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TEST REPORT

Application No.: ZEWA2312000155RG

Applicant: Rolling Wireless S.à r.l.

Address of Applicant: 15, rue Edward Steichen, 2540 Luxembourg

Manufacturer: Rolling Wireless S.à r.l.

Address of Manufacturer: 15, rue Edward Steichen, 2540 Luxembourg

EUT Description: RN932A Model No.: **RN932A**

Trade Mark: Rolling Wireless FCC ID: 2AX2URN932A

FCC 47 CFR Part 2.1091 Standards:

FCC KDB 447498 D01 v06

Date of Receipt: 2023/12/12 Date of Issue: 2024/03/19

Test Result: PASS*

Authorized Signature:

Keny Xu Laboratory Manager



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In the configuration tested, the EUT complied with the standards specified above.



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Version

Revision Record									
Version Chapter Date Modifier Remark									
01		2024/03/19		Original					

Prepared By	Jack Huang) / Test Engineer
Checked By	Flora Wang (Flora Wang) / Reviewer





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General Information

2.1 Client Information

Applicant:	Rolling Wireless S.à r.l.
Address of Applicant:	15, rue Edward Steichen, 2540 Luxembourg
Manufacturer:	Rolling Wireless S.à r.l.
Address of Manufacturer:	15, rue Edward Steichen, 2540 Luxembourg

2.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

FCC –Designation Number: CN1336

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch has been recognized as an accredited testing laboratory.

Designation Number: CN1336.

Test Firm Registration Number: 787754



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2.3 General Description of EUT

EUT Description:	RN932A										
Model No.:	RN932A										
Trade Mark:	Rolling Wireless										
Hardware Version:	1	1									
Software Version:	AFPQ52XA_00.12.	AFPQ52XA_00.12.05.00									
Power Supply:	12V										
Antenna Type:	External Antenna										
HPUE Power Class:	Class 2: NR Band r	n77; NR Band n78									
	WCDMA Band II:	4.1dBi(Ant1)	WCDMA Band IV:	5.0dBi(Ant1)							
	WCDMA Band V:	-0.5dBi(Ant1)									
	LTE Band 2:	4.1dBi(Ant1)	LTE Band 4:	5.0dBi(Ant1)							
	LTE Band 5:	-0.5dBi(Ant1)	LTE Band 7:	-2.5dBi(Ant1)							
	LTE Band 12:	-1.5dBi(Ant1)	LTE Band 13:	1.6dBi(Ant1)							
	LTE Band 14:	1.5dBi(Ant1)	LTE Band 17:	-2.1dBi(Ant1)							
	LTE Band 25:	4.3dBi(Ant1)	LTE Band 26:	-0.5dBi(Ant1)							
Antenna Gain:	LTE Band 66:	5.0dBi(Ant1)	LTE CA_2C:	4.1dBi(Ant1)							
	LTE CA_5B:	-0.5dBi(Ant1)	LTE CA_7C:	-2.5dBi(Ant1)							
	LTE CA_66B:	5.0dBi(Ant1)	LTE CA_66C:	5.0dBi(Ant1)							
	NR Band n2:	4.1dBi(Ant1)	NR Band n5:	-0.5dBi(Ant1)							
	NR Band n66:	5.0dBi(Ant1)	NR Band n71:	-2.0dBi(Ant1)							
	NR Band n77:	2.9dBi(Ant1)	NR Band n78:	2.9dBi(Ant1)							
	Note:										
	The antenna gain are derived from the gain information report provided by the manufacturer.										

Remark:

As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.



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3 RF Exposure Evaluation

3.1 RF Exposure Compliance Requirement

3.1.1 Limits

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm2)	Averaging time (minutes)							
	(A) Limits for Occup	ational/Controlled Expo	sures								
0.3-3.0	614	1.63	*(100)	6							
3.0-30	1842/f	4.89/f	*(900/f2)	6							
30-300	61.4	0.163	1.0	6							
300-1500	/	1	f/300	6							
1500-100,000	1	1	6								
(1)	(B) Limits for General Population/Uncontrolled Exposure										
0.3-1.34	614	1.63	*(100)	30							
1.34-30	824/f	2.19/f	*(180/f2)	30							
30-300	27.5	0.073	0.2	30							
300-1500	/	1	f/1500	30							
1500-100,000	/	1	1.0	30							

F=frequency in MHz

RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).

Friis Formula

Friis transmission formula: Pd = (Pout*G)/(4* Pi * R2)

Where

Pd = power density in mW/cm2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd id the limit of MPE, 1 mW/cm2. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.



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^{*=}Plane-wave equivalent power density

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3.1.2 Test Procedure

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

3.1.3 EUT RF Exposure Evaluation

Output Power Into Antenna & RF Exposure Evaluation Distance:

This confirmed that the device comply with MPE limit.

