Electromagnetic compatibility and Radio Spectrum Matters ERM

TEST REPORT

HELEM2301000021-1 v1.2

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Member of SGS Group (Société Générale de Surveillance)

Test Report

Electromagnetic compatibility and Radio spectrum Matters (ERM)

FINAS Finnish Accreditation Service T004 (EN ISO/IEC 17025)

Equipment Under Test:	Electronic Pipette
Model:	Picus® 2
Trademark:	Sartorius
Manufacturer/Customer:	Sartorius Liquid Handling oy Tulppatie 1 FI-00880 Helsinki Finland

Tests have been performed according to the following standard(s)

Title of the standard	Reference standard	Version
Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz band; Harmonised Standard for access to radio spectrum	EN 300 328	V2.2.2

- *partial testing, see test suite for details*

Date:	2 July 2026	Date:	2 July 2026
Issued by:	Lauri Sippola Testing Engineer	Checked by:	Rauno Repo Senior EMC Specialist

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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.

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RELEASE HISTORY

Version	Changes	Issued
1.0	Initial release	27 February 2023
1.1	Manufacturer's company information was updated	31 October 2024
1.2	Picus® 2 Dispenser LH-747601 added to parallel models	2 July 2026

PRODUCT DESCRIPTION

Equipment Under Test

Type:	Electronic Pipette
Model:	Picus® 2
Trademark:	Sartorius
Serial no:	Sample 1: Prototype 1 Sample 2: Prototype 1 Sample 3: VER1 0023 Sample 4: VER1 0048
Software version:	xx
Hardware version:	B
Radio module or chip:	u-blox BMD-350

General Description

The equipment under test is a battery-powered portable electronic pipette. The pipette can be charged via USB port while using the device, or via proprietary charging pins in a charging stand when not in use.

The Picus® 2 model has multiple variants with different number of channels and volume range:

Variant	Model	Channels	Volume range [µl]
LH-747021	Picus® 2	1	0.2 – 10
LH-747041	Picus® 2	1	5 – 120
LH-747061	Picus® 2	1	10 – 300
LH-747081	Picus® 2	1	50 – 1 000
LH-747101	Picus® 2	1	100 – 5 000
LH-747111	Picus® 2	1	500 – 10 000
LH-747321	Picus® 2	8	0.2 – 10
LH-747341	Picus® 2	8	5 – 120
LH-747361	Picus® 2	8	10 – 300
LH-747391	Picus® 2	8	50 – 1 200
LH-747421	Picus® 2	12	0.2 – 10
LH-747441	Picus® 2	12	5 – 120
LH-747461	Picus® 2	12	10 – 300
LH-747491	Picus® 2	12	50 – 1 200
LH-747601	Picus® 2 Dispenser	-	-

Samples and Modifications

No.	Name	Description
1	Sample 1	Configured to transmit at the lowest channel
2	Sample 2	Configured to transmit at the highest channel
3	Sample 3	Configured to receive at the lowest channel
4	Sample 4	Configured to receive at the highest channel

Specifications

Type of Modulation:	☐ FHSS ☒ Other
Operating Frequency Range:	2402-2480 MHz
Conducted Power:	-
Channels:	40
Nominal Channel Bandwidth:	1 MHz
Channel Separation:	1 MHz
Adaptivity:	☐ Frame Based LBT mechanism ☐ Load Based LBT mechanism ☐ DAA mechanism ☒ Non-adaptive equipment
Antenna Type:	Ceramic chip
Antenna Gain:	1 dBi
Antenna Count:	1
Geo-location Capability:	☒ No ☐ Yes
Beam Forming Capability:	☒ No ☐ Yes
EUT Dimensions:	Height: 215 mm Width: 115 mm Length: 65 mm
Power Requirements:	Battery-powered (2.5-7.5 VDC), charged via USB port
Operating Temperature Range:	+15…+40 °C

Ports and Cables

Cable / Port	Description
USB	Charging the EUT (not used during testing)

Peripherals

Peripheral	Description / Usage
-	-

Photographs



Photograph 1: The EUT (Sample 1)



