



Maximum Permissible Exposure Evaluation

FCC ID: ZQ6-AP5811SA&IC: 11956A-AP5811SA**Change II**

Report No.	:	TBR-C-202601-0203-10	
Applicant	:	AMPAK Technology Inc	
Equipment Under Test (EUT)			
EUT Name	:	AP5811SA	
Model No.	:	AP5811SA	
Series Model No.	:	N/A	
Brand Name	:	AMPAK, SPARKLAN	
Sample ID	:	HC-C-202601-0203-01-01&HC-C-202601-0203-02-01	
Receipt Date	:	2026-01-26	
Test Date	:	2026-01-26 to 2026-03-16	
Issue Date	:	2026-03-16	
Standards	:	RSS-102 Issue 6 December 15, 2023 FCC Part 2.1091	
Test Method	:	KDB 447498 D01 General RF Exposure Guidance v06	
Conclusions	:	PASS	
In the configuration tested, the EUT complied with the standards specified above.			
Test By	:	Gold. Zhang	
Reviewed By	:	Henry Huang	
Approved By	:	Ivan Su	

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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Revision History

Report No.	Version	Description	Issued Date
TBR-C-202601-0203-1	Rev.01	Initial issue of report	2026-03-16
Note: (1) This report is Class II change report for the original equipment have changed, the transmitter module itself has not changed. More information about the test data please refer to the original test report. (2) Add an antenna (EAF727A) . The interface for connecting the RF cable is the same as before. However, the antenna gain is smaller than before. (3) The antenna gain is smaller than before, so the assessment will still be based on the previous maximum antenna gain.			



1. General Information about EUT

1.1 Client Information

Applicant	:	AMPAK Technology Inc.
Address	:	6F-2, No.23, Huanke 1st Rd., Zhubei City, Hsinchu County 302047, Taiwan R.O.C.
Manufacturer	:	AMPAK Technology Inc.
Address	:	6F-2, No.23, Huanke 1st Rd., Zhubei City, Hsinchu County 302047, Taiwan R.O.C.

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	AP5811SA
Models No.	:	AP5811SA
Model Different	:	N/A
Product Description	:	Operation Frequency: Bluetooth&BLE: 2402MHz~2480MHz 2.4G Wi-Fi: 2412MHz~2462MHz U-NII-1: 5180MHz~5240MHz U-NII-2A: 5260MHz~5320MHz U-NII-2C: 5500MHz~5720MHz U-NII-3: 5745MHz~5825MHz U-NII-5: 5955MHz~6415MHz U-NII-6: 6435MHz~6515MHz U-NII-7: 6535MHz~6875MHz U-NII-8: 6895MHz~7115MHz
	:	Modulation Type: Bluetooth&BLE: GFSK, Pi/4-DQPSK, 8DPSK 802.11b: DSSS (DQPSK, DBPSK, CCK) 802.11g: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11a: OFDM (QPSK, BPSK, 16QAM, 64QAM) 802.11n: OFDM (QPSK, BPSK, 16QAM, 64QAM) 802.11ac: OFDM (QPSK, BPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 1024QAM)
	:	Antenna Gain: 2.4G-2.5GHz: Dipole Antenna 5.96dBi 5G-7GHz: Dipole Antenna 6.34dBi
Power Rating	:	DC 3.3V
Software Version	:	N/A
Hardware Version	:	N/A
Remark: The above antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.		



Antenna Information(2.4-2.5GHz)

Model No. of antenna:	Type of antenna:	Gain of the antenna (Max.)
		Antenna 1
AD-103AG	Dipole Antenna	2.02dBi
AD-301N	Dipole Antenna	4.4dBi
AD-302N	Dipole Antenna	3.14dBi
AD-303N	Dipole Antenna	3.14dBi
AD-305N	Dipole Antenna	5.0dBi
AD-501AX	Dipole Antenna	3.7dBi
AD-510AX	Dipole Antenna	2.27dBi
AD-512AX	Dipole Antenna	2.35dBi
AD-514AX	Dipole Antenna	3.07dBi
AD-515AX	Dipole Antenna	5.96dBi
EAF727A	PCB Antenna	-1.1dBi

Note: This module will use ten different antennas, and only the one with the larger antenna gain(**Antenna1: 5.96dBi(AD-515AX)**)will be used for test.

