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TEST REPORT

of

FCC CFR 47 part 1, 1.1307(b), 1.1310

FCC ID: 2AVZC-A000010007A

Equipment Under Test	:	BT/Wi-Fi Combo Module Gen6
Model Name	:	A000020012A
Variant Model Name(s)	:	-
Applicant	:	Markone technology CO., Ltd.
Manufacturer	:	SUNTEL VINA CO., LTD.
Date of Receipt	:	2021.06.08
Date of Test(s)	:	2021.06.11 ~ 2021.07.13
Date of Issue	:	2021.07.15

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

1) The results of this test report are effective only to the items tested.
2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
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Tested by: Nancy Park

Technical Manager: Jinhyoung Cho

SGS Korea Co., Ltd. Gunpo Laboratory

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

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1.2. Details of Applicant

Applicant	:	Markone technology CO., Ltd.
Address	:	232, Yeongudanji-ro, Ochang-eup, Cheongwon-gu, Cheongju-si, Chungcheonbuk-do, South Korea, 28119
Contact Person	:	Lee, Jong-bok
Phone No.	:	+82 10 9916 2536

1.3. Details of Manufacturer

Company	:	SUNTEL VINA CO., LTD.
Address	:	Lot XN8, Dai An Industrial Zone Extension, Lai Cach Town, Cam Giang District, Hai Duong Province, Viet Nam.(SUNTEL VINA)

1.4. Description of EUT

Kind of Product		BT/Wi-Fi Combo Module Gen6
Model Name		A000020012A
Serial Number		Conducted: 001 Radiated: 002
Power Supply		DC 3.3 V
Frequency Range		2 402 ㎒ ~ 2 480 ㎒ (Bluetooth) 2 402 ㎒ ~ 2 480 ㎒ (Bluetooth Low Energy) 2 412 ㎒ ~ 2 462 ㎒ (11b/g/n_HT20) 5 180 ㎒ ~ 5 240 ㎒ (Band 1: 11a/n_HT20, 11ac_VHT20) 5 190 ㎒ ~ 5 230 ㎒ (Band 1: 11n_HT40, 11ac_VHT40) 5 210 ㎒ (Band 1: 11ac_VHT80) 5 745 ㎒ ~ 5 825 ㎒ (Band 3: 11a/n_HT20, 11ac_VHT20) 5 755 ㎒ ~ 5 795 ㎒ (Band 3: 11n_HT40, 11ac_VHT40) 5 775 ㎒ (Band 3: 11ac_VHT80)
Modulation Technique		DSSS, OFDM, GFSK, π/4DQPSK, 8DPSK
Number of Channels		79 channels (Bluetooth) 40 channels (Bluetooth Low Energy) 11 channels (11b/g/n_HT20) 4 channels (Band 1: 11a/n_HT20, 11ac_VHT20) 2 channels (Band 1: 11n_HT40, 11ac_VHT40) 1 channel (Band 1: 11ac_VHT80) 5 channels (Band 3: 11a/n_HT20, 11ac_VHT20) 2 channels (Band 3: 11n_HT40, 11ac_VHT40) 1 channel (Band 3: 11ac_VHT80)
Antenna Type		PCB & Cable Assembly antenna
Antenna Gain	**ANT 1**	2 400 ㎒ ~ 2 483.5 ㎒: 1.65 ㏈i (Bluetooth) 2 400 ㎒ ~ 2 483.5 ㎒: 1.65 ㏈i (Bluetooth Low Energy) 5 150 ㎒ ~ 5 250 ㎒: 2.54 ㏈i (WLAN 5 G) 5 725 ㎒ ~ 5 850 ㎒: 2.45 ㏈i (WLAN 5 G)
	ANT 2	2 400 ㎒ ~ 2 483.5 ㎒: 1.63 ㏈i (WLAN 2.4 G) 5 150 ㎒ ~ 5 250 ㎒: 2.84 ㏈i (WLAN 5 G) 5 725 ㎒ ~ 5 850 ㎒: 2.73 ㏈i (WLAN 5 G)
H/W Version		V10
S/W Version		V04

1.5. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL002377	2021.07.15	Initial

2. RF Exposure Evaluation

2.1. Environmental evaluation and exposure limit according to FCC CFR 47 part 1, 1.1307(b), 1.1310

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (㎒)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (㎽/㎠)	Average Time
(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
1 500-100 000	-	-	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/1500	30
1 500-100 000	-	-	**1.0**	**30**

2.1.1. Friis transmission formula: Pd = (Pout*G)/(4*pi*R^2)

Where Pd = power density in ㎽/㎠

Pout = output power to antenna in ㎽

G = gain of antenna in linear scale

R = distance between observation point and center of the radiator in ㎝

Pd the limit of MPE, 1 ㎽/㎠. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

2.1.2. Test Result of RF Exposure Evaluation

Test Item : RF Exposure Evaluation Data

Test Mode : Normal Operation

2.1.3. Output Power into Antenna & RF Exposure Evaluation Distance

Bluetooth

- Maximum tune up tolerance

Frequency Range (㎒)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
2 400 ~ 2 483.5	2	1.65	0.000 461	1

Bluetooth Low Energy

- Maximum tune up tolerance

Frequency (㎒)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
2 400 ~ 2 483.5	4	1.65	0.000 731	1

WLAN (2.4G)

- Maximum tune up tolerance

Frequency Range (㎒)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
2 400 ~ 2 483.5	15	1.63	0.009 157	1

WLAN (5G)

- Maximum tune up tolerance

Frequency Range (㎒)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
5 150 ~ 5 250	11	5.70	0.009 305	1
5 725 ~ 5 850	13	5.60	0.014 412	1

Note;

- For antenna gain in WLAN (5G), ANT 1 and ANT 2 are combined. Because WLAN (5G) operates with MIMO function.
- The power density Pd (5th column) at a distance of 20 ㎝ calculated from the friis transmission formula is far below the limit of 1 ㎽/㎠.
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
- This equipment should be installed and operated with minimum 20 ㎝ between the radiator and your body.
- The antenna gain of this transmitter is less than 6 dBi and must not be collocated or operating in conjunction with any other antenna or transmitter unless authorized to do so by the FCC.
- According to KDB 447498 D01 RF Exposure Guidance 4.1.

Simultaneous transmission of RF Exposure test exclusion for worst case configuration.

Bluetooth: the ratio is 0.000 731 / 1
WLAN: the ratio is 0.014 412 / 1

Confirm the sum result of individual MPEs ratio is ≤ 1.0;
Bluetooth + WLAN: (0.000 731 / 1) + (0.014 412 / 1) = 0.015 143 ≤ 1.0

- End of the Test Report -