

Test report No:
NIE: 61876REM.002A1

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	Wireless headphone
(*) Trademark	Unity
(*) Model and /or type reference	UAR-100
Other identification of the product	HW Version: C4.5.4 SW Version: 0.28.6 FCC ID: 2AYFG001 IC ID: 26790-001
(*) Features	Bluetooth, Bluetooth LE, WIFI
Manufacturer	HED TECHNOLOGIES CTN, Chemin Des Aulx, 18 (3rd floor) CH-1228 Plan-Les-Ouates - Geneva - Switzerland
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)	Rafael López EMC Consumer & RF Lab. Manager
Date of issue	2021-04-16
Report template No	FDT08_23 (*) "Data provided by the client"

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Acronyms

Acronym ID	Acronym Description
Avg	Radiated Average Level
Avg	Conducted Average Level
Az	Azimuth
CPL	Zones / Coupling Cables
Code	EMC Test Code
Freq	Frequency
Freq Rng	Frequency Range
H	Height
Line	Conducted Emissions - Tested Line
MP	Measurement Point
Max	Conducted Maximum Level
MaxPeak	Radiated Maximum Peak Level
OM	Operation Mode
Pol	Polarization
QuasiPeak	Conducted Quasi Peak Level
QuasiPeak	Radiated Quasi Peak Level
S/	Sample
V	Verdict
Volt Immunity Lvl	Voltage Immunity Severity Level
Volt Immunity Type	Voltage Immunity Type

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.

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.
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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 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. Unity is a none foldable with an adjustable headband based on WiFi and Bluetooth technologies.

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.

Sample 01 (S/01):

Control Number	Description	Model	Serial N°	Date of Reception	Application
61876_006	Wireless headphone	UAR-100	047 001 A A0L 00058	2021-01-05	Element under test
61876_007	USB cable	---	---	2021-01-05	Element under test
7769-3	AC/DC Adapter	Goobay 43796	---	N/A	Auxiliary element

Sample 02 (S/02):

Control Number	Description	Model	Serial N°	Date of Reception	Application
61876_001	Wireless headphone	UAR-100	047 001 A A0L 00067	2021-01-05	Element under test
61876_007	USB cable	---	---	2021-01-05	Element under test
7769-3	AC/DC Adapter	Goobay 43796	---	N/A	Auxiliary element

Notes referenced to samples during the project.

Id	Note
S/01	Original sample.
S/02	Sample with programmable RF behavior to set the reception mode.

Test sample description

Ports..... :	Port name and description		Cable				
			Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾	
	N/A						
Supplementary information to the ports..... :	N/A						
Rated power supply	Voltage and Frequency			Reference poles			
				L1	L2	L3	N
	☐	AC:					
	☒	DC: 5 Vdc (Internal battery). Battery charge by means of an AC/DC.					
Rated Power	Not provided data						
Clock frequencies..... :	Not provided data						
Other parameters	Not provided data						
Software version	0.28.6						
Hardware version	C4.5.4						
PCB versions..... :	- Left Carrier: C4.5.4 - Right audio: C4.5.3 - Left USB: C4.5.1 - Left mics: C4.5.0 - Right mics: C4.5.0 - Top mics: C4.5.0						
Dimensions in cm (W x H x D)	Not provided data						
Mounting position	☒	Other: Wearable device					
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

HED TECHNOLOGIES
CTN, Chemin Des Aulx, 18 (3rd floor)
CH-1228 Plan-Les-Ouates - Geneva - Switzerland

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2021-01-08
Date (finish)	2021-01-19

Document history

Report number	Date	Description
61876REM.002	2021-03-04	First release
61876REM.002A1	2021-04-16	The Model name, FCC ID and IC of the device have been corrected: Model name: UAR-100 FCC ID: 2AYFG001 IC: 26790-001

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. = 20 % Max. = 75 %

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

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. = 20 % Max. = 75 %

Remarks and comments

The tests have been performed by the technical personnel: Jaime Barranquero & Antonio Sánchez.

