verify No.965198316047

위변조방지/진위확인
www.docuqr.com

TEST REPORT

KCTL Inc.
65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

eurofins | KCTL

1. Client

- Name : SystemBase Co., Ltd.
- Address : Daerung Post Tower-1 16F, 288, Digital-ro, Guro-gu, Seoul, South Korea
- Date of Receipt : 2022-05-04

2. Use of Report : Certification

3. Name of Product / Model : Serial to WiFi Converter / sWiFi/all V1.1

4. Manufacturer / Country of Origin : SystemBase Co., Ltd. / Korea

5. FCC ID : PRO-SWIFIALLV11

6. Date of Test : 2022-05-25 to 2022-06-20

7. Location of Test : ■ Permanent Testing Lab ☐ On Site Testing
(Address:65,Sinwon-roYeongtong-gu,Suwon-si,Gyeonggi-do,16677, Korea)

8. Test method used : 47 CRF Part 1.1310

9. Test Result : Refer to the test result in the test report

Affirmation	Tested by Name : Taeyoung Kim (Signature)	Technical Manager Name : Seungyong Kim (Signature)

2022-06-22

KCTL Inc.

As a test result of the sample which was submitted from the client, this report does not guar antee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.

REPORT REVISION HISTORY

Date	Revision	Page No
2022-06-22	Originally issued	-

This report shall not be reproduced except in full, without the written approval of KCTL Inc. This document may be altered or revised by KCTL Inc. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by KCTL Inc. will constitute fraud and shall nullify the document. This test report is a general report that does not use the KOLAS accreditation mark and is not related to KS Q ISO/IEC 17025 and KOLAS accreditation.

General remarks for test reports

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ **Statement not required by the standard or client used for type testing**

CONTENTS

1. General information 4
2. Device information 4
2.1. Accessory information 5
2.2. Frequency/channel operations.....5
3. Measurement uncertainty 5
4. RF Exposure.....6
4.1. Test results.....7
5. Measurement Equipment.....9

1. General information

Client	:	SystemBase Co., Ltd.
Address	:	Daerung Post Tower-1 16F, 288, Digital-ro, Guro-gu, Seoul, South Korea
Manufacturer	:	SystemBase Co., Ltd.
Address	:	Daerung Post Tower-1 16F, 288, Digital-ro, Guro-gu, Seoul, South Korea
Laboratory	:	KCTL Inc.
Address	:	65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132 VCCI Registration No. : R-20080, G-20078, C-20059, T-20056 CAB Identifier: KR0040 ISED Number: 8035A KOLAS No.: KT231

2. Device information

Equipment under test	:	Serial to WiFi Converter
Model	:	sWiFi/all V1.1
Modulation technique	:	WIFI(802.11a/b/g/n_HT20)_DSSS, OFDM
Number of channels	:	802.11b/g/n_HT20 : 11 ch UNII-1: 4 ch (20 ㎒) UNII-2A: 4 ch (20 ㎒) UNII-2C: 11 ch (20 ㎒) UNII-3: 5 ch (20 ㎒)
Power source	:	DC 5 V
Antenna specification	:	Dipole Antenna
Antenna gain	:	WIFI/Bluetooth(BDR/EDR/BLE)_6.13 dBi UNII-1 : 6.20 dBi UNII-2A : 6.67 dBi UNII-2C : 7.45 dBi UNII-3 : 6.40 dBi
Frequency range	:	2 412 ㎒ ~ 2 462 ㎒ (802.11b/g/n_HT20) UNII-1: 5 180 ㎒ ~ 5 240 ㎒ (802.11a/n_HT20) UNII-2A: 5 260 ㎒ ~ 5 320 ㎒ (802.11a/n_HT20) UNII-2C: 5 500 ㎒ ~ 5 700 ㎒ (802.11a/n_HT20) UNII-3: 5 745 ㎒ ~ 5 825 ㎒ (802.11a/n_HT20)
Software version	:	sWiFi all V1.1.1
Hardware version	:	FW_5092_DU0_SU0_S411N_MA400D_6L3T, sWiFi_all_Firmware_V1.1.2
Test device serial No.	:	N/A
Operation temperature	:	-40 ℃ ~ 85 ℃

2.1. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source
SWITCHING ADAPTOR	SHENZHEN FUJIA APPLIANCE CO., LTD,	FJ-SW126K0501000DN	-	INPUT : 100 ~ 240 V / 50/60 Hz / 0.4 A OUTPUT : 5 V, 1.0 A

2.2. Frequency/channel operations

This device contains the following capabilities:
WiFi (802.11a/b/g/n)

