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Report No.: 2401RSU027-U6 Report Version: Issue Date: 2024-07-26

RF Exposure Evaluation Declaration

FCC ID: SVC-M66

Lenbrook Industries Limited Applicant:

M66 Streaming DAC Preamplifier **Product:**

Model No.: M66

Brand Name: NAD

FCC Rule Part(s): FCC Part 2.1091

Result: Complies

Evaluation Date: 2024-06-12

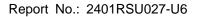
Reviewed By: Ada Zhang **Approved By:** Robin Wu

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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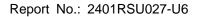
Revision History

Report No.	Version	Description	Issue Date	Note
2401RSU027-U6	V01	Initial Report	2024-07-26	Valid



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1. General Information

1.1. Applicant

Lenbrook Industries Limited
633 Granite Court, Pickering, Ontario L1W 3K1

1.2. Manufacturer

HANSONG(NANJING) TECHNOLOGY LTD

8 Chengxin Street, Jiangning Economy and Technology Development Zone, Nanjing, 211106, China

1.3. Testing Facility

\boxtimes	Test Site – MRT Suzhou Laboratory					
	Laboratory Location (Suzhou - Wuzhong)					
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China					
	Laboratory Locat	tion (Suzhou - SIP	·)			
	4b Building, Liand	o U Valley, No.200	Xingpu Rd., Shengpι	ı Town, Suzhou Indu	strial Park, China	
	Laboratory Accre	ditations				
	A2LA: 3628.01		CNAS	S: L10551		
	FCC: CN1166		ISED:	CN0001		
	VCCI	□R-20025	□G-20034	□C-20020	□T-20020	
	VCCI:	□R-20141	□G-20134	□C-20103	□T-20104	
	Test Site – MRT Shenzhen Laboratory					
	Laboratory Location (Shenzhen)					
	1G, Building A, Ju	nxiangda Building,	Zhongshanyuan Roa	d West, Nanshan Di	strict, Shenzhen,	
	China					
	Laboratory Accre	ditations				
	A2LA: 3628.02		CNAS	: L10551		
	FCC: CN1284		ISED:	CN0105		
	Test Site - MRT T	Taiwan Laboratory	1			
	Laboratory Locat	tion (Taiwan)				
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)					
	Laboratory Accre	ditations				
	TAF: 3261					
	FCC: 291082, TW	3261	ISED:	TW3261		



1.4. Product Information

M66 Streaming DAC Preamplifier
M66
NAD
Bluetooth-BR/EDR
802.11a/b/g/n/ac
Refer to Section 1.5
100-240V ~ 50/60Hz
0 ~ 40°C

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

Antenna Type	Frequency Band (MHz)	Antenna Gain (dBi)
5: 1 4 1	2400 ~ 2483.5	1.97
Dipole Antenna	5150 ~ 5850	2.74

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	Electric Field	Magnetic Field Power Density		Average Time
(MHz)	Strength (V/m)	Strength (A/m)	(mW/cm ²)	(Minutes)
	(A) Limits fo	r Occupational/ Contro	l 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	1,500 f/300		<6	
1,500-100,000	-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/f²)		<30		
30-300	0-300 27.5 0.073 0.2		<30	
300-1,500		f/1500 <3		<30
1,500-100,000	,500-100,000 1.0 <30		<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:

$$P th(mW) = \{ERP_{20cm}(d / 20cm)^x d \le 20cm\}$$

$$P th(mW) = \{ERP_{20cm} 20cm < d \le 40cm\}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20cm}\sqrt{f}}\right)$$
 and f is in GHz;

and

$$ERP_{20cm}(mW) = \{2040f \ 0.3GHz \le f < 1.5GHz\}$$

$$ERP_{20cm}(mW) = \{3060 \ 1.5GHz \le f \le 6GHz\}$$

(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 $\lambda/2\pi$, 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 1 to §1.1307(b)(3)(i)(C)	- Single RF Sou	rces Subject to Routine	Environmental Evaluation

RF Source Frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1920R ²
1.34-30	3450R²/f²
30-300	3.83R ²
300-1,500	0.0128R ² f
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.

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

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 $\lambda/2\pi$ 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.



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2.3. Calculated Result

Product	M66 Streaming DAC Preamplifier
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Tune-up Conducted Power (dBm)	Tune-up ERP (dBm)	Tune-up ERP (mW)
Bluetooth-BR/EDR	2402 ~ 2480	9.00	8.82	7.62
2.4GHz Wi-Fi	2412 ~ 2462	18.00	17.82	60.53
5GHz Wi-Fi	5180 ~ 5825	20.00	20.59	114.55

Note 1: Tune-up Conducted Power was declared by manufacturer.

Note 2: Tune-up ERP (dBm) = Tune-up Conducted Power (dBm) + Antenna Gain (dBi) - 2.15 dB.

Note 3: Tune-up ERP (mW) = $10^{\text{Tune-up ERP (dBm)}/10}$.

For single RF source, Option C

Test Mode	Frequency Band	λ/2π	R	Tune-up ERP	Thresholds ERP
	(MHz)	(m)	(m)	(mW)	(mW)
Bluetooth-BR/EDR	2402 ~ 2480	0.0199	0.20	7.62	768
2.4GHz Wi-Fi	2412 ~ 2462	0.0198	0.20	60.53	768
5GHz Wi-Fi	5180 ~ 5825	0.0092	0.20	114.55	768

Note 1: R is from user manual.

Note 2: The Bluetooth-BR/EDR and 2.4GHz Wi-Fi / 5GHz Wi-Fi can transmit simultaneously, therefore, the worst-case total exposure ratios = 7.62 / 768 + 114.55 / 768 = 0.1591 < 1.

CONCLUSION:

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

The End
