

Test Report

Electromagnetic Compatibility (EMC)

HELEM2306000271-1



TESTS ACCORDING TO FCC PART 15 B REQUIREMENTS

Equipment Under Test: Droplet Generator and Sorter
Trademark: Samplix
Model: Xdrop Sort
Customer / Manufacturer: Samplix ApS
Bregnerødvej 96
3460 Birkerød
Denmark
FCC Rule Part: FCC CFR 47 Part 15 Subpart B, Class A

Date: 6 November 2023

Issued by: The signature is handwritten in blue ink and appears to read "Henri Mäki".

Henri Mäki
Testing Engineer

Date: 6 November 2023

Checked by: The signature is handwritten in blue ink and appears to read "Rauno Repo".

Rauno Repo
Senior EMC Specialist

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GENERAL REMARKS**Disclaimer**

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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	18 October 2023
1.1	Test standards corrected	6 November 2023

PRODUCT DESCRIPTION**Equipment Under Test (EUT)**

EUT information	
General Product Description	Droplet Generator and Sorter
Trademark	Samplix
Model	Xdrop Sort
Type	-
Serial number	SAMXS210004
Power input port type	AC, three-wire (L/N/PE)
Rated voltage	110 – 240 V
Rated current	1.3 A
Rated frequency	50 – 60 Hz
Rated power	-
EUT Highest operation freq.	1 GHz (System on Module processor)
Hardware Version (if any)	-
Software Version (if any)	-
Mechanical size of the EUT	364 x 305 x 654 mm, 23.5 kg
Parallel models	-
Radio module or chip	-

The EUT was tested as a table-top unit.

General description

The equipment under test is a droplet generator and sorter intended to be used by trained laboratory technicians in a clean laboratory environment for DNA sample preparation and sampling from mixed DNA samples using droplet microfluidics technology. The equipment is operated from a touch screen, and droplet generation and sorting are fully automated.

Samples and modifications

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

Ports and cables

Cable / Port	Description
AC mains input	Power supply to the EUT, cable length 3 m
USB-A	Maintenance port, not used during testing

Peripherals

Peripheral	Description / Usage
-	-

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 a test mode was enabled, which simulates the sorting operation of the instrument. Sorting simulation mimics how the valves operate during normal sorting operation. During droplet operation valves are just kept activated for the majority of time. Display was showing test mode screen. The lasers were also enabled, which in real operation are used when the instrument sorts the samples. The input voltage during testing was 120 V, 60 Hz.

The test conditions were proposed by the customer.

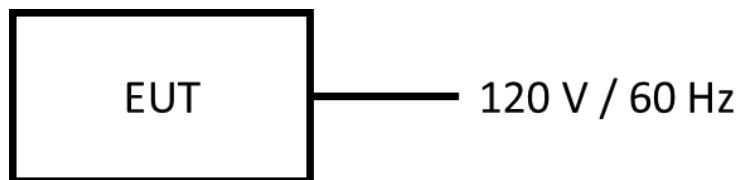


Figure 1: Test setup block diagram

Operation modes

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

Mode	Description
1	Power on, test mode loop enabled (simulation of sorting operation), lasers enabled.

Emission Measurement Uncertainty

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

SUMMARY OF TESTING

Test Specification	Description of Test	Result
FCC Part 15 Subpart B §15.107	Conducted Emissions, Class A	PASS
FCC Part 15 Subpart B §15.109	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: FI0002	SGS Fimko Ltd Takomotie 8 FI-00380, HELSINKI FINLAND
Test Site:	<input type="checkbox"/> K10LAB <input checked="" type="checkbox"/> K5LAB <input type="checkbox"/> T10LAB

EMISSION TESTS**Conducted Emissions**

Standard: ANSI C63.4-2014
Tested by: HEM
Date: 28 August 2023
Temperature: 23 °C
Humidity: 53 %RH
Barometric pressure: 1008 hPa
Measurement uncertainty: ± 2.9 dB, level of confidence 95 % (k = 2)

FCC Rule: §15.107(a)

Test Plan

Conducted disturbance voltage was measured with an artificial main network from 150 kHz to 30 MHz with a resolution bandwidth of 9 kHz. Measurements were carried out with peak and average detectors from the phase and neutral lines of the power supply cable.

