TEST REPORT

Applicant:	MeiG Smart Technology Co., Ltd
Address:	2nd Floor,Office Building,No.5 Lingxia Road, Fenghuang, Fuyong Street, Bao'an District, Shenzhen, China.
Equipment Type:	Wi-Fi 6E Smart Module
Model Name:	SNM955
Brand Name:	MEIGLink
FCC ID:	2APJ4-SNM955
Test Standard:	47 CFR Part 2.1091 KDB 447498 D04 v01
Test Date:	Dec. 12, 2022 - Jan. 14, 2023
Date of Issue:	Feb. 23, 2023

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Julie Zhu **Checked by:** Xu Rui **Approved by:** Tu Lang

(Testing Director)

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Feb. 17, 2023	Initial Issue
Rev. 02	Feb. 23, 2023	Update assessment result in section 5.

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☑ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	MeiG Smart Technology Co., Ltd
Address	2nd Floor, Office Building, No.5 Lingxia Road, Fenghuang, Fuyong Street, Bao'an District, Shenzhen, China.

2.2 Manufacturer Information

Manufacturer	MeiG Smart Technology Co., Ltd
Address	2nd Floor, Office Building, No.5 Lingxia Road, Fenghuang, Fuyong Street, Bao'an District, Shenzhen, China.

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	Wi-Fi 6E Smart Module
Model Name Under Test	SNM955
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Note: Not applicable.

2.6 Technical Information

Network and Wireless connectivity	Bluetooth (BR+EDR+BLE) 2.4G WIFI 802.11b, 802.11g, 802.11n(HT20/40) and 802.11ax(HE20/40) 5G WIFI 802.11a, 802.11n(HT20/40), 802.11ac(VHT20/40/80/160) and 802.11ax(HE20/40/80/160), U-NII-1/2A/2C/3 6G WIFI 802.11ax(HE20/40/80/160), U-NII-5/6/7/8

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	Bluetooth, WLAN	
Frequency Range	Bluetooth	2400 ~ 2483.5 MHz
	802.11b/g	2412 MHz ~ 2472 MHz
	802.11ax(HE20/HE40)	2412 MHz ~ 2472 MHz
	802.11 a	5150 MHz ~ 5250 MHz
		5250 MHz ~ 5350 MHz
		5470 MHz ~ 5725 MHz
		5725 MHz ~ 5850 MHz
	802.11 n(HT20/HT40)	5150 MHz ~ 5250 MHz
		5250 MHz ~ 5350 MHz
		5470 MHz ~ 5725 MHz
		5725 MHz ~ 5850 MHz
	802.11 ac(VHT20/VHT40/VHT80)	5150 MHz ~ 5250 MHz
		5250 MHz ~ 5350 MHz
		5470 MHz ~ 5725 MHz
		5725 MHz ~ 5850 MHz
	802.11 ax(HE20/HE40/HE80)	5150 MHz ~ 5250 MHz
		5250 MHz ~ 5350 MHz
		5470 MHz ~ 5725 MHz
		5725 MHz ~ 5850 MHz
	802.11 ac(VHT160)/ax(HE160)	5150 MHz ~ 5250 MHz
		5470 MHz ~ 5725 MHz
	802.11 ax(HE20/HE40/HE80/HE160)	5925 MHz ~ 6425 MHz
		6425 MHz ~ 6525 MHz
		6525 MHz ~ 6875 MHz
		6875 MHz ~ 7125 MHz
Antenna Type	Bluetooth	External Antenna
	WLAN	External Antenna
Exposure Category	General Population/Uncontrolled Exposure	
EUT Stage	Mobile Device	

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices
2	KDB 447498 D04 v01	447498 D04 Interim General RF Exposure Guidance v01

4 DEVICE CATEGORY AND LEVELS LIMITS

Mobile Device:

CFR Title 47 §2.1091(b)

(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.

