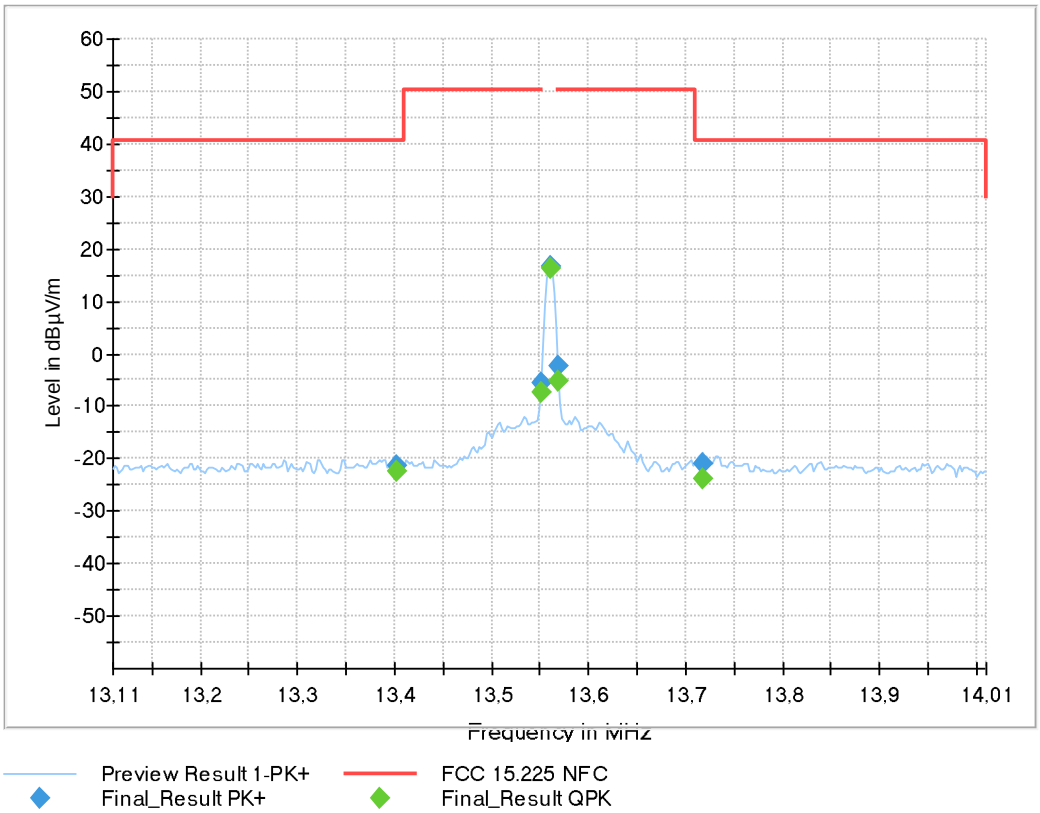
Verdict

Pass

Attachments

Modulation = ISO 15693 Frequency MHz = 13.56

Images:



Spectrum analyzer parameters:

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

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

Limits

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 (µV/m)	Field strength (dBµV/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

Modulation: ISO 14443A

Results

Frequency range 9 kHz - 30 MHz:

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

Frequency range 30 - 200 MHz:

Spurious frequencies detected:

Spurious frequency (MHz)	Emission Level (dBµV/m)	Polarization	Detector
31.5555	17.73	H	QP
35.4995	15.89	V	QP