The EUT was working as described in the section “EUT Test Conditions”.

Class A limits:

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15 – 0.5	79	66
0.5 – 30	73	60

Test results

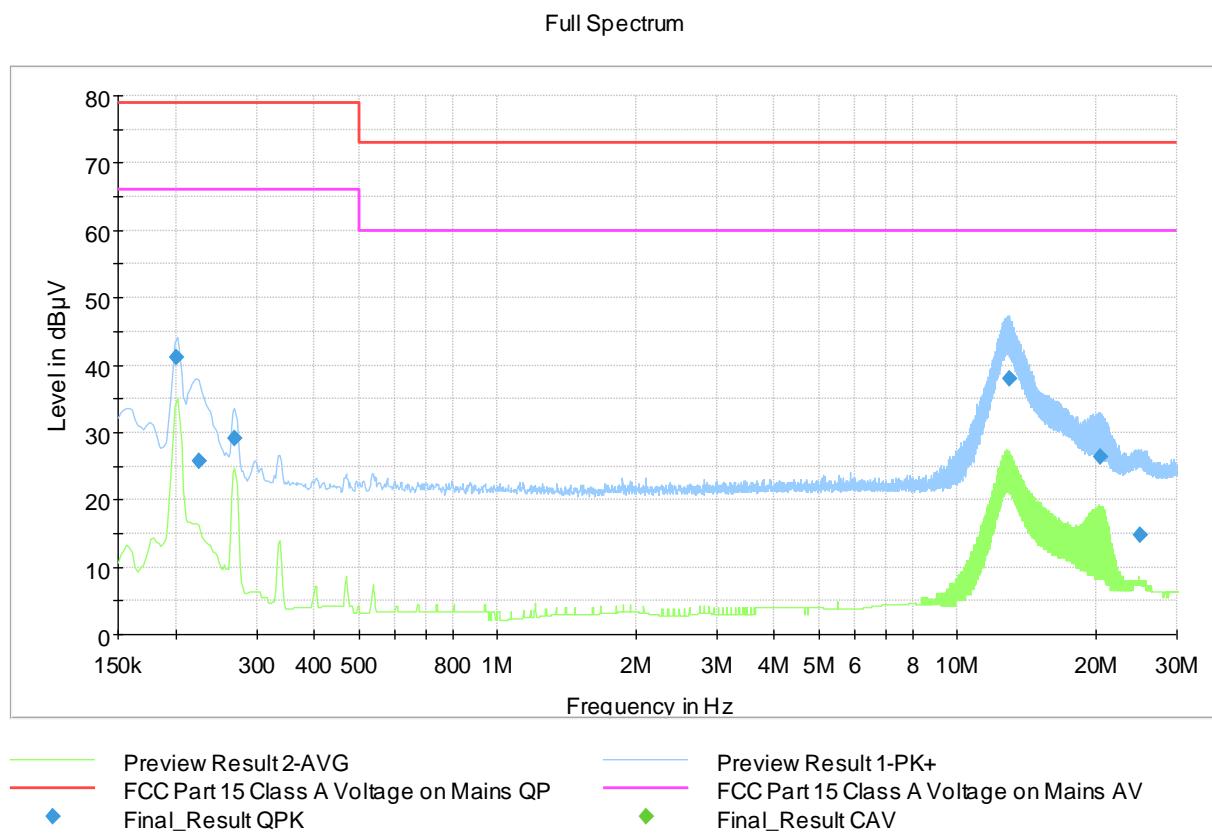


Figure 2: Conducted emissions

Table 1: Test results for conducted emissions

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Limit (dB μ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.200750	41.13	---	79.00	37.87	15 x 1000.0	9.000	N	9.7
0.224250	25.85	---	79.00	53.15	15 x 1000.0	9.000	N	9.7
0.269250	29.14	---	79.00	49.86	15 x 1000.0	9.000	N	9.7
12.961250	37.93	---	73.00	35.07	15 x 1000.0	9.000	L1	10.3
20.468250	26.36	---	73.00	46.64	15 x 1000.0	9.000	N	10.6
24.873000	14.87	---	73.00	58.13	15 x 1000.0	9.000	L1	10.6

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

Measured QuasiPeak and CAverage values include the correction factor.

