DEKRA Testing and Certification, S.A.U.
Parque Tecnológico de Andalucía,
c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España
C.I.F. A29 507 456

ISED CABid: ES1909
Lab Company Number: 4621A

Test report No:
NIE: 75213REM.001

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B and C(15.207) (10-1-21 Edition) & ICES-003 Issue 7 (October 2020)

(*) Identification of item tested	Wearable biosignals monitor
(*) Trademark	ACUPEBBLE
(*) Model and /or type reference	ACUPEBBLE 100
Other identification of the product	--
(*) Features	FCC ID: 2A258-AP100D05 IC: 30461-AP100D05 Features: Bluetooth LE HW version: D05 SW version: 2.0.0
Manufacturer	Acurable Limited Finsgate, 5-7 Cranwood Street, London EC1V 9EE, United Kingdom
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B and C (10-1-21 Edition) & ICES-003 Issue 7 (October 2020)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez Industrial & Automotive EMC Lab. Manager Firmado digitalmente por 53680346W JOSE MANUEL GOMEZ (C:A29507456)
Date of issue	2023-05-11
Report template No	FDT08_24 (*) "Data provided by the client"

Index

Acronyms

Acronym ID	Acronym Description
Code	EMC Test Code
Freq Rng	Frequency Range
Line	Conducted Emissions - Tested Line
MP	Measurement Point
OM	Operation Mode
S/	Sample
V	Verdict

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 ISED-recognized accredited testing laboratory, CABid: ES1909, Company Number: 4621A, 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.

The total uncertainty of the measurement system for the measured conducted disturbance characteristics of EUT from 150 kHz to 30 MHz is I = ± 3,9 dB for quasi-peak measurements, I = ± 3,2 dB for peak measurements (k = 2).

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is I = ± 4,9 dB for quasi-peak measurements, I = ± 4,6 dB for peak measurements (k= 2).

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 1000 MHz to 12.75 GHz is I = ± 2,6 dB for peak and average measurements (k = 2).

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 consists of Wearable biosignals monitor. AcuPebble is a miniature electronic wireless wearable device, enclosed in a plastic case which is intended to be worn attached.

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 results.

Usage of samples

Samples under test have been selected by: The client.

Id	Control Number	Description	Model	Serial Nº	Date of Reception	Application
S/01	72861B_16.1	Module (EMC BLE OFF)	--	--	2022-11-02	Element Under Test
S/02	72861B_16.1	Module (EMC BLE OFF)	--	--	2022-11-02	Element Under Test
	6162 (internal equipment)	AC/DC power supply	--	--	--	Auxiliary Element
S/03	72861B_15.1	Module (EMC BLE ON)	--	--	2022-11-02	Element Under Test
	6162 (internal equipment)	AC/DC power supply	--	--	--	Auxiliary Element

Notes referenced to samples during the project.

Test sample description

<table>
<tr><td rowspan="2">Ports…… :</td><td rowspan="2">Port name and description</td><td colspan="4">Cable</td></tr>
<tr><td>Specified max length [m]</td><td>Attached during test</td><td>Shielded</td><td>Coupled to patient(3)</td></tr>
<tr><td></td><td>---</td><td>.....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>Supplementary information to the ports…… :</td><td colspan="5">---</td></tr>
<tr><td rowspan="5">Rated power supply .....:</td><td colspan="2" rowspan="2">Voltage and Frequency</td><td colspan="4">Reference poles</td></tr>
<tr><td>L1</td><td>L2</td><td>L3</td><td>N</td><td>PE</td></tr>
<tr><td>[ ]</td><td>AC: .....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>[ ]</td><td>AC: .....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>[X]</td><td colspan="5">DC: 3.7Vdc</td></tr>
<tr><td></td><td>[ ]</td><td colspan="5">DC: .....</td></tr>
<tr><td>Rated Power .....:</td><td colspan="6">Avg power: 14.1 mW</td></tr>
<tr><td>Clock frequencies.....:</td><td colspan="6">32.768 kHZ, 32.0 MHz</td></tr>
<tr><td>Other parameters .....:</td><td colspan="6">.....</td></tr>
<tr><td>Software version .....:</td><td colspan="6">2.0.0</td></tr>
<tr><td>Hardware version .....:</td><td colspan="6">D05</td></tr>
<tr><td>Dimensions in cm (W x H x D) ....:</td><td colspan="6">.....</td></tr>
<tr><td rowspan="5">Mounting position .....:</td><td>[ ]</td><td colspan="5">Table top equipment</td></tr>
<tr><td>[ ]</td><td colspan="5">Wall/Ceiling mounted equipment</td></tr>
<tr><td>[ ]</td><td colspan="5">Floor standing equipment</td></tr>
<tr><td>[ ]</td><td colspan="5">Hand-held equipment</td></tr>
<tr><td>[X]</td><td colspan="5">Other: Body worn equipment</td></tr>
<tr><td rowspan="2">Modules/parts.....:</td><td colspan="3">Module/parts of test item</td><td>Type</td><td colspan="2">Manufacturer</td></tr>
<tr><td colspan="3">---</td><td>.....</td><td colspan="2">.....</td></tr>
</table>

(3) Only for Medical Equipment

Identification of the client

Acurable Limited

Finsgate, 5-7 Cranwood Street, London EC1V 9EE, United Kingdom

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2023-03-13
Date (finish)	2023-03-14

Document history

Report number	Date	Description
75213REM.001	2023-05-11	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. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

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. = 30 % Max. = 60 %
Air pressure	Min. = 860mbar Max. = 1060mbar

Remarks and comments

The tests have been performed by the technical personnel: Alvaro Borrego Robles, Antonio Manuel Snchez Carrizo and Victoria Olmedo Villalba.