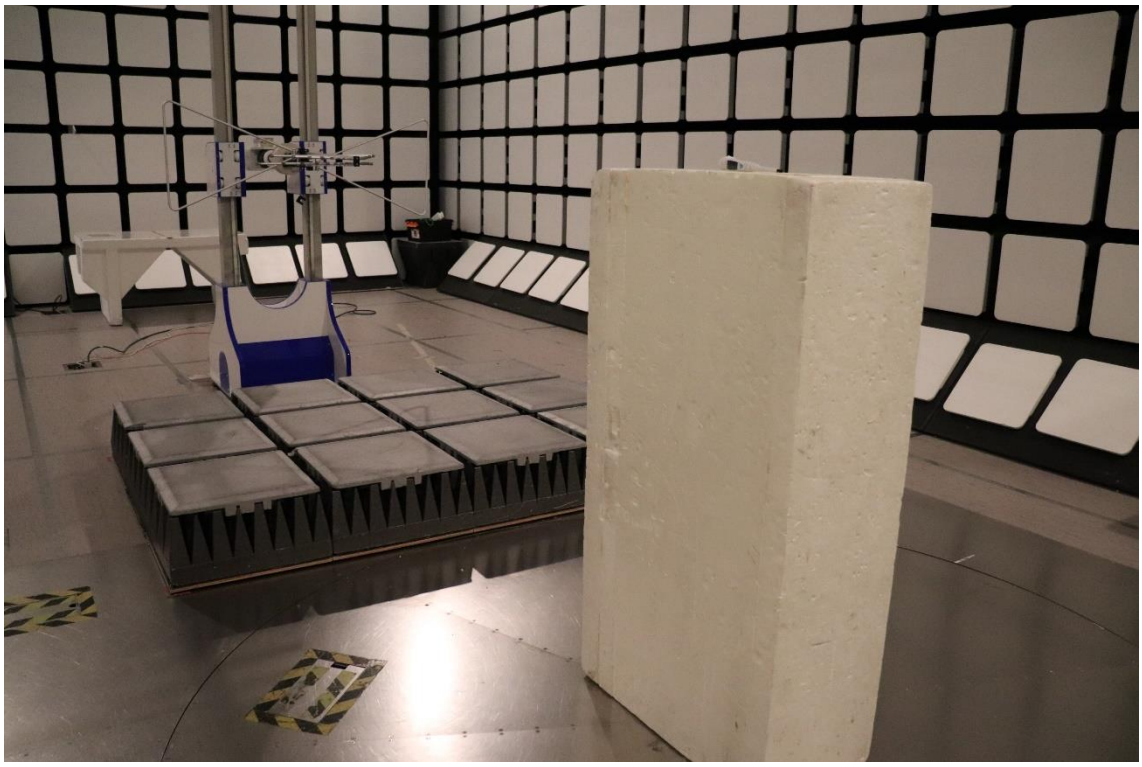
Photograph 2: The EUT (Sample 2)



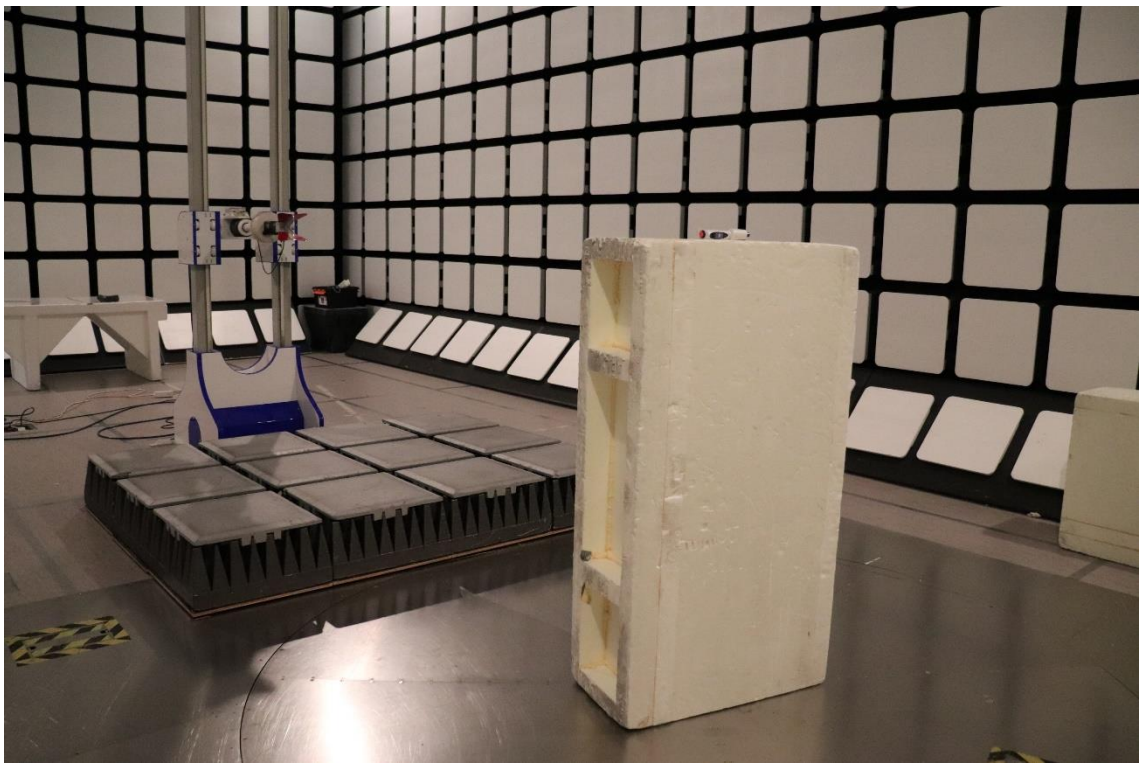
Photograph 3: The EUT (Sample 3)



