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ISED CABid: ES1909

Test report No:
NIE: 70542RRF.009

Test report

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

(*) Identification of item tested	Wireless hearing instrument
(*) Trademark	ReSound, Beltone, Interton, GN Hearing, Jabra
(*) Model and /or type reference	CAIR1R
Other identification of the product	HW version: See sample list SW version: See sample list FCC ID: X26CAIR1R IC: 6941C-CAIR1R
(*) Features	Audio amplification, proprietary 2.4 GHz wireless functionality(Proximity), Bluetooth 5.0, 10.667 MHz wireless magnetic induction functionality and WPT at 135.59 kHz
Applicant	GN HEARING A/S Lautrupbjerg 7 2750 Ballerup, Denmark
Test method requested, standard	USA FCC Part 15.209 (10–1–20 Edition): Radiated emission limits, general requirements. CANADA RSS-Gen Issue 5 (March 2019) Amendment 1. General Requirements for Compliance of Radio Apparatus. CANADA RSS-210 Issue 10 (December 2019). Licence-Exempt Radio Apparatus: Category I Equipment 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 2022.05.24 09:28:10 +02'00'
Date of issue	2022-05-24
Report template No	FDT08_24 (*) "Data provided by the client"

Index

Competences and guarantees 3
General conditions 3
Uncertainty 3
Data provided by the client 3
Usage of samples 4
Test sample description 5
Identification of the client 6
Testing period and place 6
Document history 6
Environmental conditions 6
Remarks and comments 6
Testing verdicts 8
Summary 8
Appendix A: Test results 9

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 the appropriate scope of accreditation that covers the performed test in this report.

DEKRA Testing and Certification S.A.U. is an ISED-recognized accredited testing laboratory, CABid: ES1909, 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.

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 CAIR1R is a wireless hearing aid.
3. Testing performed with the information provided in 0437250[B]_RADIO_TEST_PLAN_CAIR1R document.

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 result.

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	70542C_187	Wireless hearing instrument	CAIR1R	3112200156	2022-03-02	Element Under Test

Notes referenced to samples during the project:

Id	Type
S/01	Sample for conducted and radiated test. HW:PCBA,CAM.CUST,R,MFI,V1.B,C6 SW: Dooku2 v.9.58.1

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……. :	.....					
Rated power supply .....:	Voltage and Frequency		Reference poles			
			L1	L2	L3	N	PE
	[ ]	AC:	[ ]	[ ]	[ ]	[ ]	[ ]
	[X]	DC: Internal rechargeable battery					
Rated Power .....:	3.8 V					
Clock frequencies.....:	2.48 GHz, 10.667 MHz and 135.59 kHz					
Other parameters .....:	.....					
Software version .....:	See sample list					
Hardware version .....:	See sample list					
Dimensions in cm (W x H x D) ....:	.....					
Mounting position .....:	[ ]	Table top equipment				
	[ ]	Wall/Ceiling mounted equipment				
	[ ]	Floor standing equipment				
	[ ]	Hand-held equipment				
	[X]	Other: Placed in the ear				
Modules/parts.....:	Module/parts of test item		Type		Manufacturer	
	.....		.....		.....	
	.....		.....		.....	
Accessories (not part of the test item) .....:	Description		Type		Manufacturer	
	Computer		Certified according to IEC 60950-1, IEC 62368-1 or equivalent standard		.....	
	.....		.....		.....	
Documents as provided by the applicant.....:	Description		File name		Issue date	
	.....		.....		.....	

[3] Only for Medical Equipment

Identification of the client

GN HEARING A/S
Lautrupbjerg 7
2750 Ballerup, Denmark

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2022-03-15
Date (finish)	2022-03-31

Document history

Report number	Date	Description
70542RRF.009	2022-05-24	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 semi-anechoic 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 chamber for conducted measurements, 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: Pablo Redondo, Jose Manuel Jimenez and Nicolas Salguero.

Used instrumentation:

Conducted Measurements:

Equipment	Model	Manufacturer	Next Calibration
SHIELDED ROOM	S101	ETS LINDGREN	N/A
SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2023-02-26

Radiated Measurements:

Equipment	Model	Manufacturer	Next Calibration
SEMIANECHOIC ABSORBER LINED CHAMBER II	FACT 3 200 STP	ETS LINDGREN	N/A
SHIELDED ROOM	S101	ETS LINDGREN	N/A
ACTIVE LOOP ANTENNA 9 KHZ-30 MHz	11966A	HEWLETT PACKARD	2022-07-17
HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2023-04-30
PRE-AMPLIFIER G>40dB 10MHz-6GHz	BLNA 0160-01N	BONN ELEKTRONIK	2023-04-11
EMI TEST RECEIVER 9kHz-7GHz	ESR7	ROHDE AND SCHWARZ	2022-12-12

Testing verdicts

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

Summary

MI 10.66 MHz.