Testing verdicts

Fail	F
Inconclusive	I
Not applicable	N/A
Not measured	N/M
Pass	P
Partial Passed	P*

List of equipment used during the test

Control No.	Equipment	Model	Manufacturer	Next Calibration
7822	EMC SOFTWARE	RADIMATION	DARE INSTRUMENTS	--
7853	EMI RECEIVER 10Hz-30MHz	PMM 9010F	NARDA	2023-12-03
4523	EMI TEST RECEIVER 20Hz-26.5GHz	ESU26	ROHDE AND SCHWARZ	2023-11-05
5862	EMI TEST RECEIVER 9kHz-7GHz	ESR7	ROHDE AND SCHWARZ	2025-02-15
8165	GROUNDED PLANE LAB-3	--	--	--
7763	HORN ANTENNA 1-18GHz	BBHA 9120D	SCHWARZBECK MESS-ELEKTRONIK	2026-01-16
7769	PREAMPLIFIER 30dB 500MHz-18GHz	BBV 9718 C	SCHWARZBECK	2024-02-15
8130	SEMIANECHOIC ABSORBER LINED CHAMBER	P29419	ALBATROSS	--
8134	SHIELDED ROOM	P29419	ALBATROSS PROJECTS GMBH	--
4848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	--
7549	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2023-05-09
7550	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2023-05-09
7859	THREE-PHASE ARTIFICIAL NETWORK 32A	PMM L3-32	NARDA	2024-02-01
7826	ULTRALOG ANTENNA 30MHz-6GHz	HL562E_UPG	ROHDE AND SCHWARZ	2026-01-13

Summary

Test Specification	Requirement – Test case	Verdict	Remark
FCC 47 CFR Part 15B	RE Radiated emission. Electromagnetic field measure	Pass	---
FCC 47 CFR Part 15B	CE Continuous conducted emission	Pass	---
Supplementary information and remarks: None			

Appendix A: Test results

Appendix A content

Description of the operation modes

The operation modes described in this paragraph constitute a functionality of the sample under test for itself.

The operation modes used by the samples to which the present report refers, are shown in the following table:

Id	Description
OM/01	EUT ON. Charging battery. BLE off. Power supply: 5 Vdc.
OM/02	EUT ON. Equipment in stand-by mode. Power supply: Internal battery.
OM/03	EUT ON. Charging battery. BLE active and connected with App with an auxiliary device. Power supply 100 Vac.
OM/04	EUT ON. Charging battery. BLE Off. Power supply 100 Vac.

Test standards version applied

The product standards and test standards applied for each test cases are shown in the following table:

Product Test Standard	Test standard	Requirement – Test case
FCC CFR 47, Part 15, Subpart B (10-1-21 Edition) & ICES-003 Issue 7 (October 2020)	ANSI C63.4 (2014)	RE Radiated emission.
FCC CFR 47, Part 15, Subpart B and C(15.207) (10-1-21 Edition) & ICES-003 Issue 7 (October 2020)	ANSI C63.4 (2014)	CE Continuous conducted emission

Test Cases Details

FCC 47 CFR Part 15B

RE Radiated emission. Electromagnetic field measure

Limits

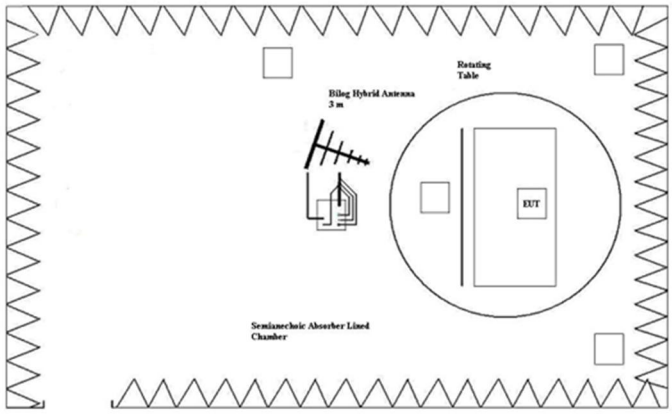
Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according to the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-21 Edition), Secs. 15.109 & ICES-003 Issue 7 (October 2020)