FCC KDB 447498 D04 General RF Exposure Guidance v01 Limit

For 300MHz to 6000Mhz

Evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP20cm in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

$$P_{\text{th}}\,(\text{mW}) = ERP_{20\,\text{cm}}\,(\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases} \qquad \text{(B.1)}$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i. e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold Pth (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by Formula (B.2).

$$P_{\text{th}}\,(\text{mW}) = \begin{cases} ERP_{20\,\text{cm}}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\,\text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases} \qquad \text{(B.2)}$$

where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\,\text{cm}}\sqrt{f}}\right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ is per Formula (B.1).
The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)										
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

For 6000MHz to 10000Mhz

Frequencies above 300 kHz but at distances R＞λ/2π, R is the antenna-person separation distance.
λ=wavelength of transmitted signal.
Can calculate from the frequency of operation using v=f*λ
v=speed of light=3*108 m/s
f=frequency(Hz)
Primarily an MPE-based exclusion but also SAR-based where λ/2π is＜20cm.

TABLE B.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.						

5 ASSESSMENT RESULT

5.1 Output Power

Bluetooth		
Mode	BR/EDR	BLE
Conducted Power (dBm)	8.90	9.12
Antenna Gain (dBi)	3.95	3.95
EIRP (dBm)	12.85	13.07
Note: This table listed the worst case power value, please refer to BL-EC22C0484-601 & BL-EC22C0484-602 report for more details.		

WLAN 2.4G			
Mode	MAX WLAN 2.4G Main Antenna	MAX WLAN 2.4G Aux Antenna	MAX WLAN 2.4G MIMO Antenna
Conducted Power (dBm)	20.75	17.03	18.04
Antenna Gain (dBi)	3.95	3.95	3.95
EIRP (dBm)	24.70	20.98	21.99
Note: This table listed the worst case power value, please refer to BL-EC22C0484-603 report for more details.			

WLAN 5G (Main Antenna)				
Mode	MAX U-NII-1	MAX U-NII-2A	MAX U-NII-2C	MAX U-NII-3
Conducted Power (dBm)	16.70	16.89	17.11	17.11
Antenna Gain (dBi)	1.46	1.52	1.29	1.48
EIRP (dBm)	18.16	18.41	18.40	18.59
Note: This table listed the worst case power value, please refer to BL-EC22C0484-604 report for more details.				

WLAN 5G (Aux. Antenna)				
Mode	MAX U-NII-1	MAX U-NII-2A	MAX U-NII-2C	MAX U-NII-3
Conducted Power (dBm)	17.70	16.87	17.32	16.52
Antenna Gain (dBi)	1.46	1.52	1.29	1.48
EIRP (dBm)	19.16	18.39	18.61	18.00
Note: This table listed the worst case power value, please refer to BL-EC22C0484-604 report for more details.				

WLAN 5G (MIMO)				
Mode	MAX U-NII-1	MAX U-NII-2A	MAX U-NII-2C	MAX U-NII-3
Conducted Power (dBm)	16.83	16.65	17.29	16.85
Antenna Gain (dBi)	1.46	1.52	1.29	1.48
EIRP (dBm)	18.29	18.17	18.58	18.33
Note: This table listed the worst case power value, please refer to BL-EC22C0484-604 report for more details.				

WLAN 6G (Main Antenna)				
Mode	MAX U-NII-5	MAX U-NII-6	MAX U-NII-7	MAX U-NII-8
Conducted Power (dBm)	13.41	13.38	13.05	15.02
Antenna Gain (dBi)	0.96	0.75	0.77	1.56
EIRP (dBm)	14.37	14.13	13.82	16.58
Note: This table listed the worst case power value, please refer to BL-EC22C0484-604 report for more details.				

WLAN 6G (Aux. Antenna)				
Mode	MAX U-NII-5	MAX U-NII-6	MAX U-NII-7	MAX U-NII-8
Conducted Power (dBm)	14.03	12.71	12.82	14.27
Antenna Gain (dBi)	0.96	0.75	0.77	1.56
EIRP (dBm)	14.99	13.46	13.59	15.83
Note: This table listed the worst case power value, please refer to BL-EC22C0484-604 report for more details.				

