RF Exposure Evaluation Declaration

FCC ID:	2BEY3LCUR57WWDB
Applicant:	NETPRISMA INC.
Product:	LTE-A Cat 16 M.2 Module
Model No.:	LCUR57-WWD
Brand Name:	Vrileg
FCC Rule Part(s):	FCC Part 2.1091
Result:	Complies
Evaluation Date:	2024-06-06

Reviewed By: Sunny Sun

Approved By: Robin Wu

Revision History

Report No.	Version	Description	Issue Date	Note
2404RSU035-U8	V01	Initial Report	2024-06-07	Valid

CONTENTS

1. General Information

1.1. Applicant

NETPRISMA INC.

1301 6TH AVE, SEATTLE, WA, 98101-2304, UNITED STATES

1.2. Manufacturer

NETPRISMA INC.

1301 6TH AVE, SEATTLE, WA, 98101-2304, UNITED STATES

1.3. Testing Facility

<table>
<tr><td>☒</td><td colspan="5">Test Site – MRT Suzhou Laboratory</td></tr>
<tr><td></td><td colspan="5">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</td></tr>
<tr><td></td><td colspan="5">Laboratory Accreditations</td></tr>
<tr><td></td><td colspan="2">A2LA: 3628.01</td><td colspan="3">CNAS: L10551</td></tr>
<tr><td></td><td colspan="2">FCC: CN1166</td><td colspan="3">ISED: CN0001</td></tr>
<tr><td></td><td rowspan="2">VCCI:</td><td>☐R-20025</td><td>☐G-20034</td><td>☐C-20020</td><td>☐T-20020</td></tr>
<tr><td></td><td>☐R-20141</td><td>☐G-20134</td><td>☐C-20103</td><td>☐T-20104</td></tr>
<tr><td>☐</td><td colspan="5">Test Site – MRT Shenzhen Laboratory</td></tr>
<tr><td></td><td colspan="5">Laboratory Location (Shenzhen)
1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China</td></tr>
<tr><td></td><td colspan="5">Laboratory Accreditations</td></tr>
<tr><td></td><td colspan="2">A2LA: 3628.02</td><td colspan="3">CNAS: L10551</td></tr>
<tr><td></td><td colspan="2">FCC: CN1284</td><td colspan="3">ISED: CN0105</td></tr>
<tr><td>☐</td><td colspan="5">Test Site – MRT Taiwan Laboratory</td></tr>
<tr><td></td><td colspan="5">Laboratory Location (Taiwan)
No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)</td></tr>
<tr><td></td><td colspan="5">Laboratory Accreditations</td></tr>
<tr><td></td><td colspan="5">TAF: 3261</td></tr>
<tr><td></td><td colspan="2">FCC: 291082, TW3261</td><td colspan="3">ISED: TW3261</td></tr>
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1.4. Product Information

Product	LTE-A Cat 16 M.2 Module
Model No.	LCUR57-WWD
Brand Name	Vrileg
Serial No.	D1C24CG1D000013 (Conducted) D1C24CG1D000108 (Radiated)
3GPP Specification	WCDMA Band II/IV/V LTE Band 2, 4, 5, 7, 12, 13, 14, 25, 26, 30, 38, 41, 42, 43, 48, 66
Antenna Information	Refer to Section 1.5
Power Type	3.135 – 4.4Vdc, typical 3.7Vdc
Note: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Antenna Details

Technology	Frequency Range (MHz)	Antenna Type	Max Peak Gain (dBi)
WCDMA Band II	1850 ~ 1910	PIFA Antenna	3.87
WCDMA Band IV	1710 ~ 1755		3.91
WCDMA Band V	824 ~ 849		3.32
LTE Band 2	1850 ~ 1910		3.87
LTE Band 4	1710 ~ 1755		3.91
LTE Band 5	824 ~ 849		3.32
LTE Band 7	2500 ~ 2570		3.16
LTE Band 12	699 ~ 716		3.19
LTE Band 13	777 ~ 787		3.28
LTE Band 14	788 ~ 798		3.25
LTE Band 25	1850 ~ 1915		3.87
LTE Band 26	814 ~ 849		3.32
LTE Band 30	2305 ~ 2315		0.98
LTE Band 38	2570 ~ 2620		3.07
LTE Band 41	2496 ~ 2690		3.16
LTE Band 42	3450 ~ 3550		2.35
LTE Band 43	3700 ~ 3800		1.94
LTE Band 42	3550 ~ 3600		2.35
LTE Band 43	3600 ~ 3700		1.94
LTE Band 48	3550 ~3700		1.00
LTE Band 66	1710 ~ 1780		3.91

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.

