Radio Frequency Exposure Evaluation Report

FOR:
Philips-Respironics

Model Name:
1116426

Product Description:
Pressure Device with Bluetooth Radio (BDR/EDR) and LTE CAT M cellular modem in accessory, sends and receives data.

FCC ID: THO1116426
IC ID: 3234B-1116426

Per:
CFR Part1 (1.1307 &1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General RF Exposure Guidance v06
ISED RSS-102 Issue 5

Report number: EMC_PHIL4_051_19001_FCC_ISED_MPE

DATE: 6/17/2019

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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 Part1 (1.1307 &1.1310), Part 2 (2.1091) and IC standard ISED 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 Name
Philips-Respironics	Pressure Device with Bluetooth Radio (BDR/EDR)	1116426

Specifically this report shows that the product fulfills the radiated emission requirements when operating in simultaneous transmission mode, when plugged into a common host together with following radio module:

Company	Description	Model Name
Philips-Respironics	LTE CAT M cellular modem in accessory, sends and receives data.	200606C Parent & 200607C Variant

Based on client declaration, only differences in same carrier models is one is a diminutive version where parts are not stuffed to remove a USB port

Report reviewed by:

Date	Section	Name	Signature
6/17/2019	Compliance	Cindy Li (Lab Manager)	Cindy Li Digitally signed by Cindy Li DN: cn=Cindy Li, o=Cetecom Inc., ou=EMC, email=cindy.li@cetecom.com, c=US Date: 2019.06.17 18:45:12 -07'00'

Responsible for the Report:

Date	Section	Name	Signature
6/17/2019	Compliance	Issa Ghanma (EMC Engineer)	Digitally signed by: Issa Ghanma DN: CN = Issa Ghanma email = issa.ghanma@cetecom.com C = US O = CETECOM INC. OU = EMC Date: 2019.06.17 16:53:20 -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:	Cindy Li
Responsible Project Leader:	Cathy Palacios

2.2 Identification of the Client / Manufacturer

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

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as client.
Manufacturers Address:	----------
City/Zip Code	----------
Country	----------

3 Equipment under Assessment

Model name:	1116426
Module name:	Broadcom in DreamStation
FCC ID:	THO1116426
IC ID:	3234B-1116426
Power Supply/ Rated Operating Voltage Range:	❖ DELTA ELECTRONICS, INC. ▪ S/N : 70HW85E086A ▪ AC/DC ADAPTER ▪ MODEL : MDS-080AAS12 A C.C.:A ▪ INPUT : 100-240V~50-60Hz 2.0-1.0A ▪ OUTPUT : 12V ⎓ 6.67A
Integrated Module Info:	❖ **Cellular:** ▪ Module name : U-blox CAT M1 Modem ▪ Model number : SARA-R410M-02B-01 ▪ FCC ID : XPY2AGQN4NNN ▪ IC ID : 8595A-2AGQN4NNN ▪ IMEI : 352753092205330 ▪ PMN : DreamStation Cellular Modem ▪ H.W Version : 200606C Parent & 200607C Variant ▪ S.W Version : V3.00.04 ❖ **Bluetooth (BDR\EDR) and LE:** same as host.
DreamST sutoSV H/HT, DS S/N:	J22657340BAB2
DreamStation Hum Core Pack DOM S/N:	H2264660179E3
H.W Version:	00
S.W Version:	B0.0.0.2061
Regulatory Band:	❖ **Cellular Module:** ▪ LTE Band 2 : 1850 ~ 1910 MHz ▪ LTE Band 4 : 1710 ~ 1755 MHz ▪ LTE Band 5 : 824.0 ~ 849 MHz ▪ LTE Band 12 : 699 ~ 716 MHz ❖ **Bluetooth BDR/EDR:** ▪ 2402 MHz (ch0) ~ 2480 MHz (ch79), 80 channels. ❖ **Bluetooth low energy:** ▪ 2402 MHz (ch0) ~ 2480 MHz (ch39), 40 channels

Antenna Type:	❖ **Cellular:** ▪ Printed on Case ▪ Gain (dBi): o LTE Band 2 : 3.1 o LTE Band 4 : 4.2 o LTE Band 5 : -1.26 o LTE Band 12 : -0.8 ❖ **Bluetooth (BDR\EDR) & LE:** ▪ PCB Trace 1.5 dBi
Maximum Conducted Output Power:	❖ **Cellular:** From modular grant [Watts]: ▪ LTE Band 2 : 0.316 ▪ LTE Band 4 : 0.316 ▪ LTE Band 5 : 0.316 ▪ LTE Band 12 : 0.316 ❖ **Bluetooth (BDR\EDR) & LE:** ▪ 0.004 dBi
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 – 100.000	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 2.109(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);
operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm (EIRP: 36.9);

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 Evaluation

5.1 Analysis to Exclude Routine RF Exposure evaluation for Stand Alone Operation

Band	Lowest frequency [MHz]	Max.Power Conducted [dBm \ W]	EIRP [dBm \ W]	FCC EIRP limit [dBm]	ISED EIRP limit [W]	Verdict
LTE 2	1850	25.0 \ 0.316	28.10 \ 0.645	36.90	2.239	Complies
LTE 4	1710	25.0 \ 0.316	29.20 \ 0.831	36.90	2.122	Complies
LTE 5	824	25.0 \ 0.316	23.74 \ 0.236	33.90	1.288	Complies
LTE 12	699	25.0 \ 0.316	24.20 \ 0.263	33.90	1.151	Complies
BT	2402	5.13 \ 0.004	6.63 \ 0.006	36.90	2.676	Complies

The single radios are exempt from routine environmental evaluation.

6 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 EIRP measured or calculated from known gain and conducted output power.
- Cellular can transmit simultaneously with Bluetooth radio.

Band	Lowest frequency [MHz]	Max.Power Conducted [W]	EIRP [W]	Actual [W/m2]	FCC [W/m2]	ISED [W/m2]	How much of limit is used up [%]
LTE 2	1850	0.316	0.645	1.284	10.0	4.476	28.67
LTE 4	1710	0.316	0.831	1.654	10.0	4.242	38.98
LTE 5	824	0.316	0.236	0.629	5.493	2.576	24.41
LTE 12	699	0.316	0.263	0.629	4.66	2.302	27.31
BT	2402	0.004	0.006	0.011	10.0	5.351	0.21

Note: For LTE Bands 5 and 12, the maximum conducted output power used, to establish the worst-case scenario.

Conclusion:

- **The worst case simultaneous transmission is LTE Band 4 simultaneous with Bluetooth BDE\EDR which is using 39.19% of a limit of 100%. The equipment is passing RF exposure requirements for 20cm distance.**

7 Revision History

Date	Report Name	Changes to report	Report prepared by
6/17/2019	EMC_PHIL4_051_19001_FCC_ISED_MPE	Initial Release	Issa Ghanma