DEKRA Testing and Certification, S.A.U.
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DEKRA

ENAC ENSAYOS Nº 51/LE147

Test report No:
NIE: 64656REM.001

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 Issue 6 (January 2016, Updated April 2019)

(*) Identification of item tested	Sensor device with Wirepas mesh network connectivity
(*) Trademark	Thingsee Environment
(*) Model and /or type reference	PD2
Other identification of the product	HW Version: PD2_02 SW Version: 2020.03.26.1_ts_pod3wp34 FCC ID: 2AEU3TSENV IC: 20236-TSENV
(*) Features	Measurement of several physical quantities. Wirepas protocol stack using BT LE radio.
Manufacturer	HALTIAN PRODUCTS OY Yrttipellontie 1 D, 90230 Oulu, Finland.
Test method requested, standard	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 (Updated 04-2019)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López Martín EMC Consumer & RF Lab. Manager RAFAEL LÓPEZ MARTÍN 2020.06.01 09:31:56 +02'00'
Date of issue	2020-06-01
Report template No	FDT08_22 (*) "Data provided by the client"

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Competences and guarantees

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Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification internal document PODT000.

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. PD2 is used for measurements of several physical quantities and resulting data is sent wirelessly to a Wirepas protocol mesh network. The device has sensors for temperature, humidity, air pressure, ambient light, magnetism and acceleration. It also includes an LED for indication purposes. Typically PD2 is used together with MTXH Thingsee Gateway in use cases where the measurements are performed in several locations and this data is wirelessly collected and sent via 2G cellular connection to a data server / cloud.

DEKRA 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.

Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
64656/004	Thingsee POD2 sensor device	PD2	PSN: ESY93100724	2020-04-20

Test sample description

Ports..... :	Port name and description		Cable					
			Specified length [m]	Attached during test	Shielded			
	N/A			☐	☐			
				☐	☐			
				☐	☐			
				☐	☐			
Supplementary information to the ports..... :	Not provided data							
Rated power supply ..... :	Voltage and Frequency		Reference poles					
			L1	L2	L3	N	PE	
	☐	AC:	☐	☐	☐	☐	☐	
	☒	DC: 3.0V, 2 x AAA 1.5V alkaline primary batteries.						
Rated Power ..... :	Peak 24mW (3V x 8mA), average 120uW (3V x 40uA)							
Clock frequencies ..... :	BT IC clocks 32.768kHz, 32MHz							
Other parameters..... :	Not provided data							
Software version ..... :	2020.03.26.1_ts_pod3wp34							
Hardware version..... :	PD2_02							
Dimensions in mm (W x H x D)... :	35mm x 15mm x 53mm							
Mounting position..... :	☐	Table top equipment						
	☒	Wall/Ceiling mounted equipment						
	☐	Floor standing equipment						

	☐	Hand-held equipment	
	☐	Other: Placed behind ear	
Modules/parts .....:	Module/parts of test item	Type	Manufacturer
	nRF52832	BT IC	Nordic Semiconductor
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

HALTIAN PRODUCTS OY
Yrttipellontie 1 D, 90230 Oulu, Finland.

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2020-04-21
Date (finish)	2020-04-21

Document history

Report number	Date	Description
64656REM.001	2020-06-01	First release

List of equipment used during the test

Control Number	Description	Model	Manufacturer	Next Calibration
0246	HORN ANTENNA 1-18GHz	11966E	HEWLETT PACKARD	2021-10-13
0482	SEMIANECHOIC ABSORBER LINED CHAMBER 1	11.BS	IRSA	---
0549	CAMARA CONDUCIDA	-	IRSA	---
3545	USB TEMPERATURE AND HUMIDITY SENSOR	HUMIDIPROBE	PICO TECHNOLOGY	2021-04-22
3547	USB TEMPERATURE AND HUMIDITY SENSOR	HUMIDIPROBE	PICO TECHNOLOGY	2020-04-03
6195	PRE-AMPLIFIER G>55dB 1-18GHz	AMF-7D-01001800-22-10P	NARDA	2020-02-21
6666	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2022-02-05
6815	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2022-02-01
7615	SHIELDED ROOM	S101	ETS LINDGREN	---
7816	EMI TEST RECEIVER 1Hz-26.5GHz	ESW26	ROHDE AND SCHWARZ	2021-09-05

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. = 860 mbar Max. = 1060 mbar

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. = 860 mbar Max. = 1060 mbar

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. = 860 mbar Max. = 1060 mbar

Remarks and comments

The test have been performed by the technical personnel: Juan Manuel Pino & David Rubio.

