

# Test Report

*Electromagnetic Compatibility (EMC)*

HELEM2204000190-1



## TESTS ACCORDING TO FCC PART 15 B AND ISED CANADA REQUIREMENTS

Equipment Under Test:	Acoustic camera
Model:	AC13
Trademark:	NL Camera
Customer:	Noiseless Acoustics Oy Sitratie 7 A FI-00420, Helsinki Finland
FCC Rule Part:	FCC CFR 47 Part 15 Subpart B, Class A
IC Rule Part:	ICES-003 Issue 7, Class A

Date: 13 May 2022

Issued by:

A blue ink signature of Pekka Kälviäinen.

Pekka Kälviäinen  
Testing Engineer

Date: 13 May 2022

Checked by:

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Rauno Repo  
Senior EMC Specialist

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## GENERAL REMARKS

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*Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.*

**RELEASE HISTORY**

Version	Changes	Issued
1.0	Initial release	13 May 2022

## PRODUCT DESCRIPTION

### Equipment Under Test (EUT)

EUT information	
General Product Description	Acoustic camera
Trademark	NL Camera
Model	AC13
Type	-
Serial number	AC130655
Power input port type	DC (battery)
Rated voltage	12 V
Rated current	1 A
Rated frequency	-
Rated power	-
EUT Highest operation freq.	5 GHz WLAN
Hardware Version (if any)	-
Software Version (if any)	-
Mechanical size of the EUT	Height: 28 cm    Width: 18 cm    Length: 12 cm    Weight: 1 kg
Parallel models	LF10

The EUT was tested as a tabletop unit.

### General description

The equipment under test is a battery powered handheld acoustic camera. It measures the direction of a sound source and converts it to visual form for the display. The equipment includes 2.4 and 5 GHz WLAN radios.

### Samples and modifications

No.	Name	Description
1	Sample 1	Test sample supplied by the customer

### Ports and cables

none

### Peripherals

none

## TEST CONDITION

### EUT Test Conditions During EMC-Testing

Configuration of the EUT was made to correspond to the actual assembling conditions as far as possible. The EUT was powered on and the sound source measurement was enabled. During testing the EUT was powered by the internal battery. Radios were set to stand-by mode during the tests.

The test conditions and the performance criteria were proposed (supplied) by the customer.

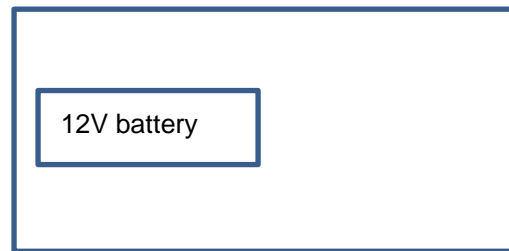


Figure 1: Test setup block diagram

### Operation modes

During the tests the EUT was in the following operation modes:

Mode	Description
1	Power on, sound source measurement enabled

### Emission Measurement Uncertainty

The uncertainties comply with CISPR 16-4-2 ed.2 requirements ( $U_{lab} < U_{CISPR}$ ).

## Summary of Testing

### SUMMARY OF TESTING

Test Specification	Description of Test	Result
FCC CFR 47 15/B §15.107, ICES-003 3.2.1	Conducted emissions, Class A/B	Not Applicable
FCC CFR 47 15/B §15.109, ICES 003 3.2.2	Radiated Emissions, Class A	PASS

Decision rule used for the emission tests are defined in standard CISPR 16-4-2 / EN 55016-4-2 clause 4.2

### Test Facility

Testing Laboratory / address: FCC designation number: <b>FI0002</b> ISED CAB identifier: <b>T004</b>	SGS Fimko Ltd Takomotie 8 FI-00380, HELSINKI FINLAND
Test Site:	<input type="checkbox"/> K10LAB, ISED Canada registration number: <b>8708A-1</b> <input checked="" type="checkbox"/> K5LAB, ISED Canada registration number: <b>8708A-2</b> <input type="checkbox"/> T10LAB

**Radiated Emissions In The Frequency Range 30 MHz - 1000 MHz.****EMISSION TESTS****Radiated Emissions In The Frequency Range 30 MHz - 1000 MHz.**

<b>Standard:</b>	ANSI C63.4 (2014)	
<b>Tested by:</b>	PKA	
<b>Date:</b>	13 May 2022	
<b>Humidity:</b>	30 – 60 %	
<b>Temperature:</b>	22 ± 3 °C	
<b>Barometric pressure:</b>	860 – 1 060 mbar	
<b>Measurement uncertainty:</b>	± 4.9 dB (30 – 200 MHz)	Level of confidence 95 % (k = 2).
	± 4.1 dB (200 – 1 000 MHz)	

**FCC Rule: 15.109(a)**  
**ICES-003: 3.2.2**

**Test plan**

The radiated emission measurements were done within a semi anechoic screened chamber. The EUT was placed on a table 0.8 m above the reflecting ground plane. The measurement distance was 3 meters. The worst interferences were determined during measurements by rotating the turntable and adjusting the antenna height. The measurements were done in horizontal and vertical antenna polarizations. The supply voltage to the turntable was fed through the filter.

The EUT was working as described in the section “EUT Test Conditions During EMC-Testing”.

Field strength results at the distance of 3 m were converted (by -10.46 dB) so that they can be directly compared with Class A 10 m limits.