Add an antenna(EAF727A). The interface for connecting the RF cable is the same as before. However, the antenna gain is smaller than before. (Antenna: -1.1dBi)

Antenna information: (5-7GHz)

Model No. of antenna:	Type of antenna:	Gain of the antenna (Max.)
		Antenna 1
AD-103AG	Dipole Antenna	2.03dBi
AD-301N	Dipole Antenna	5.8dBi
AD-302N	Dipole Antenna	2.87dBi
AD-303N	Dipole Antenna	3.45dBi
AD-305N	Dipole Antenna	5.53dBi
AD-501AX	Dipole Antenna	5.0dBi
AD-510AX	Dipole Antenna	3.52dBi
AD-512AX	Dipole Antenna	3.02dBi
AD-514AX	Dipole Antenna	4.17dBi
AD-515AX	Dipole Antenna	6.34dBi
EAF727A	PCB Antenna	-3.1dBi(5180-5825MHz)
EAF727A	PCB Antenna	-3.1dBi(5955-7115MHz)

Note: This module will use ten different WiFi antennas, and only the one with the larger antenna gain(**Antenna1: 6.34dBi;(AD-515AX)**) will be used for test.

Add an antenna(EAF727A). The interface for connecting the RF cable is the same as before. However, the antenna gain is smaller than before. (Antenna: -3.1dBi 5180-5825MHz; -3.7dBi 5955-7115MHz)

	HVIN	Brand Name
First PV	AP5811SA	AMPAK
Second PV	AP5811SA	SPARKLAN



2. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U_{Lab})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	± 3.50 dB ± 3.10 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	± 4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	± 4.50 dB
Radiated Emission	Level Accuracy: Above 1000MHz	± 4.20 dB
RF Power- Conducted	Level Accuracy: Above 1000MHz	± 0.95 dB
Power Spectral Density- Conducted	Level Accuracy: Above 1000MHz	± 3 dB
Occupied Bandwidth	Level Accuracy: 30MHz to 1000 MHz Above 1000MHz	$\pm 3.8\%$
Unwanted Emission- Conducted	Level Accuracy: 30MHz to 1000 MHz Above 1000MHz	± 2.72 dB
Temperature	/	$\pm 0.6^{\circ}\text{C}$
Humidity	/	$\pm 4\%$
Supply voltages	/	$\pm 2\%$
Time	/	$\pm 4\%$



3. Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1/F., Building 6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an District, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.FCC Accredited Test Site Number: 854351. Designation Number: CN1223.

IC Registration No.: (11950A)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A. CAB identifier: CN0056.



4 Method Of Measurement for IC

4.1. Applicable Standard

[RSS-102 Issue 6 December 15, 2023](#): Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands), sets out the requirements and measurement techniques used to evaluate radio frequency (RF) exposure compliance of radio communication apparatus designed to be used within the vicinity of the human body.

[ANSI C95.1-1999](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

[FCC KDB publication 447498 D01 General RF Exposure Guidance v06](#): Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

4.2 Evaluation Method and Limit

According to RSS-102 issue 6 Table 7, RF field strength and power density limits for devices used by the general public (uncontrolled environment)

Frequency range (MHz)	Electric field (V _{RMS} /m)	Magnetic field (A _{RMS} /m)	Power density (W/m ²)	Reference period (minutes)
10-20	27.46	0.0728	2	6
20-48	$58.07 / f^{0.25}$	$0.1540 / f^{0.25}$	$8.944 / f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	$0.158 f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000/f^{1.2}$

Frequency Band	f (MHz)	Limit of Power Density (W/m ²)
2.4G	2402	5.35
5G	5180	9.05
6G	5955	9.95
Note: Limit=0.02619$f^{0.6834}$ (where f is in MHz). The f in the limit is the frequency of the lowest Channel.		



4.3 Calculation Formula

Prediction of power density at the distance of the applicable MPE limit:

$S = PG/4\pi R^2$ = Power density (in appropriate units, e.g W/m²)

P = power input to antenna (in appropriate units, e.g W)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g m)

Simultaneous transmission MPE Considerations

According to KDB447498: All transmitters and antennas in the host must be either evaluated for MPE compliance, by measurement or computational modeling, or qualify for the standalone MPE test exclusion in section 7.1. Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0 .

