

# RF Exposure Evaluation Declaration

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**FCC ID:** 2BAXN-MR0001  
**Applicant:** Willand (Beijing) Technology Co., LTD.  
**Product:** Navimow  
**Model No.:** H800N-VF, H1500N-VF, H3000N-VF  
**Brand Name:** Segway  
**FCC Rule Part(s):** FCC Part 2.1091  
**Received Date:** 2023-04-20  
**Result:** Complies

**Reviewed By:**

\_\_\_\_\_  
Vincent Yu

**Approved By:**

\_\_\_\_\_  
Robin Wu



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

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### Revision History

Report No.	Version	Description	Issue Date	Note
2304RSU043-U4	V01	Initial Report	2023-06-14	Valid

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#### 1.4. Product Information

Product Name	Navimow
Model No.	H800N-VF, H1500N-VF, H3000N-VF
Wi-Fi Specification	802.11b/g/n
Bluetooth Specification	V4.1
SRD Specification	915.05 ~ 917.9 MHz
Antenna Information	Refer to 1.5.
Power Supply	By Battery Pack
<p>Note:</p> <ol style="list-style-type: none"> <li>Only the rated capacity of the internal battery is different, others are all identical. H3000N-VF was selected for all of test in this report.</li> <li>This device contains a certified WWAN module (FCC ID: XMR201909EC25AFX).</li> <li>The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.</li> </ol>	

#### 1.5. Antenna Details

Specification	Frequency Band (MHz)	Antenna Type	Max. Antenna Gain (dBi)
SRD	915.05 ~ 917.90	PCB Antenna	2.46
BLE	2402 ~ 2480	PCB Antenna	-1.26
2.4G WIFI#1	2412~2462	PCB Antenna	5.00
2.4G WIFI#2	2412~2462	PIFA Antenna	3.47
WCDMA Band II	1850 ~ 1910	FPC Antenna	2.53
WCDMA Band IV	1710 ~ 1755		2.53
WCDMA Band V	824 ~ 849		0.50
LTE Band 2	1850 ~ 1910		2.53
LTE Band 4	1710 ~ 1755		2.53
LTE Band 5	824 ~ 849		0.50
LTE Band 12	699 ~ 716		0.50
LTE Band 13	777 ~ 787		0.50
LTE Band 14	788 ~ 798		0.50
LTE Band 66	1710 ~ 1780		2.53
LTE Band 71	663 ~ 698		0.50

### **1.6. Device Classification**

According to the user manual, the antenna of this device is at least 20cm away from the body of the user, this device is classified as a Mobile Device. So, the RF exposure evaluation requirements of § 2.1091 for mobile device exposure conditions subject to MPE limits.

### **1.7. Applied Standards**

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 2.1091 & KDB 447498 D04 Interim General RF Exposure Guidance v01

## 2. RF Exposure Evaluation

### 2.1. Test Limits

According to FCC §1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

Limits For Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	<6
30-300	61.4	0.163	1.0	<6
300-1,500	--	--	f/300	<6
1,500-100,000	--	--	5	<6
(B) Limits for General Population/ Uncontrolled Exposures				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	<30
30-300	27.5	0.073	0.2	<30
300-1,500	--	--	f/1500	<30
1,500-100,000	--	--	1.0	<30

f= frequency in MHz. \* = Plane-wave equivalent power density.

## 2.2. MPE Exemptions

**For single RF sources** (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph §1.1307(b)(2) of this section): A single RF source is exempt if:

**(Option A)** The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(ii)(A) of this section.

Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(ii)(A);

**(Option B)** Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P is given by:

$$P_{th}(mW) = \{ERP_{20cm} (d / 20cm)^x \quad d \leq 20cm$$

$$P_{th}(mW) = \{ERP_{20cm} \quad 20cm < d \leq 40cm$$

Where

$$x = -\log_{10} \left( \frac{60}{ERP_{20cm} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20cm}(mW) = \{2040f \quad 0.3GHz \leq f < 1.5GHz$$

$$ERP_{20cm}(mW) = \{3060 \quad 1.5GHz \leq f \leq 6GHz$$

**(Option C)** Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least  $\lambda/2\pi$ , where  $\lambda$  is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of  $\lambda/4$  or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).