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
3258	SONDA DE TEMPERATURA Y HUMEDAD RELATIVA	HUMIDIPROBE	PICO TECHNOLOGY	2021-04-22
4575	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	TR-702W	T&D	2021-04-22
7769	PREAMPLIFIER 30dB 500MHz-18GHz	BBV 9718 C	SCHWARZBECK	2022-01-09
7817	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2021-10-29
7826	ULTRALOG ANTENNA 30MHz-6GHz	HL562E_UPG	ROHDE AND SCHWARZ	2022-10-15
8130	SEMIANECHOIC ABSORBER LINED CHAMBER VI	P29419	ALBATROSS	---
8134	SHIELDED ROOM	P29419	ALBATROSS PROJECTS GMBH	---

Summary

Test Specification.	Requirement – Test case	Verdict	Remark
FCC CFR 47, Part 15, Subpart B y C (10-1-19 Edition) Secs. 15.107 and 15.207 & ICES-003 Issue 7 (October 2020). ANSI C63.4 (2014)	Radiated emission	Pass	---
FCC CFR 47, Part 15, Subpart B y C (10-1-19 Edition) Secs. 15.107 and 15.207 & ICES-003 Issue 7 (October 2020) ANSI C63.4 (2014)	Conducted emission	Pass	---

Appendix A: Test results

Appendix A content

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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. Power supply: internal battery.
OM_02	EUT ON. Charging battery. Power supply: 5Vdc. using an auxiliary AC/DC adapter.

Note: Radio transmissions are not supported while charging.

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 y C (10-1-19 Edition) Secs. 15.109 & ICES-003 Issue 7 (October 2020).	ANSI C63.4 (2014)	Radiated emission
FCC CFR 47, Part 15, Subpart B y C (10-1-19 Edition) Secs. 15.107 and 15.207 & ICES-003 Issue 7 (October 2020).	ANSI C63.4 (2014)	Conducted emission

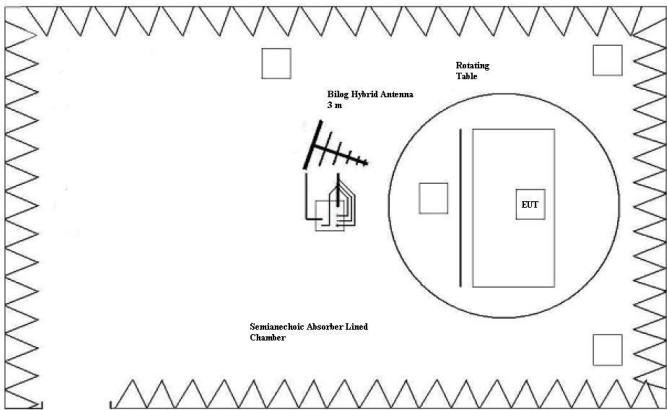
Test Cases Details

FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Sec. 15.109 &
ICES-003 Issue 7 (October 2020)
Radiated emission

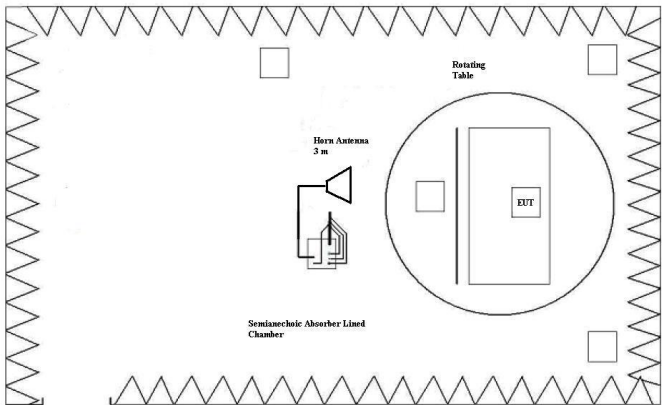
Limits of interference Class B

The applied limit for radiated emissions, 3m distance, according to requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 7 (Updated 04-2020) is

Frequency of emission (MHz)	Field strength limit (microvolt/meter) (QuasiPeak Detector)*	Field strength (dBµV/m) (QuasiPeak Detector)*
30-88	100	40
88-216	150	43.5
216-230	200	46
230-960	200	47
Above 960	500	54
*Above 1GHz, the limit is defined for an AVG detector.		



