

ISED CABid: ES1909
Lab. Company Number: 4621A

Test Report No:
71590RRF.003

Test Report

USA FCC Part 15.225, 15.209

CANADA RSS-210, RSS-Gen

(*) Identification of item tested	Proximity electromechanic lock
(*) Trademark	Ojmar
(*) Model and /or type reference	OTS Pulse (Full PCB 233-16)
(*) Derived model not tested	233-01
Other identification of the product	FCC ID: 2ANY7OJM007 IC: Not provided
(*) Features	Technologies: Mifare Classic, Mifare Desfire EV1/EV2 2K, 4K and 8K, Mifare Ultralight, HID iClass and HID Seos. Compatible with Ultralight C and technogym. BLE. Wireless protocol: Proprietary protocol based on 802.15.4. Power supply: 4x1,5V AA Alkaline batteries. Functional temperature range: -10° to 42° (without condensation). Autonomy: Up to 8 years (Depending on usage, humidity and temperature). Approximate weight: 375 g. HW version: OTS Pulse 1.0.2 SW version: 2.0.0
Applicant	OJMAR S.A. Polígono industrial de Ierun s/n, 20870, Elgoibar, Guipúzcoa, Spain
Test method requested, standard	USA FCC Part 15.225 (10-1-23 Edition): Operation within the band 13.110 -14.010. USA FCC Part 15.209 (10-1-23 Edition): Radiated emission limits, general requirements. CANADA RSS-210 Issue 10 Amendment (April 2020). CANADA RSS-Gen Issue 5 Amendment 2 (February 2021). ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager 
Date of issue	2024-07-23
Report template No	FDT08_24 (*) "Data provided by the client"

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Acronyms

Acronym ID	Acronym Description
20dBw	20 dB Bandwidth
99OBW	99% Occupied Bandwidth
Freq	Frequency
Freq Rng	Frequency Range
FreqError%	Frequency Error
Mod	Modulation
Pol	Polarization
QuasiPeak	Radiated Quasi Peak Level
T	Temperature
Un	Nominal Voltage

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.
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 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 $\leq \pm 3.08$ 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 $\leq \pm 3.08$ dB

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

The total uncertainty of the measurement system for the conducted testing of EUT is:
Frequency Tolerance of the Carrier Signal: Measurement uncertainty $\leq \pm 12.3$ kHz
Occupied Bandwidth $\leq \pm 1.42$ kHz

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 model OTS Pulse consists of a Proximity electromechanic lock that communicates via RFID (13,56MHz) using Mifare Classic, Mifare Desfire and Mifare Ultralight technologies.
Lock is powered by 4 AA batteries of 1,5 V each one.
Lock also allows NFC communication at 13,56 MHz for maintenance purposes.
Working mode is following one:
Once knob is pressed, a switch is activated that starts communication between interior antenna and proximity card. Lock reads the UID of the card or the UID of the smartphone that is sent by BLE and send the information to the Gateway. Gateway, with the information that has stored in its memory, answers back accepting or denying the petition operation. Once received, lock moves the motor and closes. After that, lock sends the event of operation to Gateway. Opening is made in the same way. Lock is sleep until the switch is pressed.
3. Letter of Equivalence:



INTELLIGENT LOCKING SYSTEMS™

Letter of Equivalence

OTS PULSE

Pag. 1 of 1

F03.04 R01

We hereby confirm the equivalence between the following OTS Pulse system boards

Full PCB	Equivalent PCB
233-16	233-01

Ambas placas poseen las siguientes características:

- Same RFID antenna design.
- Same BLE antenna design.
- Same Wireless antenna design.
- Same functional Firmware and bootloader.

Both boards have the same PCB layout. The only difference is that the following component "CHIP HID SEL55100000" is not mounted on the 233-01 board:

This chip is used to read the static serial number of the HID Seos cards, using the same antenna circuit.

The reason for having two boards is purely economic, as the price difference is significant.

Signed

At Elgoibar, 30/08/2023



Xabier Martínez

Product Manager

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 N°	Date of Reception	Application
S/01	71590B_13.1	OTS (Radiated sample)	--	--	2023-05-04	Element Under Test

Notes referenced to samples during the project:

Id	Type
S/01	All tests.

