

Test Report

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Report No.: E20230322427101-5

Customer: Shenzhen SDMC Technology Co.,Ltd.

Address: Room 1022, Floor 10, Building A, Customs Building, No. 2, Xin'an 3rd Road, Dalang Community, Xin'an Street, Bao'an District, Shenzhen,China

Sample Name: AX1800 Dual Band WiFi6 CATV GPON Terminal

Sample Model: NP1835GRF

Receive Sample Date: Mar.29,2023

Test Date: Apr.10,2023 ~ May.24,2023

Reference Document: CFR 47, FCC Part 2.1091 Radio frequency radiation exposure evaluation: mobile devices.

Test Result: Pass

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GRG METROLOGY & TEST GROUP CO., LTD.

Issued Date: 2023-06-02

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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E20230322427101-5	Original Issue	2023-05-25

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1. GENERAL DESCRIPTION OF EUT

1.1 APPLICANT

Name: Shenzhen SDMC Technology Co.,Ltd.
Address: Room 1022, Floor 10, Building A, Customs Building, No. 2, Xin'an 3rd Road, Dalang Community, Xin'an Street, Bao'an District, Shenzhen,China

1.2 MANUFACTURER

Name: Shenzhen SDMC Technology Co.,Ltd.
Address: Room 1022, Floor 10, Building A, Customs Building, No. 2, Xin'an 3rd Road, Dalang Community, Xin'an Street, Bao'an District, Shenzhen,China

1.3 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Product Name: AX1800 Dual Band WiFi6 CATV GPON Terminal

Adding Product Name: AX1800 Dual Band WiFi6 GPON Terminal, AX1800 Dual Band WiFi6 GPON Terminal

Model No.: NP1835GRF

Adding Model: NP1835G, NP1835GB

Model difference description: The above series models are consistent with the main model in terms of schematic diagram, circuit design, circuit layout, and internal structure, The differences are mainly due to the inconsistency of model name and NP1835GRF with RF Port、Telephone Port but without USB Port, NP1835G without RF Port but with Telephone Port and USB Port, NP1835GB without RF Port、Telephone Port、USB Port.

Trade Name: SDMC, D FIBRA

FCC ID: 2AW68-NP1835GRF

Power Supply: DC 12.0V power supplied by adapter

Adapter Specification:

NP1835GRF:

Adapter 1:

Model:SA182V-120150U;

Input:100-240V~50/60Hz 0.4A;

Output:12V ---- 1.5A;

NP1835G:

Adapter 1:

Model:SA182V-120150U;

Input:100-240V~50/60Hz 0.4A;

Output:12V ---- 1.5A;

NP1835GB:

Adapter 1:

Model:F12L33-120100SPAU;

Input:100-240V~50/60Hz 0.3A;

Output:12V ---- 1A 12.0W;

Adapter 2:

Model:SA12BV-120100U;

Input:100-240V~50/60Hz 0.4A;

Output:12V ---- 1A.

Frequency Range: 2412MHz-2462MHz for 802.11b/g/n HT20/ax HE20
2422MHz-2452MHz: 802.11n HT40/ax HE40
U-NII-1: 5180 MHz~5240 MHz
U-NII-2A: 5260 MHz~5320 MHz
U-NII-2C: 5500 MHz~5720 MHz
U-NII-3: 5745 MHz~5825 MHz

Transmit Power: Reference Section 4 Table 2

Modulation type: 2.4G wifi:
DSSS for 802.11b mode;
OFDM for 802.11g/n mode;
OFDM , OFDMA for 802.11ax mode;
5G wifi:
OFDM, OFDMA.

Antenna Specification: Reference Section 4 Table 1

Temperature Range: 0°C~40°C

Hardware Version: V1.0

Software Version: NP1835GRF: S01.1B.01.001
NP1835G: NP1835GR005
NP1835GB: S01.31.19.003

Sample No: E20230322427101-0004

Note: The EUT antenna gain is provided by the applicant. This report is made solely on the basis of such data and/or information. We accept no responsibility for the authenticity and completeness of the above data and information and the validity of the results and/or conclusions.