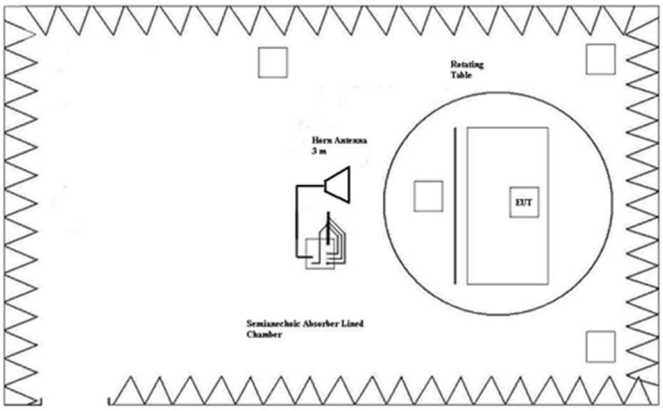
Frequency range (MHz)	FCC Part 15B		ICES-003 Issue 7		FCC Part 15B & ICES-003 Issue 7	
	QP Limit for 3 m		QP Limit for 3 m		PK Limit for 3 m	AVG Limit for 3 m
	(µV/m)	(dBµV/m)	(µV/m)	(dBµV/m)	(dBµV/m)	(dBµV/m)
30 to 88	100	40	100	40	---	---
88 to 216	150	43.5	150	43.5	---	---
216 to 230	200	46	200	46	---	---
230 to 960	200	46	224	47		
960 to 1000	500	54	500	54	---	---
Above 1000	---	---	---	---	74	54

Limits according to FCC Part 15B, are equal or more stringent than those of ICES-003 Issue 7.

Setup for measurements



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

Results

S/	OM	Code	Freq Rng (MHz)	V
01	OM/01	RE0101LR	[30, 1000]	P
01	OM/01	RE0101HR	[1000, 12750]	P
01	OM/02	RE0102LR	[30, 1000]	P
01	OM/02	RE0102HR	[1000, 12750]	P

Verdict

Pass

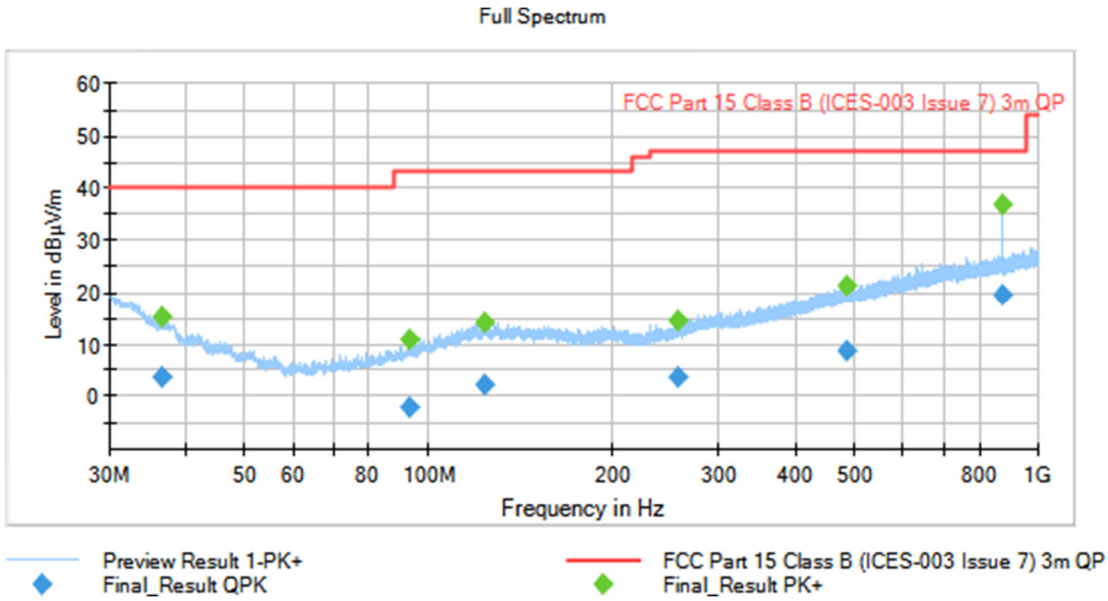
Attachments

EMC Test Code = RE0101LR Frequency Range MHz = [30, 1000]

Sample ID: S/01

Operation Mode: OM/01. EUT ON. Charging battery. BLE off. Power supply: 5 Vdc

Images:



Tables:

