

RF Exposure Evaluation Report

APPLICANT : Rolling Wireless S.a r.l.
EQUIPMENT : CAT-M Module
BRAND NAME : Rolling Wireless
MODEL NAME : RW520-GL
FCC ID : 2AX2URW520GL
STANDARD : 47 CFR Part 2.1091
FCC KDB 447498 D01 v06

The product evaluation date was started from Sep. 29, 2024 and completed on Sep. 29, 2024. We, Sporton International Inc. (Shenzhen), would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.



Approved by: Si Zhang

Sporton International Inc. (Shenzhen)

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA482606	Rev. 01	Initial issue of report.	Oct. 11, 2024



1. Administration Data

1.1. Testing Laboratory

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Testing Laboratory			
Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR01-SZ	CN1256	421272

Applicant	
Company Name	Rolling Wireless S.a r.l.
Address	8-10, rue Mathias Hardt 1717, Luxembourg

Manufacturer	
Company Name	Rolling Wireless S.a r.l.
Address	8-10, rue Mathias Hardt 1717, Luxembourg

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	CAT-M Module
Brand Name	Rolling Wireless
Model Name	RW520-GL
FCC ID	2AX2URW520GL
Wireless Technology and Frequency Range	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850 MHz ~ 1910 MHz LTE Category M1: LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 14 : 788 MHz ~ 798 MHz LTE Band 25 : 1850 MHz ~ 1915 MHz LTE Band 26 : 814 MHz ~ 849 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz LTE Band 85: 698 MHz ~ 716 MHz
Mode	GPRS/EGPRS LTE Category M1: QPSK / 16QAM
Antenna Type	Monopole Antenna or PIFA Antenna
Antenna Gain	GSM850: 3.00 dBi GSM850: 3.00 dBi LTE Band 2 : 3.00 dBi LTE Band 4 : 3.00 dBi LTE Band 5 : 3.00 dBi LTE Band 12 : 3.00 dBi LTE Band 13 : 3.00 dBi LTE Band 14 : 3.00 dBi LTE Band 25 : 3.00 dBi LTE Band 26 : 3.00 dBi LTE Band 66: 3.00 dBi LTE Band 85: 3.00 dBi
HW Version	V1.4
SW Version	69400.1006.00.22.04.02
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. Monopole Antenna and PIFA Antenna share the same antenna gain information,so only chose one to evaluated MPE.

Comments and Explanations:

1. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.
2. The maximum RF output tune up power, antenna gain also the safe distance used for evaluate RF exposure were declared by manufacturer.

3. Maximum RF average output tune up power among production units

<GSM>

Mode	Maximum Average power(dBm)	
	GSM850	GSM1900
GPRS 1 Tx slot	33.50	30.00
GPRS 2 Tx slots	30.00	28.50
GPRS 3 Tx slots	29.00	26.50
GPRS 4 Tx slots	28.00	25.50
EDGE 1 Tx slot	27.00	26.50
EDGE 2 Tx slots	26.00	25.50
EDGE 3 Tx slots	24.00	24.00
EDGE 4 Tx slots	23.00	23.00

<LTE>

Mode		Maximum Average power(dBm)
LTE	Band 2	21.00
	Band 4	21.00
	Band 5	21.00
	Band 12	21.00
	Band 13	21.00
	Band 14	21.00
	Band 25	21.00
	Band 26	21.00
	Band 66	21.00
	Band 85	21.00



4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled 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
300-1500			f/300	6
1500-100,000			5	6
(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/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
GPRS 850 (1 Tx slot)	824	3.0	33.50	36.5	562.34	0.112	0.549
GPRS 850 (2 Tx slots)	824	3.0	30.00	33.0	498.82	0.099	0.549
GPRS 850 (3 Tx slots)	824	3.0	29.00	32.0	594.29	0.118	0.549
GPRS 850 (4 Tx slots)	824	3.0	28.00	31.0	630.96	0.126	0.549
EGPRS 850 (1 Tx slot)	824	3.0	27.00	30.0	125.89	0.025	0.549
EGPRS 850 (2 Tx slots)	824	3.0	26.00	29.0	198.58	0.040	0.549
EGPRS 850 (3 Tx slots)	824	3.0	24.00	27.0	187.95	0.037	0.549
EGPRS 850 (4 Tx slots)	824	3.0	23.00	26.0	199.05	0.040	0.549
GPRS 1900 (1 Tx slot)	1850	3.0	30.00	33.0	251.19	0.050	1.000
GPRS 1900 (2 Tx slots)	1850	3.0	28.50	31.5	353.13	0.070	1.000
GPRS 1900 (3 Tx slots)	1850	3.0	26.50	29.5	334.20	0.067	1.000
GPRS 1900 (4 Tx slots)	1850	3.0	25.50	28.5	354.81	0.071	1.000
EGPRS 1900 (1 Tx slot)	1850	3.0	26.50	29.5	112.20	0.022	1.000
EGPRS 1900 (2 Tx slots)	1850	3.0	25.50	28.5	176.99	0.035	1.000
EGPRS 1900 (3 Tx slots)	1850	3.0	24.00	27.0	187.95	0.037	1.000
EGPRS 1900 (4 Tx slots)	1850	3.0	23.00	26.0	199.05	0.040	1.000
LTE Band 2	1850	3.0	21.00	24.000	251.189	0.050	1.000
LTE Band 4	1710	3.0	21.00	24.000	251.189	0.050	1.000
LTE Band 5	824	3.0	21.00	24.000	251.189	0.050	0.549
LTE Band 12	699	3.0	21.00	24.000	251.189	0.050	0.466
LTE Band 13	777	3.0	21.00	24.000	251.189	0.050	0.518
LTE Band 14	788	3.0	21.00	24.000	251.189	0.050	0.525
LTE Band 25	1850	3.0	21.00	24.000	251.189	0.050	1.000
LTE Band 26	814	3.0	21.00	24.000	251.189	0.050	0.543
LTE Band 66	1710	3.0	21.00	24.000	251.189	0.050	1.000
LTE Band 85	698	3.0	21.00	24.000	251.189	0.050	0.465

Note:

1. For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
2. Chose the maximum power to do MPE analysis.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

-----THE END-----