

RF EVALUATION TEST REPORT

Applicant..... : Shenzhen KSTAR New Energy Company Limited

Address..... : RD Building KSTAR Industrial Park 7th Road Western Area Hi-Tech Industrial
Zone Guangming District, Shenzhen, China

Manufacturer..... : Shenzhen KSTAR New Energy Company Limited

Address..... : RD Building KSTAR Industrial Park 7th Road Western Area Hi-Tech Industrial
Zone Guangming District, Shenzhen, China

Factory..... : Shenzhen KSTAR New Energy Company Limited

Address..... : RD Building KSTAR Industrial Park 7th Road Western Area Hi-Tech Industrial
Zone Guangming District, Shenzhen, China

Product Name..... : Data Logger

Brand Name..... : **KSTAR**

Model No. : KSM-WIFI-PLUG3

FCC ID..... : 2BGYM-WIFI-PLUG3


Measurement Standard..... : 47 CFR PART 2, Section 2.1091

Receipt Date of Samples.... : March 04, 2024

Date of Tested..... : March 04, 2024 to May 22, 2024

Date of Report..... : June 27, 2024

This report shows that above equipment is technically compliant with the requirements of the standards above. All test results in this report apply only to the tested sample(s). Without prior written approval of Dongguan Nore Testing Center Co., Ltd, this report shall not be reproduced except in full.



Prepared by

Jenny Liu / Project Engineer



Iori Fan / Authorized Signatory

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Revision History

Report Number	Description	Issued Date
NTC2403049F01	Initial Issue	2024-06-27

1. General Description of EUT

Product Information	
Product name:	Data Logger
Main Model Name:	KSM-WIFI-PLUG3
Additional Model Name:	N/A
Model Difference:	N/A
S/N:	2403-0961
Brand Name:	KSTAR
Hardware version:	Not Stated
Software version:	Not Stated
Rating:	DC 5V 2A Max
Typical Arrangement:	Tabletop
I/O Port:	Refer to the user manual
Accessories Information	
Adapter:	N/A
Cable:	N/A
Other:	N/A
Additional information	
Note:	N/A
Remark:	All the information above are provided by the manufacturer. More detailed feature of the EUT please refers to the user manual.

Technical Specification (Bluetooth)	
Bluetooth Version:	V5.2
Frequency Range:	2402-2480MHz
Modulation Type:	GFSK
Number of Channel:	40
Channel Space:	2MHz
Antenna Type:	Dipole
Number of Antenna	1
Antenna Gain:	4.31 dBi (Declared by the manufacturer)
RF PHY Support:	1Mbps, 2Mbps

Technical Specification (2.4G WLAN)	
Frequency Range:	2412-2462MHz for IEEE 802.11b/g/n(HT20)/ax(HE20) 2422-2452MHz for IEEE 802.11n(HT40)/ax(HE40) (802.11ax Only support full RU Mode)
Modulation Technology:	DSSS, OFDM
Modulation Type:	CCK, DQPSK, DBPSK, QPSK, BPSK, 16-QAM, 64-QAM,
Number of Channel:	11 for IEEE 802.11b/g/n(HT20)/ax(HE20) 7 for IEEE 802.11n(HT40)/ax(HE40)
Channel Space:	5MHz
Antenna Type:	Dipole
Number of Antenna	1
Antenna Gain:	4.31 dBi (Declared by the manufacturer)

2. Test Facility and Location

Test Site	:	Dongguan Nore Testing Center Co., Ltd. (Dongguan NTC Co., Ltd.)
Accreditations and Authorizations	:	<p>The Laboratory has been assessed and proved to be in compliance with CNAS/CL01</p> <p>Listed by CNAS, August 13, 2018</p> <p>The Certificate Registration Number is L5795.</p> <p>The Certificate is valid until August 13, 2024</p> <p>The Laboratory has been assessed and proved to be in compliance with ISO17025</p> <p>Listed by A2LA, November 01, 2017</p> <p>The Certificate Registration Number is 4429.01</p> <p>Listed by FCC, November 06, 2017</p> <p>Test Firm Registration Number: 907417</p> <p>Listed by Industry Canada, June 08, 2017</p> <p>The Certificate Registration Number. Is 46405-9743A</p>
Test Site Location	:	Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, China

3. Applicable Standards and References

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

Test Standards:

47 CFR Part 1, 1.1307

47 CFR Part 2, 2.1091

KDB 447498 D04 v01

4. Maximum Permissible Exposure Limit

According to 47 CFR Part 1, 1.1307, for single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if: 47 CFR Part 1, 1.1307

(A) The available maximum time- averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

(B) Or the available maximum time- averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

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

Where,

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

And,

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

d = the minimum separation distance (cm) in any direction from any part of the device antenna(s) or radiating structure(s) to the body of the device user.

For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time- averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

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

Where,

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

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(C) of this section 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 including existing evaluated transmitters.

P_i = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

$P_{th,i}$ = the exemption threshold power (P_{th}) according to paragraph (b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i .

ERP_j = the ERP 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 formula of paragraph (b)(3)(i)(C) of this section.

Evaluated_k= the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

Exposure Limit_k= either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k, as applicable from §1.1310 of this chapter.

5. RF Exposure Evaluation Results

Single RF Source								
Mode	Frequency (MHz)	Max. Conducted Power (dBm)	Antenna Gain (dBi)	Max. EIRP (dBm)	Max. ERP (dBm)	Max. ERP (mW)	Separation Distance (cm)	Part 1.1307 Option (B) P _{th} (mW)
Bluetooth	2402	2.101	4.31	6.411	4.261	2.67	20	3060
2.4G WLAN	2412	18.138	4.31	22.448	20.298	107.10	20	3060

Multiple RF Source (Simultaneous Transmission)			
2.4G WLAN (P/P _{th} Ratio)	Bluetooth (P/P _{th} Ratio)	Total Ratio	Limit
0.00087	0.035	0.0359	1.0
Note: Where P = Max.ERP in mW			

Conclusion:

According to 47 CFR §1.1307 (b)(3)(i)(B), the RF exposure analysis concludes that the product is compliant with the FCC RF exposure requirements in mobile exposure condition.

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