

Test report No:
NIE: 68042REM.002

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B
(10-1-19 Edition) & ICES-003 Issue 7 (October 2020)

(*) Identification of item tested	Battery control unit
(*) Trademark	Inuheat
(*) Model and /or type reference	PP3/3000
Other identification of the product	HW version: 3.1 SW version: 3.3 FCC ID: 2A2NC-1100047 IC ID: 27559-1100047
(*) Features	BLE, NFC
Manufacturer	Inuheat Group AB Hedtångsvägen 6 436 53 Hovås, Sweden
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 Issue 7 (October 2020)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez Industrial & Automotive EMC Lab. Manager
Date of issue	2021-07-20
Report template No	FDT08_23 (*) "Data provided by the client"

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Acronyms

Acronym ID	Acronym Description
Code	EMC Test Code
Freq Rng	Frequency Range
OM	Operation Mode
S/	Sample
V	Verdict

Competences and guarantees

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DEKRA Testing and Certification S.A.U. is an FCC-recognized accredited testing laboratory with the appropriate scope of accreditation that covers the performed tests in this report.

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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 radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is $I = \pm 4,9$ dB for quasi-peak measurements, $I = \pm 4,6$ 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 $I = \pm 2,6$ dB for peaks 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 a Unit for supplying energy to heated garments as well as communication with an App in phones.

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 N°	Date of Reception	Application
S/01	68042B_95.1	Battery control Unit	PP3/3000	40226	2021-05-13	Element Under Test
S/01	68042B_100.1	Charging cradle with USB cable	--	--	2021-05-13	Element Under Test
S/01	68042B_103.1	Glove	--	--	2021-05-13	Auxiliary Element

Test sample description

Test Sample description (compulsory information for EMC and RF testing services)

Ports..... :	Port name and description		Cable			
			Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾
	Terminal 1	NA	[]	[]	[]	
	Terminal 2	NA	[]	[]	[]	
Supplementary information to the ports..... :	Outputs alternating (plus/minus) square pulse power to garments when garment is recognized and a resistance is measured.					
Rated power supply	Voltage and Frequency		Reference poles			
			L1	L2	L3	N
	[X]	AC: (-16Vac) - 16 Vac 1Hz (Output voltage to garment)				
	[X]	DC: 4Vdc (Internal Battery)				
	[X]	DC: 5Vdc (Charging voltage)				
Rated Power	Max 6.5W					
Clock frequencies.....	1Hz square pulse					
Other parameters	Not provided data					
Software version	3.3					
Hardware version	3.1					
Dimensions in cm (W x H x D)	4.8 x 8.0 x 1.7					
Mounting position	[]	Table top equipment				
	[]	Wall/Ceiling mounted equipment				
	[]	Floor standing equipment				
	[]	Hand-held equipment				
	[X]	Other: On garment				
Modules/parts.....	Module/parts of test item		Type	Manufacturer		
	N/A					
Accessories (not part of the test item)	Description		Type	Manufacturer		
	N/A					

Documents as provided by the applicant.....:	Description	File name	Issue date
	N/A		

Identification of the client

Inuheat Group AB
Hedtångsvägen 6 436 53 Hovås, Sweden

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2021-05-13
Date (finish)	2021-05-14

Document history

Report number	Date	Description
68042REM.001	2021-07-20	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
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 °C Max. = 35 °C
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 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860mbar Max. = 1060mbar

Remarks and comments

The tests have been performed by the technical personnel: Alejandro Marin Chorro and Raul Alfaya Ruiz.

Testing verdicts

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

List of equipment used during the test

Control Number	Description	Model	Manufacturer	Next Calibration
6196	PRE-AMPLIFIER G>55dB 1-18GHz	AMF-7D-01001800-22-10P	NARDA	2022-02-25
6666	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2022-02-05
6607	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2022-04-06
6815	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2022-02-01
7614	SEMIANECHOIC ABSORBER LINED CHAMBER V	---	---	---
7743	HORN ANTENNA 0,75-18GHz	3115	ETS LINDGREN	2023-08-24

Summary

Test Specification.	Requirement – Test case	Verdict	Remark
FCC 47 CFR Part 15B	RE Radiated emission. Electromagnetic field measure	Pass	---
	CE Continuous conducted emission	N/A	(1)

Supplementary information and remarks:

(1) Test not applicable, as there is no AC port or other applicable ports under test.