Test sample description

Ports..... :	<table><tr><th rowspan="2">Port name and description</th><th colspan="4">Cable</th></tr><tr><th>Specified max length [m]</th><th>Attached during test</th><th>Shielded</th><th>Coupled to patient⁽³⁾</th></tr><tr><td>-</td><td>-</td><td>☐</td><td>☐</td><td>☐</td></tr></table>	Port name and description	Cable				Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾	-	-	☐	☐	☐												
Port name and description	Cable																										
	Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾																							
-	-	☐	☐	☐																							
Supplementary information to the ports..... :	-																										
Rated power supply :	<table><tr><th colspan="2" rowspan="2">Voltage and Frequency</th><th colspan="5">Reference poles</th></tr><tr><th>L1</th><th>L2</th><th>L3</th><th>N</th><th>PE</th></tr><tr><td>☐</td><td>AC:</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>☒</td><td>DC: 4 AA Batteries (6V)</td><td></td><td></td><td></td><td></td><td></td></tr></table>	Voltage and Frequency		Reference poles					L1	L2	L3	N	PE	☐	AC:						☒	DC: 4 AA Batteries (6V)					
Voltage and Frequency				Reference poles																							
		L1	L2	L3	N	PE																					
☐	AC:																										
☒	DC: 4 AA Batteries (6V)																										
Rated Power..... :	-																										
Clock frequencies..... :	-																										
Other parameters :	-																										
Software version..... :	2.0.0																										
Hardware version :	OTS Pulse 1.0.2																										
Dimensions in cm (W x H x D) ... :	-																										
Mounting position :	<table><tr><td>☐</td><td>Table top equipment</td></tr><tr><td>☐</td><td>Wall/Ceiling mounted equipment</td></tr><tr><td>☐</td><td>Floor standing equipment</td></tr><tr><td>☐</td><td>Hand-held equipment</td></tr></table>	☐	Table top equipment	☐	Wall/Ceiling mounted equipment	☐	Floor standing equipment	☐	Hand-held equipment																		
☐	Table top equipment																										
☐	Wall/Ceiling mounted equipment																										
☐	Floor standing equipment																										
☐	Hand-held equipment																										

	☐	Other:	
Modules/parts..... :	Module/parts of test item		Type
	-		-
Accessories (not part of the test item) :	Description		Type
	-		-
Documents as provided by the applicant..... :	Description		File name
	-		-

⁽³⁾ Only for Medical Equipment

Identification of the client

OJMAR S.A.
Polígono industrial de Ierun s/n, 20870, Elgoibar, Guipúzcoa, Spain

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2024-02-19
Date (finish)	2024-03-20

Document history

Report number	Date	Description
71590RRF.003	2024-07-23	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 Valentin Andarias Diaz.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
00242	ACTIVE LOOP ANTENNA 9 KHZ-30 MHz	11966A	HEWLETT PACKARD	2024-08-18
06143	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2027-01-22
02942	EMI TEST RECEIVER 20Hz-40GHz	ESU40	ROHDE AND SCHWARZ	2026-02-22
07760	DIGITAL MULTIMETER	175	FLUKE	2024-11-08
06615	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-04
06609	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-22
07193	MULTI-DEVICE CONTROLLER	CO3000	INNCO	N/A
00922	POWER SUPPLY DC 40 V / 40 A	NGPE 40/40	ROHDE AND SCHWARZ	N/A
06142	PRE-AMPLIFIER G>38dB 30MHz-6GHz	BLNA 0360-01N	BONN ELEKTRONIK	2024-06-28
06791	SEMIANECHOIC ABSORBER LINED CHAMBER IV	FACT 3 200 STP	ETS LINDGREN	N/A
06793	SHIELDED ROOM	S101	ETS LINDGREN	N/A
04848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A
06668	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2024-12-14
07794	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2025-04-21
06611	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2025-04-04
08002	TEMPERATURE CHAMBER MK56 BINDER	MK 56	BINDER	2025-01-23
07798	WMS32	WMS32	ROHDE AND SCHWARZ	N/A

Testing verdicts

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

Summary

RFID (NFC 13.56 MHz) 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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<i>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</i>	17
<i>FCC 15.225 (d) / RSS-210 B.6 (a)(iv) Field Strength of Emissions outside of the band 13.110 MHz - 14.010 MHz</i>	19
<i>FCC 15.225 (e) / RSS-210 B.6 (b) Frequency Tolerance of the Carrier Signal</i>	21

TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 6 Vdc
Vminimum: 5.1 Vdc
Vmaximum: 6.9 Vdc
Type of Power Supply: 4 AA Batteries.