Radiated Emissions

Standard:	ANSI C63.4-2014
Tested by:	HEM
Date:	28 August 2023
Temperature:	23 °C
Humidity:	53 %RH
Barometric pressure:	1008 hPa
Measurement uncertainty:	$\pm 4.9 \text{ dB}$ (30 – 200 MHz) level of confidence 95 % (k = 2) $\pm 4.1 \text{ dB}$ (200 – 1 000 MHz) $\pm 4.3 \text{ dB}$ (1 – 18 GHz)

FCC Rule: §15.109(a)

Test plan

The radiated emission measurements were done within a semi anechoic screened chamber. Additional floor absorbers were used on the floor between the EUT and receiving antenna in radiated emission test above 1 GHz. The EUT was placed on a table 0.8 m above the reflecting ground plane. The measurement distance was 3 meters and the results were extrapolated to 10-meter distance using a factor of 20 dB per decade of distance. 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”.

Radiated measurement settings

	30 – 1000 MHz	1 – 5 GHz
Preliminary testing:		
Turntable movement:	30 ° step	15 ° step
Turntable position:	15 ° to 345 °	0 ° to 345 °
Antenna movement:	1.5 m step	1.5 m step
Antenna height:	1.0 m to 4.0 m	1.0 m to 4.0 m
Antenna polarization:	Vertical and horizontal	Vertical and horizontal
Final testing:		
Turntable movement:	Continuous	Continuous
Turntable position:	± 30 °	± 15 °
Antenna movement:	Continuous	Continuous
Antenna height:	± 1.5 m	± 1.5 m
Antenna polarization:	Vertical and horizontal	Vertical and horizontal

