

Maximum Permissible Exposure Evaluation

FCC ID: 2A23L-NBD-AS60

1. Client Information

Applicant	:	NBDair Inc.
Address	:	1023 Walnut Street, #100,Boulder, CO 80302 U.S.A
Manufacturer	:	NBDair Inc.
Address	:	1023 Walnut Street, #100,Boulder, CO 80302 U.S.A

2. General Description of EUT

EUT Name	:	AirBox	
Models No.	:	NBD-AS60, NBD-AS61, NBD-AS62, NBD-AS63, NBD-AS64, NBD-AS65, NBD-AS66, NBD-AS67, NBD-AS68, NBD-AS69, NBD-AS20, NBD-AS21, NBD-AS22, NBD-AS23, NBD-AS24, NBD-AS25, NBD-AS26, NBD-AS27, NBD-AS28, NBD-AS29, NBD-AS30, NBD-AS31, NBD-AS32, NBD-AS33, NBD-AS34, NBD-AS35, NBD-AS36, NBD-AS37, NBD-AS38, NBD-AS39	
Model Different:	:	All PCB boards and circuit diagrams are the same, the only difference is the color and appearance.	
Product Description	:	Operation Frequency:	802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz
		Number of Channel:	802.11b/g/n(HT20):11 channels 802.11n(HT40): 7 channels
		RF Output Power:	802.11b: 17.284dBm 802.11g: 15.678dBm 802.11n (HT20): 15.643dBm 802.11n (HT40): 14.233dBm
		Antenna Gain:	2.5dBi PCB Antenna
Power Rating	:	For Adapter Input: 100-240V~, 50/60Hz 0.4A Output:12.0V 1.0A	
Software Version	:	N/A	
Hardware Version	:	N/A	
Connecting I/O Port(S)	:	Please refer to the User's Manual	
Remark	:	the MPE report used the EUT (20210915-18_01-2#).	

MPE Calculations for WIFI

1. Antenna Gain:

PCB Antenna:2.5dBi.

2. EUT Operation Condition:

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

3. Exposure Evaluation:

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=(PG)/4\pi R^2$$

Where

S: power density

P: power input to the antenna

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

4. Test Result:

Worst Maximum MPE Result								
Mode	N _{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
802.11b	1	2412	17.284	17±1	18	2.5	20	0.0397
		2437	16.609	16±1	17	2.5	20	0.0315
		2462	16.116	16±1	17	2.5	20	0.0315
802.11g	1	2412	15.678	15±1	16	2.5	20	0.0251
		2437	15.235	15±1	16	2.5	20	0.0251
		2462	14.526	14±1	15	2.5	20	0.0199
802.11n(HT20)	1	2412	15.643	15±1	16	2.5	20	0.0251
		2437	15.007	15±1	16	2.5	20	0.0251
		2462	14.469	14±1	15	2.5	20	0.0199
802.11n(HT40)	1	2422	14.233	14±1	15	2.5	20	0.0199
		2437	13.604	13±1	14	2.5	20	0.0158
		2452	13.387	13±1	14	2.5	20	0.0158

Note:

(1) N_{TX}= Number of Transmit Antennas

(2) RF Output power specifies that Maximum Conducted Peak Output Power.

5. Conclusion:

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

Limits for General Population/ Uncontrolled Exposure

Frequency Range (MHz)	Power density (mW/ cm ²)
300-1,500	F/1500
1,500-100,000	1.0

For 2.4WIFI:2412~2462 MHz

MPE limit S: 1mW/ cm²

The MPE is calculated as $0.0397 \text{ mW} / \text{cm}^2 < \text{limit } 1 \text{mW} / \text{cm}^2$. So, RF exposure limit warning or SAR test are not required.

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b).

The RF Exposure Information page from the manual is included here for reference.

Note

For a more detailed features description, please refer to the RF Test Report.

6. Conclusion:

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

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