FranklinWH Energy Storage Inc.

MPE ASSESSMENT REPORT

Report Type:
FCC MPE assessment report

Model:
aGate X (may be followed by blank;
may be followed by A to Z; may be followed by 0 to 9;
may be followed by symbol.)

REPORT NUMBER:
240600353SHA-006

ISSUE DATE:
September 2, 2024

DOCUMENT CONTROL NUMBER:
TTRFFCCMPE-01_V1

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TEST REPORT

Report no.: 240600353SHA-006

APPLICANT:	FranklinWH Energy Storage Inc. 8 The Green ,Ste A, Dover, DE 19901,USA
MANUFACTURER:	FranklinWH Technologies Co., Ltd. Room 301, Building 5A Skyworth Innovation Park, No.8 Tangtou 1st Road, Tangtou community Shiyan sub-district , Baoan District, Shenzhen, Guangdong, China
Factory:	Dongguan Shingi Electronics Co., Ltd. No. 1 Yadi South Road, Qiaotou Town , Dongguan City , Guangdong Province , China.
FCC ID:	2BCMR-AGATEX20

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:
KDB447498 D01 General RF Exposure Guidance v06 FCC Part2.1091, FCC Part2.1093 FCC Part1.1307(b)

PREPARED BY:	**REVIEWED BY:**
Project Engineer Sky Yang	Reviewer Wakeyou Wang

TEST REPORT

Revision History

Report No.	Version	Description	Issued Date
240600353SHA-006	Rev. 01	Initial issue of report	September 2, 2024

TEST REPORT

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	aGate
Type/Model:	aGate X (may be followed by blank; may be followed by A to Z; may be followed by 0 to 9； may be followed by symbol.)
Description of EUT:	The EUT is an Energy storage control system which supports 2.4G, 5G Wi-Fi (802.11b/g/n/a/ac mode), BT and LTE function. LTE function uses a certified module, the FCC ID is XMR201909EC25AFX, the IC ID is 10224A-2019EC25AFX.
Rating:	120/208VAC ; 120V/240VAC 120/208VAC is 3-wire form 3-phase, 4-wire network.
EUT type:	☐ Table top ☒ Floor standing
Sample received date:	June 27, 2024

Note:
All models are same except for model name, different names represent different sales regions.

1.2 Technical Specification

Frequency Range:	2400MHz ~ 2483.5MHz
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20, IEEE 802.11n-HT40
Type of Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT20: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT40: OFDM (64-QAM, 16-QAM, QPSK, BPSK)
Channel Number:	11 Channels for 802.11b, 802.11g and 802.11n(HT20) 9 Channels for 802.11n(HT40)
Data Rate:	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS15 IEEE 802.11n-HT40: Up to MCS15
Channel Separation:	5 MHz
Antenna Information:	5.9dBi, PCB Antenna for antenna 1 and antenna 2

Frequency Range:	5150 ~ 5250MHz 5250 ~ 5350MHz 5470 ~ 5725MHz 5725 ~ 5850MHz

TEST REPORT

Support Standards:	802.11a, 802.11n(HT20), 802.11n(HT40) , 802.11ac(HT20), 802.11ac(HT40) , 802.11ac(HT80)
Type of Modulation:	OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Channel Number:	For 5150 ~ 5250MHz band: Channel 36 - 48 For 5250 ~ 5350MHz Band: Channel 52 - 64 For 5470 ~ 5725MHz Band: Channel 100 - 140 For 5725 ~ 5850MHz band: Channel 149 - 165
Antenna Information:	3.7dBi, PCB Antenna for antenna 1 and antenna 2
	3.7dBi, PCB Antenna for antenna 1 and antenna 2
	3.8dBi, PCB Antenna for antenna 1 and antenna 2
	5.7dBi, PCB Antenna for antenna 1 and antenna 2

Frequency Band:	2400MHz ~ 2483.5MHz
Support Standards:	Bluetooth LE
Type of Modulation:	GFSK
Channel Number:	40 (0 - 39)
Data Rate:	1Mbps
Channel Separation:	2 MHz
Antenna Information:	PCB Antenna, 5.9dBi

Frequency Band:	2400MHz ~ 2483.5MHz
Support Standards:	Bluetooth BR+EDR
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Type of Modulation:	GFSK, π/4 DQPSK, 8DPSK
Channel Number:	79 (0 - 78)
Data Rate:	1Mbps
Channel Separation:	1 MHz
Antenna:	PCB Antenna, 5.9dBi

1.3 Description of Test Facility

Name:	Intertek Testing Services (Shanghai FTZ) Co., Ltd.
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L21189
	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab Registration code No.: 2042B-1
	VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252
	A2LA Accreditation Lab Certificate Number: 3309.02

All tests were sub-contracted.