Test results 30 – 1000 MHz

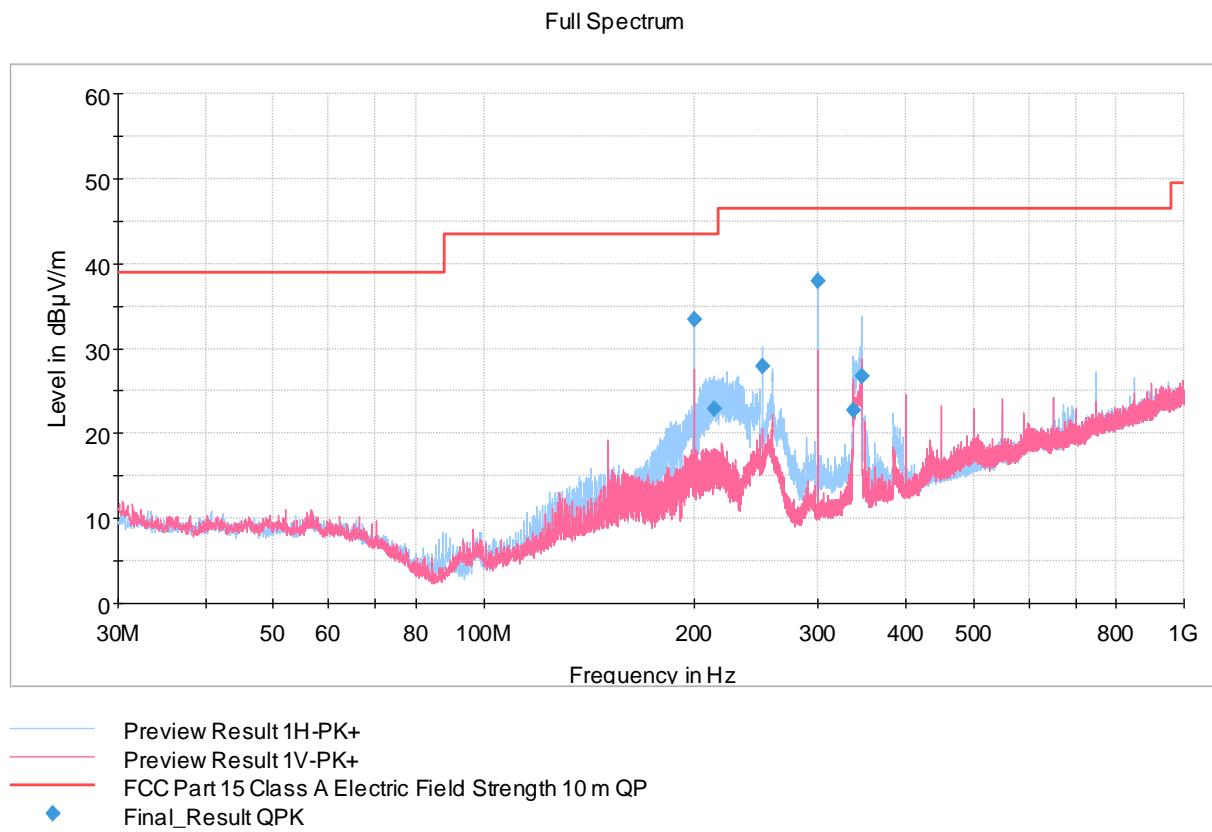


Figure 3: Radiated emissions 30 – 1000 MHz

Table 2: Test results for radiated emissions (30 – 1000 MHz)

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
200.010000	33.41	43.50	10.09	15 x 1000.0	120.000	122.0	H	99.0	4.9
213.600000	22.95	43.50	20.55	15 x 1000.0	120.000	108.0	H	241.0	5.0
250.020000	27.95	46.44	18.49	15 x 1000.0	120.000	115.0	H	318.0	7.1
300.030000	37.97	46.44	8.47	15 x 1000.0	120.000	108.0	H	165.0	8.9
336.740000	22.67	46.44	23.77	15 x 1000.0	120.000	100.0	H	113.0	10.0
346.560000	26.74	46.44	19.70	15 x 1000.0	120.000	100.0	H	118.0	10.1

Correction factor (dB) in the final result table contains the sum of the transducers (antenna + cables). Measured QuasiPeak values include the correction factor.