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

RESULTS

CRmmnnRR	Description	Result
RE0101LR	Range: 30 MHz - 1000 MHz.	P
RE0102LR	Range: 30 MHz - 1000 MHz.	P
RE0101HR	Range: 1 GHz - 12.75 GHz.	P
RE0102HR	Range: 1 GHz - 12.75 GHz.	P

mm: Sample number; nn: Operation mode; RR: Measurement range.

*According to FCC 47 CFR Part 15B / ICES-003, the radiated emission test has to cover up to the fifth harmonic of the internal working frequency.

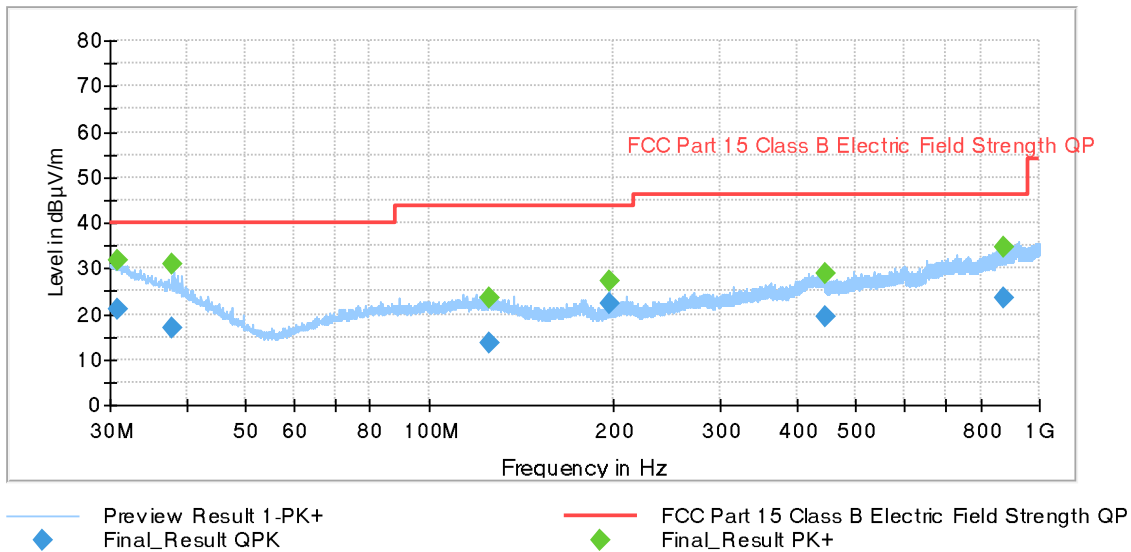
VERDICT

Pass

Images:

Project: 61876REM.002A1
Company: HED
Sample: 01
Operation mode: 01
Graphical code: RE0101LR
Description: EUT ON. Power supply: internal battery.
Verdict: Passed