WLAN 6G (MIMO)				
Mode	MAX U-NII-5	MAX U-NII-6	MAX U-NII-7	MAX U-NII-8
Conducted Power (dBm)	13.98	12.67	15.09	14.28
Antenna Gain (dBi)	0.96	0.75	0.77	1.56
EIRP (dBm)	14.94	13.42	15.86	15.84
Note: This table listed the worst case power value, please refer to BL-EC22C0484-604 report for more details.				

5.2 Tune-up power

Mode	Conducted Power Range (dBm)	EIRP Range (dBm)	ERP Range (dBm)
BT	[8.00, 10.00]	[11.95, 13.95]	[9.80, 11.80]
WLAN 2.4G Main Antenna	[19.00, 21.00]	[22.95, 24.95]	[20.80, 22.80]
WLAN 2.4G Aux Antenna	[16.00, 18.00]	[19.95, 21.95]	[17.80, 19.80]
WLAN 2.4G MIMO Antenna	[17.00, 19.00]	[20.95, 22.95]	[18.80, 20.80]
U-NII-1 Main Antenna	[16.00, 18.00]	[17.46, 19.46]	[15.31, 17.31]
U-NII-1 Aux Antenna	[16.00, 18.00]	[17.46, 19.46]	[15.31, 17.31]
U-NII-1 MIMO Antenna	[16.00, 18.00]	[17.46, 19.46]	[15.31, 17.31]
U-NII-2A Main Antenna	[16.00, 18.00]	[17.52, 19.52]	[15.37, 17.37]
U-NII-2A Aux Antenna	[16.00, 18.00]	[17.52, 19.52]	[15.37, 17.37]
U-NII-2A MIMO Antenna	[16.00, 18.00]	[17.52, 19.52]	[15.37, 17.37]
U-NII-2C Main Antenna	[16.00, 18.00]	[17.29, 19.29]	[15.14, 17.14]
U-NII-2C Aux Antenna	[16.00, 18.00]	[17.29, 19.29]	[15.14, 17.14]
U-NII-2C MIMO Antenna	[16.00, 18.00]	[17.29, 19.29]	[15.14, 17.14]

U-NII-3 Main Antenna	[16.00, 18.00]	[17.48, 19.48]	[15.33, 17.33]
U-NII-3 Aux Antenna	[16.00, 18.00]	[17.48, 19.48]	[15.33, 17.33]
U-NII-3 MIMO Antenna	[16.00, 18.00]	[17.48, 19.48]	[15.33, 17.33]
U-NII-5 Main Antenna	[13.00, 15.00]	[13.96, 15.96]	[11.81, 13.81]
U-NII-5 Aux Antenna	[13.00, 15.00]	[13.96, 15.96]	[11.81, 13.81]
U-NII-5 MIMO Antenna	[13.00, 15.00]	[13.96, 15.96]	[11.81, 13.81]
U-NII-6 Main Antenna	[12.00, 14.00]	[12.75, 14.75]	[10.60, 12.60]
U-NII-6 Aux Antenna	[12.00, 14.00]	[12.75, 14.75]	[10.60, 12.60]
U-NII-6 MIMO Antenna	[12.00, 14.00]	[12.75, 14.75]	[10.60, 12.60]
U-NII-7 Main Antenna	[12.00, 14.00]	[12.77, 14.77]	[10.62, 12.62]
U-NII-7 Aux Antenna	[12.00, 14.00]	[12.77, 14.77]	[10.62, 12.62]
U-NII-7 MIMO Antenna	[14.00, 16.00]	[14.77, 16.77]	[12.62, 14.62]
U-NII-8 Main Antenna	[14.00, 16.00]	[15.56, 17.56]	[13.41, 15.41]
U-NII-8 Aux Antenna	[14.00, 16.00]	[15.56, 17.56]	[13.41, 15.41]
U-NII-8 MIMO Antenna	[14.00, 16.00]	[15.56, 17.56]	[13.41, 15.41]
Note1: ERP= EIRP -2.15dB Note2: According KDB 447498 D04, used the greater of maximun conducted power and ERP to compare with the threshold value Pth.			