FCC PART 15.209 / RSS-Gen, RSS-210 PARAGRAPH Requirement – Test case	Verdict	Remark
Occupied bandwidth	P	
FCC 15.209 (a) / RSS-Gen 8.9.,RSS-210 7.2. : General field strength and Trasmitter emission limits.	P	
Supplementary information and remarks: None.		

Appendix A: Test results

INDEX

TEST CONDITIONS 11
Occupied Bandwidth 13
15.209 (a) / RSS-Gen 8.9., RSS-210 7.2. General field strength and Transmitter emission limits 14

TEST CONDITIONS

POWER SUPPLY (V):

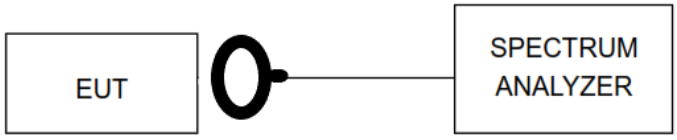
Vnominal:	3.8 Vdc
Type of Power Supply:	DC voltage from rechargeable battery
Type of Antenna:	Integral coil antenna

TEST FREQUENCIES:

Nominal Operating Frequency: 10.66 MHz

CONDUCTED MEASUREMENTS

The equipment under test EUT was set up in a shielded room and it is connected to the spectrum analyzer through a RF cable and a coupling device.



Coupling device

RADIATED MEASUREMENTS

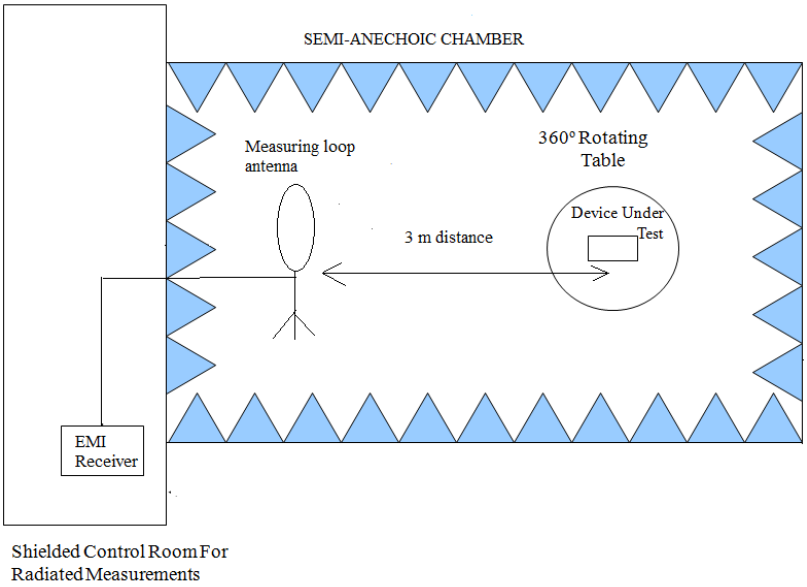
All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Loop antenna for the range between 9 kHz to 30 MHz) is situated at a distance of 3 m.

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.