2. LABORATORY AND ACCREDITATIONS

2.1. LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of GRG METROLOGY & TEST GROUP CO., LTD.

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2.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA A2LA(Certificate #2861.01)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada ISED (Company Number: 24897, CAB identifier:CN0069)

USA FCC (Registration Number: 759402, Designation Number:CN1198)

Copies of granted accreditation certificates are available for downloading from our web site,
<http://www.grgtest.com>

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3. LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE

According to the KDB 447498 D04 Interim General RF Exposure Guidance v01, General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table 4.1 to support an exemption from further evaluation from 300 kHz through 100 GHz.

TABLE 4.1—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 ² f
1,500	–	100,000	31.8 mm	–	0.5 mm	19.2R ²
Subscripts L and H are low and high; λ is wavelength. From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.						

For mobile devices that are not exempt per Table 4.1 at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in §1.1310 is necessary if the ERP of the device is greater than $ERP_{20\text{cm}}$ in Formula (4.1).

$$P_{\text{th}} (\text{mW}) = ERP_{20\text{ cm}} (\text{mW}) = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (4.1)$$

In accordance with KDB447498D04 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 (Evaluated_k term) shall be used to determine exemption for simultaneous transmission according to Formula

$$\text{MPE Ratio} = \sum_{j=1}^b \frac{ERP_j}{ERP_{\text{th},j}} < 1$$

ERP_j: the available maximum time-averaged power or the ERP, whichever is greater, 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 § 1.1307(b)(3)(i)(C) Table 1 formula at the location in question.

the sum of the ratios of the applicable terms for SAR-based, MPE-based and measured SAR or MPE shall be less than 1, to determine simultaneous transmission exposure compliance.

4. CALCULATION METHOD

Predication of MPE limit at a given distance

$EIRP(dBm) = \text{Maximum Tune-up Output power (dBm)} + \text{Maximum antenna gain (dBi)}$

$ERP(dBm) = EIRP(dBm) - 2.15$

R= minimum distance to the center of radiation of the antenna

From the EUT RF output power, the minimum mobile separation distance, d=20cm, as well as the maximum gain of the used as following information, the RF power ERP can be obtained.

Table 1 Antenna Specification

Frequency Band	Antenna type	Internal Identification	Maximum antenna gain
2.4G wifi	Built-in antenna	Antenna 1	4.12 dBi
		Antenna 2	2.37 dBi
5G wifi U-NII-1	Built-in antenna	Antenna 3	2.84 dBi
		Antenna 4	4.09 dBi
5G wifi U-NII-2A		Antenna 3	3.07 dBi
		Antenna 4	3.81 dBi
5G wifi U-NII-2C		Antenna 3	3.91 dBi
		Antenna 4	3.90 dBi
5G wifi U-NII-3		Antenna 3	3.81 dBi
		Antenna 4	3.86 dBi

Table 2 Transmit Power

Frequency Band	Test mode	Maximum Output Power (dBm)	Tune-up Output Power Range (dBm)
2.4G wifi	802.11b	22.86	23.0 ± 1.0
	802.11g	27.34	27.5 ± 1.0
	802.11n HT20	28.58	28.7 ± 1.0
	802.11n HT40	29.32	28.7 ± 1.0
	802.11ax HE20	28.91	28.7 ± 1.0
	802.11ax HE40	29.03	28.7 ± 1.0
5G wifi U-NII-1	802.11a	21.45	21.5 ± 1.0
	802.11n HT20	23.08	23.5 ± 1.0
	802.11n HT40	23.30	23.5 ± 1.0
	802.11ac VHT20	22.47	22.5 ± 1.0
	802.11ac VHT40	23.35	23.5 ± 1.0
	802.11ac VHT80	22.90	23.0 ± 1.0
	802.11ax HE20	22.21	22.5 ± 1.0
	802.11ax HE40	19.75	20.0 ± 1.0
	802.11ax HE80	19.00	19.5 ± 1.0

