

TEST REPORT

of

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

FCC ID: 2AY49-KES-T202ES

Equipment Under Test : SMART RELAY CONTROLLER 2 CHANNEL
Model Name : KES-T202ES
Variant Model Name(s) : Refer to the page 3
Applicant : KYUNG IN ELECTRONICS CO., LTD
Manufacturer : KYUNG IN ELECTRONICS CO., LTD
Date of Receipt : 2021.03.03
Date of Test(s) : 2021.03.30 ~ 2021.04.27
Date of Issue : 2021.04.28

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

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Report Number: F690501-RF-RTL002001

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

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- Designation number: KR0150

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1.2. Details of Applicant

Applicant : KYUNG IN ELECTRONICS CO., LTD

Address : 1411, Byucksan Digital Valley 2, 184, Gasan digital 2-ro, Geumcheon-gu, Seoul,
 South Korea, 08501

Contact Person : Jang, Suk-woon

Phone No. : +82 2 2113 2003

1.3. Details of Manufacturer

Company : ACE CYBER TECH

Address : 267, Namdongseo-ro, Namdong-gu, Incheon, Republic of Korea

1.4. Description of EUT

Kind of Product	SMART RELAY CONTROLLER
Model Name	KES-T202ES
Variant Model Names	KES-T201ES
Power Supply	AC 110 ~ 220 V
Frequency Range	2 405 MHz ~ 2 480 MHz (Zigbee)
Modulation Technique	DSSS
Number of Channels	16 channels (Zigbee)
Antenna Type	Pattern Antenna
Antenna Gain	2 dBi
H/W Version	Ver 1.3
S/W Version	Ver 1.0.2

1.5. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL002001	2021.04.28	Initial

1.6. Information of Variant Models

Model names		Description
Basic model	KES-T202ES	- Basic model
Variant model	KES-T201ES	- Same to basic model except below - Difference in Color

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 (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	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: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d the limit of MPE, 1 mW/cm². 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

Zigbee

- Maximum tune up tolerance

Frequency Range (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
2 400 ~ 2 483.5	9.5	2.0	0.002 810	1

Note;

- The power density Pd (5th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
- This equipment should be installed and operated with minimum 20 cm between the radiator and your body.
- The antenna gain of this transmitter is less than 6 dB i 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.

- End of the Test Report -