Radio Frequency Exposure Evaluation Report

FOR:
Philips Respironics

Model Number:
LAX410H15C, LAX420H15C,
LAX520H15C, ARX410H15C,
ARX420H15C, ARX520H15C

Product Description:
CPAP machine with integral Cell modem and BT

FCC ID: THO1141623

Per:
CFR Part Part1 (1.1307 &1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General RF Exposure Guidance v06

Report number: EMC_PHIL4_089_21001_FCC_ISED_MPE_Rev1

DATE: 2021-11-12

***CETECOM* Inc.**
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1 Assessment

This RF Exposure evaluation report provides evidence for compliance of the below identified device with the RF Exposure limits for mobile devices as defined in FCC CFR Part 1 (1.1307 &1.1310) and Part 2 (2.1091) under worst case conditions (measured or rated RF output power, antenna gain, distance towards human body, multiple transmitter information as presented by the applicant).
In addition, maximum antenna gain or minimum distance towards the human body is calculated respectively, where relevant.

The device meets the limits as stipulated by the above given FCC and IC rule parts based on available specifications for worst case conditions at 20cm distance to the body.

Company	Description	Model #
Philips Respironics	CPAP machine with integral Cell modem and BT	LAX410H15C LAX420H15C LAX520H15C ARX410H15C ARX420H15C ARX520H15C

Report reviewed by: TCB Evaluator

Date	Section	Name	Signature
2021-11-12	Compliance	Kevin Wang (EMC Lab Manager)	kevin.wang@cetecom.com Digitally signed by: kevin.wang@cetecom.com DN: CN = kevin.wang@cetecom.com Date: 2021.11.15 15:47:35 -08'00'

Responsible for the Report:

Date	Section	Name	Signature
2021-11-12	Compliance	Cheng Song (EMC Engineer)	cheng.song@cetecom.com Digitally signed by: cheng.song@cetecom.com DN: CN = cheng.song@cetecom.com Date: 2021.11.15 14:52:40 -08'00'

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
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Lab Manager:	Kevin Wang
Responsible Project Leader:	Cathy Palacios

2.2 Identification of the Client / Manufacturer

Client's Name:	Philips Respironics
Street Address:	6501 Living Place
City/Zip Code	Pittsburgh, PA 15206
Country	USA

Identification of the Manufacturer

Manufacturer's Name:	Same as Client
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment under Assessment

Marketing name:	DreamStation 2 Advanced Auto CPAP
HW Version :	01
SW Version :	V1.0.0.3212
Regulatory Band:	❖ **Cellular Module:** ▪ GSM 850: 824.2 ~ 848.8 MHz ▪ GSM 1900: 1850.2 ~ 1909.8 MHz ▪ WCDMA/UMTS FDD BAND II: 1852.4 ~ 1907.6 MHz ▪ WCDMA/UMTS FDD BAND V: 826.4 ~ 846.6 MHz ❖ **BTLE:** ▪ Nominal band: 2400 MHz – 2483.5 MHz; ▪ Center to center: 2402 MHz (ch 0) – 2480 MHz (ch 39), 40 channels
Integrated Module Info:	❖ **Cellular Module:** ▪ Module name: u-blox ▪ Model number: SARA-U201 ▪ FCC ID: XPY1CGM5NNN ❖ **BTLE:** ▪ Module name: Dialog DA14585
Antenna Type:	❖ **Cellular:** ▪ Antenna maximum gain: o GSM 850: 0.8 dBi o GSM 1900: 3.2 dBi o UMTS II: 3.2 dBi o UMTS V: 0.8 dBi ❖ **BTLE:** ▪ Antenna gain: 2.81 dBi
Maximum Conducted Output Power:	❖ **Cellular:** From modular grant [dBm]: ▪ GSM 850: 32.4 ▪ GSM 1900: 29.8 ▪ UMTS II: 23.6 ▪ UMTS V: 24.1 ❖ **BTLE:** From modular grant [dBm]: 9.3
Power Supply/ Rated Operating Voltage Range:	10.8 V (min) / 13.2 V (max) / 12 V (nom)

Operating Temperature Range:	Tmin: 5 ºC / Tmax: 35 ºC / Tnom: 21 ºC
Sample Revision:	☐Prototype Unit; ■Production Unit; ☐Pre-Production

4 RF Exposure Limits and FCC and IC Basic Rules

For the specific described radio apparatus the following basic limits and rules apply for both, FCC and IC where not indicated differently.

4.1 Power Density Limits acc. to FCC 1.1310(e) / RSS-102 i5, cl. 4:

FCC

Frequency Range (MHz)	Power density (mW/cm²)	Averaging time (minutes)
300 – 1500	f (MHz) /1500	30
1500 – 100000	1.0	30

IC

300 – 6000	0.02619 x f (MHz) $^{0.6834}$	6

4.2 Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.1091(c) / RSS-102, cl. 2.5 (rounded to 1 decimal point):

FCC
operating frequency < 1.5GHz: excluded if ERP < 1.5W / 31.8dBm (EIRP: 33.9 dBm);
operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm (EIRP: 36.9 dBm);

IC
300MHz < = operating frequency < 6 GHz: excluded if EIRP < 0.0131 x f (MHz) $^{0.6834}$ W

4.3 RF Exposure Estimation (MPE Estimation)

Having available the source based average output power and peak antenna gain or the ERP/EIRP of the specified device and for a known minimum distance of its radiating structures from the body of persons according to its use cases (at least 20cm) the power density at that distance can be estimated by the following formula for plane-wave equivalent conditions (far-field conditions), when ground reflection is neglected.

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (mW/cm² or W/m²)
P = power input to the antenna (mW or W)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (cm or m)

5 Evaluations

5.1 Analysis of RF Exposure for simultaneous transmission

- Evaluations are based on worst case power density limits for Canada.
- Calculations are made for 20cm.
- Evaluations are based on ERP/EIRP measured or calculated from known gain and conducted output power.
- Cellular can transmit simultaneously with BTLE.

Band of Operation (MHz)			Conducted Power	Antenna Gain	EIRP (dBm)	EIRP In W	Max Duty Cycle	Distance (m)	Power Density (W/m^2)		Optional for Co-Transmission % of limit used up
									Reference Level	Calculated	
GSM 850			32.50	1.00	33.50	2.24	25.00%	0.20	4.24	1.11	26.25%
824.2	to	848.8									
GSM 1900			30.50	1.00	31.50	1.41	25.00%	0.20	9.55	0.70	7.36%
1850.2	to	1909.8									
UMTS II			23.00	2.00	25.00	0.32	100.00%	0.20	9.55	0.63	6.59%
1850	to	1910									
UMTS V			23.00	2.00	25.00	0.32	100.00%	0.20	4.25	0.63	14.83%
824	to	849									
BTLE			9.30	2.81	12.11	0.02	100.00%	0.20	10.00	0.03	0.32%
2402	to	2480									

5.2 Conclusion:

The worst-case simultaneous transmission is GSM 850 simultaneous with BTLE, which is using 26.57 of a limit of 100%. The equipment is passing RF exposure requirements for 20cm distance.

6 Revision History

Date	Report Name	Changes to report	Prepared by
2021-07-14	EMC_PHIL4_089_21001_FCC_ISED_MPE	Initial Release	Cheng Song
2021-11-12	EMC_PHIL4_089_21001_FCC_ISED_MPE_Rev1	Updated section 5 Evaluations	Cheng Song

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