ANTENNA (*):

Type of Antenna: Integrated.
Maximum Declared Antenna Gain: Not applicable.

TEST FREQUENCIES (*):

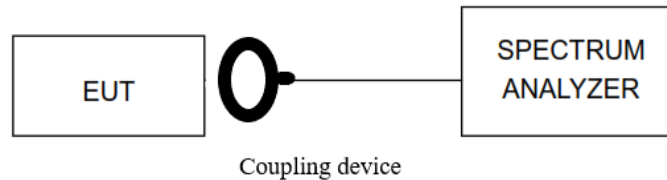
Nominal Operating Frequency: 13.56 MHz
Modulation: ISO 15693.

TEST SETUP

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.



For extreme test conditions the EUT was placed inside a climatic chamber and connected to a spectrum analyzer using a low-loss cable and a coupling device. An external DC power supply was connected to the EUT for voltage variation test.

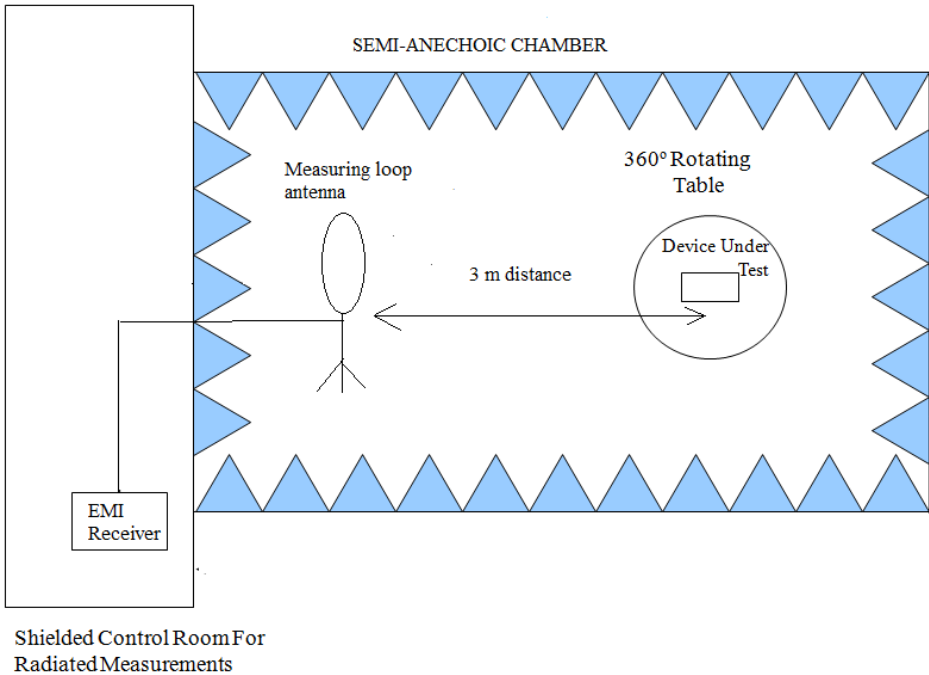
RADIATED MEASUREMENTS

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.

