



TEST REPORT

KCTL Inc.

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Report No.:
KR20-SRF0093-A

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1. Client

- Name : ShinHeung Precision Co., Ltd.
- Address : 53, Je3gongdan3-gil, Seoun-myeon, Anseong-si, Gyeonggi-do, Korea
- Date of Receipt : 2019-10-04

2. Use of Report : Certification

3. Name of Product and Model : KIOSK / SK-163

4. Manufacturer and Country of Origin : ShinHeung Precision Co., Ltd. / Korea

5. FCC ID : O8HSK-163

6. Date of Test : 2019-11-15 to 2019-11-21

7. Test Standards : 47 CFR Part 1.1310

8. Test Results : Refer to the test result in the test report

Affirmation	Tested by	Technical Manager
	Name : Euijung Kim  (Signature)	Name : Heesu Ahn  (Signature)

2020-03-05

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As a test result of the sample which was submitted from the client, this report does not guarantee 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
2020-03-04	Initial report	-
2020-03-05	Updated	8

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1. General information

Client : ShinHeung Precision Co., Ltd.
 Address : 53, Je3gongdan3-gil, Seoun-myeon, Anseong-si, Gyeonggi-do, Korea
 Manufacturer : ShinHeung Precision Co., Ltd.
 Address : 53, Je3gongdan3-gil, Seoun-myeon, Anseong-si, Gyeonggi-do, 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
 Industry Canada Registration No. : 8035A
 KOLAS No.: KT231

2. Device information

Equipment under test : KIOSK
 Model : SK-163
 Derivative Model : SK-363, SK-563
 Modulation technique : WIFI(802.11a/b/g/n)_DSSS, OFDM
 Power source : AC 120 V
 Antenna specification : Dipole Antenna
 Antenna gain : 3.42 dBi
 Operation temperature : 21 °C
 Software version : Windows 10 Enterprise 2016 LTSC
 Hardware version : VER1.0
 Frequency range & Number of channels
 2 412 MHz ~ 2 462 MHz : WIFI(802.11b/g/n_HT20)_11 ch
 2 422 MHz ~ 2 452 MHz : WIFI(802.11n_HT40)_09 ch

2.1. Information about derivative model

The difference between basic model and derivative models is:

Derivative models are for the different buyer code.

2.2. Frequency/channel operations

This device contains the following capabilities:

802.11b/g/n(HT20/40)

Ch.	Frequency (MHz)
301	2 412
.	.
06	2 437
.	.
11	2 462

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

Ch.	Frequency (MHz)
03	2 422
.	.
06	2 442
.	.
09	2 452

Table 2.2.2. 802.11n HT40 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 or 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 ($\pm$)
Conducted RF power	1.76 dB

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4. RF Exposure

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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 (MHz)	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [mW/cm ²]	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 MHz, * = 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 kHz

4.1. Test results

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MPE (Maximum Permissible Exposure) Prediction

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

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

S = power density [mW/cm^2]

P = Power input to antenna [mW]

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 [cm]

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 cm must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.

Note.

1. The power density P_d (5th column) at a distance of 20 cm calculated from the friis transmission Formula is far below the limit of 1 mW/cm^2 .

2. Unequal antenna gains, with equal transmit powers. For antenna gains given by $G_1, G_2, \dots, G_N$ dBi (i) If transmit signals are correlated, then

Directional gain = $10 \log[(10G_1/20 + 10G_2/20 + \dots + 10G_N/20)/2/NANT]$ dB i [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

Calculation Result of RF exposure

Maximum tune-up tolerance

-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/cm^2]	Limit [mW/cm^2]
802.11b	2 462	16.50	44.67	3.42	2.20	0.019 53	1.000 00

End of test report