

TEST REPORT

Applicant: Franklin Technology Inc.
Address: 906 JEI Platz, 186, Gasan digital 1-ro, Geumcheon-gu, Seoul 08502 Korea
Equipment Type: WI-FI Mesh Extender
Model Name: FX10
Brand Name: JEXtream
FCC ID: XHG-FX10
Test Standard: 47 CFR Part 2.1091
KDB 447498 D04 v01
Sample Arrival Date: Aug. 01, 2023
Test Date: Aug. 02, 2023 - Aug. 25, 2023
Date of Issue: Sep. 05, 2023

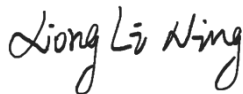
ISSUED BY:

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(Testing Director)



Revision History		
Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>Sep. 05, 2023</u>	<u>Initial Issue</u>

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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	<input checked="" type="checkbox"/> Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	<input type="checkbox"/> 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	Franklin Technology Inc.
Address	906 JEI Platz, 186, Gasan digital 1-ro, Geumcheon-gu, Seoul 08502 Korea

2.2 Manufacturer Information

Manufacturer	Franklin Technology Inc.
Address	906 JEI Platz, 186, Gasan digital 1-ro, Geumcheon-gu, Seoul 08502 Korea

2.3 General Description for Equipment under Test (EUT)

EUT Name	WI-FI Mesh Extender
Model Name Under Test	FX10
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	P1
Software Version	FX10.FR.1423
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Ancillary Equipment

Note: Not applicable.

2.5 Technical Information

Network and Wireless connectivity	WIFI 802.11a, 802.11b, 802.11g, 802.11n, 802.11ac and 802.11ax U-NII-1/3
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	WLAN	
Frequency Range	802.11b/g/n(HT20)/ax(HE20)	2412 MHz ~ 2462 MHz
	802.11n(HT40)/ax(HE40)	2422 MHz ~ 2452 MHz
	802.11a/n(HT20/HT40)/ac(VHT20/VHT40/VHT80)/ax(HE20/HE40/HE80)	5150 MHz ~ 5250 MHz
		5725 MHz ~ 5850 MHz
Antenna Type	WLAN	Dipole
Exposure Category	General Population/Uncontrolled Exposure	
Product Type	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

Evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP_{20cm} in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

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

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 $\lambda/4$ 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 P_{th} (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). P_{th} is given by Formula (B.2).

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

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

5 ASSESSMENT RESULT

5.1 Output Power

WIFI 2.4G			
Mode	Main Aantenna	Aux. Aantenna	MIMO
Conducted Power (dBm)	18.97	18.81	21.84
Antenna Gain (dBi)	3.67	3.67	6.68
EIRP (dBm)	22.64	22.48	28.52

Note: This table listed the worst case power value, please refer to BL-SZ2371318-601 report for more details.

WIFI 5.2G			
Mode	Main Aantenna	Aux. Aantenna	MIMO
Conducted Power (dBm)	18.90	18.80	21.82
Antenna Gain (dBi)	3.13	3.13	6.14
EIRP (dBm)	22.03	21.93	27.96

Note: This table listed the worst case power value, please refer to BL-SZ2371318-602 report for more details.

WIFI 5.8G			
Mode	Main Aantenna	Aux. Aantenna	MIMO
Conducted Power (dBm)	18.87	18.92	21.99
Antenna Gain (dBi)	3.42	3.42	6.43
EIRP (dBm)	22.29	22.34	28.42

Note: This table listed the worst case power value, please refer to BL-SZ2371318-602 report for more details.

5.2 Tune-up power

Mode	Conducted Power Range (dBm)	EIRP Range (dBm)	ERP Range (dBm)
WIFI2.4G Main.Ant	[17.00,19.00]	[21.00,23.00]	[18.85,20.85]
WIFI2.4G Aux.Ant	[17.00,19.00]	[21.00,23.00]	[18.85,20.85]
WIFI2.4G MIMO.Ant	[20.00,22.00]	[27.00,29.00]	[24.85,26.85]
WIFI5.2G Main.Ant	[17.00,19.00]	[20.00,22.00]	[17.85,19.85]
WIFI5.2G Aux.Ant	[17.00,19.00]	[21.00,23.00]	[18.85,20.85]
WIFI5.2G MIMO.Ant	[20.00,22.00]	[26.00,28.00]	[23.85,25.85]
WIFI5.8G Main.Ant	[17.00,19.00]	[21.00,23.00]	[18.85,20.85]
WIFI5.8G Aux.Ant	[17.00,19.00]	[21.00,23.00]	[18.85,20.85]
WIFI5.8G MIMO.Ant	[20.00,22.00]	[27.00,29.00]	[24.85,26.85]

Note1: ERP= EIRP -2.15dB.
Note2: According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value Pth.

5.3 RF Exposure Evaluation Result

Evolution mode	Maximum power (dBm)	Maximum power (mw)	Distance (mm)	Threshold Power (mW)	Power / Limit	Verdict
WIFI2.4G Main.Ant	20.85	121.62	200	3060.00	0.040	Pass
WIFI2.4G Aux.Ant	20.85	121.62	200	3060.00	0.040	Pass
WIFI2.4G MIMO.Ant	26.85	484.17	200	3060.00	0.158	Pass
WIFI5.2G Main.Ant	19.85	96.61	200	3060.00	0.032	Pass
WIFI5.2G Aux.Ant	20.85	121.62	200	3060.00	0.040	Pass
WIFI5.2G MIMO.Ant	25.85	384.59	200	3060.00	0.126	Pass
WIFI5.8G Main.Ant	20.85	121.62	200	3060.00	0.040	Pass
WIFI5.8G Aux.Ant	20.85	121.62	200	3060.00	0.040	Pass
WIFI5.8G MIMO.Ant	26.85	484.17	200	3060.00	0.158	Pass

5.4 Collocated Power Calculation

Evolution mode	Frequency(MHz)	Power /Limit	Σ (Power / Limit) of 2.4G WLAN +5.8G WLAN	Verdict
WIFI2.4G Main.Ant	2412	0.158	0.316	Pass
WIFI5.8G Main.Ant	5850	0.158		

Note:

- Σ (Power / Limit): This is a summation of [(power for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding Power limit)], for WLAN 2.4GHz+WLAN 5GHz.
- Both of the 2.4GHz/5GHz can transmit simultaneously, the formula of calculated the Power is $CP1 / LP1 + CP2 / LP2 + \dots$ etc. < 1
CP = Calculation power
LP = Limit of power
- Both of the 2.4GHz WIFI and 5.8GHz WIFI can't transmit simultaneously at same time.
- The worst-case situation is 0.316, which is less than "1". This confirmed that the device comply with FCC KDB 447498 D04 Power limit.
- The DUT work frequency range used is 2400 MHz ~ 2483.5 MHz and 5725 MHz ~ 5850 MHz the result close to the limit by the above formula, so we select worst case power to calculate the exclusion power threshold.
- More power list please refer to BL-SZ2371318-601/602 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

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--END OF REPORT--