Appendix A: Test results

Appendix A content

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PHOTOGRAPHS¡ERROR! MARCADOR NO DEFINIDO.

Description of the operation modes

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. Every operation mode takes a failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

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. Radio silence mode. Power Supply: Internal battery (4 Vdc).
OM/02	EUT ON. Charging mode. Power Supply: 5 Vdc via USB

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 (10-1-19 Edition) & ICES-003 Issue 7 (October 2020)	ANSI C63.4 (2014)	RE Radiated emission.

Test Cases Details

FCC 47 CFR Part 15B

RE Radiated emission. Electromagnetic field measure

Limits of interference Class B

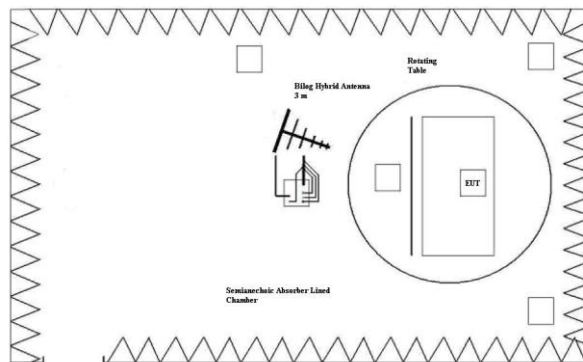
The applied limit for radiated emissions, 3 m distance, according to the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 7 (October 2020)

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
	($\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)	($\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)
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

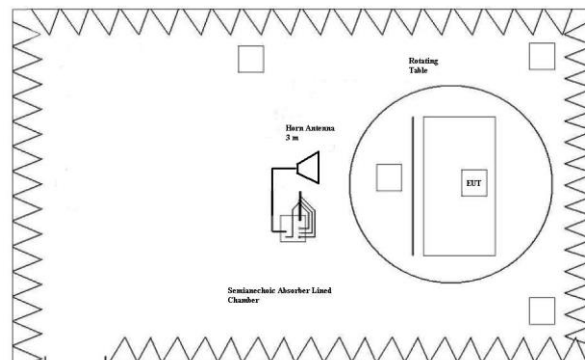
NOTE: FCC QP and AVG limits are in concordance with RSS-Gen Issue 5 (March 2019), Secs. 7.1 and 7.3.

Limits according to FCC Part 15B, equal to 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

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

Sample ID: S/01

Operation Mode: OM/01. EUT ON. Radio silence mode. Power Supply: Internal battery (4 Vdc).

Images:

