

Test Report

Electromagnetic Compatibility (EMC)



TESTS ACCORDING TO FCC PART 15B REQUIREMENTS

Equipment Under Test:	Temperature Logger
Type / Model:	Logmore 2
Customer:	Logmore Oy Vasarakatu 22 FI-40320 Jyväskylä FINLAND
Manufacturer:	Logmore Oy Vasarakatu 22 FI-40320 Jyväskylä FINLAND
FCC Rule Part:	FCC CFR 47 Part 15 Subpart B (2018), Class B

Date: 31 July 2019

Issued by:

A blue ink signature of Rauno Repo.

Rauno Repo
Senior EMC/RF Specialist

Date: 31 July 2019

Checked by:

A blue ink signature of Mikko Halonen.

Mikko Halonen
Development Engineer

Table of Contents

GENERAL REMARKS.....	3
Disclaimer.....	3
RELEASE HISTORY	4
PRODUCT DESCRIPTION	5
Equipment Under Test (EUT).....	5
Description of the EUT	5
Type of the EUT	5
Power Requirements.....	5
Mechanical Dimensions	5
Cable Lengths and Types	5
Peripherals	5
TEST CONDITIONS.....	6
EUT Test Conditions during Testing	6
SUMMARY OF TESTING.....	7
TEST RESULTS.....	8
Radiated Emissions In The Frequency Range 30 MHz to 1000 MHz.....	8
TEST EQUIPMENT	10

GENERAL REMARKS**Disclaimer**

This document is issued by the Company under its General Conditions of service accessible at http://www.sgs.com/terms_and_conditions.htm. attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. This document cannot be reproduced except in full, without prior approval of the Company.

RELEASE HISTORY

Version	Changes	Issued
1.0	Initial release	31 July 2019

PRODUCT DESCRIPTION

Equipment Under Test (EUT)

Temperature logger

Type:	Logmore 2
Serial number:	10010
HW version:	1.0
SW version:	1.0

Description of the EUT

The QR code on the screen changes automatically when a new measurement is saved. This technology syncs history data from the sensors by scanning the QR code with any device (such as your iOS or Android smartphone or a Laser Scanner).

Uploading the data takes less than a second. Combined with cloud service removes the need for manually compiling data from data logger devices.

The highest operation frequency is 25 MHz.

Type of the EUT

The EUT was tested as a tabletop unit.

Power Requirements

Rated voltage:	Battery operated 3.3 V
Rated frequency:	DC

Mechanical Dimensions

Height:	6 mm	Length:	47.2 mm	Width:	44.5 mm
---------	------	---------	---------	--------	---------

Cable Lengths and Types

- None

Peripherals

- None

TEST CONDITIONS

EUT Test Conditions during Testing

Configuration of the EUT was made to correspond to the actual assembling conditions as far as possible. The EUT was performing continuous temperature logging operation.



Figure 1. Test setup diagram. The EUT is a battery-operated device without any cables.

Summary of Testing

SUMMARY OF TESTING

Test Specification	Description of Test	Result
§15.107	Conducted Emissions	N/A ¹⁾
§15.109	Radiated Emissions (Class B)	PASS

¹⁾ The EUT is a battery powered device.

Test Facility

Testing Laboratory / address: FCC registration number: 904175	SGS Fimko Ltd Särkiniementie 3 FI-00210, HELSINKI FINLAND
Test Site:	<input type="checkbox"/> K10LAB, ISED Canada registration number: 8708A-1 <input checked="" type="checkbox"/> K5LAB, ISED Canada registration number: 8708A-2 <input type="checkbox"/> L3LAB <input type="checkbox"/> T10LAB

TEST RESULTS

Radiated Emissions In The Frequency Range 30 MHz to 1000 MHz

Standard:	ANSI C63.4	(2014)
Tested by:	RRE	
Date:	13 March 2019	
Temperature:	23 ± 3 °C	
Humidity:	30 - 60 % RH	
Barometric pressure:	860 - 1060 hPa	
Measurement uncertainty:	± 4.5 dB	Level of confidence 95 % (k = 2).

FCC Rule: 15.107 (a), 15.109(a)

Test plan

Radiated electric field strength was measured from 30 MHz to 1 GHz in a semi-anechoic chamber. Measurements were done with a resolution bandwidth of 120 kHz. The preview measurements were done with a peak detector and the final measurements with a quasi-peak detector. The EUT was placed on a table 0.8 meters above the ground plane.

X, Y, Z axes orientations were determined, the worst case orientation (Y) was measured.

The measuring distance between EUT and the receiving antenna was 3 meters.

The EUT was working as described in the section "EUT Test Conditions During Testing".

