Radio Frequency Exposure Evaluation Report

FOR:
Philips Respironics

Model Number:
DSX510H11C, DSX510T11C, DSX520H11C, DSX520T11C, DSX420H11C, DSX420T11C, DSX410H11C, DSX410T11C, VAX520H21C, VAX520T21C, VAX520T21C15, DSX520T11C15

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
ISEDC RSS-102 Issue 5

Report number: EMC_PHIL4-100-21001_FCC_ISED_MPE

DATE: 2021-09-13

***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), Part 2 (2.1091) and IC standard RSS-102 issue 5 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	DSX510H11C, DSX510T11C, DSX520H11C, DSX520T11C, DSX420H11C, DSX420T11C, DSX410H11C, DSX410T11C, VAX520H21C, VAX520T21C, VAX520T21C15, DSX520T11C15

Report reviewed by: TCB Evaluator

Date	Section	Name	Signature
2021-09-13	Compliance	Kevin Wang (EMC Lab Manager)	

Responsible for the Report:

Date	Section	Name	Signature
2021-09-13	Compliance	Cheng Song (EMC Engineer)	cheng.song@cetecom.com Digitally signed by: cheng.song@cetecom.com DN: CN = cheng.song@cetecom.com Date: 2021.09.13 20:13:21 -07'00'

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
Fax:	+1 (408) 586 6299
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

Model name:	DSX510H11C, DSX510T11C, DSX520H11C, DSX520T11C, DSX420H11C, DSX420T11C, DSX410H11C, DSX410T11C, VAX520H21C, VAX520T21C, VAX520T21C15, DSX520T11C15
FCC ID	THO1141623
HW Version :	10
SW Version :	V1.0.3.3690
Product Marketing Name (PMN):	DreamStation 2 Advanced Auto CPAP
Radios included in the device	❖ **Cellular:** • Model Name: u-blox • Model Number: SARA-R410M-02B • FCC ID: XPY2AGQN4NNN • IC ID: 8585A-2AGQN4NNN • Frequency of Operation: LTE 2 / LTE 4 / LTE 5 / LTE 12 / LTE 13 ❖ **Bluetooth:** • Bluetooth 5.0 Low Energy: Dialog DA14585 • Nominal band: 2400 MHz – 2483.5 MHz; • Center to center: 2402 MHz (ch 0) – 2480 MHz (ch 39), 40 channels
Antenna Type:	❖ **Cellular:** • Antenna maximum gain: o LTE 2: 3.2 dBi o LTE 4: 3.4 dBi o LTE 5: 1.0 dBi o LTE 12: 1.4 dBi o LTE 13: 2 dBi ❖ **BTLE:** • Antenna gain: 2.81 dBi
Maximum Conducted Output Power:	❖ **Cellular:** • From modular grant [Watts]: o LTE 2: 0.302 o LTE 4: 0.2399 o LTE 5: 0.3162

	o LTE 12: 0.2399 o LTE 13: 0.2818 ❖ **BTLE:** From modular grant [Watts]: 0.0085
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.

Radio	**freq MHz**	MaxPower **W** conducted from module grant	MaxPower from module grant convert to **dBm**	Ant Gain dbi	Ant Gain lin	EIRP W calculated	Canda W/m2	US W/m2	Actual W/m2	How much of limit is used up
LTE 2	1850	0.302	24.800	3.2	2.09	0.631	4.476	10.000	1.255	28.04%
LTE 4	1732.5	0.2399	23.800	3.4	2.19	0.525	4.280	10.000	1.044	24.39%
LTE 5	824	0.3162	25.000	1	1.26	0.398	2.576	5.493	0.792	30.72%
LTE 12	707.5	0.2399	23.800	1.4	1.38	0.331	2.321	4.717	0.659	28.36%
LTE 13	777	0.2818	24.499	2	1.58	0.447	2.474	5.180	0.889	35.89%
BT-LE	2402	0.00850	9.294	2.81	1.91	0.016	5.351	10.000	0.032	0.60%

5.2 Conclusion:

The worst-case simultaneous transmission is LTE 13 simultaneous with BTLE, which is using 36.49% 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
2021-08-18	EMC_PHIL4-100-21001_FCC_ISED_MPE	Initial Release	Cheng Song

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