Verdict

Pass

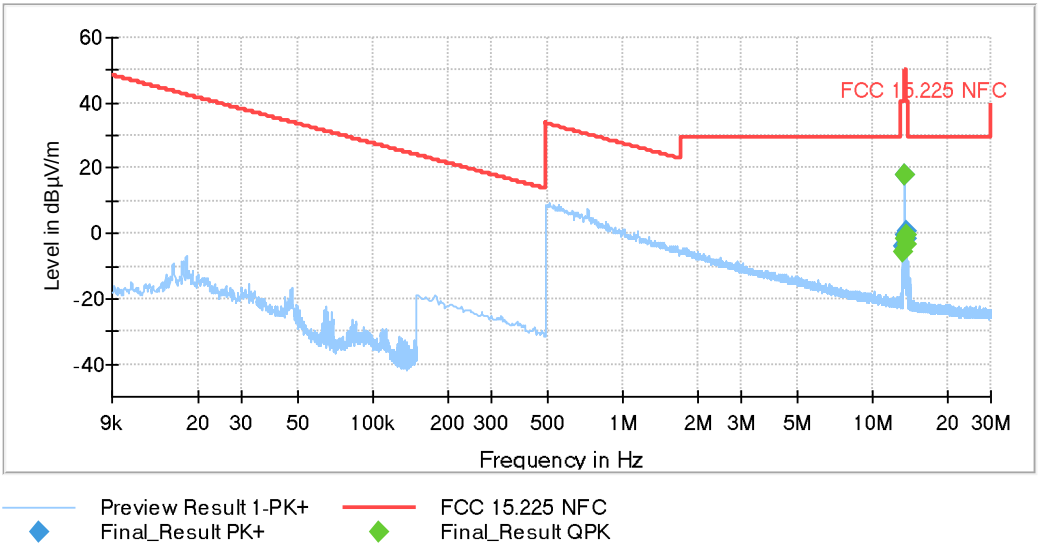
Attachments

Spectrum analyzer parameters:

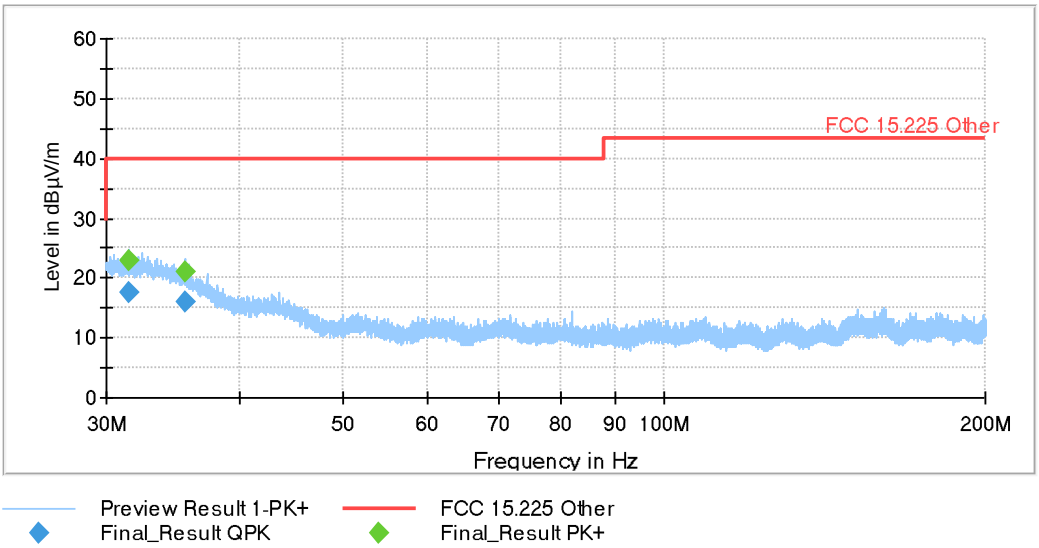
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	50 Hz	PK+	200 Hz	0.1 s	0 dB
150 kHz - 30 MHz	2.25 kHz	PK+	9 kHz	0.1 s	0 dB
30 MHz - 200 MHz	8.5 kHz	PK+	100 kHz	1 s	30 dB

Modulation = ISO 14443A Frequency MHz = 13.56

Images:



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



Modulation: ISO 15693

Results

Frequency range 9 kHz - 30 MHz:

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

Frequency range 30 - 200 MHz:

Spurious frequencies detected:

Spurious frequency (MHz)	Emission Level (dBµV/m)	Polarization	Detector
32.2015	17.54	H	QP
35.3890	15.94	V	QP