Full Spectrum

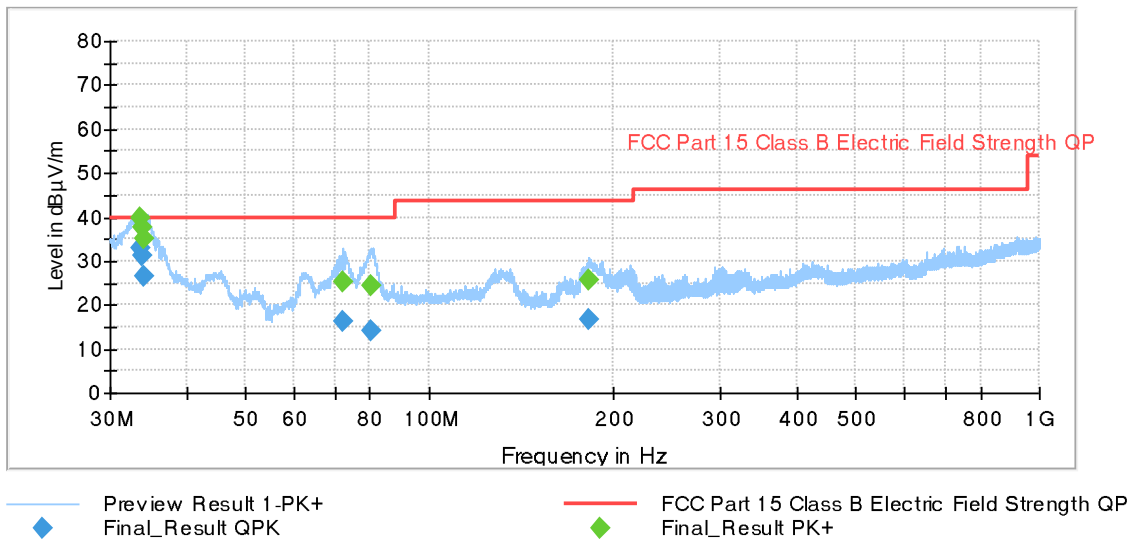


Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Height (cm)	Pol	Azimuth (deg)
30.960000	---	31.90	400.0	H	218.0
30.960000	21.10	---	400.0	H	218.0
37.891000	---	30.72	183.0	V	92.0
37.891000	17.05	---	183.0	V	92.0
125.354000	13.63	---	257.0	H	206.0
125.354000	---	23.64	257.0	H	206.0
198.005000	---	27.14	100.0	V	72.0
198.005000	22.21	---	100.0	V	72.0
444.569000	---	28.82	166.0	V	163.0
444.569000	19.41	---	166.0	V	163.0
872.692000	23.60	---	318.0	H	0.0
872.692000	---	34.60	318.0	H	0.0

Project: 61876REM.002A1
Company: HED
Sample: 01
Operation mode: 02
Graphical code: RE0102LR
Description: EUT ON. Charging battery. Power supply: 5 Vdc using an auxiliary AC/DC adapter.
Verdict: Passed

Full Spectrum

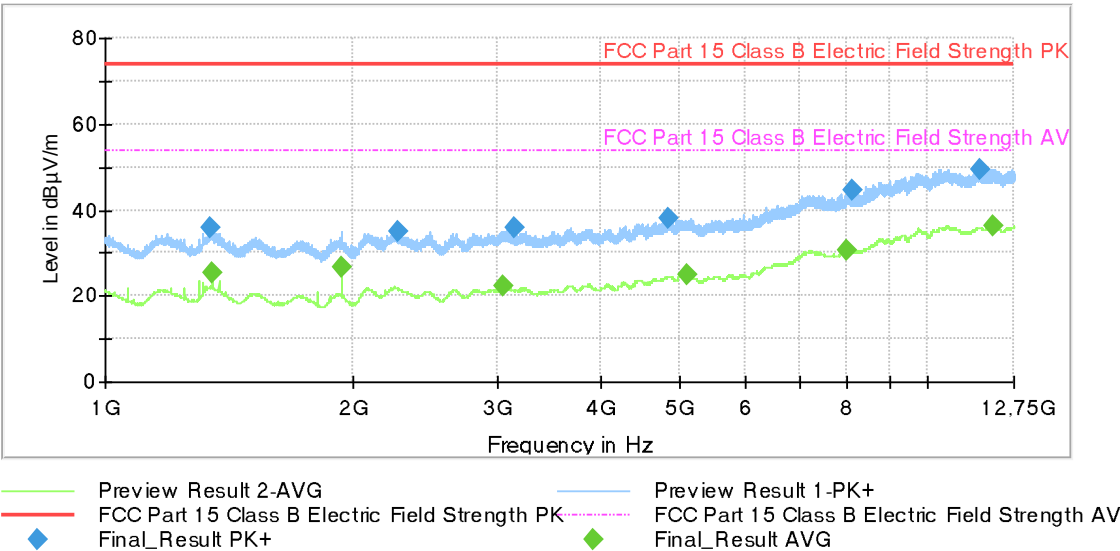


Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Height (cm)	Pol	Azimuth (deg)
33.660000	---	39.80	119.0	V	150.0
33.660000	32.97	---	119.0	V	150.0
33.926000	---	37.57	100.0	V	16.0
33.926000	31.02	---	100.0	V	16.0
34.053000	---	35.11	104.0	V	22.0
34.053000	26.66	---	104.0	V	22.0
72.143000	---	25.06	140.0	V	78.0
72.143000	16.10	---	140.0	V	78.0
80.173000	---	24.43	153.0	V	10.0
80.173000	14.02	---	153.0	V	10.0
182.757000	---	25.85	107.0	H	82.0
182.757000	16.87	---	107.0	H	82.0

