



REPORT No. : SZ17080187S01

RF EXPOSURE EVALUATION REPORT

APPLICANT : Anker Technology Co., Limited

PRODUCT NAME : Nebula Mars Lite

MODEL NAME : D2321

TRADE NAME : Nebula

BRAND NAME : N/A

FCC ID : 2AB7K-D2321
47CFR 2.1091

STANDARD(S) : KDB 447498 D01 General RF Exposure
Guidance v06

ISSUE DATE : 2017-09-12

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

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DIRECTORY

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Change History		
Issue	Date	Reason for change
1.0	2017-09-12	First edition

**TEST REPORT DECLARATION**

Applicant	Anker Technology Co., Limited
Applicant Address	Room 1318-19,Hollywood Plaza,610 Nathan Road, Mongkok, Kowloon,Hong Kong
Manufacturer	Anker Technology Co., Limited
Manufacturer Address	Room 1318-19,Hollywood Plaza,610 Nathan Road, Mongkok, Kowloon,Hong Kong
Product Name	Nebula Mars Lite
Model Name	D2321
Brand Name	N/A
HW Version	9893C
SW Version	N/A
Test Standards	47CFR 2.1091; KDB 447498 D01 General RF Exposure Guidance v06
Issue Date	2017-09-12
SAR Evaluation	Not Required

Tested by

:

Peng Fuwei (Test engineer)

Approved by

:

Peng Huarui (Supervisor)



1. TECHNICAL INFORMATION

Note: the following data is based on the information by the applicant.

1.1. Identification of Applicant

Company Name:	Anker Technology Co., Limited
Address:	Room 1318-19,Hollywood Plaza,610 Nathan Road,Mongkok,Kowloon,Hong Kong

1.2. Identification of Manufacturer

Company Name:	Anker Technology Co., Limited
Address:	Room 1318-19,Hollywood Plaza,610 Nathan Road,Mongkok,Kowloon,Hong Kong

1.3. Equipment Under Test (EUT)

Model Name:	D2321
Trade Name:	Nebula
Brand Name:	N/A
Hardware Version:	9893C
Software Version:	N/A
Frequency Bands:	802.11 b/g/n: 2412-2462 MHz; 802.11a/ac/n: 5180-5825MHz Bluetooth 2.1+EDR ,Bluetooth4.1; 2402-2480 MHz;
Modulation Mode:	WIFI 802.11b: DSSS; WIFI 802.11g: OFDM; WIFI 802.11a/ac/n:OFDM; Bluetooth 2.1+EDR: GFSK/ $\pi/4$ -DQPSK/8-DPSK; Bluetooth4.1: GFSK
Antenna Type:	FPCB Antenna
Antenna Gain:	Bluetooth:3.6dBi 2.4G wifi:1.2 dBi 5G wifi:4.1 dBi

1.3.1. Photographs of the EUT

1. EUT front view



2. EUT rear view





1.3.2. Identification of all used EUT

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the following two numerical characters indicate the software version of the test sample.

EUT Identity	Hardware Version	Software Version
1#	9893C	N/A

1.4. Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title
1	47 CFR§2.1091	Radiofrequency Radiation Exposure Evaluation: mobile devices
2	KDB 447498 D01v06	General RF Exposure Guidance



2. DEVICE CATEGORY AND RF EXPOSURE LIMIT

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

Mobile Devices:

47CFR 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. MEASUREMENT OF CONDUCTED PEAK OUTPUT POWER

1. WiFi Average output power

Band	Channel	Frequency (MHz)	Output Power(dBm)		
			802.11b (DSSS)	802.11g (OFDM)	802.11n20 (OFDM)
WiFi	1	2412	17.52	15.60	13.94
	6	2437	17.27	15.14	13.77
	11	2462	16.99	14.99	13.47

2. 5GHz Wi-Fi Average output power

Band	Channel	Frequency (MHz)	Output Power(dBm)	
			802.11a20	802.11n20
Wi-Fi 5.2GHz	36	5180	11.38	11.20
	44	5220	11.98	11.56
	48	5240	12.13	11.78

Band	Channel	Frequency (MHz)	Output Power(dBm)
			802.11n40
Wi-Fi 5.2GHz	38	5190	11.25
	46	5230	11.70

Band	Channel	Frequency (MHz)	Output Power(dBm)	
			802.11a20	802.11n20
Wi-Fi 5.8GHz (UNII)	149	5745	9.98	9.86
	157	5785	10.10	9.77
	165	5825	10.12	9.91



Band	Channel	Frequency (MHz)	Output Power(dBm)
			802.11n40
Wi-Fi 5.8GHz (UNII)	151	5755	10.11
	159	5795	10.31

2. BT peak output power

Band	Channel	Frequency (MHz)	Output Power(dBm)		
			GFSK	$\pi/4$ -DQPSK	8-DPSK
BT2.1+EDR	0	2402	6.83	5.07	5.05
	39	2441	8.51	7.43	7.47
	78	2480	8.87	7.54	7.44

Band	Channel	Frequency (MHz)	Output Power(dBm)
			GFSK
BT4.1	0	2402	5.07
	19	2441	6.62
	39	2480	6.95



4 RF EXPOSURE EVALUATION

Standalone transmission MPE evaluation

Bands	Frequency (MHz)	Antenna Gain (dBi)	Conducted Average Power (dBm)	Time-averaging EIRP (mW)	Power density (mW/cm ²)	Limit for MPE (mW/cm ²)
BT	2480	3.6	8.87	33.99	0.0068	2.736
2.4GHz	2412	1.2	17.52	74.47	0.0148	2.684
5GHz	5240	4.1	12.13	41.98	0.0084	4.561

1. MPE calculation method

$$\text{Power Density} = \text{EIRP} / 4\pi R^2$$

Where: $\text{EIRP} = P \cdot G$

P = Peak out power

G = Antenna gain

R = Separation distance (20cm)



ANNEX C GENERAL INFORMATION

1. Identification of the Responsible Testing Laboratory

Company Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Department:	Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Responsible Test Lab Manager:	Mr. Su Feng
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2. Identification of the Responsible Testing Location

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

***** END OF REPORT *****