

Report No.: SEWM2209000196RG06
 Rev.: 01
 Page: 1 of 8

TEST REPORT

Application No.: SEWM2209000196RG
Applicant: Neutron Holdings, Inc.
Address of Applicant: 85 2nd St, San Francisco, CA 94105 USA
Manufacturer: Neutron Holdings, Inc.
Address of Manufacturer: 85 2nd St, San Francisco, CA 94105 USA
EUT Description: Central Controller
Model No.: Lime-4.1-GL
Trade Mark: Lime
FCC ID: 2APB2LIME-41-GLV2
Standards: 47 CFR Part 2.1091
 FCC KDB 447498 D01 v06
Date of Receipt: 2022/10/21
Date of Issue: 2022/12/12

Test Result:	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Panta Sun
 Wireless Laboratory Manager



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1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2022/12/12		Original

Prepared By		 <hr/> (Nick Hu) / Test Engineer
Checked By		 <hr/> (Well Wei) / Reviewer



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2 General Information

2.1 Client Information

Applicant:	Neutron Holdings, Inc.
Address of Applicant:	85 2nd St, San Francisco, CA 94105 USA
Manufacturer:	Neutron Holdings, Inc.
Address of Manufacturer:	85 2nd St, San Francisco, CA 94105 USA

2.2 Test Facility

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

• A2LA (Certificate No. 6336.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

• Innovation, Science and Economic Development Canada

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• FCC –Designation Number: CN1312

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327



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2.3 General Description of EUT

EUT Description:	Central Controller		
Model No.:	Lime-4.1-GL		
Trade Mark:	Lime		
Hardware Version:	V4_1.2.1		
Software Version:	V4_1.1.8		
Antenna Type:	PIFA Antenna		
Antenna Gain:	WCDMA Band II:	3.82dBi	WCDMA Band IV: 4.65dBi
	WCDMA Band V:	1.72dBi	
	LTE Band 2:	3.82dBi	LTE Band 4: 4.65dBi
	LTE Band 5:	1.72dBi	LTE Band 7: 3.79dBi
	LTE Band 12:	-5.19dBi	LTE Band 13: -2.47dBi
	LTE Band 25:	3.82dBi	LTE Band 26: 1.72dBi
	LTE Band 38:	3.85dBi	LTE Band 41: 3.96dBi
	BT/BLE:	3.2dBi	2.4GWIFI: 3.2dBi
	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/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

F=frequency in MHz
 *=Plane-wave equivalent power density
 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: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is 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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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

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.0 / 2.0 in linear scale.

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 Average Output Power (dBm)	Output Power to Antenna (dBm)	EIRP(ERP) Limit (dBm)	Output Power to Antenna (mw)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	conclusion
WCDMA Bnad II	1852.4	3.82	24.00	27.82	33.00	251.1886	0.1204	1.0000	Pass
WCDMA Bnad IV	1712.4	4.65	24.00	28.65	30.00	251.1886	0.1458	1.0000	Pass
WCDMA Bnad V	826.4	1.72	24.00	25.72	38.45	251.1886	0.0743	0.5509	Pass
LTE B2	1850.7	3.82	24.00	27.82	33.00	251.1886	0.1204	1.0000	Pass
LTE B4	1710.7	4.65	24.00	28.65	30.00	251.1886	0.1458	1.0000	Pass
LTE B5	824.7	1.72	24.00	25.72	38.45	251.1886	0.0743	0.5498	Pass
LTE B7	2502.5	3.79	25.00	28.79	33.00	316.2278	0.1506	1.0000	Pass
LTE B12	699.7	-5.19	24.00	18.81	34.77	251.1886	0.0151	0.4665	Pass
LTE B13	779.5	-2.47	24.00	21.53	34.77	251.1886	0.0283	0.5197	Pass
LTE B25	1850.7	3.82	24.00	27.82	33.00	251.1886	0.1204	1.0000	Pass
LTE B26(814-824)	814.7	1.72	24.00	25.72	NA	251.1886	0.0743	0.5431	Pass
LTE B26(824-849)	824.7	1.72	24.00	25.72	38.45	251.1886	0.0743	0.5498	Pass
LTE B38	2572.5	3.85	24.00	27.85	33.00	251.1886	0.1213	1.0000	Pass
LTE B41	2498.5	3.96	24.00	27.96	33.00	251.1886	0.1244	1.0000	Pass
BT	2402.0	3.20	5.00	8.20	30.00	3.1623	0.0013	1.0000	Pass
2.4GWIFI	2412.0	3.20	19.50	22.70	30.00	89.1251	0.0370	1.0000	Pass



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3.1.4 Exposure calculations for multiple sources

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE in accordance with the provisions of Table(A) and Table(B). To comply with the MPE, the fraction of the MPE in terms of E2, H2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity.

In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^n \frac{S_i}{MPE_i} \leq 1$$

The product also has multiple transmitters The Simultaneous Transmission Possibilities are as below:

Simultaneous Tx Combination	Configuration
1	WCDMA + WIFI 2.4G
2	WCDMA + Bluetooth
3	LTE + WIFI 2.4G
4	LTE + Bluetooth
5	WWAN+ WIFI 2.4

No.	Mode	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)	Result Ratio	Total Ratio	Limit	Result
1	WCDMA Band V	0.0743	0.5509	0.1349	0.1719	1.00	Pass
	WIFI 2.4G	0.0370	1.0000	0.0370			
2	WCDMA Band V	0.0743	0.5509	0.1349	0.1362	1.00	Pass
	Bluetooth	0.0013	1.0000	0.0013			
3	LTE Band 12	0.0151	0.4665	0.0324	0.0694	1.00	Pass
	WIFI 2.4G	0.0370	1.0000	0.0370			
4	LTE Band 12	0.0151	0.4665	0.0324	0.0337	1.00	Pass
	Bluetooth	0.0013	1.0000	0.0013			
5	LTE Band 12	0.0151	0.4665	0.0324	0.0694	1.00	Pass
	WIFI 2.4G	0.0370	1.0000	0.0370			

Remark: This WWAN Band was recalculated on worst Band.

---End of Report---



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