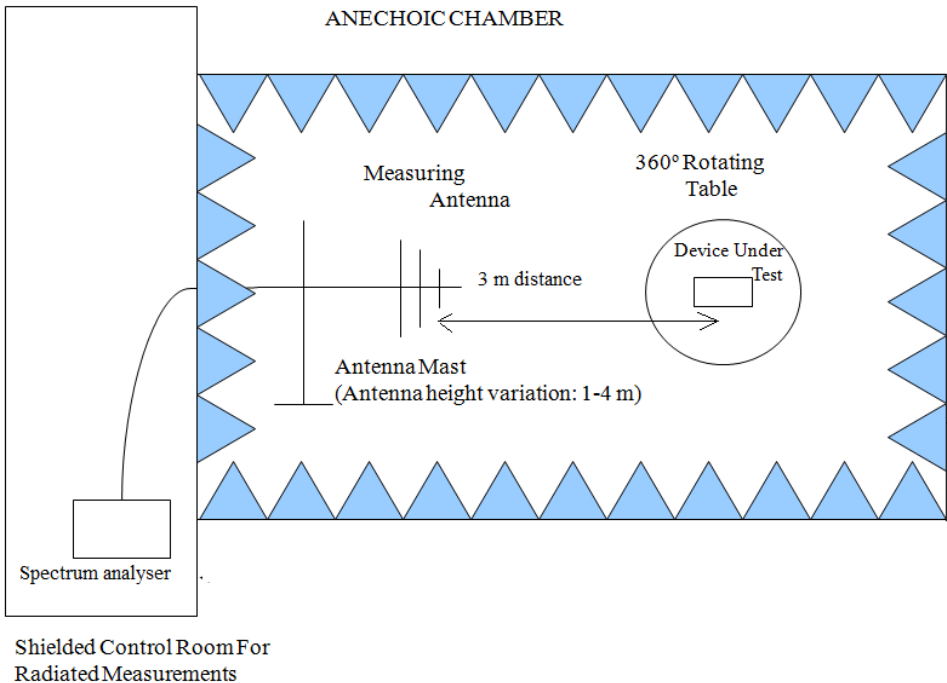
For radiated emissions in the range 9 kHz to 30 MHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 40 dB per decade is used to normalize the measured data for determining compliance.

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:



TEST CASES DETAILS

Occupied Bandwidth

Modulation: ISO 15693

Results

Freq (MHz)	99OBW (kHz)	20dBw (kHz)
13.56	305.50	26.29

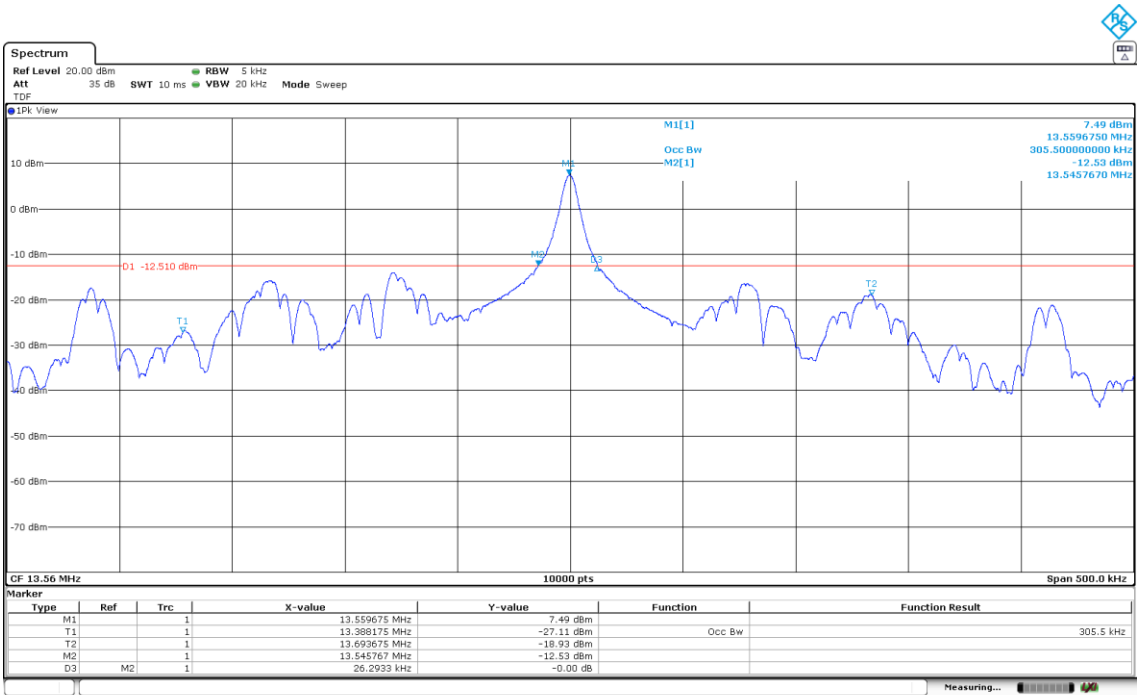
Verdict

Pass

Attachments

Modulation = ISO 15693 Frequency MHz = 13.56

Images:



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

Limits

- 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 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	14,58	-25,42

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	-7,44	-47,44

- 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	-9,33	-49,33

- 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	-9,32	-49,32

- 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	-10,66	-50,66

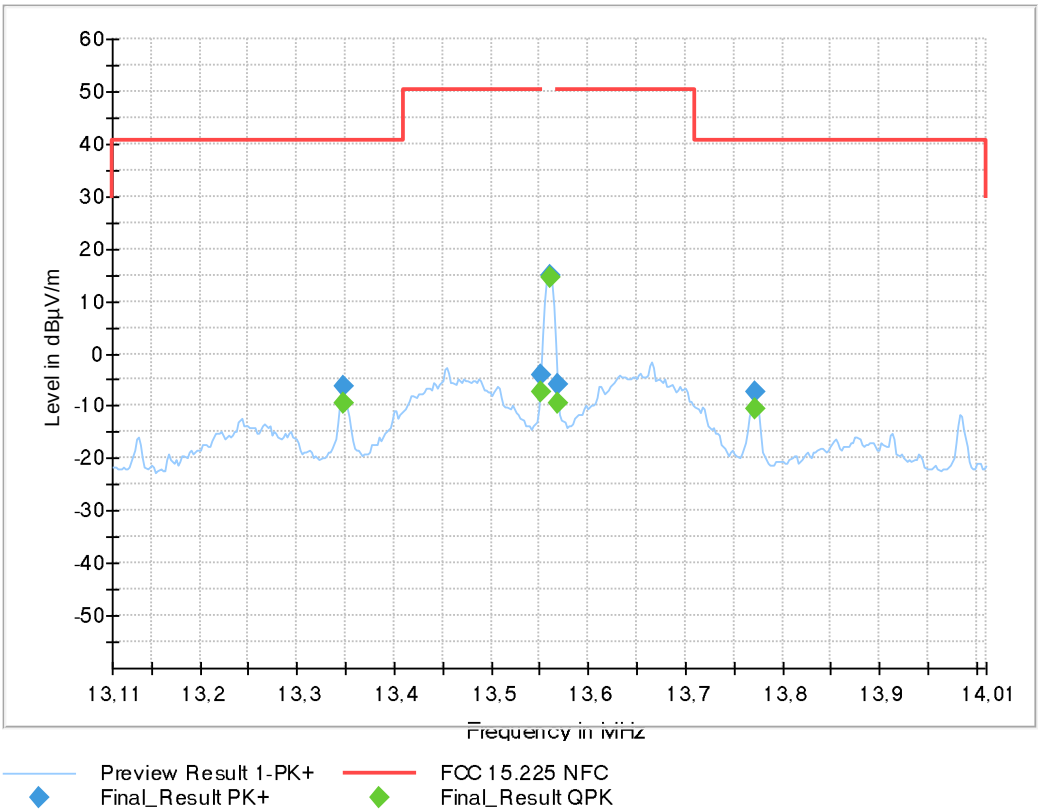
Verdict

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

FCC 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 15693

Results

Freq (MHz)	Freq Rng (MHz)	Freq (MHz)	QuasiPeak (dBµV/m)	Pol
13.56	[0.009, 30]	0.728250	8.52	Front
13.56	[30, 200]	39.809000	23.98	V
13.56	[30, 200]	59.971000	12.20	V
13.56	[30, 200]	30.705500	23.58	V
13.56	[30, 200]	67.791000	27.27	V
13.56	[30, 200]	41.543000	24.94	V
13.56	[30, 200]	40.667500	30.68	V

