Radio Frequency Exposure Evaluation Report

For

Philips Respironics Inc.

Philips Dream Station

Continuous Airway Pressure Device
with Bluetooth radio module FCC ID: THO1116426, IC ID: 3234B-1116426, Model: 1116426

in combination with

Dream Station Cellular Modem (CDMA)
with Gemalto CDMA module FCC ID: QIPPCS3

or

Dream Station Wi-Fi Accessory
with AzureWave Technologies Wi-Fi module FCC ID: TLZ-CU288

Applied Rules and Standards

CFR Part Part 1 (1.1307 &1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General 24 RF Exposure Guidance v05r02

Industry Canada RSS-102, Issue 5 of March 2013

Report number: EMC_PHIL4-007-14001_MPE

DATE: 06-17-2015

1 Administrative Data

1.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
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Compliance Manager:	Franz Engert
Responsible Project Leader:	Yu-Chien Ho

1.2 Identification of the Client / Manufacturer

Manufacturer's Name:	Respironics Inc. (Philips Respironics)
Manufacturers Address:	1001 Murry Ridge Lane
City/Zip Code	Murrysville, PA 15668
Country	USA
Contact Person:	Jonathan Kurtz
Phone No.	724-387-7578
e-mail:	Jonathan.Kurtz@Philips.com

2 Equipment under Assessment

Marketing Name / Model No:	CPAP Device: 700x110 (US) & 700x120 (Canada) WLAN Radio: 100700W (US) & 100710W (Canada)
HW Version :	00
FCC-ID :	THO1116426
IC-ID:	3234B-1116426 / M/N: 1116426
Product Description:	Bluetooth modular radio transmitter (BDR/EDR and LE) incorporated in the Continuous Airway Pressure Device (Philips Dream Station); **Note: subject to this RF exposure evaluation report is the co-location of the Bluetooth modular radio (BT BTR/EDR or LE mode) located on the mother board of the host device (the Philips Dream Station) with either the Wi-Fi modular transmitter (FCC ID: TLZ-CU288) as incorporated in the Dream Station Wi-Fi Accessory or with the CDMA modular transmitter (FCC ID: QIPPCS3) as incorporated in the Dream Station Cellular Modem Accessory;**
Frequency Range / number of channels:	Bluetooth: Nominal band: 2400 – 2483.5; Center to center: LE: 2402 (Ch.0) – 2480 (Ch.39), 40 channels Center to center: BDR/EDR: 2402 (Ch.0) – 2480 (Ch.78), 79 channels WLAN 802.11b/g/n: Nominal band: 2400 – 2483.5; Ch. 1, 2412 MHz to Ch. 11, 2462 MHz, 11 channels. CDMA: 850 MHz: 825.03-848.97; 799 channels 1900 MHz: 1850.05-1909.95; 1199 channels
Type(s) of Modulation:	Bluetooth: GFSK, π /4 DQPSK, 8DPSK Wi-Fi: IEEE 802.11 b/g/n: CCK, BPSK, QPSK, 16QAM, 64QAM CDMA
Antenna Information as declared:	Bluetooth: internal, 1.5 dBi Wi-Fi: internal, 3.17 dBi CDMA: internal, 2 dBi
Max. Output Powers:	Bluetooth: 4.1 dBm, avg, eirp, rated Wi-Fi: 18.53 dBm, avg, conducted, measured CDMA: 25dBm, avg, conducted, measured
Co-located Transmitters/ Antennas?	■ Yes (Bluetooth and WiFi or Bluetooth and CDMA) ☐ No
Device Category:	■ Fixed Installation ☐ Mobile (mark mobile if both possible) ☐ Portable ☐ mixed Mobile and Portable
Exposure Category:	☐ Occupational/ Controlled ■ General Population/ Uncontrolled
Test Sample Status:	Production

3 Assessment

This RF Exposure evaluation report provides information about 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 given 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.

Company	Description	Model #
Philips Respironics Inc.	Continuous Airway Pressure Device with Bluetooth modular radio (BDR/EDR)	700x110 (US) 700x120 (Canada)
Philips Respironics Inc.	Cellular Modem Accessory with CDMA modular radio	100600C (US) 100610C (Canada)
Philips Respironics Inc.	Wi-Fi Accessory with Wi-Fi modular radio	100700W (US) 100710W (Canada)

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2015-06-17	Compliance	Franz Engert (Compliance Manager)	Digitally signed by Franz Engert DN: cn=Franz Engert, c=US, o=CETECOM, ou=Complience, email=franz.engert@cetecom.com Date: 2015.06.17 18:52:37 -07'00'

Responsible for the Report:

Date	Section	Name	Signature
2015-06-17	Compliance	Kris Lasarov (EMC Engineer)	Kris Lazarov Digitally signed by Kris Lazarov DN: cn=Kris Lazarov, o=CETECOM, ou, email=kris.lazarov@cetecom.com, c=US Date: 2015.06.17 18:56:58 -07'00'

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/cm^2)	Averaging time (minutes)
300 – 1500	f (MHz) /1500	30
1500 – 100.000	1.0	30

IC

300 – 6000	0.02619 x f (MHz) $^{0.6834}$	6
1500 – 100.000	1.0	30

4.2 Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.109(c) / RSS-102, cl. 2.5 (rounded to 1 decimal point):

FCC
operating frequency < 1.5GHz: excluded if ERP < 1.5W / 31.8dBm;
operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm;

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

4.3 EMC Output Power Limits (ERP/EIRP) acc. to FCC part 22/24 / IC RSS-132, RSS-133 (to be additionally taken into account for maximum antenna gain considerations)

part 22: 7W ERP / 38.5dBm (IC: 11.5W / 40.6dBm EIRP)
part 24: 2W EIRP / 33.0dBm

Per KDB 447498 D01 FCC allows calculative estimation of RF exposure for mobile applications when routine environmental evaluation categorical exclusion applies and also for fixed applications.
When categorical exclusion can not be claimed for mobile applications MPE measurement is required for TCB approval.

RSS-102 of Industry Canada does generally not require RF exposure evaluation for fixed or mobile applications which stay below the given exclusion limits.

4.4 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 it's radiating structures from the body of persons according to it's 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 Routine Environmental Evaluation Applicability

Based on the maximum output power test results from the associate emc report provided with this filing or on the declared maximum tune-up tolerance and documented peak antenna gain values.

Transmission Mode	**max. EIRP**	**duty cycle**	**total EIRP simul taneous trans missions intra-band (worst cases only)**	**FCC / IC Limits for** Routine Environmental Evaluation Applicability, EIRP	**excluded?**
	dBm	%	dBm	dBm	
Bluetooth (LE)	4.1	<100	n.a.	36.9 / 34.3	yes
CDMA 850	27.0	100	n.a.	33.9 / 31.1	yes
CDMA 1900	27.0	100	n.a.	36.9 / 33.5	yes
WLAN 2.4 GHz	21.7	<100	n.a.	36.9 / 34.3	yes

Result: The co-located transmitters under consideration are all categorically excluded from Routine Environmental Evaluation.

5.2 Compliance with MPE (Power Density) limits

Limits:
Smax @ 824MHz = 0.55mW/cm^2 (824MHz is worst case);
Smax @ 1850MHz and @ 2400MHz = 1.0mW/cm^2;

The highest power density is resulting from the formula: $S = EIRP / 4*\pi*r^2$;
The power density is calculated for the minimum distance r = 20cm;

Highest source base time averaged EIRP with Bluetooth: 4.1 dBm;
Resulting maximum power density at 2400MHz: **S(2400MHz) = 0.0005 mW/cm^2**

Highest source base time averaged EIRP with WLAN 2.4GHz: 21.7 dBm;
Resulting maximum power density at 2400MHz: **S(2400MHz) = 0.03 mW/cm^2**

Highest source base time averaged EIRP with CDMA 850 and 1900 MHz: 27.0 dBm;
Resulting maximum power density at 850MHz: **S(850MHz) = 0.10 mW/cm^2**

Result: The equipment (the Philips Dream Station Wi-Fi as well as CDMA Accessory) the fulfills the related MPE limits for the minimum distance between the antenna and the human body of 20cm.

5.3 Simultaneous Transmission MPE Test Exclusion (per KDB 447498 D01)

Possible simultaneous transmissions: Bluetooth and Wi-Fi or Bluetooth and CDMA.

Power density to the limit ratio for the Bluetooth transmitter: 0.0005 mW/cm^2 / 1.0 mW/cm^2 = 0.0005;

Power density to the limit ratio for the WLAN transmitter: 0.03 mW/cm^2 / 1.0 mW/cm^2 = 0.03;

Highest power density to the limit ratio for the CDMA transmitter: 0.1 mW/cm^2 / 0.55 mW/cm^2 = 0.18;

Σ of Power Density (MPE) ratios Bluetooth/Wi-Fi co-location = 0.0005 + 0.03 = 0.0305 < 1

Σ of Power Density (MPE) ratios Bluetooth/CDMA co-location = 0.0005 + 0.18 = 0.1805 < 1

Result: The equipment is excluded from simultaneous transmission MPE test.

5.4 Maximum allowed Antenna Gain – Gmax

not applicable since fixed internal antennae is used in the product (the Philips Dream Station Wi-Fi as well as CDMA Accessory).

6 Revision History

Date	Report Name	Changes to report	Report prepared by
2015-06-17	EMC_PHIL4-007-14001_MPE	First Version	Douglas Antioco