



REPORT No.: SZ25070108S01

RF EXPOSURE EVALUATION REPORT

APPLICANT : Anker Innovations Limited

PRODUCT NAME : soundcore Nebula X1 Pro

MODEL NAME : D2151

BRAND NAME : soundcore

FCC ID : 2AOKB-D2151

STANDARD(S) : 47 CFR Part 2(2.1091)

RECEIPT DATE : 2025-07-11

TEST DATE : 2025-07-21 to 2025-08-21

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Change History		
Version	Date	Reason for change
1.0	2025-09-10	First edition



1. Technical Information

Note: Provide by applicant.

1.1 Applicant and Manufacturer Information

Applicant:	Anker Innovations Limited
Applicant Address:	Unit 56, 8th Floor, Tower 2, Admiralty Centre, 18 Harcourt Road, Hong Kong
Manufacturer:	Anker Innovations Limited
Manufacturer Address:	Unit 56, 8th Floor, Tower 2, Admiralty Centre, 18 Harcourt Road, Hong Kong

1.2 Equipment under Test (EUT) Description

Product Name:	soundcore Nebula X1 Pro	
Sample No.:	2#, 3#, 5#	
Hardware Version:	V5	
Software Version:	V11.0.46	
Module Type:	☒ MTK7663; ☒ RTL8711; ☒ ATS3031 (The product includes three modules.)	
Frequency Bands:	WLAN 2.4GHz	2412MHz-2462MHz
	WLAN 5GHz	5180MHz-5240MHz; 5260MHz-5320MHz; 5500MHz-5720MHz; 5745MHz-5825MHz
	Bluetooth	2402MHz-2480MHz
Modulation Mode:	WLAN 2.4GHz	DSSS, OFDM
	WLAN 5GHz	OFDM, OFDM
	Bluetooth	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Antenna Information:	Module MTK7663	
	Bluetooth	
	Antenna Type:	FPC Antenna
	Antenna Gain:	6.37dBi
	WLAN 2.4GHz	
	Antenna Type:	FPC Antenna
	Antenna Gain:	ANT1: 5.13dBi; ANT2: 4.96dBi
	WLAN 5GHz	
	Antenna Type:	FPC Antenna



	Antenna Gain:	ANT1: 6.30dBi; ANT2: 5.43dBi
	Module RTL8711	
	Bluetooth	
	Antenna Type:	FPC Antenna
	Antenna Gain:	5.48dBi
	WLAN 5GHz	
	Antenna Type:	FPC Antenna
	Antenna Gain:	5.82dBi
	Module ATS3031	
	Bluetooth	
	Antenna Type:	FPC Antenna
	Antenna Gain:	4.81dBi

Note 1: The EUT description presented in the report are provided by applicant and/or manufacturer, and the test laboratory is not responsible for the accuracy of the information. For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.



1.3 Applied Reference Documents

Leading reference documents for testing:

Identity	Document Title	Remark
47 CFR Part 2(2.1091)	Radio Frequency Radiation Exposure Assessment: mobile devices	/
KDB 447498 D01v06	General RF Exposure Guidance	/
Note 1: Any additions, deviation, or exclusions from the method shall be noted in the "Remark".		



2. Device Category and RF Exposure Limit

Per user manual, based on 47 CFR 2.1091, this device belongs to mobile device category with General Population/Uncontrolled exposure.

Mobile Devices:

47 CFR 2.1091(b)

For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term "fixed location" means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

General Population/Uncontrolled Exposure:

The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

Table 1 Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(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

3. Maximum Average Power Summary

Module MTK7663

Wireless Mode	Frequency (MHz)	Max. Average Power (dBm)	Tune-up Limit (dBm)
WLAN 2.4GHz ANT1	2437	12.55	13.00
WLAN 2.4GHz ANT2	2462	13.20	13.50
WLAN 2.4GHz MIMO	2462	13.85	14.00
WLAN 5GHz ANT1	5710	13.46	13.50
WLAN 5GHz ANT2	5745	13.45	13.50
WLAN 5GHz MIMO	5180	14.04	14.50
Bluetooth	2402	10.64	10.50

Module RTL8711

Wireless Mode	Frequency (MHz)	Max. Average Power (dBm)	Tune-up Limit (dBm)
WLAN 5GHz	5500	12.99	13.50
Bluetooth	2440	4.11	4.50

Module ATS3031

Wireless Mode	Frequency (MHz)	Max. Average Power (dBm)	Tune-up Limit (dBm)
Bluetooth	2402	5.04	5.50

Note 1: According to KDB 447498, MPE assessment is based on source-based time-averaged maximum conducted output power of the RF channel requiring assessment, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

Note 2: The maximum average power refers to report (Report No.: SZ25070108W01/W02/W03/W04/W05/W06/W07).