Verdict

Pass

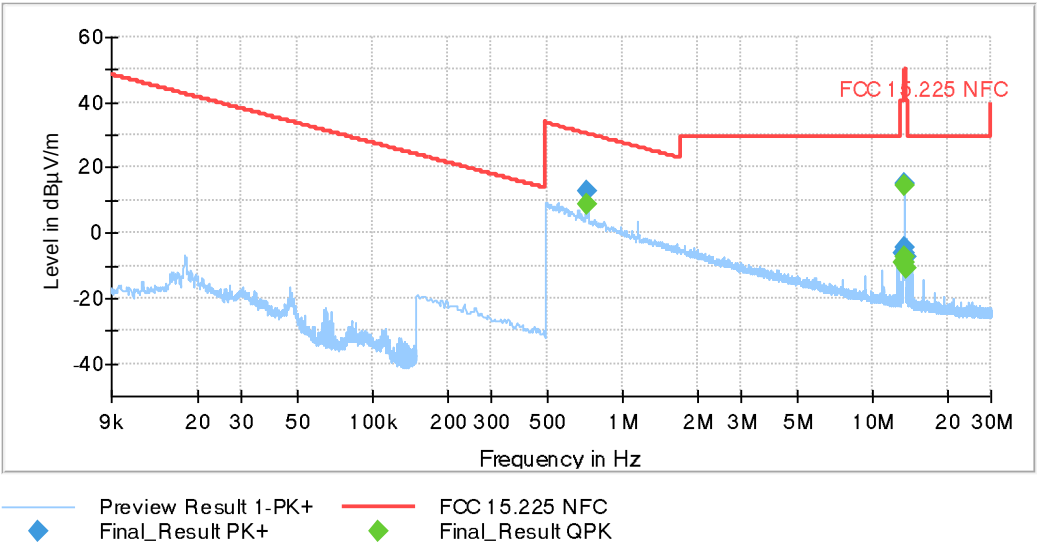
Attachments

Spectrum analyzer parameters:

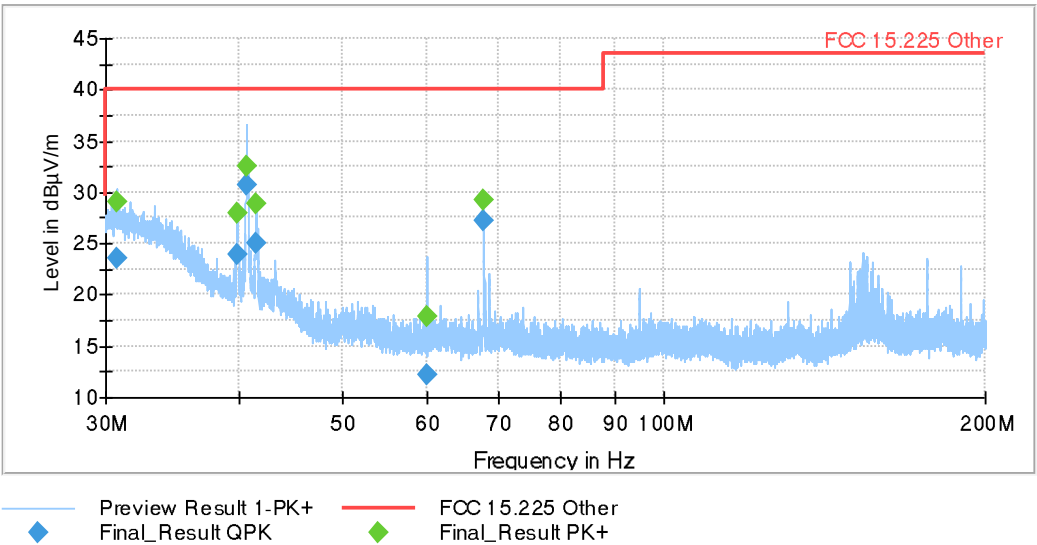
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	50 Hz	PK+	200 Hz	0.1 s	0 dB
150 kHz - 30 MHz	2.25 kHz	PK+	9 kHz	0.1 s	0 dB
30 MHz - 200 MHz	8.5 kHz	PK+	100 kHz	1 s	30 dB

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.



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

Limits

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.

Modulation: ISO 15693

Results

Frequency Stability over Temperature Variations:

T (°C)	FreqError (%)
-20	0,0000014
-10	0,0000014
0	0,0000014
10	0,0000014
20	0,0000013
30	0,0000012
40	0,0000011
50	0,0000012

Frequency Stability over Voltage Variations:

Power supply (V)	FreqError (%)
5.1 VDC	0,0000013
6.9 VDC	0,0000014

Verdict

Pass