5G wifi U-NII-2A	802.11a	20.63	21.0±1.0
	802.11n HT20	21.41	21.5±1.0
	802.11n HT40	20.82	21.0±1.0
	802.11ac VHT20	19.80	20.0±1.0
	802.11ac VHT40	20.81	21.0±1.0
	802.11ac VHT80	21.28	21.5±1.0
	802.11ax HE20	20.85	21.0±1.0
	802.11ax HE40	22.79	22.5±1.0
	802.11ax HE80	19.45	19.5±1.0
5G wifi U-NII-2C	802.11a	21.70	22.0±1.0
	802.11n HT20	20.88	21.0±1.0
	802.11n HT40	22.36	22.0±1.0
	802.11ac VHT20	20.76	21.0±1.0
	802.11ac VHT40	22.32	22.0±1.0
	802.11ac VHT80	21.77	22.0±1.0
	802.11ax HE20	22.08	22.0±1.0
	802.11ax HE40	21.69	22.0±1.0
	802.11ax HE80	22.86	22.0±1.0
5G wifi U-NII-3	802.11a	21.12	21.5±1.0
	802.11n HT20	22.64	23.0±1.0
	802.11n HT40	22.58	23.0±1.0
	802.11ac VHT20	22.73	23.0±1.0
	802.11ac VHT40	24.53	25.0±1.0
	802.11ac VHT80	22.68	23.0±1.0
	802.11ax HE20	22.69	23.0±1.0
	802.11ax HE40	22.88	23.0±1.0
	802.11ax HE80	23.03	23.0±1.0

Note:

1. The maximum output Power of 2.4G wifi were refer to the module report. (Report No.: E20230322427101-2).
2. The maximum output Power of 5G wifi were refer to the module report. (Report No.: E20230322427101-3)

5. ESTIMATION RESULT

5.1 MEASUREMENT RESULTS

STANDALONE MPE

Mode	Frequency (MHz)	Maximum Tune-up Output power (dBm)	Antenna Gain (dBi)	Maximum Tune-up EIRP (dBm)	Maximum Tune-up ERP (dBm)	Maximum Tune-up ERP (mW)	Threshold ERP (mW)
2.4G WIFI	2412-2472	29.70	4.12	33.82	31.67	1468.9263	3060
5G wifi U-NII-1	5150-5250	24.50	4.09	28.59	26.44	440.5549	3060
5G wifi U-NII-2A	5250-5350	23.50	3.81	27.31	25.16	328.0953	3060
5G wifi U-NII-2C	5470-5725	23.00	3.91	26.91	24.76	299.2265	3060
5G wifi U-NII-3	5725-5850	26.00	3.86	29.86	27.71	590.2011	3060

Remark:

1. RF Exposure use distance is 20cm from manufacturer declaration of user manual.
2. ERP=EIRP-2.15

For Simultaneous transmission:

- $\sum \text{MPE ratios} = \text{MPE ratio}(2.4\text{G wifi}) + \text{MPE ratio}(5\text{G wifi-U-NII-1});$
- $\sum \text{MPE ratios} = \text{MPE ratio}(2.4\text{G wifi}) + \text{MPE ratio}(5\text{G wifi-U-NII-2A});$
- $\sum \text{MPE ratios} = \text{MPE ratio}(2.4\text{G wifi}) + \text{MPE ratio}(5\text{G wifi-U-NII-2C});$
- $\sum \text{MPE ratios} = \text{MPE ratio}(2.4\text{G wifi}) + \text{MPE ratio}(5\text{G wifi-U-NII-3});$

Maximum Simultaneous transmission MPE Ratio for WLAN(2.4G wifi) and RLAN(5G wifi)

Maximum MPE ratio (2.4G wifi)	Maximum MPE ratio (5G wifi)	$\sum \text{MPE ratios}$	Limit	Results
0.480	0.193	0.673	1.000	Pass

Note:

1. The bluetooth and wifi support simultaneous.
2. ERP_j : the available maximum time-averaged power or the ERP, whichever is greater, of fixed, mobile, or portable RF source j.
3. $\text{ERP}_{\text{th},j}$: exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least $\lambda/2\pi$, according to the applicable § 1.1307(b)(3)(i)(C) Table 1 formula at the location in question.
4. Maximum MPE Ratio (2.4G wifi) = Maximum Tune-up ERP / Threshold ERP
 $= 1468.9263\text{mW}/3060\text{mW} = 0.480;$
 Maximum MPE Ratio (5G wifi) = Maximum Tune-up ERP(5G wifi U-NII-3) / Threshold ERP
 $= 590.2011\text{mW}/3060\text{mW} = 0.193;$
5. $\sum \text{MPE ratios} = \text{Maximum MPE Ratio (2.4G wifi)} + \text{Maximum MPE Ratio (5G wifi)}$
 $= 0.480 + 0.193 = 0.673 < 1.$
6. The result is pass.

6. CONCLUSION

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

----- End of Report -----