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 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	LTE-A Cat 16 M.2 Module
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Tune-up Conducted Power (dBm)	Antenna Gain (dBi)	Tune-up ERP (dBm)	Tune-up ERP (mW)
WCDMA Band II	1850 ~ 1910	25.0	3.87	26.72	469.89
WCDMA Band IV	1710 ~ 1755	25.0	3.91	26.76	474.24
WCDMA Band V	824 ~ 849	25.0	3.32	26.17	414.00
LTE Band 2	1850 ~ 1910	25.0	3.87	26.72	469.89
LTE Band 4	1710 ~ 1755	25.0	3.91	26.76	474.24
LTE Band 5	824 ~ 849	25.0	3.32	26.17	414.00
LTE Band 7	2500 ~ 2570	25.0	3.16	26.01	399.02
LTE Band 12	699 ~ 716	25.0	3.19	26.04	401.79
LTE Band 13	777 ~ 787	25.0	3.28	26.13	410.20
LTE Band 14	788 ~ 798	25.0	3.25	26.10	407.38
LTE Band 25	1850 ~ 1915	25.0	3.87	26.72	469.89
LTE Band 26	814 ~ 849	25.0	3.32	26.17	414.00
LTE Band 30	2305 ~ 2315	23.0	0.98	21.83	152.41
LTE Band 38	2570 ~ 2620	25.0	3.07	25.92	390.84
LTE Band 41	2496 ~ 2690	26.5	3.16	27.51	563.64
LTE Band CA_41C	2496 ~ 2690	24.0	3.16	25.01	316.96
LTE Band 42	3450 ~ 3550	22.0	2.35	22.20	165.96
LTE Band 43	3700 ~ 3800	22.0	1.94	21.79	151.01
LTE Band 42	3550 ~ 3600	22.0	2.35	22.20	165.96
LTE Band 43	3600 ~ 3700	22.0	1.94	21.79	151.01
LTE Band 48	3550 ~3700	22.0	1.00	20.85	121.62
LTE Band 66	1710 ~ 1780	25.0	3.91	26.76	474.24
WiFi 2.4GHz	2400 ~ 2483.5	20.0	5.00	22.85	192.7525
WiFi 5GHz	5150 ~ 5825	25.0	5.00	27.85	609.5369
Bluetooth	2400 ~ 2483.5	15.0	5.00	17.85	60.9537

Notes:

1. The Tune-up Power is declared by the manufacturer.
2. Tune-up ERP = Tune up Conducted Power + Antenna Gain - 2.15.
3. This product does not support WiFi, BLE, the report is only used for calculation.

For single RF source, Option B

Test Mode	Frequency Band (MHz)	Max Tune-up Power (dBm)	Max ERP (mW)	Threshold Power at 20cm (mW)	Max Antenna Gain per Pth
WCDMA Band II	1850 ~ 1910	25.0	469.8941	3060.0	12.0
WCDMA Band IV	1710 ~ 1755	25.0	474.2420	3060.0	12.0
WCDMA Band V	824 ~ 849	25.0	413.9997	1681.0	9.4
LTE Band 2	1850 ~ 1910	25.0	469.8941	3060.0	12.0
LTE Band 4	1710 ~ 1755	25.0	474.2420	3060.0	12.0
LTE Band 5	824 ~ 849	25.0	413.9997	1681.0	9.4
LTE Band 7	2500 ~ 2570	25.0	399.0249	3060.0	12.0
LTE Band 12	699 ~ 716	25.0	401.7908	1426.0	8.7
LTE Band 13	777 ~ 787	25.0	410.2041	1585.1	9.2
LTE Band 14	788 ~ 798	25.0	407.3803	1607.5	9.2
LTE Band 25	1850 ~ 1915	25.0	469.8941	3060.0	12.0
LTE Band 26	814 ~ 849	25.0	413.9997	1660.6	9.4
LTE Band 30	2305 ~ 2315	23.0	152.4053	3060.0	14.0
LTE Band 38	2570 ~ 2620	25.0	390.8409	3060.0	12.0
LTE Band 41	2496 ~ 2690	26.5	563.6377	3060.0	10.5
LTE Band CA_41C	2496 ~ 2690	24.0	316.9567	3060.0	13.0
LTE Band 42	3450 ~ 3550	22.0	165.9587	3060.0	15.0
LTE Band 43	3700 ~ 3800	22.0	151.0080	3060.0	15.0
LTE Band 42	3550 ~ 3600	22.0	165.9587	3060.0	15.0
LTE Band 43	3600 ~ 3700	22.0	151.0080	3060.0	15.0
LTE Band 48	3550 ~3700	22.0	121.6186	3060.0	15.0
LTE Band 66	1710 ~ 1780	25.0	474.2420	3060.0	12.0
WiFi 2.4GHz	2400 ~ 2483.5	20.0	192.7525	3060.0	17.0
WiFi 5GHz	5150 ~ 5825	25.0	609.5369	3060.0	12.0
Bluetooth	2400 ~ 2483.5	15.0	60.9537	3060.0	22.0

For multiple RF sources

The EUT supports WWAN + Wi-Fi 2.4GHz or Wi-Fi 5GHz + BLE simultaneous transmissions. The worst-case combination is WWAN + Wi-Fi 5GHz + BLE.

So, the Max Simultaneous Transmission = 401.7908/1426 (WWAN) + 609.5369/3060 (NII) + 60.9537/3060 (BLE) = 0.5009 < 1

CONCLUSION:

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

The End