Ch.	Frequency (㎒)
01	2 412
. .	. .
06	2 437
. .	. .
11	2 462

Table 2.2.1. 802.11b/g/n(HT20) mode

UNII-1

Ch.	Frequency (㎒)
36	5 180
40	5 200
48	5 240

UNII-2A

Ch.	Frequency (㎒)
52	5 260
56	5 280
64	5 320

UNII-2C

Ch.	Frequency (㎒)
100	5 500
120	5 600
140	5 700

UNII-3

Ch.	Frequency (㎒)
149	5 745
157	5 785
165	5 825

Table 2.2.2. 802.11a/n_HT20 mode

3. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.
All measurement uncertainty values are shown with a coverage factor of *k*=2 to indicated a 95 % level of confidence. The measurement data shown herein meets of exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded uncertainty (±)
Conducted RF power	0.9 ㏈

4. RF Exposure

Regulation

This document is prepared to show compliance with the RF Exposure requirements as required in §1.1310 of the FCC rules and Regulations.
The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1-1.
According to FCC §1.1310: the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b).

Table 1 – Limits for Maximum Permissible Exposure (MPE)

Frequency Range (㎒)	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [㎽/㎠]	Averaging Time [minute]
(A) Limits for Occupational / Controlled Exposure				
0.3 ~ 3.0	614	1.63	*100	6
3.0 ~ 30	1842/f	4.89/f	*900/f^2	6
30 ~ 300	61.4	0.163	1.0	6
300 ~ 1 500	/	/	f/300	6
1 500 ~ 15 000	/	/	5	6
(B) Limits for General Population / Uncontrolled Exposure				
0.3 ~ 1.34	614	1.63	*100	30
1.34 ~ 30	824/f	2.19/f	*180/f^2	30
30 ~ 300	27.5	0.073	0.2	30
300 ~ 1 500	/	/	f/1 500	30
1 500 ~ 15 000	/	/	1.0	30

*f=frequency in ㎒, *= plane-wave equivalent power density*

Per the guidance of KDB 680106, the E-field and H-field limits shown in the table above are extended down to 100 ㎑

4.1. Test results

MPE (Maximum Permissive Exposure) Prediction

Predication of MPE limit at a given distance: Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2 \quad \left(\Rightarrow R = \sqrt{PG/4\pi S}\right)$$

S = power density [㎽/㎠]
P = Power input to 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 [㎝]

RF Exposure Compliance Issue

The information should be included in the user's manual:
This appliance and its antenna must not be co-located or operation is conjunction with any other antenna or transmitter. A minimum separation distance of 20 ㎝ must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.

Antenna gain

Band	Ant Gain [dBi]
2.4 ㎓	6.13
5 ㎓_U-NII-1	6.20
5 ㎓_U-NII-2A	6.67
5 ㎓_U-NII-2C	7.45
5 ㎓_U-NII-3	6.40

Calculation Result of RF exposure

-WLAN (2.4 GHz)

Mode	Frequency [MHz]	Max Tune-up Power [dBm]	Max Tune-up Power [mW]	Ant Gain [dBi]	Ant Gain [mW]	Power density at 20 cm [mW/cm²]	Limit [mW/cm²]
802.11b	2 457	20.50	112.20	6.13	4.10	0.091 57	1.00

-WLAN (5 GHz)

UNII-1

Mode	Frequency [MHz]	Max Tune-up Power [dBm]	Max Tune-up Power [mW]	Ant Gain [dBi]	Ant Gain [mW]	Power density at 20 cm [mW/cm²]	Limit [mW/cm²]
802.11a	5 180	16.50	44.67	6.20	4.17	0.037 05	1.00

UNII-2A

Mode	Frequency [MHz]	Max Tune-up Power [dBm]	Max Tune-up Power [mW]	Ant Gain [dBi]	Ant Gain [mW]	Power density at 20 cm [mW/cm²]	Limit [mW/cm²]
802.11n_HT20	5 320	16.50	44.67	6.67	4.65	0.041 28	1.00

UNII-2C

Mode	Frequency [MHz]	Max Tune-up Power [dBm]	Max Tune-up Power [mW]	Ant Gain [dBi]	Ant Gain [mW]	Power density at 20 cm [mW/cm²]	Limit [mW/cm²]
802.11n_HT20	5 580	16.00	39.81	7.45	5.56	0.044 03	1.00

UNII-3

Mode	Frequency [MHz]	Max Tune-up Power [dBm]	Max Tune-up Power [mW]	Ant Gain [dBi]	Ant Gain [mW]	Power density at 20 cm [mW/cm²]	Limit [mW/cm²]
802.11a	5 745	16.00	39.81	6.40	4.37	0.034 57	1.00

5. Measurement Equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Vector Signal Generator	R&S	SMBV100A	257566	22.07.09
Signal Generator	R&S	SMB100A	176206	23.01.19
Power Sensor	R&S	NRP-Z81	1137.9009.02-106225-JM	23.05.03
Attenuator	HP	8491A	29738	22.12.21
DC Power Supply	Agilent	E3632A	MY40004791	22.09.17

End of test report