Project: 61876REM.002A1
Company: HED
Sample: 02
Operation mode: 01
Graphical code: RE0201HR
Description: EUT ON. Power supply: internal battery.
Verdict: Passed

Full Spectrum

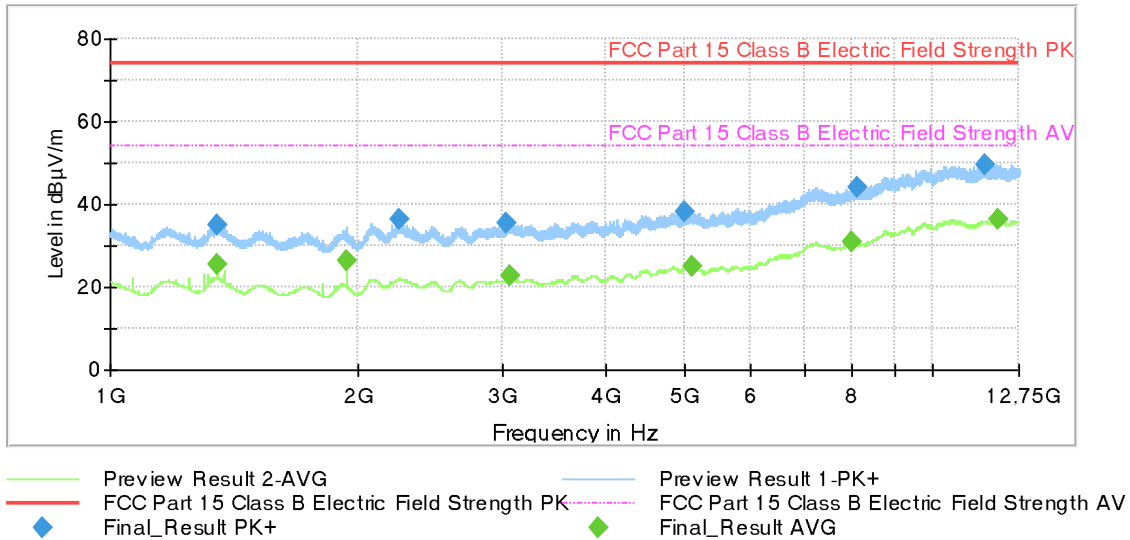


Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1341.200000	35.63	---	73.97	38.34
1350.000000	---	25.41	53.97	28.56
1937.600000	---	26.49	53.97	27.48
2268.000000	35.05	---	73.97	38.92
3057.200000	---	22.38	53.97	31.59
3141.200000	35.65	---	73.97	38.32
4852.800000	38.25	---	73.97	35.72
5099.600000	---	24.91	53.97	29.06
7997.600000	---	30.81	53.97	23.16
8107.200000	44.66	---	73.97	29.31
11570.400000	49.57	---	73.97	24.40
12042.800000	---	36.22	53.97	17.75

Project: 61876REM.002A1
Company: HED
Sample: 02
Operation mode: 02
Graphical code: RE0202HR
Description: EUT ON. Charging battery. Power supply: 5 Vdc using an auxiliary AC/DC adapter.
Verdict: Passed

Full Spectrum



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1350.000000	---	25.30	53.97	28.67
1350.000000	35.00	---	73.97	38.97
1937.600000	---	26.18	53.97	27.79
2246.000000	36.36	---	73.97	37.61
3036.800000	35.60	---	73.97	38.37
3062.400000	---	22.55	53.97	31.42
4998.000000	38.19	---	73.97	35.78
5097.600000	---	25.09	53.97	28.88
7999.200000	---	30.96	53.97	23.02
8115.600000	44.12	---	73.97	29.85
11628.400000	49.68	---	73.97	24.29
12038.800000	---	36.26	53.97	17.71