Photograph 4: The EUT (Sample 4)



Photograph 5: Test setup for radiated tests (30-1000 MHz)



Photograph 6: Test setup for radiated tests (1-12.75 GHz)

SUMMARY OF TESTING

Test conditions

During radiated measurements, configuration of the EUT was made to correspond to the actual assembling conditions as far as possible. The EUT was set on 150 cm table in semi anechoic chamber with floor absorbers.

The EUT's radio was configured with software provided by the manufacturer. Normal modulation and maximum transmit power was used during the tests.

Table 1: Normal and extreme test conditions

Test conditions:		Temperature [ºC]:	Voltage [V]:
Normal		+20…+25	-
Extreme	Minimum	+15	
	Maximum	+40	

Extreme temperature and voltage ranges were provided by the customer.

Table 2: The test frequencies used in testing

Channel	Frequency [MHz]
Low	2402
Mid	2440
High	2480

Table 3: Settings for test cases

Test	Setting
RF Output Power	-
Power Spectral Density	-
Duty cycle, Tx-sequence, Tx-gap	-
Accumulated Transmit Time, Frequency Occupation and Hopping Sequence	-
Hopping Frequency Separation	-
Medium Utilization	-
Adaptivity	-
Occupied Channel Bandwidth	-
Transmitter unwanted spurious emissions in the out-of-band domain	-
Transmitter unwanted spurious emissions in the spurious domain	Continuous modulated transmission
Receiver spurious emissions	Continuous receive
Receiver blocking	-

Measurement Uncertainty

Parameter	Uncertainty	Limit
Occupied Channel Bandwidth	±0.0005 %	±5 %
RF output power, conducted	±0.349 dB	±1,5 dB
Power Spectral Density, conducted	±0.372 dB	±3 dB
Unwanted Emissions, conducted	±2.90 dB	±3 dB
All emissions, radiated	±5.29 dB	±6 dB
Temperature	±3 °C	±3 °C
Supply voltages	±3 %	±3 %
Time	±0.1 %	±5 %
Level of confidence 95.45 % (k = 2)		

Test suite

Measurement/Test	Test Specification	Result
RF Output Power	EN 300 328 V2.2.2 (2019-07)	**N/T**
Power Spectral Density	EN 300 328 V2.2.2 (2019-07)	**N/T**
Duty cycle, Tx-sequence, Tx-gap	EN 300 328 V2.2.2 (2019-07)	**N/A**(1
Accumulated Transmit Time, Frequency Occupation and Hopping Sequence	EN 300 328 V2.2.2 (2019-07)	**N/A**(2
Hopping Frequency Separation	EN 300 328 V2.2.2 (2019-07)	**N/A**(2
Medium Utilization	EN 300 328 V2.2.2 (2019-07)	**N/A**(3
Adaptivity	EN 300 328 V2.2.2 (2019-07)	**N/A**(4
Occupied Channel Bandwidth	EN 300 328 V2.2.2 (2019-07)	**N/T**
Transmitter unwanted emissions in the out-of-band domain	EN 300 328 V2.2.2 (2019-07)	**N/T**
Transmitter unwanted emissions in the spurious domain	EN 300 328 V2.2.2 (2019-07)	**PASS**
Receiver spurious emissions	EN 300 328 V2.2.2 (2019-07)	**PASS**
Receiver blocking	EN 300 328 V2.2.2 (2019-07)	**N/T**
Geo-location capability	EN 300 328 V2.2.2 (2019-07)	**N/A**(5

Possible test case verdicts:

Test case does not apply to the EUT:	N/A
EUT does meet the requirement:	P (Pass)
EUT does not meet the requirement:	F (Fail)
Test was not performed:	N/T

The decision rule applied for the tests results stated in this test report is according to the recommendation of Annex C of ETSI TR 100 028-2 V1.4.1.