Table 1 to §1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1920R <sup>2</sup>
1.34-30	3450R <sup>2</sup> /f <sup>2</sup>
30-300	3.83R <sup>2</sup>
300-1,500	0.0128R <sup>2</sup> f
1,500-100,000	19.2R <sup>2</sup>

**For multiple RF sources:** Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(i)(A).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Where:

**a** = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(B) of this section for  $P_{th}$ , including existing exempt transmitters and those being added.

**b** = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

**c** = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

$P_i$  = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source  $i$  at a distance between 0.5 cm and 40 cm (inclusive).

$P_{th,i}$  = the exemption threshold power ( $P_{th}$ ) according to paragraph §1.1307(b)(3)(i)(B) of this section for fixed, mobile, or portable RF source  $i$ .

$ERP_j$  = the ERP of fixed, mobile, or portable RF source  $j$ .

**$ERP_{th,j}$**  = exemption threshold ERP for fixed, mobile, or portable RF source  $j$ , at a distance of at least  $\lambda/2\pi$  according to the applicable formula of paragraph §1.1307(b)(3)(i)(C) of this section.

**$Evaluated_k$**  = the maximum reported SAR or MPE of fixed, mobile, or portable RF source  $k$  either in the device or at the transmitter site from an existing evaluation at the location of exposure.

**$Exposure Limit_k$**  = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source  $k$ , as applicable from §1.1310 of this chapter.

### 2.3. Calculated Result

Product	Navimow
Test Item	RF Exposure Evaluation Exemption
Evaluation Type	Single RF source, Option B (See section 2.2 of this report)

Specification	Frequency Band (MHz)	Antenna Gain (dBi)	Tune-up Power (dBm)		Max. Tune-up Power (mW)	Exemption Thresholds (mW)
			Conducted	ERP		
SRD	915.05 ~ 917.90	2.46	15.469	<b>15.779</b>	37.836	1866.702
BLE	2402 ~ 2480	-1.26	<b>1.730</b>	-1.680	1.489	3060.000
2.4G WIFI#1	2412 ~ 2462	5.00	13.450	<b>16.300</b>	42.658	3060.000
2.4G WIFI#2	2412 ~ 2462	3.47	25.850	<b>27.170</b>	521.195	3060.000
WCDMA Band II	1850 ~ 1910	2.53	25.000	<b>25.380</b>	345.144	3060.000
WCDMA Band IV	1710 ~ 1755	2.53	25.000	<b>25.380</b>	345.144	3060.000
WCDMA Band V	824 ~ 849	0.50	<b>25.000</b>	23.350	316.228	1680.960
LTE Band 2	1850 ~ 1910	2.53	25.000	<b>25.380</b>	345.144	3060.000
LTE Band 4	1710 ~ 1755	2.53	25.000	<b>25.380</b>	345.144	3060.000
LTE Band 5	824 ~ 849	0.50	<b>25.000</b>	23.350	316.228	1680.960
LTE Band 12	699 ~ 716	0.50	<b>25.000</b>	23.350	316.228	1425.960
LTE Band 13	777 ~ 787	0.50	<b>25.000</b>	23.350	316.228	1585.080
LTE Band 14	788 ~ 798	0.50	<b>25.000</b>	23.350	316.228	1607.520
LTE Band 66	1710 ~ 1780	2.53	25.000	<b>25.380</b>	345.144	3060.000
LTE Band 71	663 ~ 698	0.50	<b>25.000</b>	23.350	316.228	1352.520

Note:

1. According to the user manual, the evaluation distance is 20cm.
2. The tune-up tolerance is  $\pm 2$ dB for SRD/BLE/Wi-Fi specification.
3. The tune-up power of the WCDMA/LTE refer to the MPE report of FCC ID: XMR201909EC25AFX.

The SRD, BLE, 2.4G WIFI#1, 2.4G WIFI #2 and WWAN (WCDMA or LTE) can be transmitted simultaneously.

$$\text{Exposure Ratio} = 37.836/1866.702 + 1.489/3060 + 42.658/3060 + 521.195/3060 + 316.228/1352.52 = 0.439 < 1.$$

**Conclusion:** Based on the above assessment, this device complies with the RF Exposure Exemption.