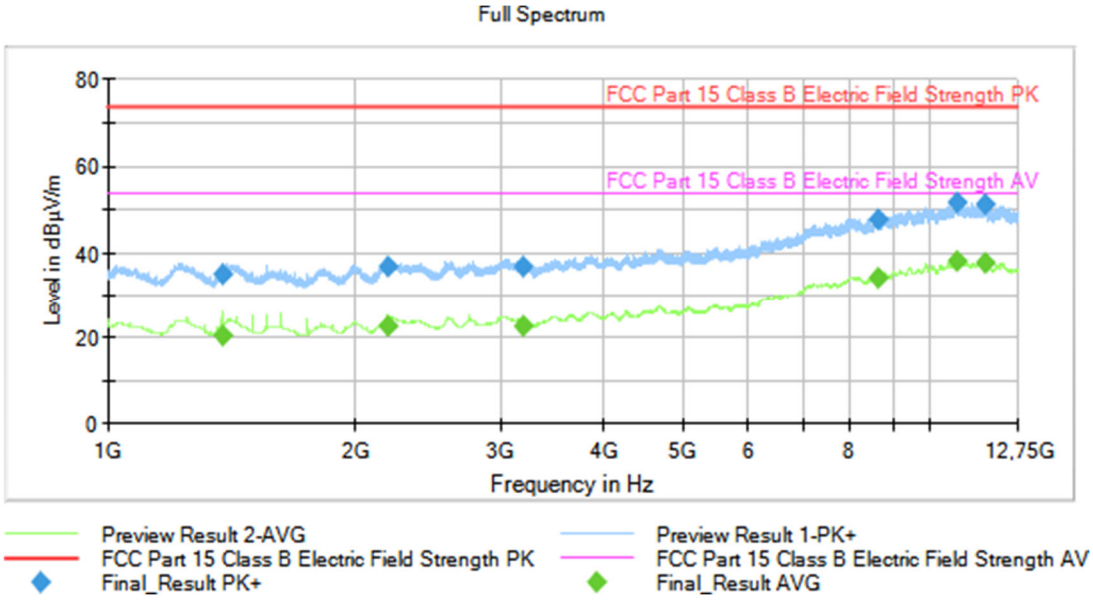
Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
36.569000	3.80	---	40.00	36.20	229.0	H	0.0
36.569000	---	15.37	---	---	229.0	H	0.0
93.084000	---	10.91	---	---	400.0	H	334.0
93.084000	-2.08	---	43.52	45.60	400.0	H	334.0
124.008000	---	14.24	---	---	125.0	H	180.0
124.008000	2.16	---	43.52	41.36	125.0	H	180.0
257.434000	3.72	---	47.00	43.28	111.0	V	264.0
257.434000	---	14.41	---	---	111.0	V	264.0
486.697000	8.68	---	47.00	38.32	151.0	H	62.0
486.697000	---	21.31	---	---	151.0	H	62.0
875.564000	---	36.84	---	---	119.0	H	139.0
875.564000	19.48	---	47.00	32.52	119.0	H	139.0

EMC Test Code = RE0101HR Frequency Range MHz = [1000, 12750]

Sample ID: S/01

Operation Mode: OM/01. EUT ON. Charging battery. BLE off. Power supply: 5 Vdc

Images:



Tables:

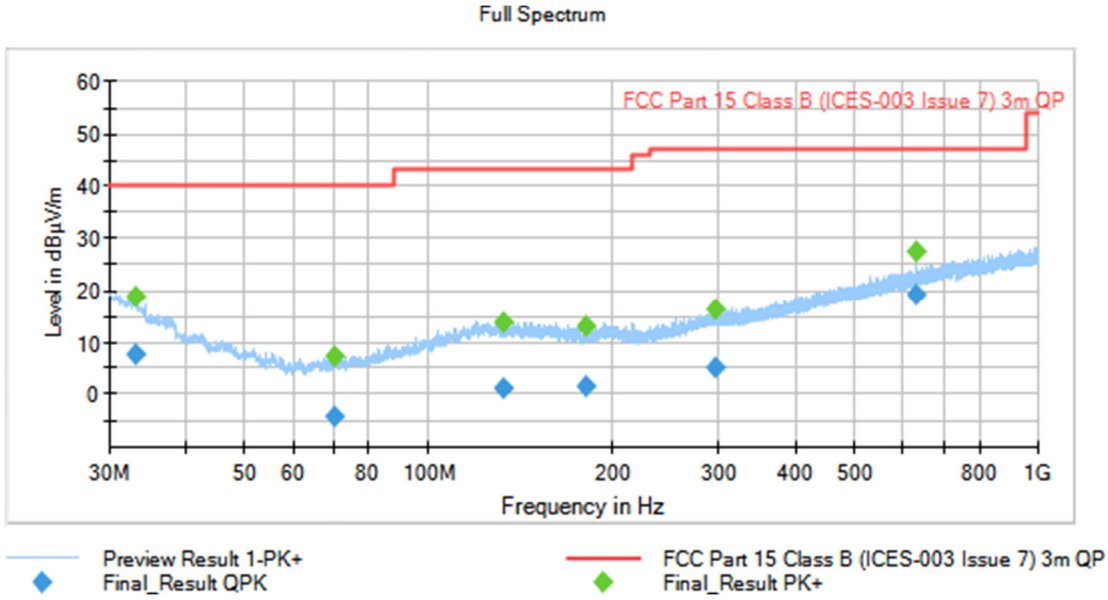
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
1375.980000	35.15	---	73.97	38.82	180.0	V	254.0
1375.980000	---	20.75	53.97	33.22	180.0	V	254.0
2193.860000	36.82	---	73.97	37.15	263.0	H	285.0
2193.860000	---	22.92	53.97	31.05	263.0	H	285.0
3198.680000	36.65	---	73.97	37.32	261.0	V	143.0
3198.680000	---	22.80	53.97	31.17	261.0	V	143.0
8639.240000	47.66	---	73.97	26.31	137.0	H	356.0
8639.240000	---	34.10	53.97	19.87	137.0	H	356.0
10754.260000	---	37.86	53.97	16.11	164.0	H	56.0
10754.260000	51.76	---	73.97	22.21	164.0	H	56.0
11657.680000	---	37.55	53.97	16.42	226.0	H	63.0
11657.680000	51.10	---	73.97	22.87	226.0	H	63.0

EMC Test Code = RE0102LR Frequency Range MHz = [30, 1000]

Sample ID: S/01

Operation Mode: OM/02. EUT ON. Equipment in stand-by mode. Power supply: Internal battery

Images:



Tables:

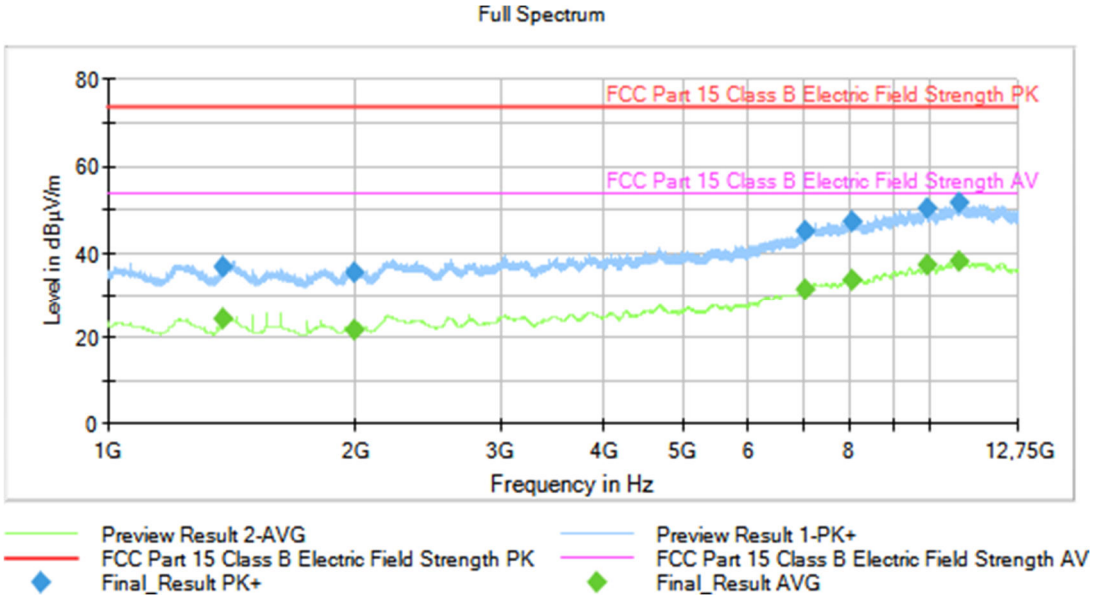
Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
33.112000	---	18.71	---	---	298.0	V	76.0
33.112000	7.55	---	40.00	32.45	298.0	V	76.0
69.962000	---	7.29	---	---	371.0	H	326.0
69.962000	-4.36	---	40.00	44.36	371.0	H	326.0
132.603000	---	13.69	---	---	228.0	V	22.0
132.603000	1.18	---	43.52	42.34	228.0	V	22.0
181.371000	1.54	---	43.52	41.98	362.0	V	192.0
181.371000	---	13.03	---	---	362.0	V	192.0
296.221000	5.13	---	47.00	41.87	245.0	V	112.0
296.221000	---	16.46	---	---	245.0	V	112.0
631.149000	---	27.53	---	---	298.0	H	24.0
631.149000	19.23	---	47.00	27.77	298.0	H	24.0

EMC Test Code = RE0102HR Frequency Range MHz = [1000, 12750]

Sample ID: S/01

Operation Mode: OM/02. EUT ON. Equipment in stand-by mode. Power supply: Internal battery

Images:



Tables:

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
1375.620000	36.67	---	73.97	37.30	196.0	H	318.0
1375.620000	---	24.64	53.97	29.33	196.0	H	318.0
1987.800000	35.55	---	73.97	38.42	350.0	V	344.0
1987.800000	---	21.87	53.97	32.10	350.0	V	344.0
7051.800000	44.85	---	73.97	29.12	180.0	V	112.0
7051.800000	---	31.41	53.97	22.56	180.0	V	112.0
8017.540000	47.41	---	73.97	26.56	206.0	H	302.0
8017.540000	---	33.78	53.97	20.19	206.0	H	302.0
9880.460000	50.43	---	73.97	23.54	247.0	V	163.0
9880.460000	---	36.96	53.97	17.01	247.0	V	163.0
10847.600000	51.53	---	73.97	22.44	350.0	H	146.0
10847.600000	---	38.05	53.97	15.92	350.0	H	146.0

CE Continuous conducted emission

Limits

Limits of interference Class B

The applied limit for continuous conducted emissions in power leads, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B and C (10-1-21 Edition), Secs. 15.107 and 15.207 & ICES-003 Issue 7 (October 2020), in the frequency range 0,15 to 30 MHz, for Class B equipment was:

Frequency range	Limit (dBµV)	
(MHz)	Quasi-Peak	Average
0,15 to 0,5	66 – 56*	56 – 46*
0,5 to 5	56	46
5 to 30	60	50

*Decreases with the logarithm of the frequency.