**Radiated measurement settings****Preliminary testing:**

Turntable movement:	30 ° step
Turntable position:	0 ° to 330°
Antenna movement:	1.5 m step
Antenna height:	1.0 m to 4.0 m
Antenna polarization:	Vertical and horizontal

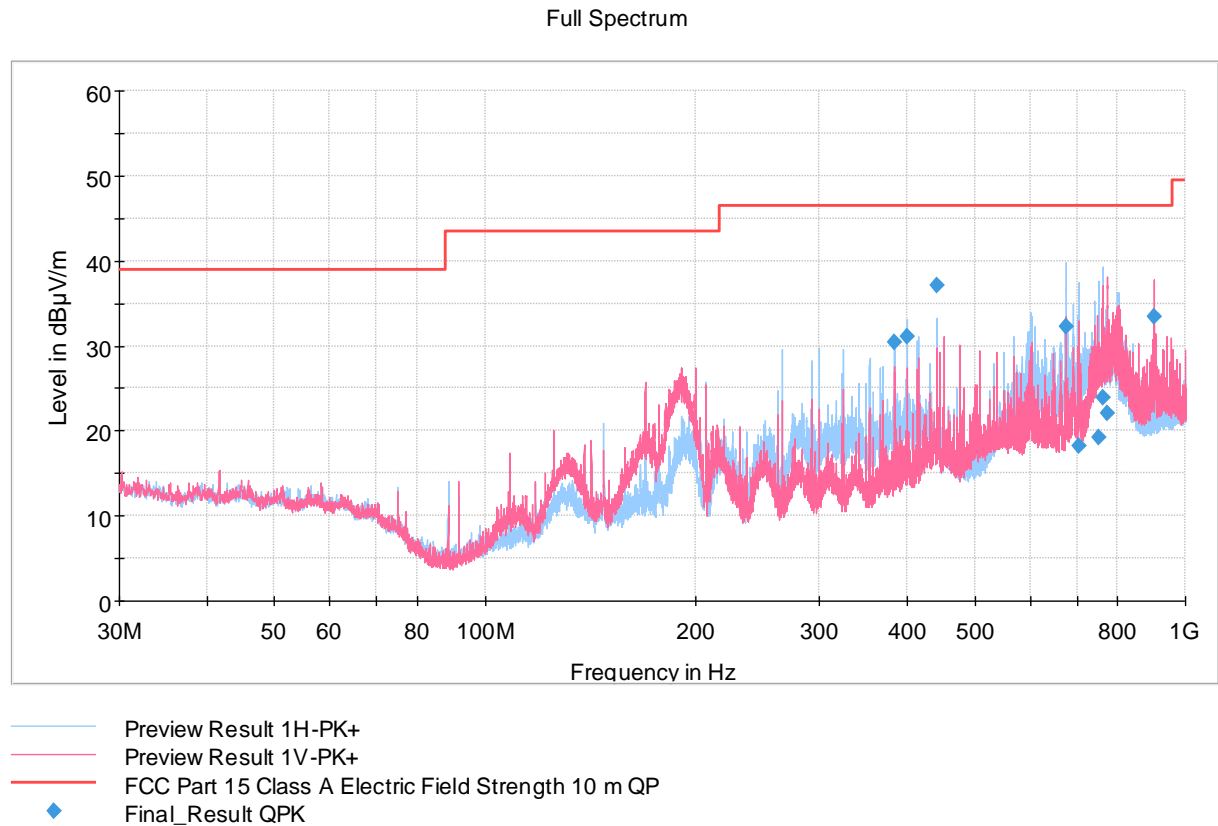
**Final testing:**

Turntable movement:	Continuous
Turntable position:	± 15 °
Antenna movement:	Continuous
Antenna height:	± 0.75 m
Antenna polarization:	Vertical and horizontal



## Radiated Emissions In The Frequency Range 30 MHz - 1000 MHz.

### Measured Quasi-Peak Values In The Frequency Range 30 MHz - 1000 MHz.



**Figure 2:** Measured results

### Final measurements from the worst frequencies

**Table 1:** Final quasi-peak results

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
384.620000	30.40	46.40	16.00	1000.0	120.000	229.0	H	28.0	11.2
400.000000	31.08	46.40	15.32	1000.0	120.000	214.0	H	199.0	11.4
442.500000	37.08	46.40	9.32	1000.0	120.000	187.0	H	196.0	13.0
676.820000	32.32	46.40	14.08	1000.0	120.000	100.0	H	255.0	17.4
704.800000	18.24	46.40	28.16	1000.0	120.000	108.0	H	335.0	17.8
752.140000	19.26	46.40	27.14	1000.0	120.000	108.0	H	173.0	18.8
761.490000	23.88	46.40	22.52	1000.0	120.000	100.0	H	251.0	19.0
774.590000	22.03	46.40	24.37	1000.0	120.000	172.0	V	356.0	19.2
902.400000	33.47	46.40	12.93	1000.0	120.000	108.0	V	24.0	20.9

Correction factor (dB) in the final result tables contains the sum of the transducers (antenna + cables).

QuasiPeak values are measured values corrected with the correction factor.

**TEST EQUIPMENT**

Equipment	Manufacturer	Type	Inv or serial	Prev Calib	Next Calib
TEMPERATURE/ HUMIDITY SENSOR	EDS	OW-ENV-TH, K5 SAC	inv:10517	2021-10-22	2022-10-22
TURNTABLE	MATURO	DS430 UPGRADED	inv:10182	NCR	NCR
MAST & TURNTABLE CONTROLLER	MATURO	NCD	inv:10183	NCR	NCR
ANTENNA MAST	MATURO	TAM 4.0E	inv:10181	NCR	NCR
ATTENUATOR	PASTERNAK	PE 7004-4 (4dB)	inv:10126	2021-03-30	2023-03-30
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	NCR	NCR
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv:10679	2021-06-21	2022-06-21
ANTENNA	SCHWARZBECK	VULB 9168	inv:8911	2020-11-04	2022-11-04

NCR = No calibration required

**END OF REPORT**