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

Summary

Emission Test		
Requirement – Test case	**Verdict**	**Remark**
Radiated emission. Electromagnetic field measure (30 MHz – 1000 MHz)	P	---
Radiated emission. Electromagnetic field measure (1 GHz – 12.75 GHz)	P	---
Radiated emission. Electromagnetic field measure (12.75 GHz – 26 GHz)	N/A	(1)
Continuous conducted emission (150 KHz – 30 MHz)	N/A	(2)
Supplymentary information and remarks: (1) Range: f>12.75 GHz. Test required only if the 5th harmonics of the maximum internal work frequency EUT is higher than 12.75GHz. (2) Test not applicable due to DUT powered by DC		

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:

OPERATION MODE	DESCRIPTION
OM#01	EUT ON. BLE unpaired, RX mode. Power supply: 3Vdc (Internal battery)

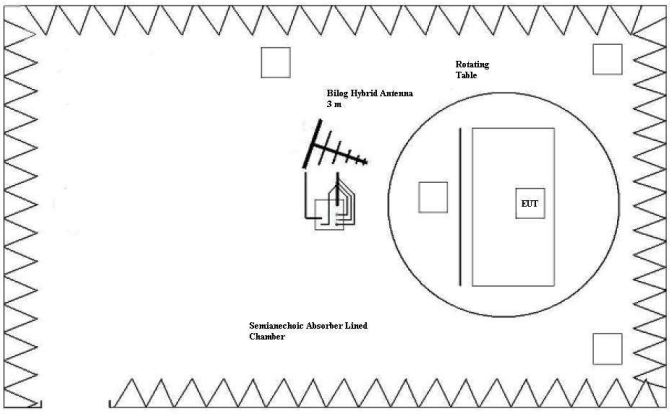
RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Secs. 15.109; ICES-003 (January 2016, updated April 2019)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Secs. 15.109; ICES-003 (January 2016, updated April 2019)

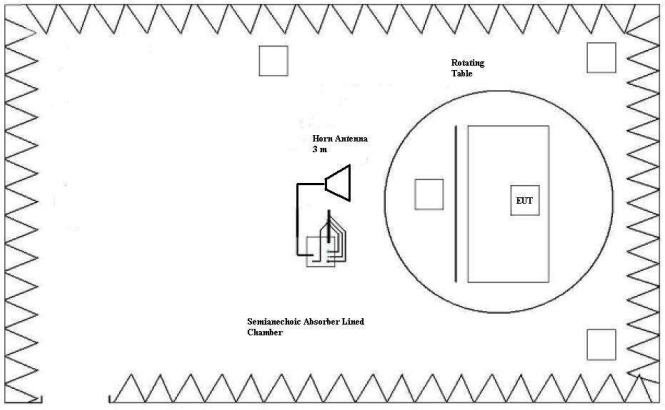
Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 6 (Updated 04-2019)

Frequency of emission (MHz)	Field strength (microvolt/meter)
30-88	100
88-216	150
21-960	200
Above 960	500