Results

S/	OM	Code	Freq Rng (MHz)	Line	V
02	OM/04	CE02040N	[0.15, 30]	N	P
02	OM/04	CE0204L1	[0.15, 30]	L1	P
03	OM/03	CE03030N	[0.15, 30]	N	P
03	OM/03	CE0303L1	[0.15, 30]	L1	P

Verdict

Pass

Attachments

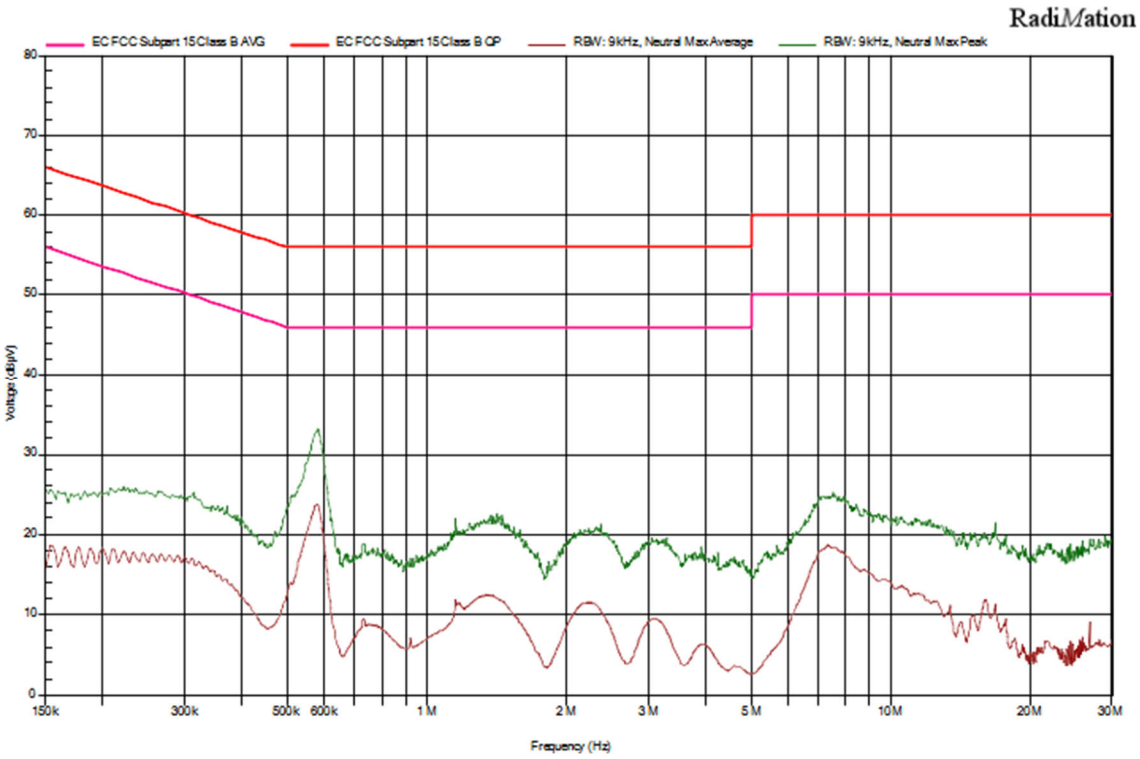
EMC Test Code = CE02040N Frequency Range MHz = [0.15, 30]

Conducted Emissions - Tested Line = N

Sample ID: S/02

Operation Mode: OM/04. EUT ON. Charging battery. BLE Off. Power supply 100 Vac

Images:



Tables:

Frequency(MHz)	Average(dBµV)	Peak(dBµV)	Line
0,222 MHz	18 dBµV	26,1 dBµV	N
0,579 MHz	23,8 dBµV	33,1 dBµV	N
0,731 MHz	9,5 dBµV	18,8 dBµV	N
1,35 MHz	12,5 dBµV	21,4 dBµV	N
1,412 MHz	12 dBµV	22,6 dBµV	N
2,317 MHz	11,1 dBµV	21 dBµV	N
3,233 MHz	8,5 dBµV	19,5 dBµV	N
3,91 MHz	6,2 dBµV	18,5 dBµV	N
7,529 MHz	18,3 dBµV	24,8 dBµV	N
16,751 MHz	11,2 dBµV	21,6 dBµV	N