Verdict

Pass

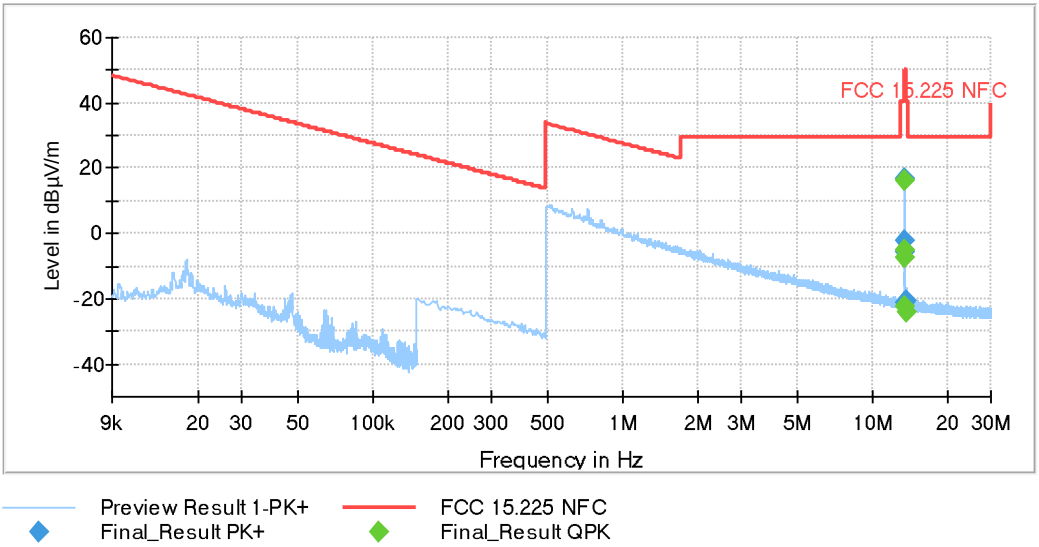
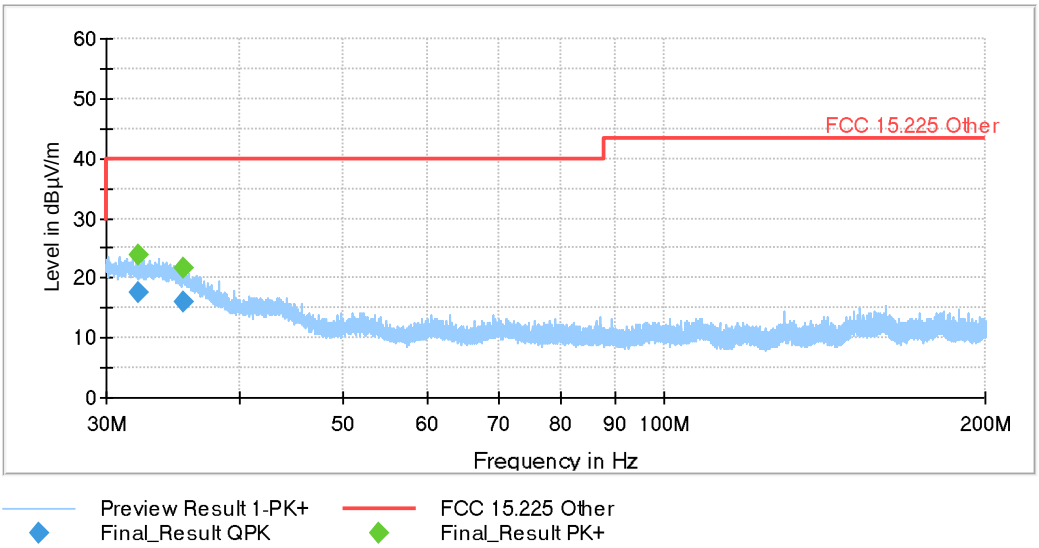
Attachments

Spectrum analyzer parameters:

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
30 MHz - 200 MHz	8.5 kHz	PK+	100 kHz	1 s	30 dB

Modulation = ISO 15693 Frequency MHz = 13.56

Images:



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