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Max Conducted Power (dBm)	EIRP(ERP) (dBm)	EIRP(ERP) Limit (dBm)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)	Gain according to EIRP(ERP) (dBi)	Gain according to Pd (dBi)	Max Gain Allowed (dBi)	conclusion
WCDMA Band II	1852.4	4.10	25.00	29.10	33.00	0.1617	1.0000	8.00	12.01	8.00	Pass
WCDMA Band IV	1712.4	5.00	25.00	30.00	33.00	0.1989	1.0000	8.00	12.01	8.00	Pass
WCDMA Band V	826.4	-0.50	25.00	22.35	38.45	0.0561	0.5509	15.60	9.42	9.42	Pass
LTE Band 2/CA_2C	1850.7	4.10	24.50	28.60	33.00	0.1441	1.0000	8.50	12.51	8.50	Pass
LTE Band 4	1710.7	5.00	24.50	29.50	30.00	0.1773	1.0000	5.50	12.51	5.50	Pass
LTE Band 5/CA_5B	824.7	-0.50	24.50	21.85	38.45	0.0500	0.5498	16.10	9.91	9.91	Pass
LTEBand 7/CA_7C	2502.5	-2.50	24.50	22.00	33.00	0.0315	1.0000	8.50	12.51	8.50	Pass
LTE Band 12	699.7	-1.50	24.50	20.85	34.77	0.0397	0.4665	12.42	9.20	9.20	Pass
LTE Band 13	779.5	1.60	24.50	23.95	34.77	0.0810	0.5197	12.42	9.66	9.66	Pass
LTE Band 14	790.5	1.50	24.50	23.85	34.77	0.0792	0.5270	12.42	9.73	9.73	Pass
LTE Band 17	706.5	-2.10	24.50	20.25	34.77	0.0346	0.4710	12.42	9.24	9.24	Pass
LTE Band 25	1850.7	4.30	24.50	28.80	33.00	0.1509	1.0000	8.50	12.51	8.50	Pass
LTE Band 26 (814-824)	814.7	-0.50	24.50	21.85	NA	0.0500	0.5431	NA	9.86	9.86	Pass
LTE Band 26 (824-849)	824.7	-0.50	24.50	21.85	38.45	0.0500	0.5498	16.10	9.91	9.91	Pass
LTE Band 66/ CA_66B/CA_66C	1710.7	5.00	24.50	29.50	30.00	0.1773	1.0000	5.50	12.51	5.50	Pass
NR Band n2	1852.5	4.10	24.50	28.60	33.00	0.1441	1.0000	8.50	12.51	8.50	Pass
NR Band n5	826.5	-0.50	24.50	21.85	38.45	0.0500	0.5510	16.10	9.92	9.92	Pass
NR Band n66	1712.5	5.00	24.50	29.50	30.00	0.1773	1.0000	5.50	12.51	5.50	Pass
NR Band n71	665.5	-2.00	24.50	20.35	34.77	0.0354	0.4437	12.42	8.98	8.98	Pass



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Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Max Conducted Power (dBm)	EIRP(ERP) (dBm)	EIRP(ERP) Limit (dBm)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)	Gain according to EIRP(ERP) (dBi)	Gain according to Pd (dBi)	Max Gain Allowed (dBi)	conclusion
NR Band n77 (3450- 3550)	3455.01	2.90	27.00	29.90	30.00	0.1944	1.0000	3.00	10.01	3.00	Pass
NR Band n77 (3450- 3550)(HPU E)	3455.01	2.90	27.00	29.90	30.00	0.1944	1.0000	3.00	10.01	3.00	Pass
NR Band n77 (3700- 3980)	3705.0	2.90	27.00	29.90	30.00	0.1944	1.0000	3.00	10.01	3.00	Pass
NR Band n77 (3700- 3980)(HPU E)	3705.0	2.90	27.00	29.90	30.00	0.1944	1.0000	3.00	10.01	3.00	Pass
NR Band n78 (3450- 3550)	3455.01	2.90	27.00	29.90	30.00	0.1944	1.0000	3.00	10.01	3.00	Pass
NR Band n78 (3450- 3550)(HPU E)	3455.01	2.90	27.00	29.90	30.00	0.1944	1.0000	3.00	10.01	3.00	Pass
NR Band n78 (3700- 3800)	3705.0	2.90	27.00	29.90	30.00	0.1944	1.0000	3.00	10.01	3.00	Pass
NR Band n78 (3700- 3800)(HPU E)	3705.0	2.90	27.00	29.90	30.00	0.1944	1.0000	3.00	10.01	3.00	Pass



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Due to the EUT support NR ENDC and CA Both LTE and NR/LTE band can transmit simultaneously, the formula of the calculated the MPE is:

$$\sum_{i=1}^{n} \frac{S_{E_{i}}(dutyfactor)}{MPE_{E_{i}}} < 1$$

NOTE The corresponding MEs must be expressed in terms of power density in the above summation Therefore, the worst-case(DC_4A_n78A) situation is 0.1773+0.1944=0.3717, which is less than "1", this confirmed that the device comply with MPE limit.

---End of Report---