1) This requirement applies only to non-adaptive equipment or to adaptive equipment operating in a non-adaptive mode. This requirement does not apply for equipment with a maximum declared RF Output power of less than 10 dBm E.I.R.P.
2) This requirement applies only to all types of FHSS equipment.
3) This requirement does not apply to adaptive equipment unless operating in a non-adaptive mode. Also this requirement does not apply for equipment with a maximum declared RF Output power of less than 10 dBm E.I.R.P.
4) This requirement applies only to adaptive equipment.
5) Applicable only for equipment with geo-location capability.

Testing location / address: SGS Fimko Ltd
Karakaarenkuja 4
FI-02610, ESPOO
FINLAND

TEST RESULTS

Transmitter unwanted emissions in the spurious domain

Standard:	EN 300 328 V2.2.2	
Tested by:	LAS	
Date:	13 February 2023	14 February 2023
Temperature:	23 °C	23 °C
Humidity:	38 %RH	35 %RH

Test result: **PASS**

Test plan

Measurements are performed according to ETSI EN 300 328 V2.2.2 clause 5.4.9.2

Transmitter unwanted emissions in the spurious domain are emissions outside the allocated band and outside the Out-of-band Domain when the equipment is in transmit mode.

The transmitter is operating at the maximum rated carrier power. First all frequencies where a spurious emission component is detected are recorded in both measuring antenna polarization. Then each spurious frequency level is measured. The highest level of the spurious component is searched by rotating transmitter 360º with both measuring antenna polarization.

The spurious emissions are measured under normal conditions. Test will be made in lowest and highest operation frequencies. Emissions are measured in the frequency range 30 - 12 750 MHz.

Test results

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Polarization	Channel
49.213000	-81.78	-54.00	27.78	H	Low
12485.875000	-59.40	-30.00	29.40	H	Low
12589.812500	-58.65	-30.00	28.65	H	High

Receiver spurious emissions

Standard:	EN 300 328 V2.2.2	
Tested by:	LAS	
Date:	13 February 2023	14 February 2023
Temperature:	23 °C	23 °C
Humidity:	38 %RH	35 %RH

Test result: **PASS**

Test plan

Measurements are performed according to ETSI EN 300 328 V2.2.2 clause 5.4.10.2

The receiver is connected to its integrated or dedicated antenna and oriented to its normal usage position and height on the turntable in the anechoic chamber. The measurements are made with the receiver on the receiving state. First all frequencies where a spurious emission component are detected are recorded in both measuring antenna polarization. Then each spurious frequency level is measured. The highest level of the spurious component is searched by rotating transmitter 360º with both measuring antenna polarization.

The receiver spurious emissions are measured under normal conditions. Test will be made in lowest and highest operation frequencies. Emissions are measured in the frequency range 30 - 12 750 MHz.

Test results

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Polarization	Channel
30.175000	-80.62	-57.00	23.62	V	Low
30.265500	-80.64	-57.00	23.64	H	High
269.403000	-90.65	-57.00	33.65	H	High
299.024500	-92.17	-57.00	35.17	H	Low
4957.493333	-65.50	-47.00	18.50	V	High
12578.445000	-59.59	-47.00	12.59	H	Low
12687.592500	-59.90	-47.00	12.90	V	High

TEST EQUIPMENT

Equipment	Manufacturer	Type	Inv or serial	Prev Calib	Next Calib
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	10 dB, DC-40 GHz	sn: A1	2021-04-20	2023-04-20
ATTENUATOR	PASTERNACK	PE 7004-4 (4dB)	inv:10126	2021-03-30	2023-03-30
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv:10679	2022-06-20	2023-06-20
FILTER	WAINWRIGHT	HP, WHKX4.0/18G-10SS	inv:10403	2023-01-09	2025-01-09
MAST & TURNTABLE CONTROLLER	MATURO	NCD	inv:10183	NCR	NCR
RF PREAMPLIFIER	CIAO	CA118-3123	inv:10278	2022-09-21	2023-09-21
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	NCR	NCR
TURNTABLE	MATURO	DS430 UPGRADED	inv:10182	NCR	NCR

NCR = No Calibration Required

END OF REPORT