FCC CFR 47, Part 15, Subpart B y C (10-1-19 Edition) Secs. 15.107 and 15.207 &
ICES-003 Issue 7 (October 2020)
Conducted emission

Limits of interference Class B

The applied limit for continuous conducted emissions in power leads in the frequency range 0,15 to 30 MHz, for Class B equipment is:

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

RESULTS

CCmmnnhh	Description	Result
CC01020N	Range: 150kHz – 30MHz. Neutral AC wire noise.	P
CC0102L1	Range: 150kHz – 30MHz. Phase AC wire noise.	P

mm: Sample number; nn: Operation mode; hh: Wire

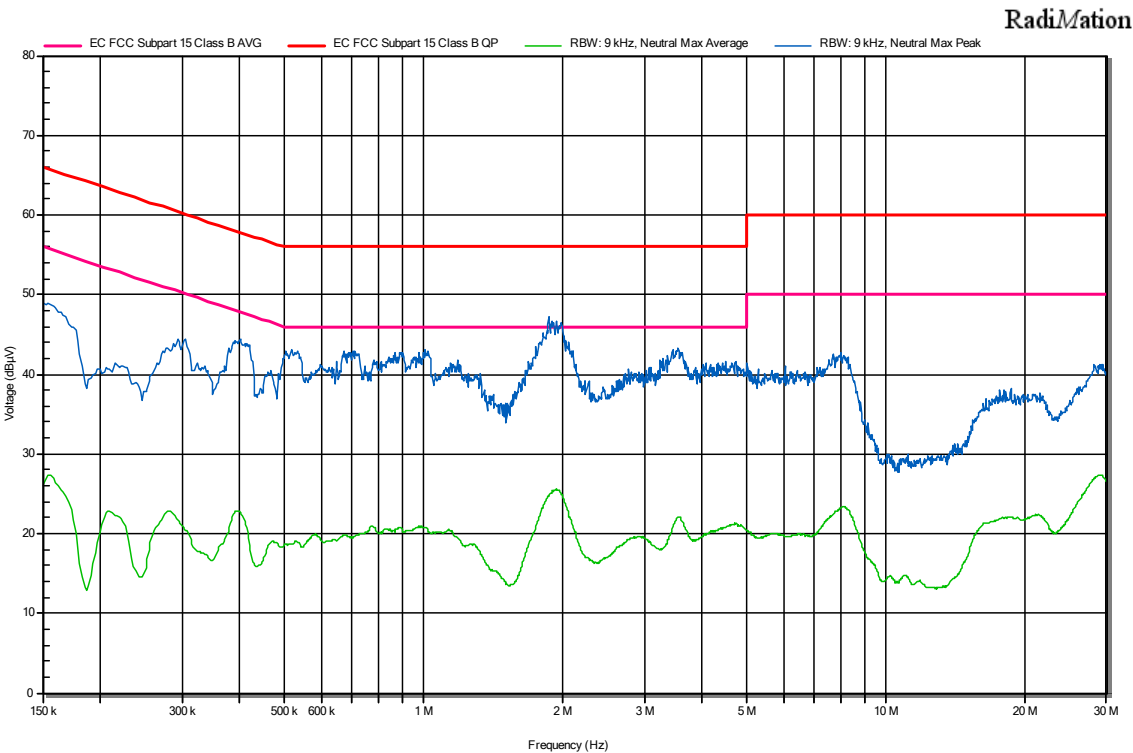
VERDICT

Pass

Images:

Project: 61876REM.002A1
Company: HED
Sample: 01
Operation mode: 02
Graphical code: CC01020N
Description: EUT ON. Charging battery. Power supply: 5 Vdc using an auxiliary AC/DC adapter.
Verdict: Passed

