RF Exposure Evaluation Declaration

FCC ID:	2BAXN-MR0005
Applicant:	Willand (Beijing) Technology Co., LTD.
Product:	Segway Navimow X3 Series
Model No.:	X315N, X330N, X350N, X390N
Brand Name:	Segway Navimow
FCC Rule Part(s):	FCC Part 2.1091
Result:	Complies
Evaluation Date:	2025-01-06

Reviewed By: Vincent Yu

Approved By: Robin Wu

Revision History

Report No.	Version	Description	Issue Date	Note
2411RSU003-U7	V01	Initial Report	2025-01-10	Valid

CONTENTS

Description Page

1. General Information 4

1.1. Applicant 4

1.2. Manufacturer 4

1.3. Testing Facility 5

1.4. Product Information 6

1.5. Antenna Details 7

1.6. Device Classification 7

1.7. Applied Standards 7

2. RF Exposure Evaluation 8

2.1. Limits 8

2.2. MPE Exemptions 9

2.3. Calculated Result 12

1. General Information

1.1. Applicant

Willand (Beijing) Technology Co., LTD.

Room 203, A1 Bldg. Zhongguancun Dongsheng Technology Park (Northern Territory), No. 66, Xixiaokou Rd, Haidian Dist., Beijing, China.

1.2. Manufacturer

Willand (Beijing) Technology Co., LTD.

Room 203, A1 Bldg. Zhongguancun Dongsheng Technology Park (Northern Territory), No. 66, Xixiaokou Rd, Haidian Dist., Beijing, China.

Navimow B.V.

Dynamostraat 7. 1014 BN Amsterdam, The Netherlands

1.3. Testing Facility

☒	**Test Site – MRT Suzhou Laboratory**
	Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China **Laboratory Location (Suzhou - SIP)** 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China **Laboratory Location (Suzhou - Wujiang)** Building 1, No.1 Xingdong Road, Wujiang, Suzhou, Jiangsu, People's Republic of China
	Laboratory Accreditations
	A2LA: 3628.01 CNAS: L10551 FCC: CN1166 ISED: CN0001 VCCI: ☐R-20025 ☐G-20034 ☐C-20020 ☐T-20020 ☐R-20141 ☐G-20134 ☐C-20103 ☐T-20104
☐	**Test Site – MRT Shenzhen Laboratory**
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China
	Laboratory Accreditations
	A2LA: 3628.02 CNAS: L10551 FCC: CN1284 ISED: CN0105
☐	**Test Site – MRT Taiwan Laboratory**
	Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
	Laboratory Accreditations
	TAF: 3261 FCC: 291082, TW3261 ISED: TW3261

1.4. Product Information

Product Name	Segway Navimow X3 Series
Model No.	X315N, X330N, X350N, X390N
Brand Name	Segway Navimow
Wi-Fi Specification	802.11a/b/g/n/ac/ax
Bluetooth Version	Bluetooth-LE only
SRD Specification	915.05 ~ 917.9MHz
3GPP Specification	WCDMA Band 2/4/5 LTE Band 2/4/5/12/13/14/66/71
Antenna Information	Refer to section 1.5
Operating Temp.	0 ~ 40°C
Power Type	By Battery
Accessories	
Charging Station	Product Name: Navimow Charging Station Model No.: X3C00G Input: 32V ⎓ 7.0A MAX Output: 25.2V ⎓ 7.0A MAX
Adapter	Model No.: NBW32D007D0N01-US Input: 100 ~ 240V, 50/60Hz, 4.0A MAX Output: 32.0V ⎓ 7.0A
Li-ion Battery Pack	Model No.: NBCF2213A Capacitance: 12800mAh / 276.5Wh Charging Voltage: 21.6VDC
Trimmer	Product Name: Trimmer Model No.: X3A10N
Antenna	Product Name: Antenna Model No.: X3R00G Power Type: 12VDC, 1A

Notes:

1. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.
2. The manufacturer states that the difference between the four models are only the battery capacity. The manufacturer selected the model X390N for testing.
3. For WWAN part, this device Contains FCC ID: XMR201909EC25AFX.
4. The adapter model used in the actual test is NBW32D007D0N01-EU. According to the manufacturer's statement, the only difference between NBW32D007D0N01-EU and NBW32D007D0N01-US is the connector of the AC cable, the others are identical.

1.5. Antenna Details

Technology	Frequency Range (MHz)	Antenna Type	Antenna Gain (dBi)
WCDMA Band II	1850 ~ 1910	PCB Antenna	2.98
WCDMA Band IV	1710 ~ 1755		2.98
WCDMA Band V	824 ~ 849		1.67
LTE Band 2	1850 ~ 1910		2.98
LTE Band 4	1710 ~ 1755		2.98
LTE Band 5	824 ~ 849		1.67
LTE Band 12	699 ~ 716		1.67
LTE Band 13	777 ~ 787		1.67
LTE Band 14	788 ~ 798		1.67
LTE Band 66	1710 ~ 1780		2.98
LTE Band 71	663 ~ 698		1.67
SRD	915.05 ~ 917.9		2.80
Bluetooth-LE	2402 ~ 2480		-1.26
2.4G Wi-Fi	2412 ~ 2462		3.55
5G Wi-Fi	5150 ~ 5250		3.85
	5250 ~ 5350		3.85
	5470 ~ 5725		3.85
	5725 ~ 5850		3.85

Note: The antenna gain is from antenna data sheet provided by the manufacturer.