4. RF Exposure Assessment

> Standalone Transmission Assessment

<Standalone Antenna Transmission Assessment>

Module MTK7663

Wireless Mode	Frequency (MHz)	Tune-up Power(dBm)	Antenna Gain(dBi)	E.I.R.P. (mW)	Power Density (mW/cm ²)	Limit for MPE (mW/cm ²)
WLAN 2.4GHz ANT1	2437	13.00	5.13	65.01	0.013	1.0
WLAN 2.4GHz ANT2	2462	13.50	4.96	70.15	0.014	1.0
WLAN 5GHz ANT1	5710	13.50	6.30	95.50	0.019	1.0
WLAN 5GHz ANT2	5745	13.50	5.43	78.16	0.016	1.0
Bluetooth	2402	10.50	6.37	48.64	0.010	1.0

Module RTL8711

Wireless Mode	Frequency (MHz)	Tune-up Power(dBm)	Antenna Gain(dBi)	E.I.R.P. (mW)	Power Density (mW/cm ²)	Limit for MPE (mW/cm ²)
WLAN 5GHz	5500	13.50	5.82	85.51	0.017	1.0
Bluetooth	2440	4.50	5.48	9.95	0.002	1.0

Module ATS3031

Wireless Mode	Frequency (MHz)	Tune-up Power(dBm)	Antenna Gain(dBi)	E.I.R.P. (mW)	Power Density (mW/cm ²)	Limit for MPE (mW/cm ²)
Bluetooth	2402	5.50	4.81	10.74	0.002	1.0



<MIMO Transmission Assessment>

Module MTK7663

Wireless Mode	Frequency (MHz)	Tune-up Power(dBm)	Directional Gain(dBi)	E.I.R.P. (mW)	Power Density (mW/cm ²)	Limit for MPE (mW/cm ²)
WLAN 2.4GHz	2462	14.00	8.06	160.69	0.032	1.0
WLAN 5GHz	5180	14.50	8.89	218.27	0.043	1.0

Note 1: The WLAN 2.4GHz directional gain = $10\log(10^{G1/20} + 10^{G2/20})^2/2 = 8.06\text{dBi}$; WLAN 5GHz directional gain = $10\log(10^{G1/20} + 10^{G2/20})^2/2 = 8.89\text{dBi}$.

Note 2: For 2.4G/5G WLAN, only the worst case will be used for calculating the power density.

Note 3: MPE calculate method

$$S = PG/4\pi R^2$$

Where: S= Power density (in appropriate units, e.g. mW/cm²)

P = Time-average maximum tune-up power (in appropriate units, e.g. dBm)

G = numeric gain of the antenna (in appropriate units, e.g. dBi)

R = Separation distance to the centre of radiation of the antenna (20cm)

➤ **Simultaneous Transmission Assessment:**

Multi-Band Simultaneous Transmission Consideration

	Position	Applicable Combination
	Body	WIFI 2.4G MIMO(MTK7663) + BT(MTK7663) WIFI 2.4G MIMO(MTK7663) + BT(MTK7663) + WIFI 5G (RTL8711) WIFI 2.4G MIMO(MTK7663) + BT(MTK7663) + WIFI 5G (RTL8711) + BT(ATS3031) WIFI 2.4G MIMO(MTK7663) + BT(MTK7663) + BT(RTL8711) WIFI 2.4G MIMO(MTK7663) + BT(MTK7663) + BT(RTL8711) + BT(ATS3031) WIFI 2.4G MIMO(MTK7663) + BT(MTK7663) + BT(ATS3031) WIFI 2.4G MIMO(MTK7663) + WIFI 5G MIMO (RTL8711) WIFI 2.4G MIMO(MTK7663) + WIFI 5G (RTL8711) + BT(ATS3031) WIFI 2.4G MIMO(MTK7663) + BT(RTL8711) WIFI 2.4G MIMO(MTK7663) + BT(RTL8711) + BT(ATS3031) WIFI 2.4G MIMO(MTK7663) + BT(ATS3031) WIFI 5G MIMO(MTK7663) + BT(MTK7663) WIFI 5G MIMO(MTK7663) + BT(MTK7663) + WIFI 5G (RTL8711) WIFI 5G MIMO(MTK7663) + BT(MTK7663) + WIFI 5G (RTL8711) + BT(ATS3031) WIFI 5G MIMO(MTK7663) + BT(MTK7663) + BT(RTL8711) WIFI 5G MIMO(MTK7663) + BT(MTK7663) + BT(RTL8711) + BT(ATS3031) WIFI 5G MIMO(MTK7663) + BT(MTK7663) + BT(ATS3031) WIFI 5G MIMO(MTK7663) + WIFI 5G (RTL8711) WIFI 5G MIMO(MTK7663) + WIFI 5G (RTL8711) + BT(ATS3031) WIFI 5G MIMO(MTK7663) + BT(RTL8711) WIFI 5G MIMO(MTK7663) + BT(RTL8711) + BT(ATS3031) WIFI 5G MIMO(MTK7663) + BT(ATS3031) BT(MTK7663) + WIFI 5G MIMO (RTL8711) BT(MTK7663) + WIFI 5G (RTL8711) + BT(ATS3031) BT(MTK7663) + BT(RTL8711) BT(MTK7663) + BT(RTL8711) + BT(ATS3031) BT(MTK7663) + BT(ATS3031)

Simultaneous Transmission Consideration



Note: This device contains transmitters that may operate simultaneously, therefore simultaneous transmission analysis is required, only the worse results were recorded as below.

Applicable Combination	Transmission Bands	Power Density (mW/cm²)	Limit (mW/cm²)	Simultaneous Transmission Result
WIFI 5G MIMO(MTK7663) + BT(MTK7663) + WIFI 5G (RTL8711) + BT(ATS3031)	WIFI 5G MIMO (MTK7663)	0.043	1.0	0.072
	BT(MTK7663)	0.010	1.0	
	WIFI 5G (RTL8711)	0.017	1.0	
	BT(ATS3031)	0.002	1.0	
Note 1: Formula for result=Power density ₁ / limit ₁ + Power density ₂ / limit ₂ ≤1. Note 2: The highlight applicable combination is the worst condition.				

➤ **Conclusion:**

According to 47 CFR 2.1091, this device complies with human exposure basic restrictions.



Annex A Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.

_____ END OF REPORT _____