시 험 성 적 서
TEST REPORT

성적서 번호 Report No.		ICRT-TR-E212934-0A
신청자 Client	기관명 Name	TRUEN Co., Ltd.
	주 소 Address	Office 1309, Woolim e-Biz Center 1, 28, Digital-ro 33-gil, Guro-gu, Seoul, Republic of Korea
시험대상품목 Sample description		Wireless Home Camera
모델명 Type designation		TSC-221SP
정 격 Ratings		DC 5.0 V
시험장소 Place of test		■ 고정시험(Inside test) □ 현장시험(Field test) 주소지(Address): 112, 113 Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea
시험기간 Date of test		08. Nov. 2021 ~ 16. Nov. 2021
시험방법/항목 Test Method/Item		FCC rule §1.1310
시험결과 Test Results		Refer to 3. Maximum Permissible Exposure
확 인 Affirmation	작성자 Tested by 성 명 Name Yeong-Hwan, Hong (Signature)	기술책임자 Technical Manager 성 명 Name Min-Gi, Son (Signature)

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This is certified that the above mentioned products have been tested for the sample

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2021. 11. 18

주식회사 아이씨알 대표이사

The head of INTERNATIONAL CERTIFICATION REGISTRAR

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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
ICRT-TR-E212934-0A	18-Nov-2021	Initial Issue	All

1. Applicant & Manufacturer & Test Laboratory Information

1.1 Applicant information

Applicant	TRUEN Co., Ltd.
Address	Office 1309, Woolim e-Biz Center 1, 28, Digital-ro 33-gil, Guro-gu, Seoul, Republic of Korea
Contact Person	YangHoon Cho
Telephone No.	+82-070-8677-6000
Fax No.	+82-02-2108-1595
E-mail	yhcho0926@truen.co.kr

1.2 Manufacturer Information

Manufacturer	TRUEN Co., Ltd.
Address	Office 1309, Woolim e-Biz Center 1, 28, Digital-ro 33-gil, Guro-gu, Seoul, Republic of Korea

1.3 Test Laboratory Information

Conducted tests were performed at	
Laboratory	ICR Co., Ltd.
Address	112, Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea
Telephone No.	+82-2-6351-9002
Fax No.	+82-2-6351-9007
RRA No.	KR0165
KOLAS No.	KT652
Test Firm Registration Number	490614

2. Equipment under Test(EUT) Information

2.1 General Information

Product Name	Wireless Home Camera
Brand Name	-
Model Name	TSC-221SP
Additional Model Name	-
FCC ID	2AZK3-TSC-221SP
Power Supply	DC 5.0 V

2.2 Additional Information

Equipment Class	DTS-Digital Transmission System
Device Type	Stand-alone
Operating Frequency	2 412 ㎒ ~ 2 462 ㎒
RF Output Power	15.52 ㏈m
Number of Channel	11
Modulation Type	802.11b: DSSS Modulation 802.11g/n(HT20): OFDM Modulation
Antenna Type	FPCB Antenna
Antenna Gain	4.17 ㏈i
Antenna Operating Mode	Single Antenna Equipment with only one antenna

2.3 Mode of operation during the test

- The EUT is continuous transmission mode during the test with set to each of the Low Channel, Middle Channel, and High Channel at the worst case data rate. The worst case data rate for each modulation is determined 1 Mbps for IEEE 802.11b, 6 Mbps for IEEE 802.11g, 6.5 Mbps for HT20.

2.4 Modifications of EUT

- None

2.5 Reason of Additional Model Name

- None

3. Maximum Permissible Exposure

3.1 RF Exposure calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment are f/1500 ㎽/㎠ for the frequency range between 300 ㎒ and 1 500 ㎒ and 1.0 ㎽/㎠ for the frequency range between 1 500 ㎒ and 100 000 ㎒.

The electric field generated for a 1 ㎽/㎠ exposure is calculated as follows:

$E = \sqrt{(30 * P * G)} / d$, and $S = E^2 / Z = E^2 / 377$, because 1 ㎽/㎠ = 10 W/m²

Where

S = Power density in ㎽/㎠, Z = Impedance of free space, 377 Ω

E = Electric filed strength in V/m, G = Numeric antenna gain, and d = distance in meter

Combing equations and rearranging the terms to express the distance as a function of the remaining variable

$d = \sqrt{(30 * P * G) / (377 * 10 S)}$

Changing to units of ㎽ and cm, using P (㎽) = P (W) / 1 000, d (㎝) = 0.01 * d (m)

$d = 0.282 * \sqrt{(P * G) / S}$

Where

d = distance in ㎝, P = Power in ㎽, G = Numeric antenna gain, and S = Power density in ㎽/㎠

3.2 EUT Descrption

Kind of EUT	Wireless Home Camera
Operating Frequency Band	■ WLAN(802.11b/g/n(HT20)): 2 412 ㎒ ~ 2 462 ㎒ □ WLAN(802.11n(HT40)): 2 422 ㎒ ~ 2 452 ㎒ □ WLAN: 5 180 ㎒ ~ 5 320 ㎒ / 5 500 ㎒ ~ 5 700 ㎒ □ WLAN: 5 745 ㎒ ~ 5 825 ㎒ □ Bluetooth: 2 402 ㎒ ~ 2 480 ㎒
Max. Output Power	15.52 dBm
Exposure Evaluation Applied	■ MPE □ SAR □ N/A

3.3 Result

According to above equation, the following result was obtained.

Operating Mode	Target Power W / tolerance	Max tune up power		Antenna Gain		Safe Distance (㎝)	Power Density (㎽/㎠) @ 20 ㎝ Separation	Limit (㎽/㎠)
		(dBm)	(㎽)	Log	Linear			
802.11b	14.43 ± 1.0	15.43	34.91	4.17	2.61	2.71	0.018	1.00
802.11g	15.52 ± 1.0	16.52	44.87			3.07	0.023	
802.11n(HT20)	15.47 ± 1.0	16.47	44.36			3.06	0.023	

According to above table, for Band(802.11g), safe distance,

D = 0.282 * $\sqrt{(44.87 * 2.61)/1.00}$ = 3.07 ㎝.

For getting power density at 20 ㎝ separation in above table, following formula was used.

S = P * G / (4π * R²) = 44.87 * 2.61 / (4 * π * 20^2) = 0.023

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

- END OF REPORT.