RF Exposure Evaluation Report

For NuvoAir AB

Equipment Under Test:

Spirometer transceiver

Model: Air Next 1.0

From The Standards Institution
Of Israel
Industry Division
Electronics & Telematics Laboratory
EMC Branch

ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY

Certificate Number: AT-1359

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1. Applicant information

Applicant:	NuvoAir AB.
Address:	Riddargatan 17D, 3 tr, 114-57, Stockholm, Sweden
Sample for test selected by:	The customer
The date of tests:	7, 10 June 2018

Equipment under test information

Description of Equipment Under Test (EUT):	Spirometer transceiver
Model:	Air Next 1.0
Software version of radio unit:	1.0.0
Hardware version:	2.0
Manufactured by:	NuvoAir AB

2. Test performance

Location:	SII EMC Section
Purpose of test:	Apparatus compliance verification in accordance with requirements identified in the below standards
Test specifications:	47CFR part 1.1310 and 2.1091 FCC KDB 447498 D01 General RF Exposure Guidance v06

This Test Report contains 6 pages and may be used only in full.	This Test Report applies only to the specimen tested and may not be applied to other specimens of the same product.

3. Summary of test:

The EUT was found to comply with requirements of: 47CFR part 1.1310 and 2.1091

Electronics and
Telematics Laboratory

August 2018

Name: Eng. Yuri Rozenberg
Position: Head of EMC Branch.

Name: Michael Feldman.
Position: Test engineer.

4. Equipment under test description.

*The applicant provided description.

4.1 General description

The EUT, is indoor device that act as spirometer. Measure flow and volume using turbine and optical sensors and send the data to mobile device. The device work on primary 2 x 1.5V AAA alkaline batteries. The data transmit via Bluetooth Low Energy (BLE 4.0).

EUT technical characteristics

Transmitter technical characteristics:		Note
Assigned frequency band	2400 MHz – 2483.5 MHz	
Operating frequency range:	2402 MHz – 2480 MHz	
Maximum declare EIRP:	0 dBm	
Bluetooth standard:	BLE 4.0	
Types of modulation:	GFSK	
Antenna information		
Type	**Manufacturer**	**Antenna gain, dBi**
Internal on PCB. Quarter – wavelength.	NuvoAir AB	1.0

5. Maximum Permissible Exposure Limits

5.1 FCC 47 CFR 1.1310

Frequency Range (MHz)	Power Density (mW/cm^2)	Averaging Time (mins)
300-1500	f(MHz)/ 1500	30
1500-100,000	1.0	30

5.2 Power Density Estimation (OET Bulletin 65)

The EUT is defined as module inside portable device designed to be used so that the radiating structure(s) of the device may be used at 20 centimeters distance from the body of the user.
The Power Density (S) around a typical RF source can be estimated using the formula

$$S = EIRP/4\pi R2$$

Where:
EIRP= Equivalent (or effective) Isotropic Radiated Power
R= Distance to the center of radiation of the antenna.

5.3 Test Result

Pt- the transmitted maximum EIRP power = -0.3 dBm = 0.93 mW.
Peak power density for distance 20 cm is $Pt/4\pi r^2 = 0.93\ mW/4\pi*0.2^2 = 0.00019\ mW/cm^2$.
That is less than 1 mW/cm^2 power density limit and the EUT meets the MPE limits of FCC CFR 47 1.1310

5.4 Routine Evaluation Exclusion Limits

FCC 47 CFR 2.1091

Frequency Range (MHz)	ERP
<1500	1.5 W/ 31.8 dBm
>1500	3.0 W/ 34.8 dBm

5.5 Results

Max EIRP= -0.3 dBm

Max ERP= -2.45 dBm

Since the highest ERP/EIRP is below the limits as specified above, the EUT is categorically excluded from routine evaluation.

6. FCC and ISEDC Exemption Limits for Routine Evaluation

6.1 FCC SAR test exclusions per KDB 447498

KDB 447498 D01 General RF Exposure Guidance v06 Section: 4.3.1.
Standalone SAR test exclusion considerations states:
For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR, 30 where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- The values 3.0 and 7.5 are referred to as numeric thresholds.

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

6.2 SAR Exclusion Calculation Results

Freq. [GHz]	d [mm]	Max. power [mW]	Calculation result	FCC Limit @ 5 mm [mW]	SAR Exclusion applicable (Yes/No)
2.4	5	0.93	0.298	3.0	Yes

SAR test exclusion threshold is < 3 for separation distance of 5 mm. Therefore, SAR test is not required.