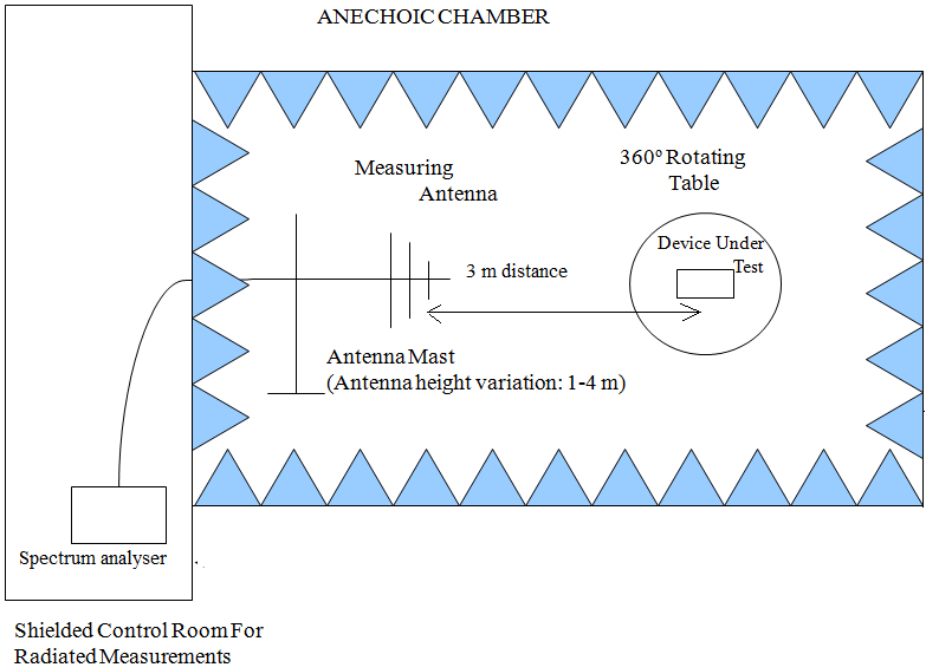
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission.

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. Measurements above 30 MHz up to 200 MHz were made in both horizontal and vertical planes of polarization.

Radiated measurements setup f < 30 MHz:



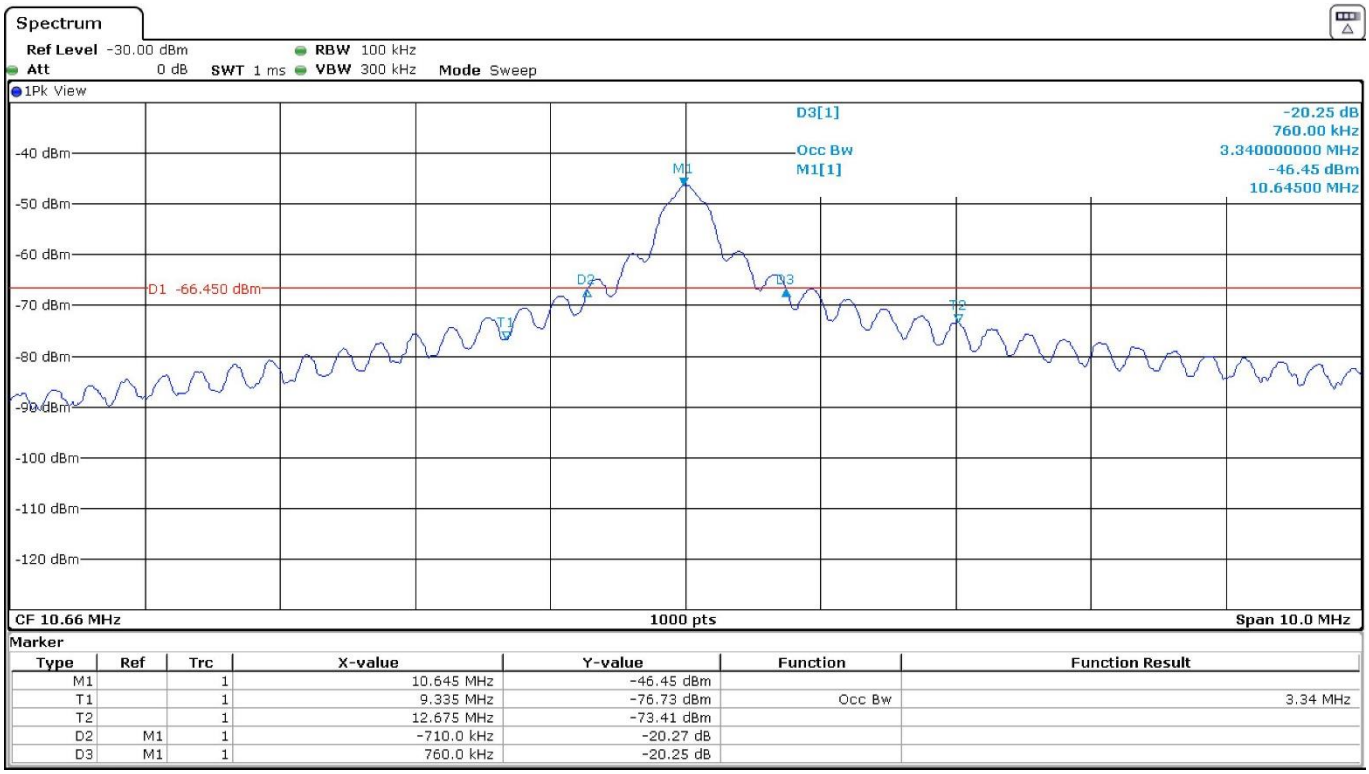
Radiated measurements setup f > 30 MHz:



Occupied Bandwidth

RESULTS:

99% Bandwidth (MHz)	3.34
Measurement uncertainty (kHz)	<±17.33



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	10.645 MHz	-46.45 dBm		
T1		1	9.335 MHz	-76.73 dBm	Occ Bw	3.34 MHz
T2		1	12.675 MHz	-73.41 dBm		
D2	M1	1	-710.0 kHz	-20.27 dB		
D3	M1	1	760.0 kHz	-20.25 dB		

15.209 (a) / RSS-Gen 8.9., RSS-210 7.2. General field strength and Transmitter emission limits

SPECIFICATION:

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Magnetic field strength (H-Field) (µA/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	6.37/ F(kHz)	300
0.490-1.705	24000/F(kHz)	-	63.7/ F(kHz)	30
1.705 - 30.0	30	29.54	0.08	30
30 - 88	100	40	-	3
88 - 216	150	43.5	-	3
216 - 960	200	46	-	3
Above 960	500	54	-	3

Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

RESULTS:

All tests were performed in a semi-anechoic chamber at a distance of 3 m, except for the measurement of the fundamental emission that was performed at a distance of 1 m due to its extremely low emission level. The maximum peak value of the fundamental emission was measured as the worst case.

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 analyser. This correction factor includes antenna factor and cable loss.

Fundamental emission:

Measured E(dBµV/m) at 1m (Peak value)	36.19
E(dBµV/m) extrapolated to 30 m (40 dB/decade)	-22.89
Equivalent level (dBµA/m) at 30 m	-74.39
Measurement uncertainty (dB)	<±3.04

Verdict: PASS

Frequency range 9 kHz - 30 MHz:

No spurious frequencies detected at less than 10 dB below the limit.

Measurement uncertainty (dB)	<±3.04

Verdict: PASS

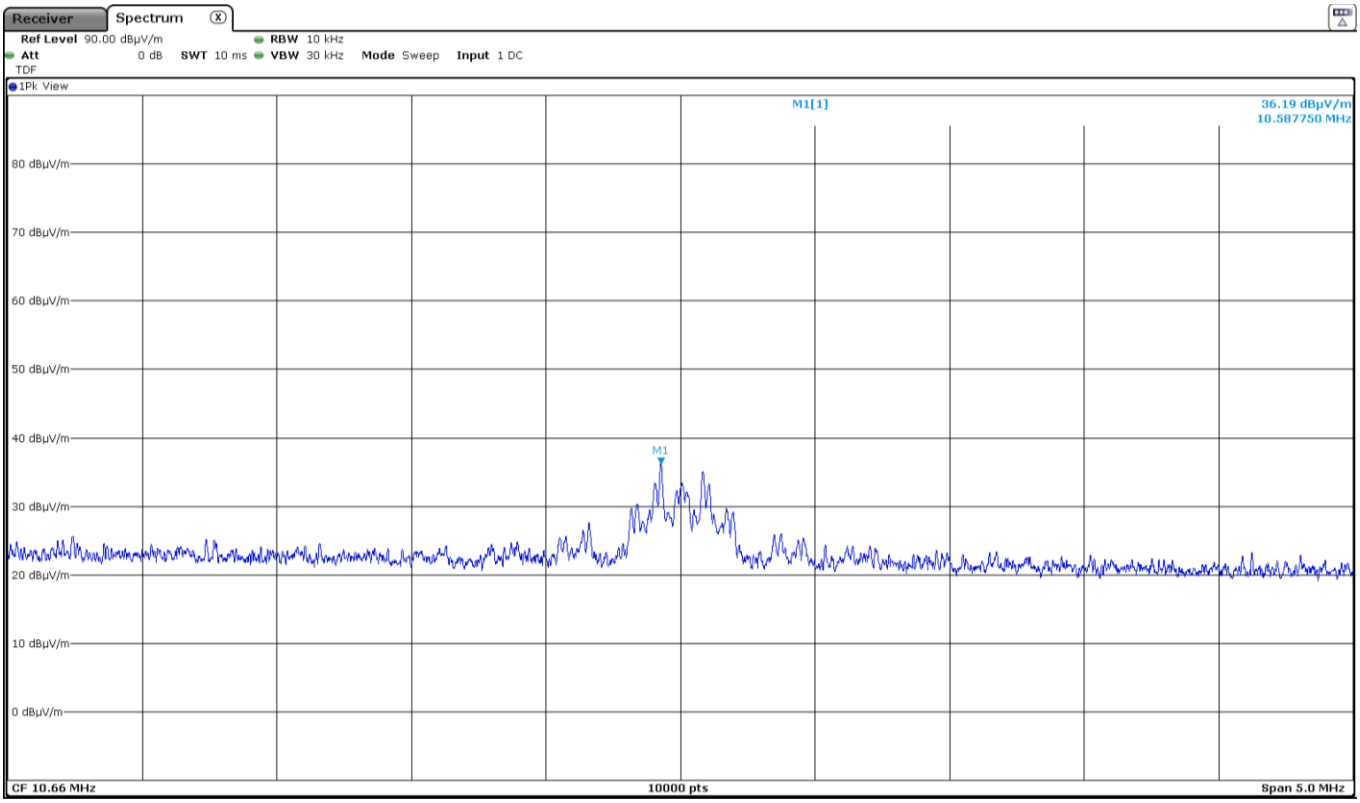
Frequency range 30 MHz - 200 MHz:

No spurious frequencies detected at less than 10 dB below the limit.

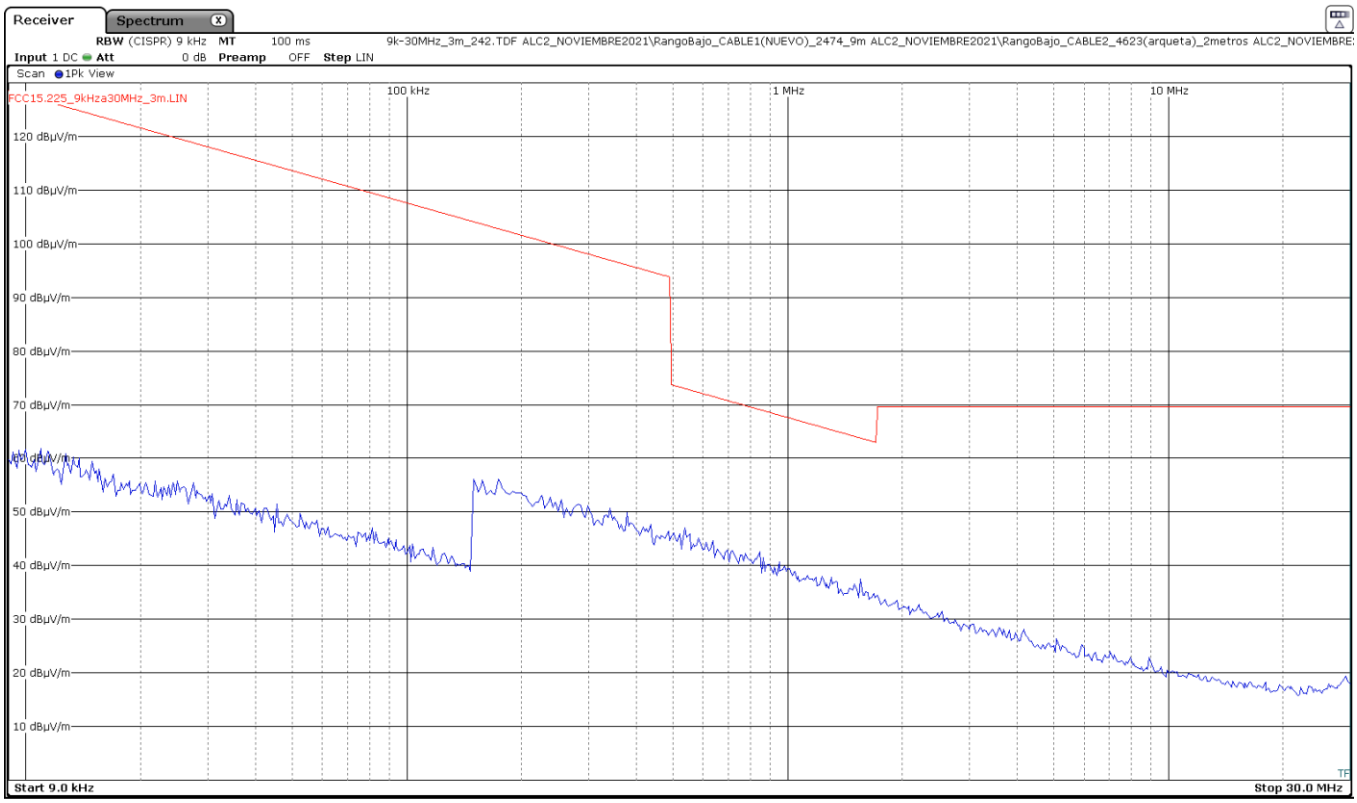
Measurement uncertainty (dB)	<±5.01

Verdict: PASS

FUNDAMENTAL EMISSION:



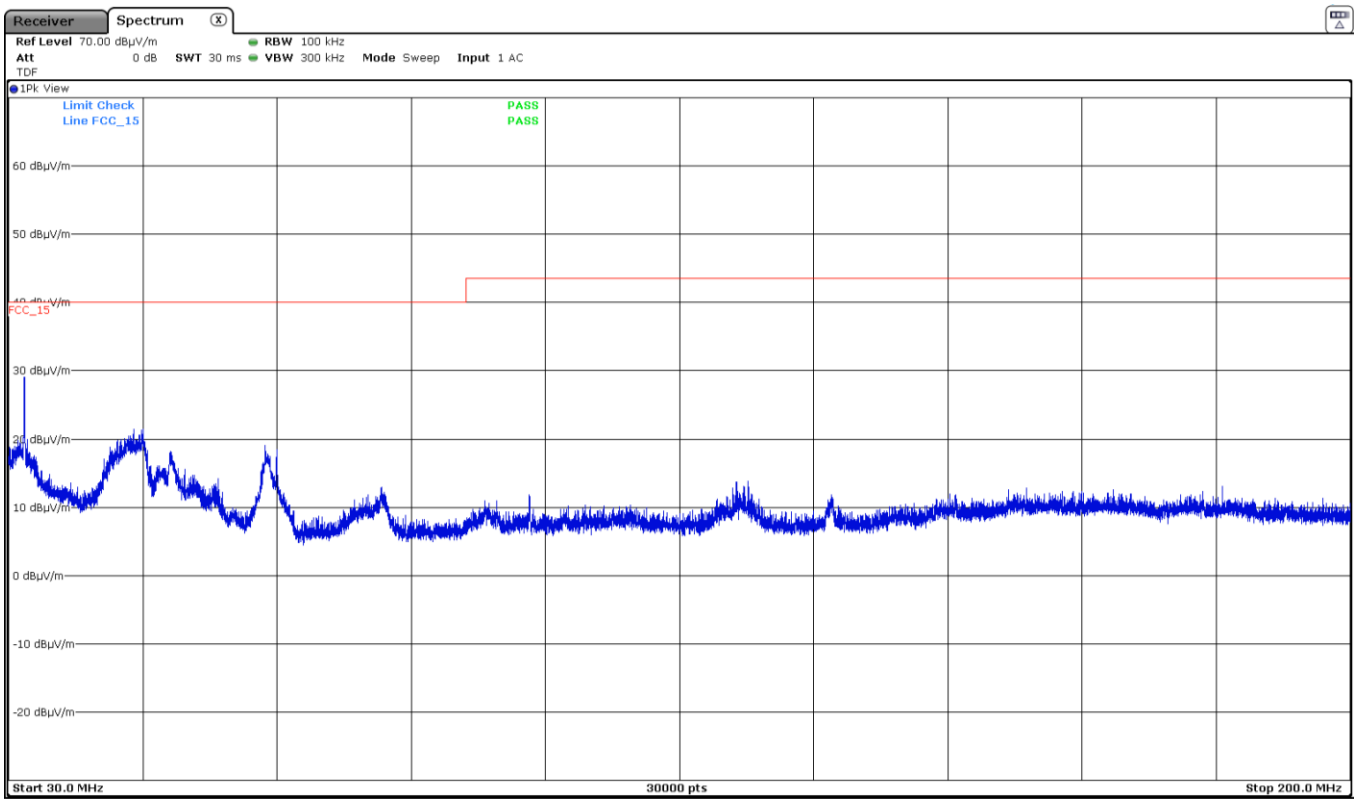
FREQUENCY RANGE 9 kHz - 30 MHz:



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

Note: The scan is performed with a peak detector.
The limits shown in the above plot are extrapolated to 3 meters.

FREQUENCY RANGE 30 - 200 MHz:



Note: The scan is performed with a peak detector.