This means that:

$\sum$ of MPE ratios ≤ 1.0



5 Test Result:

Worst MPE Result							
Test Mode	Antenna	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	Max. ANT Gain (dBi) [G]	Distance (m) [R]	Power Density (mW/ m ²) [S]
Bluetooth&BLE	/	4.44	4±1	5	5.96	0.2	0.0248
2.4G b	Ant1	17.02	17±1	18	5.96	0.2	0.4952
2.4G g	Ant1	13.86	14±1	15	5.96	0.2	0.2482
2.4G n20	Ant1	14.01	14±1	15	5.96	0.2	0.2482
2.4G ax20	Ant1	13.51	14±1	15	5.96	0.2	0.2482
5G a	Ant1	15.14	15±1	16	6.34	0.2	0.3410
5G n20	Ant1	15.04	15±1	16	6.34	0.2	0.3410
5G n40	Ant1	15.77	15±1	16	6.34	0.2	0.3410
5G ac20	Ant1	16.02	17±1	18	6.34	0.2	0.5404
5G ac40	Ant1	16.90	17±1	18	6.34	0.2	0.5404
5G ac80	Ant1	16.37	17±1	18	6.34	0.2	0.5404
5G ax20	Ant1	16.19	17±1	18	6.34	0.2	0.5404
5G ax40	Ant1	17.17	17±1	18	6.34	0.2	0.5404
5G ax80	Ant1	16.63	17±1	18	6.34	0.2	0.5404
6G ax20	Ant1	3.58	4±1	5	6.34	0.2	0.0271
6G ax40	Ant1	5.84	5±1	6	6.34	0.2	0.0680
6G ax80	Ant1	8.59	8±1	9	6.34	0.2	0.0312
Note: The antenna gain used max. antenna gain							



5.1 Summary simultaneous transmission results

Bluetooth and WiFi support Synchronization transmittether

Maximum MPE ratio Bluetooth	Maximum MPE ratio WiFi	Σ MPE ratios	Limit	Results
0.0248	0.5404	0.5652	1	PASS

Remark:

1. Output power including turn-up tolerance;
2. MPE evaluate distance is 20cm from user manual provide by manufacturer.

Note

For a more detailed features description, please refer to the RF Test Report.



6 Method of Measurement for FCC

6.1 EUT Operation Condition:

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

6.2 Exposure Evaluation:

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

Where

S: power density

P: power input to the antenna

G: power gain of the antenna in the direction of interest relative to an isotropic radiator.

R: distance to the center of radiation of the antenna

6.3 Simultaneous transmission MPE Considerations

According to KDB447498 D01 v06: All transmitters and antennas in the host must be either evaluated for MPE compliance, by measurement or computational modeling, or qualify for the standalone MPE test exclusion in section 7.1. Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0 .

This means that:

$$\sum \text{ of MPE ratios } \leq 1.0$$



7 Test Result:

Worst MPE Result							
Test Mode	Antenna	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	Max. ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
Bluetooth&BLE	/	4.44	4±1	5	5.96	20	0.00248
2.4G b	Ant1	17.02	17±1	18	5.96	20	0.04952
2.4G g	Ant1	13.86	14±1	15	5.96	20	0.02482
2.4G n20	Ant1	14.01	14±1	15	5.96	20	0.02482
2.4G ax20	Ant1	13.51	14±1	15	5.96	20	0.02482
5G a	Ant1	15.14	15±1	16	6.34	20	0.03410
5G n20	Ant1	15.04	15±1	16	6.34	20	0.03410
5G n40	Ant1	15.77	15±1	16	6.34	20	0.03410
5G ac20	Ant1	16.02	17±1	18	6.34	20	0.05404
5G ac40	Ant1	16.90	17±1	18	6.34	20	0.05404
5G ac80	Ant1	16.37	17±1	18	6.34	20	0.05404
5G ax20	Ant1	16.19	17±1	18	6.34	20	0.05404
5G ax40	Ant1	17.17	17±1	18	6.34	20	0.05404
5G ax80	Ant1	16.63	17±1	18	6.34	20	0.05404
6G ax20	Ant1	3.58	4±1	5	6.34	20	0.00271
6G ax40	Ant1	5.84	5±1	6	6.34	20	0.00680
6G ax80	Ant1	8.59	8±1	9	6.34	20	0.00312
Note: The antenna gain used max. antenna gain							



7.1 Conclusion:

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

Limits for General Population/ Uncontrolled Exposure

Frequency Range (MHz)	Power density (mW/ cm ²)
300-1,500	F/1500
1,500-100,000	1.0

For: 2402~2480MHz&2412~2462MHz&5180~5825MHz \$5955MHz-7115MHz

MPE limit S: 1mW/ cm²

The MPE is calculated as **0.05054mW / cm² < limit 1mW / cm²**.



7.2 Summary simultaneous transmission results

Bluetooth and WiFi support Synchronization transmittether

Maximum MPE ratio Bluetooth	Maximum MPE ratio WiFi	Σ MPE ratios	Limit	Results
0.00248	0.05404	0.05652	1	PASS

So, RF exposure limit warning or SAR test are not required.

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b). The RF Exposure Information page from the manual is included here for reference.

-----END OF THE REPORT-----