Test results 1 – 5 GHz

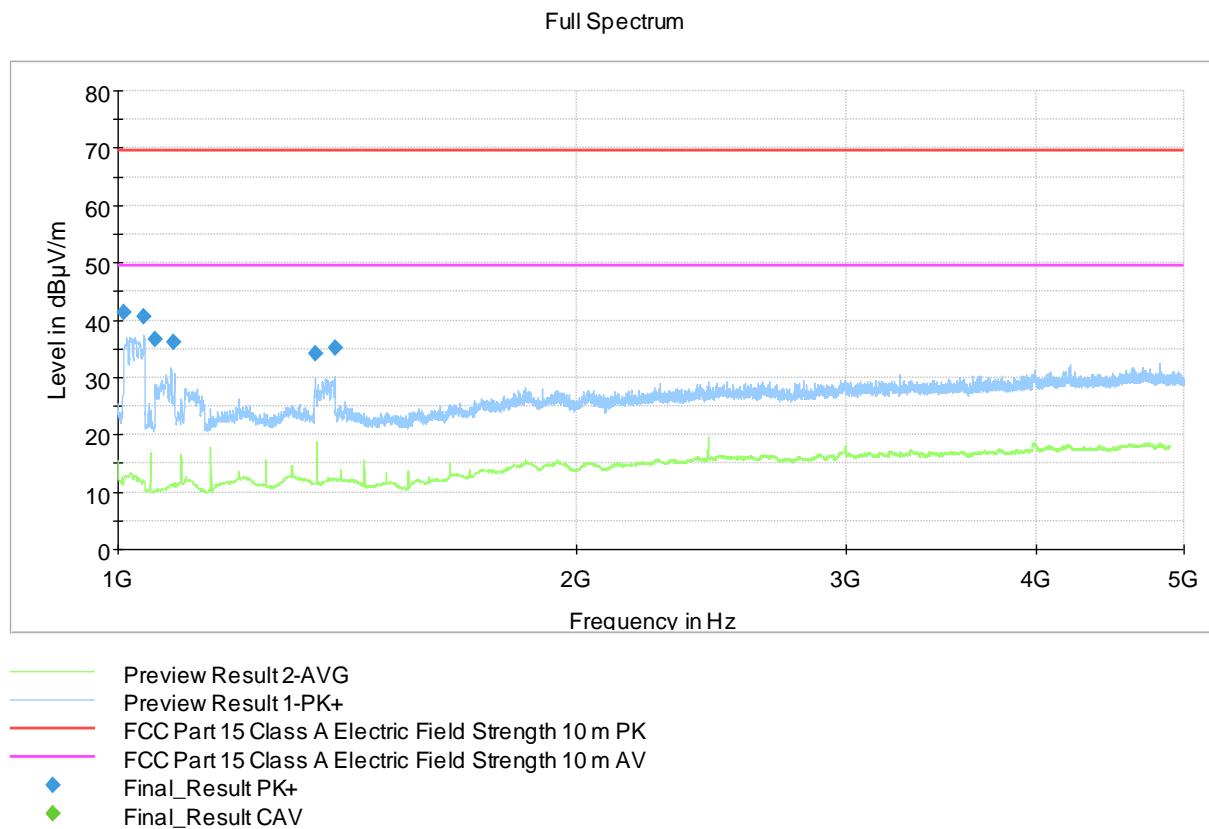


Figure 4: Radiated emissions 1 – 5 GHz

Table 3: Test results for radiated emissions (1 – 5 GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1009.400000	41.47	---	69.50	28.03	15 x 1000.0	1000.000	227.0	V	317.0	-11.6
1040.050000	40.50	---	69.50	29.00	15 x 1000.0	1000.000	186.0	H	146.0	-12.3
1057.500000	36.70	---	69.50	32.80	15 x 1000.0	1000.000	111.0	V	261.0	-12.5
1088.300000	36.15	---	69.50	33.35	15 x 1000.0	1000.000	285.0	V	327.0	-12.7
1345.850000	34.29	---	69.50	35.21	15 x 1000.0	1000.000	187.0	V	327.0	-10.2
1386.950000	35.22	---	69.50	34.28	15 x 1000.0	1000.000	209.0	H	200.0	-10.5

Correction factor (dB) in the final result table contains the sum of the transducers (antenna + amplifier + cables). Measured MaxPeak and CAverage values include the correction factor.

TEST EQUIPMENT**Conducted Emissions**

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv. 10670	2023-06-19	2024-06-19
LISN	ROHDE & SCHWARZ	ENV216	inv. 9611	2023-02-01	2024-02-01
POWER SUPPLY	CALIFORNIA INSTR.	5001 iX Series II	inv. 7826	NCR	NCR
TEMPERATURE/ HUMIDITY SENSOR	EDS	OW-ENV-TH, K5 SAC	inv. 10517	2022-10-27	2023-10-27
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-	-

Radiated Emissions

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
ANTENNA	EMCO	3117, emi 1-18GHz	inv. 7293	2022-06-16	2024-06-16
ANTENNA	SCHWARZBECK	VULB 9168	inv. 8911	2022-11-29	2024-11-29
ANTENNA MAST	MATURO	TAM 4.0E	inv. 10181	NCR	NCR
ATTENUATOR	PASTERNACK	PE 7004-4 (4dB)	inv. 10126	2023-03-13	2024-03-13
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv. 10670	2023-06-19	2024-06-19
MAST & TURNTABLE CONTROLLER	MATURO	NCD	inv. 10183	NCR	NCR
POWER SUPPLY	CALIFORNIA INSTR.	5001 iX Series II	inv. 7826	NCR	NCR
RF PREAMPLIFIER	CIAO	CA118-3123	inv. 10278	2022-09-21	2023-09-21
TEMPERATURE/ HUMIDITY SENSOR	EDS	OW-ENV-TH, K5 SAC	inv. 10517	2022-10-27	2023-10-27
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-	-
TURNTABLE	MATURO	DS430 UPGRADED	inv. 10182	NCR	NCR

NCR = No Calibration Required

END OF REPORT