1.6. Device Classification

According to the user manual, 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. 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^2)	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	*($900/f^2$)	<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	*($180/f^2$)	<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:

$\mathrm{P\,th(mW)} = \{\mathrm{ERP_{20cm}(d\,/\,20cm)^{x}}$ d ≤ 20cm

$\mathrm{P\,th(mW)} = \{\mathrm{ERP_{20cm}}$ 20cm < d ≤ 40cm

Where

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

and

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

$\mathrm{ERP_{20cm}(mW)} = \{3060$ 1.5GHz ≤ f ≤ 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 λ/2π, where λ 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 λ/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	$1920R^2$
1.34-30	$3450R^2/f^2$
30-300	$3.83R^2$
300-1,500	$0.0128R^2f$
1,500-100,000	$19.2R^2$

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 is 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.

$\boldsymbol{P_i}$ = 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).

$\boldsymbol{P_{th,i}}$ = 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*.

$\boldsymbol{ERP_j}$ = 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 λ/2π 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	Segway Navimow X3 Series
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Max. Conducted Power (dBm)	Antenna Gain (dBi)	Max. ERP (dBm)	Max. ERP (mW)
WCDMA Band II	1850 ~ 1910	25.00	2.98	25.83	382.82
WCDMA Band IV	1710 ~ 1755	25.00	2.98	25.83	382.82
WCDMA Band V	824 ~ 849	25.00	1.67	24.52	283.14
LTE Band 2	1850 ~ 1910	25.00	2.98	25.83	382.82
LTE Band 4	1710 ~ 1755	25.00	2.98	25.83	382.82
LTE Band 5	824 ~ 849	25.00	1.67	24.52	283.14
LTE Band 12	699 ~ 716	25.00	1.67	24.52	283.14
LTE Band 13	777 ~ 787	25.00	1.67	24.52	283.14
LTE Band 14	788 ~ 798	25.00	1.67	24.52	283.14
LTE Band 66	1710 ~ 1780	25.00	2.98	25.83	382.82
LTE Band 71	663 ~ 698	25.00	1.67	24.52	283.14
SRD	915.05 ~ 917.9	13.38	2.80	14.03	25.29
Bluetooth-LE	2402 ~ 2480	-1.84	-1.26	-5.25	0.30
2.4GHz Wi-Fi	2412 ~ 2462	22.82	3.55	24.22	264.24
5GHz Wi-Fi	5180 ~ 5240	20.11	3.85	21.81	151.71
	5260 ~ 5320	19.89	3.85	21.59	144.21
	5500 ~ 5720	15.63	3.85	17.33	54.08
	5745 ~ 5825	15.31	3.85	17.01	50.23

Notes:

1. The Max. Conducted Power of WCDMA / LTE refer to the MPE report of FCC ID: XMR201909EC25AFX.
2. For SRD, the Max. Conducted Power extracts from module report (report No.: 2411RSU003-U2).
3. For Bluetooth-LE, the Max. Conducted Power extracts from module report (report No.: 2411RSU003-U3).
4. For 2.4GHz Wi-Fi, the Max. Conducted Power extracts from module report (report No.: 2411RSU003-U4).
5. For 5GHz Wi-Fi, the Max. Conducted Power extracts from module report (report No.: 2411RSU003-U5).
6. Max. ERP (dBm) = Max. Conducted Power (dBm) + Antenna Gain (dBi) - 2.15.

For single RF source, Option B

Test Mode	Frequency Band (MHz)	λ / 2 π (m)	R (m)	Max. ERP (mW)	Thresholds ERP (mW)
WCDMA Band II	1850 ~ 1910	0.0258	0.20	382.82	3060.00
WCDMA Band IV	1710 ~ 1755	0.0279	0.20	382.82	3060.00
WCDMA Band V	824 ~ 849	0.0579	0.20	283.14	1680.96
LTE Band 2	1850 ~ 1910	0.0258	0.20	382.82	3060.00
LTE Band 4	1710 ~ 1755	0.0279	0.20	382.82	3060.00
LTE Band 5	824 ~ 849	0.0579	0.20	283.14	1680.96
LTE Band 12	699 ~ 716	0.0683	0.20	283.14	1425.96
LTE Band 13	777 ~ 787	0.0614	0.20	283.14	1585.08
LTE Band 14	788 ~ 798	0.0606	0.20	283.14	1607.52
LTE Band 66	1710 ~ 1780	0.0279	0.20	382.82	3060.00
LTE Band 71	663 ~ 698	0.0720	0.20	283.14	1352.52
SRD	915.05 ~ 917.9	0.0522	0.20	25.29	3060.00
Bluetooth-LE	2402 ~ 2480	0.0199	0.20	0.30	3060.00
2.4GHz Wi-Fi	2412 ~ 2462	0.0198	0.20	264.24	3060.00
5GHz Wi-Fi	5180 ~ 5240	0.0092	0.20	151.71	3060.00
	5260 ~ 5320	0.0091	0.20	144.21	3060.00
	5500 ~ 5720	0.0087	0.20	54.08	3060.00
	5745 ~ 5825	0.0083	0.20	50.23	3060.00

Notes:

1. R is from user manual.

2. The EUT supports WWAN (WCDMA or LTE) + SRD + Bluetooth-LE + 2.4GHz Wi-Fi/5GHz Wi-Fi simultaneous transmissions, therefore, the worst-case total exposure ratios = 283.14 / 1352.52 + 25.29 / 3060.00 + 0.30 / 3060.00 + 264.24 / 3060.00 = 0.30 < 1.

CONCLUSION:

The device qualifies for RF exposure test exemption at 20cm distance.

The End