FCC Part 15 150 kHz – 30 MHz Class B



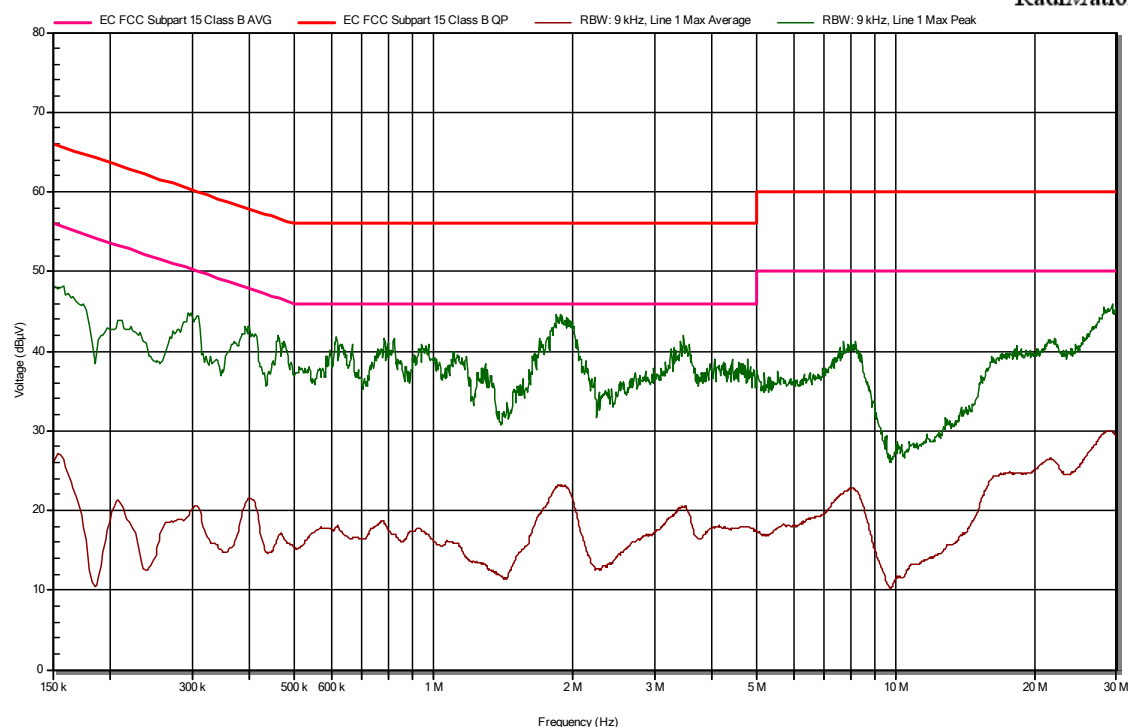
Subrange Maxima

Frequency	PK+ _CLRWR	AVG_CLRWR	Line
399,451 kHz	44,2 dBµV	22,8 dBµV	N
532,355 kHz	43 dBµV	18,9 dBµV	N
716,376 kHz	42,4 dBµV	19,8 dBµV	N
773,627 kHz	40,9 dBµV	20,9 dBµV	N
1,015 MHz	42,6 dBµV	20,6 dBµV	N
1,185 MHz	41,8 dBµV	19,2 dBµV	N
1,865 MHz	47,3 dBµV	24,7 dBµV	N
1,929 MHz	46,6 dBµV	25,6 dBµV	N
3,532 MHz	43 dBµV	21,9 dBµV	N
4,166 MHz	41,1 dBµV	20 dBµV	N

Project: 61876REM.002A1
Company: HED
Sample: 01
Operation mode: 02
Graphical code: CC0102L1
Description: EUT ON. Charging battery. Power supply: 5 Vdc using an auxiliary AC/DC adapter.
Verdict: Passed

FCC Part 15 150 kHz – 30 MHz Class B

RadiMation



Subrange Maxima

Frequency	PK+ _CLRWR	AVG _CLRWR	Line
299,261 kHz	44,8 dBμV	20,1 dBμV	L1
393,317 kHz	42,6 dBμV	21,1 dBμV	L1
460,791 kHz	42 dBμV	16,7 dBμV	L1
614,142 kHz	41,7 dBμV	17,8 dBμV	L1
781,805 kHz	41,6 dBμV	18,3 dBμV	L1
943,335 kHz	40,9 dBμV	17,4 dBμV	L1
1,103 MHz	39,9 dBμV	15,8 dBμV	L1
1,9 MHz	44,4 dBμV	22,9 dBμV	L1
3,466 MHz	41,9 dBμV	20,1 dBμV	L1
28,931 MHz	44,7 dBμV	29,9 dBμV	L1