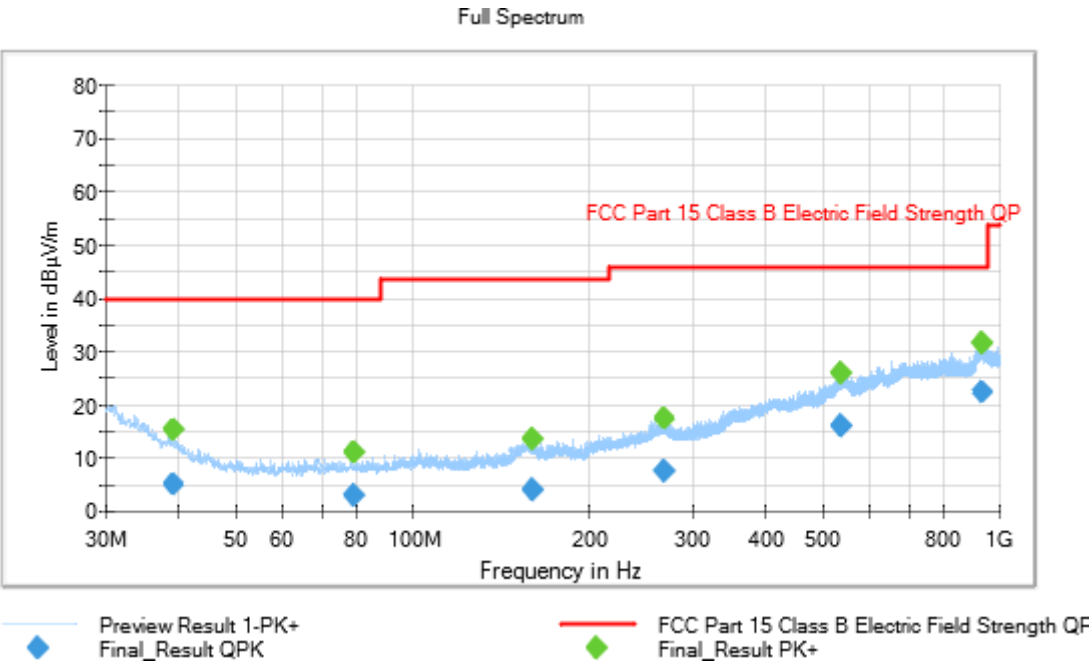


Table:

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
39.037000	---	15.15	---	---	288.0	V	328.0
39.037000	4.93	---	40.00	35.07	288.0	V	328.0
79.309000	---	11.06	---	---	108.0	V	316.0
79.309000	2.68	---	40.00	37.32	108.0	V	316.0
160.797000	3.85	---	43.52	39.67	120.0	V	292.0
160.797000	---	13.33	---	---	120.0	V	292.0
268.241000	7.46	---	46.00	40.54	227.0	H	299.0
268.241000	---	17.48	---	---	227.0	H	299.0
538.784000	15.90	---	46.00	32.10	317.0	H	82.0
538.784000	---	25.84	---	---	317.0	H	82.0
935.787000	22.23	---	46.00	25.77	100.0	H	52.0
935.787000	---	31.42	---	---	100.0	H	52.0

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

Sample ID: S/01

Operation Mode: OM/01. EUT ON. Radio silence mode. Power Supply: Internal battery (4 Vdc).

Images:

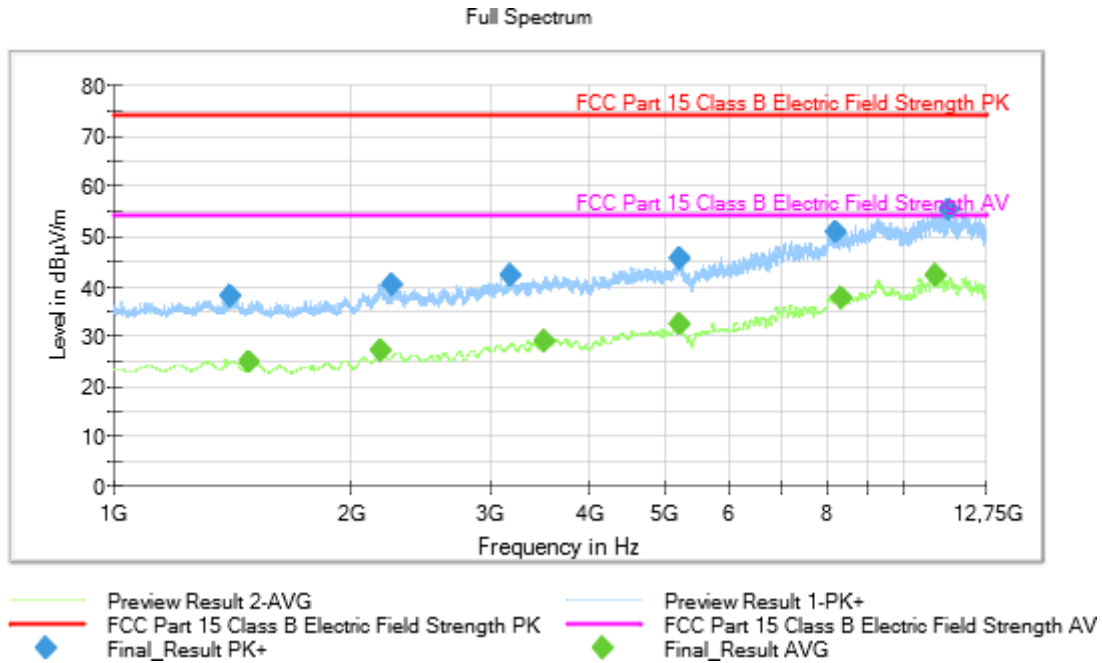


Table:

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1407.200000	37.95	---	73.97	36.02
1485.200000	---	24.81	53.97	29.16
2181.600000	---	27.09	53.97	26.88
2256.800000	40.26	---	73.97	33.71
3173.600000	42.19	---	73.97	31.78
3510.000000	---	28.97	53.97	25.00
5200.400000	---	32.30	53.97	21.67
5204.400000	45.39	---	73.97	28.58
8229.200000	50.85	---	73.97	23.12
8341.600000	---	37.62	53.97	16.35
10977.600000	---	42.24	53.97	11.73
11448.400000	55.21	---	73.97	18.76

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

Sample ID: S/01

Operation Mode: OM/02. EUT ON. Charging mode. Power Supply: 5 Vdc via USB.

Images:

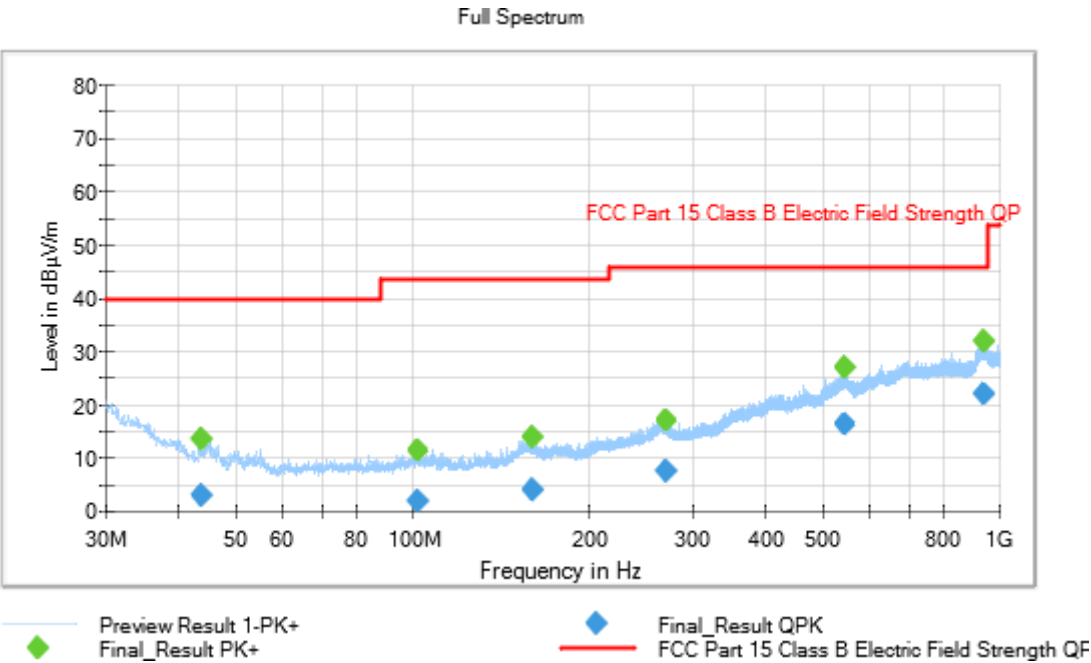


Table:

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
43.672000	2.85	---	40.00	37.15	100.0	H	61.0
43.672000	---	13.36	---	---	100.0	H	61.0
102.066000	1.62	---	43.52	41.91	400.0	V	95.0
102.066000	---	11.16	---	---	400.0	V	95.0
160.429000	---	13.68	---	---	189.0	V	0.0
160.429000	3.91	---	43.52	39.61	189.0	V	0.0
270.346000	7.38	---	46.00	38.62	187.0	H	176.0
270.346000	---	16.95	---	---	187.0	H	176.0
545.566000	16.11	---	46.00	29.89	153.0	H	188.0
545.566000	---	26.85	---	---	153.0	H	188.0
939.991000	22.11	---	46.00	23.89	245.0	V	0.0
939.991000	---	31.72	---	---	245.0	V	0.0

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

Sample ID: S/01

Operation Mode: OM/02. EUT ON. Charging mode. Power Supply: 5 Vdc via USB.

Images:

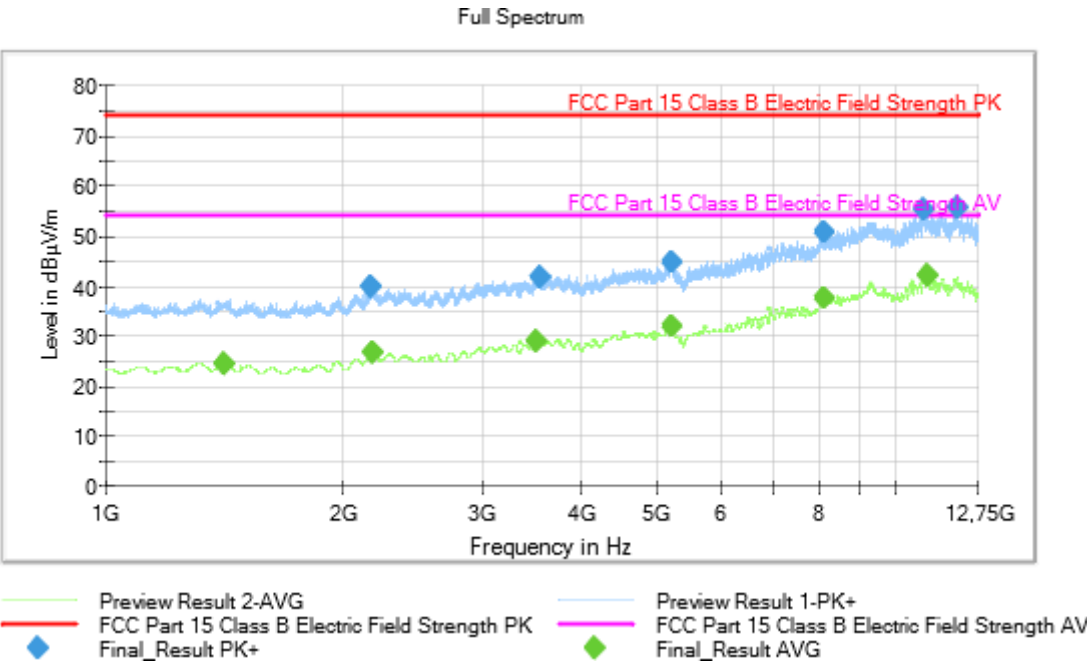


Table:

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1413.600000	---	24.57	53.97	29.40
2172.400000	39.70	---	73.97	34.27
2180.400000	---	26.81	53.97	27.16
3514.000000	---	28.76	53.97	25.21
3544.000000	41.67	---	73.97	32.30
5201.200000	---	32.11	53.97	21.86
5202.400000	44.84	---	73.97	29.13
8112.400000	50.71	---	73.97	23.26
8116.400000	---	37.38	53.97	16.59
10878.400000	55.24	---	73.97	18.73
10976.800000	---	42.06	53.97	11.91
11984.800000	55.50	---	73.97	18.47