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

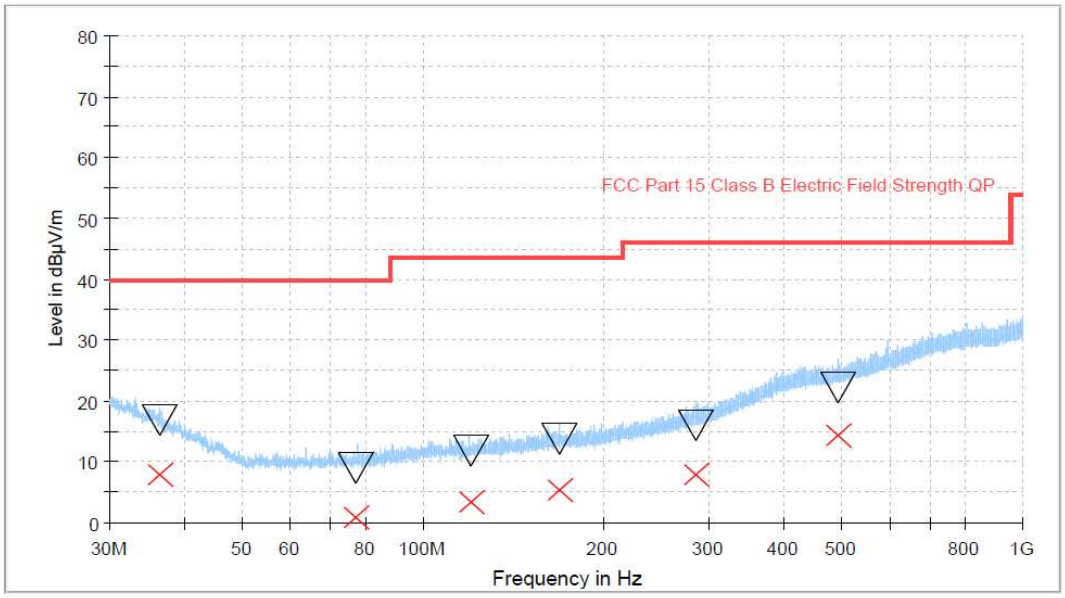
TESTED SAMPLE:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS:	CRmmnnRRPP: CR, Radiated Condition; mm: Sample number; nn: Operation mode; RR: Range; PP: Polarization.

CRmmnnRRPP	Description	Result
CR0101LR	Range: 30 MHz - 1000 MHz.	P
CR0101HR_PH	Range: 1 GHz – 12.75 GHz. Horizontal polarization.	P
CR0101HR_PV	Range: 1 GHz – 12.75 GHz. Vertical polarization.	P

Radiated Emission. CR0101LR

Project:	64656REM.001
Company:	HALTIAN PRODUCTS OY
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. BLE unpaired, RX mode. Power supply: 3Vdc (Internal battery).

Full Spectrum



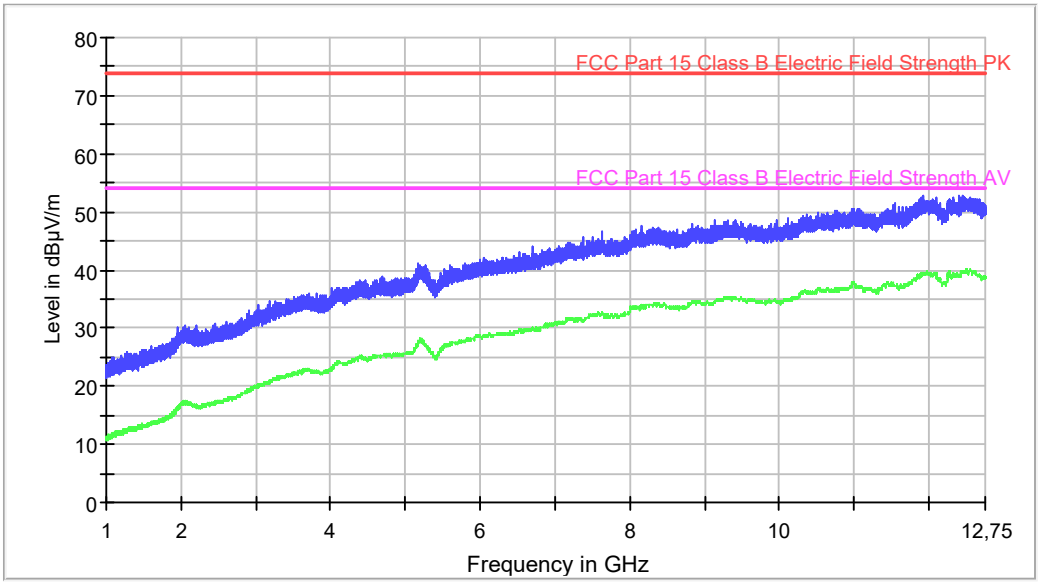
Maximizations

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
36.263000	7.82	16.70	32.18	135.0	H	2.0
77.452000	0.81	9.02	39.19	106.0	H	109.0
120.121000	3.28	11.77	36.72	311.0	V	262.0
168.673000	5.20	13.75	34.80	137.0	H	23.0
284.666000	7.72	15.87	39.28	296.0	V	311.0
492.073000	14.31	22.19	32.69	400.0	H	308.0

Radiated Emission. CR0101HR_PH

Project:	64656REM.001
Company:	HALTIAN PRODUCTS OY
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. BLE unpaired, RX mode. Power supply: 3Vdc (Internal battery). Horizontal polarization.

