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RF Exposure Evaluation Report

Application No.:	KSCR2501000044AT
FCC ID:	OJFE62-M37F851719
Applicant:	Nimbus License Sub LLC
Address of Applicant:	840 N McCarthy Blvd, Milpitas, California, United States
Manufacturer:	Nimbus License Sub LLC
Address of Manufacturer:	840 N McCarthy Blvd, Milpitas, California, United States
Equipment Under Test (EUT):	
EUT Name:	Remote Unit
Model No.:	E62-M3-L
Trade Mark:	CORNING
Standard(s) :	FCC Rules 47 CFR §2.1091 KDB 447498 D04 interim General RF Exposure Guidance v01
Date of Receipt:	2025-01-07
Date of Test:	2025-02-10 to 2025-02-20
Date of Issue:	2025-02-20
Test Result:	**Pass***

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

Revision Record			
Version	**Description**	***Date***	***Remark***
00	Original	2025-02-20	/

Authorized for issue by:				
Tested By		Kass Gao **Kass Gao /Project Engineer**		
Approved By		Terry Hou **Terry Hou /Reviewer**		

2 Contents

3 General Information

3.1 General Description of E.U.T.

Power supply:	AC 100-240V 50/60Hz or DC 48V

3.2 Details of E.U.T.

Frequency Band:	729MHz-746MHz for LTE Band12/NR n12 746MHz-756MHz for LTE Band13/NR n13 758MHz-768MHz for LTE Band14/NR n14 862MHz-869MHz for LTE Band26/NR n26 869MHz-894MHz for LTE Band26/NR n26 1930MHz-1995MHz for LTE Band25/NR n25 2110MHz-2200MHz for LTE Band66/NR n66
Antenna Type:	External Antenna
Antenna Gain:	12 dBi for 729MHz-746MHz (Provided by manufacturer) 12 dBi for 746MHz-756MHz (Provided by manufacturer) 12 dBi for 758MHz-768MHz (Provided by manufacturer) 12 dBi for 862MHz-869MHz (Provided by manufacturer) 12 dBi for 869MHz-894MHz (Provided by manufacturer) 12 dBi for 1930MHz-1995MHz (Provided by manufacturer) 12 dBi for 2110MHz-2200MHz (Provided by manufacturer)
Modulation Type:	QPSK, 16QAM, 64QAM, 256QAM
Antenna Delivery:	SISO
Nominal Output Power:	33±1dBm for 729MHz-746MHz 33±1dBm for 746MHz-756MHz 33±1dBm for 758MHz-768MHz 33±1dBm for 862MHz-869MHz 33±1dBm for 869MHz-894MHz 37±1dBm for 1930MHz-1995MHz 37±1dBm for 2110MHz-2200MHz
Nominal gain:	33dB for 729MHz-746MHz 33dB for 746MHz-756MHz 33dB for 758MHz-768MHz 33dB for 862MHz-869MHz 33dB for 869MHz-894MHz 37dB for 1930MHz-1995MHz 37dB for 2110MHz-2200MHz

Note:
The antenna gain value is provided by the customer. The test lab will not be responsible for wrong test result due to incorrect information about antenna gain values.

3.3 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

Note:

1.SGS is not responsible for wrong test results due to incorrect information (e.g. max. clock frequency, highest internal frequency, antenna gain, cable loss, etc) is provided by the applicant. (if applicable).

2.SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (if applicable).

3. Sample source: sent by customer.

3.4 Test Facility

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

• A2LA

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• FCC

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

• ISED

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

• VCCI

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

4 RF Exposure Test Exemptions

Test exemptions apply for devices used in general population/uncontrolled exposure environments, according to the SAR-based, or MPE-based exemption thresholds.

4.1 RF Exposure Test Exemptions for single RF sources

4.1.1 Blanket 1 mW Blanket Exemption

The 1 mW Blanket Exemption of §1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

The 1-mW blanket exemption applies at separation distances less than 0.5 cm, including where there is no separation. This exemption shall not be used in conjunction with other exemption criteria other than those for multiple RF sources in paragraph §1.1307(b)(3)(ii)(A).

The 1-mW exemption is independent of service type and covers the full range of 100 kHz to 100 GHz, but it shall not be used in conjunction with other exemption criteria or in devices with higher-power transmitters operating in the same time-averaging period. Exposure from such higher-power transmitters would invalidate the underlying assumption that exposure from the lower-power transmitter is the only contributor to SAR in the relevant volume of tissue.

Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

4.1.2 MPE-based Exemption

General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table B.1 [Table 1 of §1.1307(b)(1)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz. 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 $\lambda/2\pi$**, 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 $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table B.1—Thresholds For Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency			Minimum Distance			Threshold ERP
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	–	1.34	159 m	–	35.6 m	1,920 R^2
1.34	–	30	35.6 m	–	1.6 m	3,450 R^2/f^2
30	–	300	1.6 m	–	159 mm	3.83 R^2
300	–	1,500	159 mm	–	31.8 mm	0.0128 R^2f
1,500	–	100,000	31.8 mm	–	0.5 mm	19.2R^2
Subscripts L and H are low and high; λ is wavelength. R:Separation distance between the antenna to person						

The table applies to any RF source (i.e. single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at least λ/2π. The thresholds are based on the general population MPE limits with a single perfect reflection, outside of the reactive near-field, and in the main beam of the radiator.

