Radio Frequency Exposure Evaluation Report

FOR:
Philips Respironics

Model Number:
DSX510H11C, DSX510T11C, DSX520H11C, DSX520T11C

Product Description:
Continuous Airway Pressure Device with integrated Bluetooth (LE) and Cellular Radios (LTE Cat M1) that sends and receives data.

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_PHIL4-064-20001_FCC _MPE

DATE: 2020-04-08

***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 rule parts based on available specifications for worst case conditions at 20cm distance to the body.

Company	Description	Model #
Philips Respironics	Continuous Airway Pressure Device with integrated Bluetooth (LE) and Cellular Radios (LTE Cat M1) that sends and receives data	DSX510H11C, DSX510T11C, DSX520H11C, DSX520T11C

Report reviewed by: TCB Evaluator

Date	Section	Name	Signature
2020-04-08	Compliance	Cindy Li (Lab Manager)	Cindy Li Digitally signed by cindy.li@cetecom.com DN: CN=cindy.li@cetecom.com Reason: I am approving this document Location: Date: 2020-04-10 17:05:04

Responsible for the Report:

Date	Section	Name	Signature
2020-04-08	Compliance	Yuchan Lu (Test Engineer)	Yuchan Lu Digitally signed by: Yuchan Lu DN: CN = Yuchan Lu email = Yuchan.Lu@cetecom.com C = US O = CETECOM Inc. OU = EMC Date: 2020.04.08 16:07:19 -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
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Lab Manager:	Cindy Li
Responsible Project Leader:	Cathy Palacios

2.2 Identification of the Client / Manufacturer

Client's Name:	Philips Respironics
Street Address:	1740 Golden Mile Highway
City/Zip Code	Monroeville, PA 15146
Country	USA

2.3 Identification of the Applicant

Applicant's Name:	Philips Respironics
Street Address:	1001 Murry Ridge Lane
City/Zip Code:	Murrysville, PA 15668
Country:	USA

2.4 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 :	05
SW Version :	D1.0.0.1524
Firmware Version Identification Number (FVIN):	N/A
Hardware Version Identification Number (HVIN):	DSX510H11C, DSX510T11C, DSX520H11C, DSX520T11C
Product Marketing Name (PMN):	DreamStation 2 Advanced Auto CPAP
Regulatory Band:	❖ **Cellular Module:** ▪ LTE BAND 2: 1850 ~ 1910 MHz ▪ LTE BAND 4: 1710 ~ 1755 MHz ▪ LTE BAND 5: 824 ~ 849 MHz ▪ LTE BAND 12: 699 ~ 716 MHz ▪ LTE BAND 13: 777 ~ 787 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-R410M-02B ▪ FCC ID: XPY2AGQN4NNN ❖ **BTLE:** ▪ Module name: Dialog ▪ Module number: DA14585
Antenna Type:	❖ **Cellular:** ▪ Antenna maximum gain: o LTE Band 2: 3.0 dBi o LTE Band 4: 3.0 dBi o LTE Band 5: 2.0 dBi o LTE Band 12: 1.0 dBi o LTE Band 13: 2.0 dBi

	❖ **BTLE:** ▪ Antenna gain: o Low channel 2402 MHz: 2.37 dBi o Mid channel 2440 MHz: 2.81 dBi o High channel 2480 MHz: 1.92 dBi
Maximum Conducted Output Power:	❖ **Cellular:** From modular grant [Watts]: ▪ LTE Band 2: 0.302 ▪ LTE Band 4: 0.245 ▪ LTE Band 5: 0.316 ▪ LTE Band 12: 0.269 ▪ LTE Band 13: 0.275 ❖ **BTLE:** From measurement [Watts]: 0.00117
Power Supply/ Rated Operating Voltage Range:	Low 10.8VDC, Nominal 12VDC, High 13.2VDC
Operating Temperature Range:	Low 5° C, Nominal 21° C, High 35° C
Sample Revision:	☐Prototype Unit; ☐Production Unit; ■Pre-Production

4 RF Exposure Limits and FCC Basic Rules

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

4.1 Power Density Limits acc. to FCC 1.1310(e):

FCC

Frequency Range (MHz)	Power density (mW/cm^2)	Averaging time (minutes)
300 – 1500	f (MHz) /1500	30
1500 – 100000	1.0	30

4.2 Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.1091(c) (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);

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/cm^2 or W/m^2)
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 USA.
- 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]	Max Conducted power [W]	Max Conducted power + tune up tolerance [W]	Gain [dBi]	Gain [lin]	EIRP [W]	FCC LImit [W/m2]	Actual [W/m2][1]	How much of limit is used up
LTE 2	1850	0.302	0.316	3	2.00	0.631	10.000	1.254	12.54%
LTE 4	1710	0.245	0.316	3	2.00	0.631	10.000	1.254	12.54%
LTE 5	824	0.316	0.316	2	1.58	0.501	5.493	0.996	18.13%
LTE 12	699	0.269	0.316	1	1.26	0.398	4.660	0.791	16.97%
LTE 13	777	0.275	0.316	2	1.58	0.501	5.180	0.996	19.23%
BTLE	2402	0.00117	0.00117	2.81	1.91	0.002	10.000	0.004	0.04%

Note1：The calculation is based on the distance of 20cm

5.2 Conclusion:

The worst-case simultaneous transmission is LTE 13 simultaneous with BTLE, which is using 19.27 of a limit of 100%. The equipment is passing RF exposure requirements for 20cm distance.

6 Revision History

Date	Report Name	Changes to report	Report prepared by
2020-04-08	EMC_PHIL4-064-20001_FCC_MPE	Initial Release	Yuchan Lu

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