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng Science and Technology Park, Longhua District, Shenzhen, China 518109

Telephone: +86 (0) 755 2823 0888

Fax: +86 (0) 755 2823 0886

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

IC-Registration No.: 21600-1

The 3m Semi-anechoic chamber of Shenzhen UnionTrust Quality and Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 21600-1.

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TEST REPORT

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

2 MPE Assessment

Test result: Pass

2.1 MPE Assessment Limit

Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	**1**	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density.

Exposure for simultaneous transmission operations: **the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0**

TEST REPORT

2.2 Assessment Results

Power density (S) is calculated according to the formula:

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

Where S = power density in mW/cm^2

P = Radiated transmit power in mW

G = numeric gain of transmit antenna

R = distance (cm)

As we can see from the test report 240600353SHA-001:
The maximum EIRP for this BLE function = 15±1dBm = 39.8107 mW;
Here R is chosen to be 20cm,

$S1 = EIRP/4\pi R^2 = 39.8107 / (4 * 3.14 * 20 * 20) = 0.0079\ mW/cm^2 < 1\ mW/cm^2$

As we can see from the test report 240600353SHA-002:
The maximum EIRP for this EDR function = 11.5±1.5dBm = 19.9526 mW;
Here R is chosen to be 20cm,

$S2 = EIRP/4\pi R^2 = 19.9526 / (4 * 3.14 * 20 * 20) = 0.0040\ mW/cm^2 < 1\ mW/cm^2$

As we can see from the test report 240600353SHA-003:
The maximum EIRP for this 2.4G WLAN function = 33±1dBm =2511.8864 mW;
Here R is chosen to be 20cm,

$S2 = EIRP/4\pi R^2 = 2511.8864 / (4 * 3.14 * 20 * 20) = 0.4997\ mW/cm^2 < 1\ mW/cm^2$

As we can see from the test report 240600353SHA-004:
The maximum EIRP for this 5G WLAN function = 20±1 dBm = 125.8925 mW;
Here R is chosen to be 20cm,

$S2 = EIRP/4\pi R^2 = 125.8925 / (4 * 3.14 * 20 * 20) = 0.0250\ mW/cm^2 < 1\ mW/cm^2$

As we can see from the LTE module test report:
Maximum output power and minimum limit are LTE band 7 = 316.23 mW

$S3 = EIRP/4\pi R^2 = 316.23 / (4 * 3.14 * 20 * 20) = 0.0629\ mW/cm^2 < 0.45\ mW/cm^2$

Results for transmit simultaneously

No.	Configurations	Maximum MPE Value				Limits
		WLAN	WWAN	BT	Transmit simultaneously	
1	2.4G WLAN + WWAN +BT	0.4997	0.0629	0.0079	0.6474	1

Note:
According to KDB 447498 D01 General RF Exposure Guidance v06, At the transmit simultaneously calculation method is as follows:

Transmit simultaneously MPE = Σ of MPE ratios

MPE ratios = Field strengths or power density / MPE limit at the test frequency

No.	Configurations	Maximum MPE Value				Limits
		WLAN	WWAN	BT	Transmit simultaneously	
1	5G WLAN + WWAN +BT	0.0250	0.0629	0.0079	0.1727	1

Note:
According to KDB 447498 D01 General RF Exposure Guidance v06, At the transmit simultaneously calculation method is as follows:

Transmit simultaneously MPE = Σ of MPE ratios

MPE ratios = Field strengths or power density / MPE limit at the test frequency

TEST REPORT

Appendix I

Definition below must be outlined in the User Manual:

To satisfy FCC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation.
To ensure compliance, operations at closer than this distance is not recommended.

********** END **********