5.3 RF Exposure Evaluation Result

For 300MHz to 6000MHz

Evolution mode	Frequency (MHz)	Maximum power (dBm)	Maximum power (mw)	Distance (cm)	Threshold Power (mW)	Power / Limit	Verdict
BT	2480	11.80	15.14	20	3060.00	0.0049	Pass
WLAN 2.4G Main Antenna	2462	22.80	190.55	20	3060.00	0.0623	Pass
WLAN 2.4G Aux Antenna	2462	19.80	95.50	20	3060.00	0.0312	Pass
WLAN 2.4G MIMO Antenna	2462	20.80	120.23	20	3060.00	0.0393	Pass
Max WLAN 5G Main Antenna	5850	18.00	63.10	20	3060.00	0.0206	Pass
Max WLAN 5G Aux Antenna	5850	18.00	63.10	20	3060.00	0.0206	Pass
Max WLAN 5G MIMO Antenna	5850	18.00	63.10	20	3060.00	0.0206	Pass

For 6000MHz to 10000MHz

Evolution mode	Frequency (MHz)	Maximum power (dBm)	Maximum power (mw)	Distance (cm)	Threshold Power (mW)	Power / Limit	Verdict
Max WLAN 6G Main Antenna	7125	16.00	0.040	20	76.800	0.0005	Pass
Max WLAN 6G Aux Antenna	7125	16.00	0.040	20	76.800	0.0005	Pass
Max WLAN 6G MIMO Antenna	7125	16.00	0.040	20	76.800	0.0005	Pass

5.4 Collocated Power Calculation

Evolution mode	Frequency(MHz)	Power /Limit	Σ(Power / Limit) of BT + WLAN	Verdict
BT	2480	0.0049	0.0878	Pass
MAX WLAN 2.4G	2462	0.0623		
MAX WLAN 5G	5250	0.0206		
BT	2480	0.0049	0.0677	Pass
MAX WLAN 2.4G	2462	0.0623		
MAX WLAN 6G	6875	0.0005		
BT	2480	0.0049	0.0260	Pass
MAX WLAN 5G	5250	0.0206		
MAX WLAN 6G	6875	0.0005		

Note:

1. Either SAR-based or MPE-based exemption may be considered for test exemption for mobile device exposure conditions, therefore, the contributions from each exemption in conjunction with the measured SAR shall be used to determine exemption for simultaneous transmission according to Formula in FCC KDB 447498 D04.

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

a number of fixed, mobile, or portable RF sources claiming exemption using the § 1.1307(b)(3)(i)(B) formula for P_{th}, including existing exempt transmitters and those being added.

b number of fixed, mobile, or portable RF sources claiming exemption using the applicable § 1.1307(b)(3)(i)(C) Table 1 formula 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.

2. ∑(Power / Limit): This is a summation of [(power for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding Power limit)], for Bluetooth + WLAN 2.4GHz + WLAN 5GHz & Bluetooth + WLAN 2.4GHz + WLAN 6GHz and Bluetooth + WLAN 5GHz + WLAN 6GHz.
3. Both of the Bluetooth + WLAN 2.4GHz + WLAN 5GHz & Bluetooth + WLAN 2.4GHz + WLAN 6GHz and Bluetooth + WLAN 5GHz + WLAN 6GHz. can transmit simultaneously, the formula of calculated the Power is
   CP1 / LP1 + CP2 / LP2 + ……etc. < 1
   CP = Calculation power
   LP = Limit of power
4. The worst-case situation is 0.0878, which is less than “1”. This confirmed that the device comply with FCC KDB 447498 D04 Power limit.
5. The DUT work frequency range used is 2400 MHz ~ 2483.5 MHz, 5150 MHz~ 5250 MHz and 5725 MHz ~ 5850 MHz and 5925 MHz ~ 7125 MHz the result close to the limit by the above formula, so we select worst case power to calculate the exclusion power threshold.
6. More power list please refer to BL-EC22C0484-601, BL-EC22C0484-602, BL-EC22C0484-603, BL-EC22C0484-604 test report.

5.5 Conclusion

This EUT is deemed to comply with the reference level limits, therefore the basic restrictions are compliant with human exposure limits.

Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
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--END OF REPORT--