Limit calculation				
Frequency range	Frequency(MHz)	λ/2π(m)	R(m)	Threshold ERP(W)
300~1500MHz	824	0.0580	0.2000	0.422
1500~100000MHz	1850	0.0258	0.2000	0.768
1500~100000MHz	1710	0.0279	0.2000	0.768
1500~100000MHz	2500	0.0191	0.2000	0.768

4.1.3 SAR-based Exemption

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of λ/4.

As for devices with antennas of length greater than λ/4 where the gain is not well defined, but always less than that of a half-wave dipole (length λ/2), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.

The SAR-based exemption formula of §1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from **0.5cm to 40cm** and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

$$P_{\text{th}}\,(\text{mW}) = \begin{cases} ERP_{20\text{ cm}}(d/20\text{ cm})^{x} & d \le 20\text{ cm} \\ ERP_{20\text{ cm}} & 20\text{ cm} < d \le 40\text{ cm} \end{cases} \qquad \text{(B.2)}$$

where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\text{ cm}}\sqrt{f}}\right)$$

and f is in GHz, d is the separation distance (cm), and ERP_{20cm} is per Formula (B.1).

Limit calculation				
Frequency range(GHz)	Frequency(GHz)	X	d(cm)	Pth (mW)
0.3~1.5	0.824	1.419	20	1680.960
1.5~6	1.850	3.341	20	3060.000
1.5~6	1.710	3.324	20	3060.000
1.5~6	2.500	3.407	20	3060.000

4.2 RF Exposure Test Exemptions for Simultaneous Transmission

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 (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).

Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (Evaluatedk term) shall be used to determine exemption for simultaneous transmission. 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.

$$\sum_{i=1}^{a} \frac{P_i}{P_{\mathrm{th},i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{\mathrm{th},j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(B) of this section for Pth, including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (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.

Pi = 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).

Pth,i = the exemption threshold power (Pth) according to paragraph (b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i.

ERPj = the ERP of fixed, mobile, or portable RF source j.

ERPth,j = exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least λ /2 π according to the applicable formula of paragraph (b)(3)(i)(C) of this section.

Evaluatedk = 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 Limitk = 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.

5 Test Standards and Limits

5.1 FCC Radiofrequency radiation exposure limits:

According to§1.1310, the limit for general population/uncontrolled exposures

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
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	/	/	f/1500	30
1500-100,000	/	/	1.0	30

6 Measurement and Calculation

6.1 Maximum transmit power

The Power Data is based on the RF Test Report KSCR250100004401

6.2 MPE Calculation

	Evaluation method	Separation distance between the antenna to person (R)
☐	Blanket 1 mW Blanket Exemption	Regardless of separation distance
☒	MPE-based Exemption(ERP)	R≥(λ /2 π)
☐	SAR-based Exemption(P_{th})	0.5cm<R<40cm

According to the formula $S=P/4\pi R^2$, we can calculate S which is MPE.
Note:
1) P (mW)
2) R = distance to the center of radiation of antenna (in centimeter)

Frequency Band (MHz)	Max Tune up power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm2)	Limit of Power Density S(mW/cm2)	Distance R (cm)
729~746	34.00	12	46.00	39810.72	0.391	0.49	220
746~756	34.00	12	46.00	39810.72	0.391	0.50	220
758~768	34.00	12	46.00	39810.72	0.391	0.51	220
862~869	34.00	12	46.00	39810.72	0.391	0.57	220
869~894	34.00	12	46.00	39810.72	0.391	0.58	220
1930~1995	38.00	12	50.00	100000.00	0.982	1.00	220
2110~2200	38.00	12	50.00	100000.00	0.982	1.00	220

Simultaneous transmission:

Frequency Band (MHz)	Max Tune up power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Power Density S at R = 220 cm (mW/cm2)	Limit of Power Density S(mW/cm2)	Ratio (Power Density/Limit)	Limit
729~746	34.00	12	46.00	0.065	0.49	0.952	1
746~756	34.00	12	46.00	0.065	0.50		
758~768	34.00	12	46.00	0.065	0.51		
862~869	34.00	12	46.00	0.065	0.57		
869~894	34.00	12	46.00	0.065	0.58		
1930~1995	38.00	12	50.00	0.164	1.00		
2110~2200	38.00	12	50.00	0.164	1.00		

Note:
The EUT can support all bands simultaneous transmitted, but the maximum rate of MPE is 0.065/0.49+0.065/0.50+0.065/0.51+0.065/0.57+0.065/0.58+0.164/1.00+0.164/1.00=0.952<=1. So the device is exclusion from SAR test.

--End of the Report--