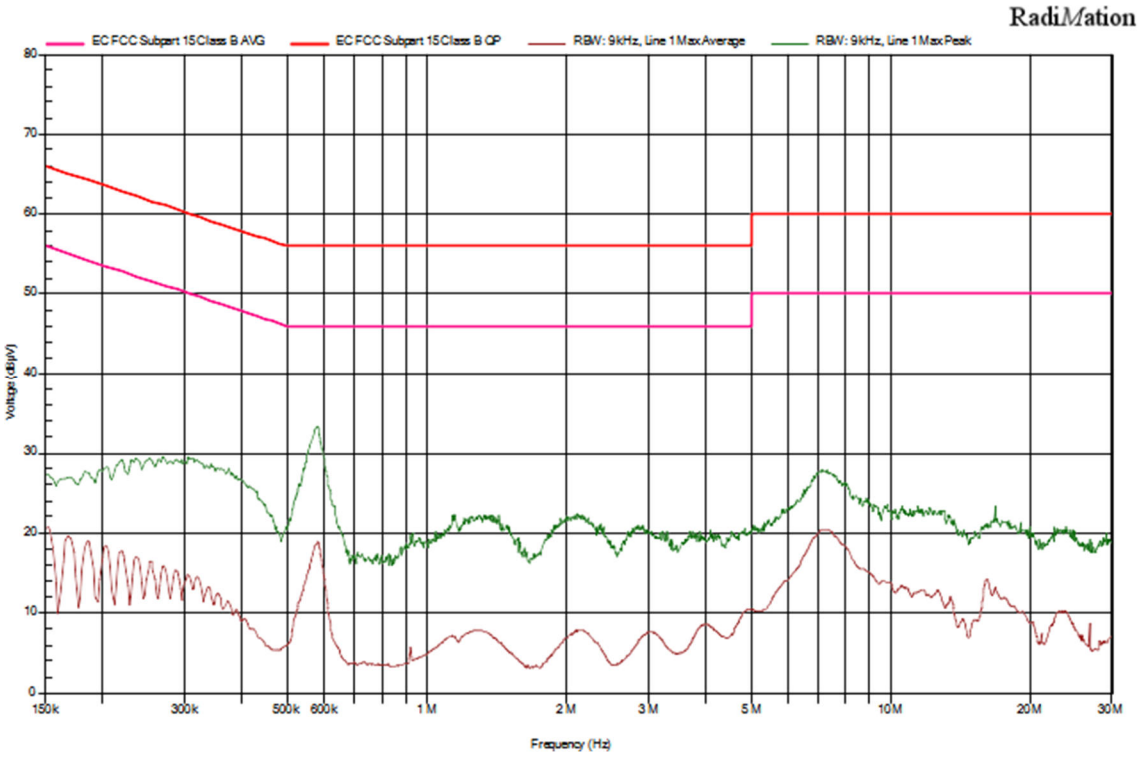
EMC Test Code = CE0204L1 Frequency Range MHz = [0.15, 30]

Conducted Emissions - Tested Line = L1

Sample ID: S/02

Operation Mode: OM/04. EUT ON. Charging battery. BLE Off. Power supply 100 Vac

Images:



Tables:

Frequency(MHz)	Average(dBµV)	Peak(dBµV)	Line
0,187 MHz	18,9 dBµV	27,5 dBµV	L1
0,312 MHz	12,9 dBµV	29,4 dBµV	L1
0,579 MHz	18,8 dBµV	33,3 dBµV	L1
1,148 MHz	6,9 dBµV	22,2 dBµV	L1
1,283 MHz	7,8 dBµV	21,7 dBµV	L1
2,125 MHz	7,8 dBµV	22,2 dBµV	L1
2,851 MHz	6,4 dBµV	20,9 dBµV	L1
3,033 MHz	7,7 dBµV	19,1 dBµV	L1
7,081 MHz	20,3 dBµV	27,7 dBµV	L1
16,751 MHz	13,3 dBµV	22,7 dBµV	L1

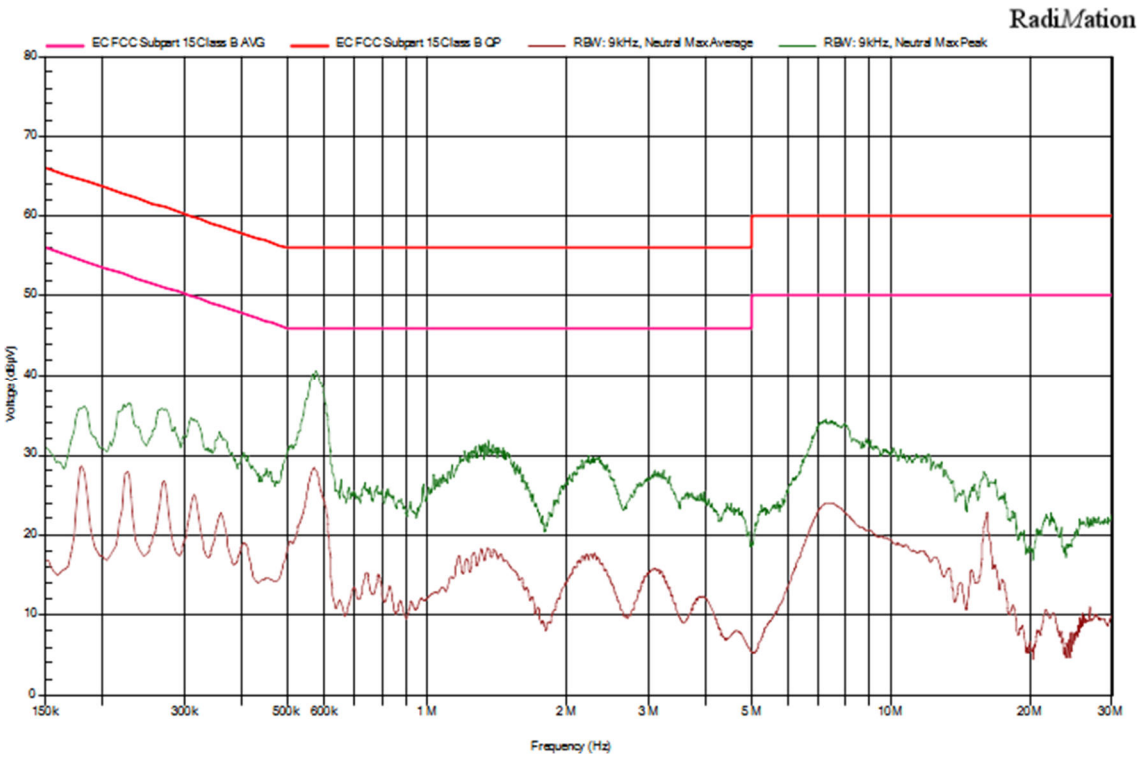
EMC Test Code = CE03030N Frequency Range MHz = [0.15, 30]