RE FCC Part 15 ClassB 1-12,75 GHz



Average Scan
FCC Part 15 Class B Electric Field Strength PK
Peak Scan
FCC Part 15 Class B Electric Field Strength AV

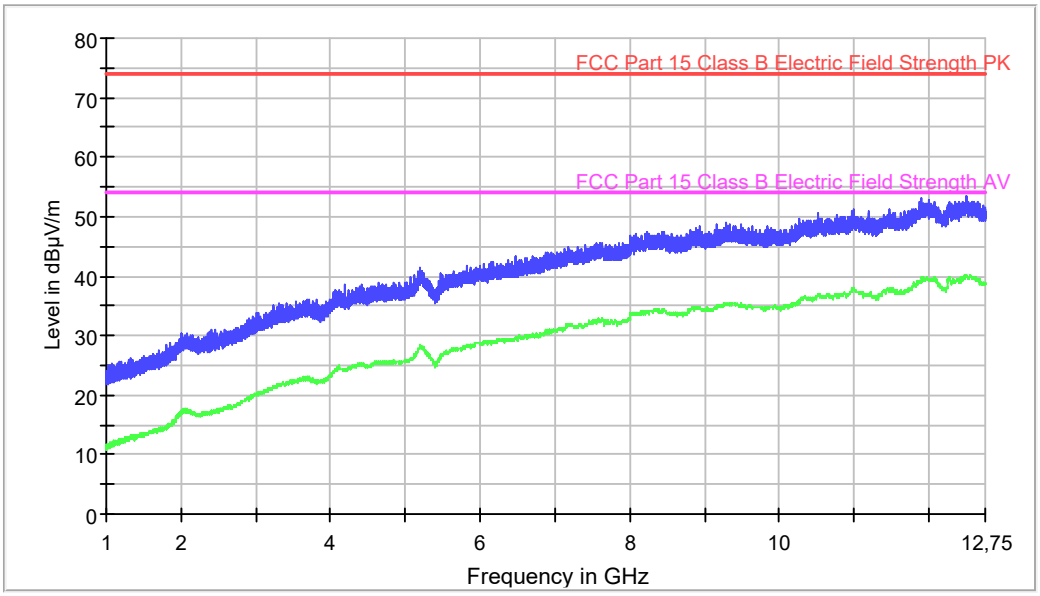
Subrange Maxima

Frequency (MHz)	PK+_CLRWR (dBµV/m)	AVG_CLRWR (dBµV/m)
2059.600000	30.6	17.4
3247.200000	34.5	21.2
4392.000000	38.2	25.0
5178.800000	41.0	27.7
6705.200000	44.0	30.0
7625.200000	46.7	32.6
9137.200000	48.5	34.5
10358.800000	49.5	36.3
11540.800000	51.4	37.2
11930.800000	52.9	39.3

Radiated Emission. CR0101HR_PV

Project:	64656REM.001
Company:	HALTIAN PRODUCTS OY
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. BLE unpaired, RX mode. Power supply: 3Vdc (Internal battery). Vertical polarization.

RE FCC Part 15 ClassB 1-12,75 GHz



Average Scan
FCC Part 15 Class B Electric Field Strength PK
Peak Scan
FCC Part 15 Class B Electric Field Strength AV

Subrange Maxima

Frequency (MHz)	PK+_CLRWR (dBµV/m)	AVG_CLRWR (dBµV/m)
2016.800000	30.5	17.5
3316.000000	35.4	21.5
4196.000000	38.7	24.1
5204.000000	41.3	28.2
6695.600000	43.5	30.1
8000.800000	46.7	33.6
9157.600000	48.8	34.8
10274.800000	49.6	36.1
11462.400000	51.2	37.7
12499.200000	53.5	40.2