Radiated measurement settings:

Preliminary testing (30 to 1000 MHz):

Turntable movement:	20 ° step
Turntable position:	0 ° to 360°
Antenna movement:	1.5 m step
Antenna height:	1.0 m to 4.0 m
Antenna polarization:	Vertical and horizontal

Final testing (30 to 1000 MHz):

Turntable movement:	Continuous
Turntable position:	0° to 360°
Antenna movement:	Continuous
Antenna height:	1.0 m to 4.0 m
Antenna polarization:	Vertical and horizontal

Radiated Emissions in the Frequency Range 30 MHz to 1000 MHz

Test results

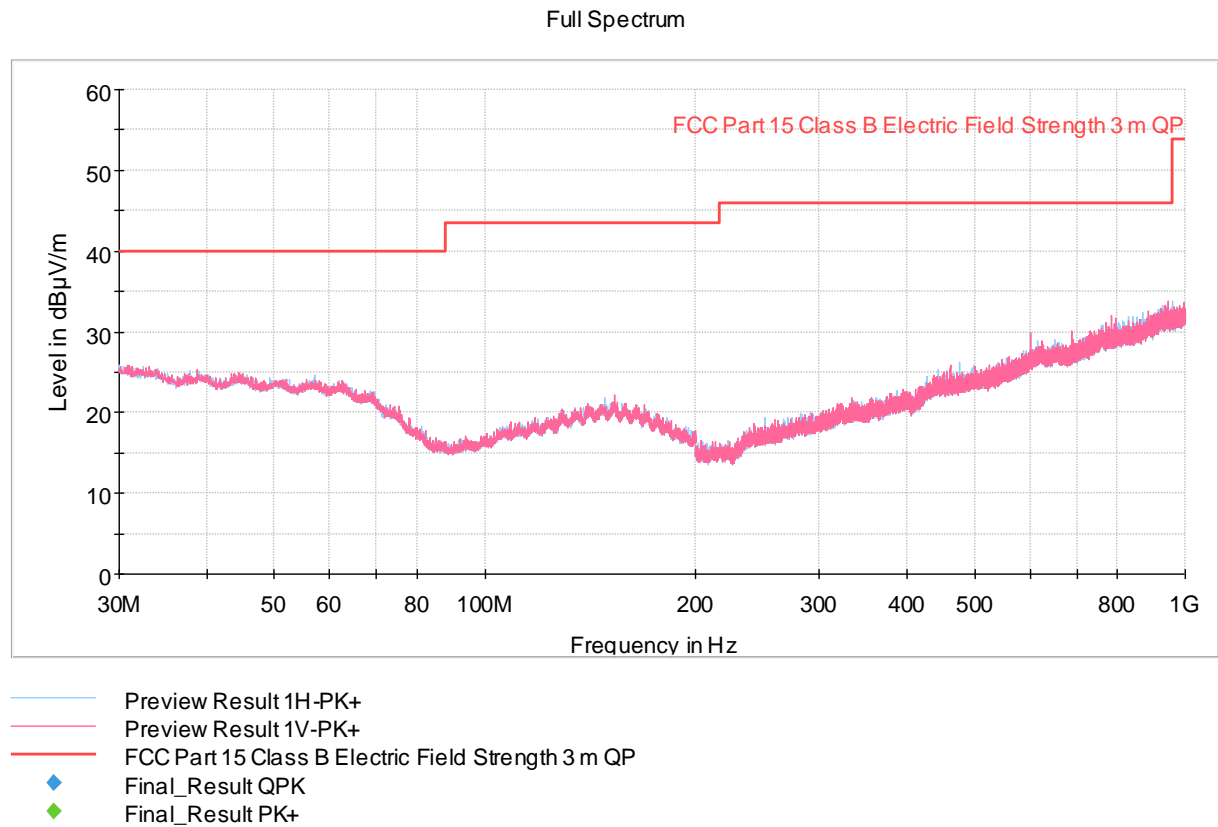


Figure 2. Measured curve with peak-detector

Table 1: Quasi-peak measurement from the worst frequencies

Frequency (MHz)	QuasiP (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
30.030000	23.8	1000.0	120.000	400.0	V	75.0	16.9	16.2	40.0
38.820000	22.7	1000.0	120.000	250.0	V	255.0	16.9	17.3	40.0
43.710000	22.9	1000.0	120.000	100.0	V	45.0	17.6	17.1	40.0
50.550000	22.7	1000.0	120.000	400.0	V	15.0	17.8	17.3	40.0
57.000000	22.3	1000.0	120.000	400.0	V	195.0	17.8	17.7	40.0
62.190000	22.3	1000.0	120.000	400.0	V	285.0	17.5	17.7	40.0

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

QuasiPeak values are measured values corrected with the correction factor.

TEST EQUIPMENT**Radiated Emissions**

Equipment	Manufacturer	Type	Inv or serial	Prev Calib	Next Calib
TURNTABLE	MATURO	DS430 UPGRADED	inv:10182	-	-
MAST & TURNTABLE CONTROLLER	MATURO	NCD	inv:10183	-	-
ANTENNA MAST	MATURO	TAM 4.0E	inv:10181	-	-
ATTENUATOR	PASTERNAK	PE 7004-4	inv:10126	2017-12-30	2019-12-30
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-	-
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv:10679	2018-06-26	2019-06-26
ANTENNA	SCHWARZBECK	VULB 9168, 30-2000MHz	inv:8911	2018-10-25	2020-10-25