Conducted Emissions - Tested Line = N

Sample ID: S/03

Operation Mode: OM/03. EUT ON. Charging battery. BLE active and connected with App with an auxiliary device. Power supply 100 Vac

Images:



Tables:

Frequency(MHz)	Average(dBµV)	Peak(dBµV)	Line
0,226 MHz	27,8 dBµV	36,3 dBµV	N
0,269 MHz	26,6 dBµV	35,7 dBµV	N
0,314 MHz	25,1 dBµV	34,5 dBµV	N
0,359 MHz	22,8 dBµV	32,3 dBµV	N
0,404 MHz	19 dBµV	30,4 dBµV	N
0,575 MHz	28,1 dBµV	40,6 dBµV	N
1,17 MHz	17,3 dBµV	29,1 dBµV	N
1,356 MHz	18,2 dBµV	31,8 dBµV	N
2,323 MHz	16,8 dBµV	29,7 dBµV	N
7,405 MHz	23,8 dBµV	34,3 dBµV	N

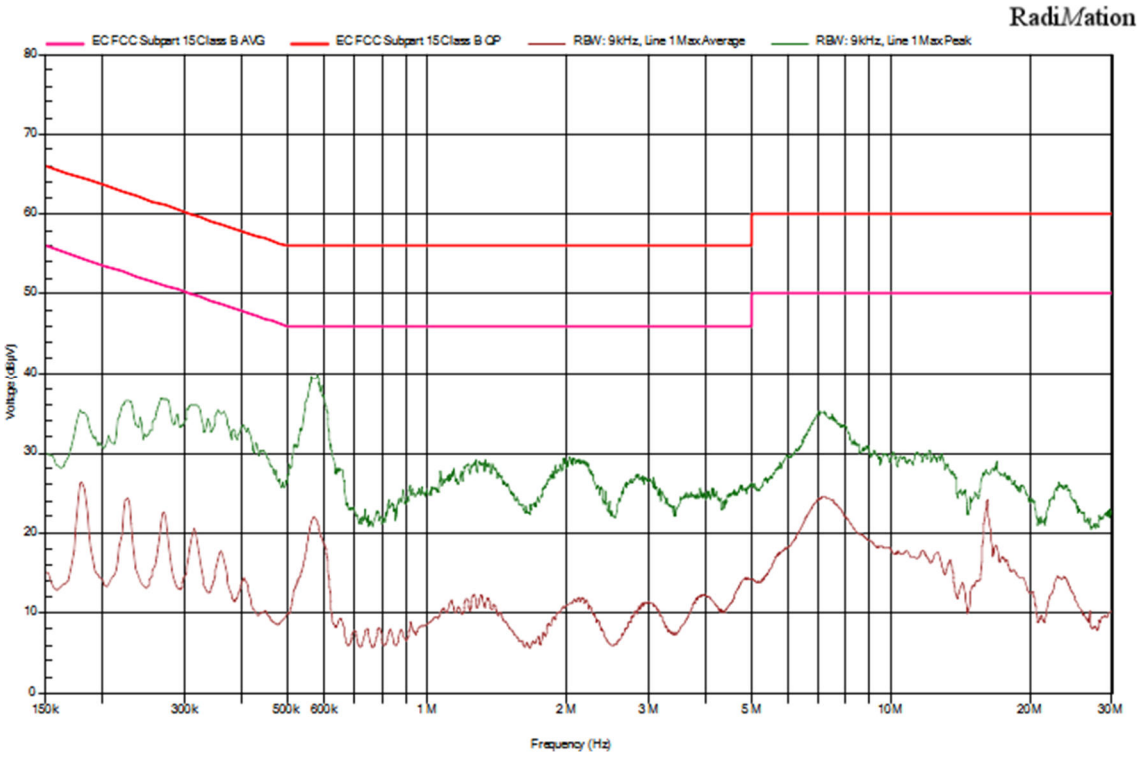
EMC Test Code = CE0303L1 Frequency Range MHz = [0.15, 30]

Conducted Emissions - Tested Line = L1

Sample ID: S/03

Operation Mode: OM/03. EUT ON. Charging battery. BLE active and connected with App with an auxiliary device. Power supply 100 Vac

Images:



Tables:

Frequency(MHz)	Average(dBµV)	Peak(dBµV)	Line
0,226 MHz	24,3 dBµV	36,5 dBµV	L1
0,271 MHz	22,5 dBµV	36,8 dBµV	L1
0,316 MHz	20,5 dBµV	36 dBµV	L1
0,359 MHz	17,8 dBµV	34,9 dBµV	L1
0,404 MHz	14,3 dBµV	33,4 dBµV	L1
0,575 MHz	21,8 dBµV	39,4 dBµV	L1
1,264 MHz	12,2 dBµV	28,9 dBµV	L1
2,07 MHz	11,5 dBµV	29 dBµV	L1
2,162 MHz	11,8 dBµV	28,9 dBµV	L1
7,182 MHz	24,4 dBµV	35,1 dBµV	L1