

FCC/IC TEST REPORT

Order No. : G-44-2018-02209
Applicant Name : iRevo-ASSA ABLOY Korea
Equipment Under Test (EUT) :
 Product Name : Digital Door Lock
 Model Name : YRD156-ZW-619
 Alt. Model Name : YRD156-ZW-605, YRD156-ZW-0BP
FCC Authorization Type : Certification
Applied Standards : FCC Part 15 Subpart B, Class B
 ANSI C63.4 : 2014
 ICES-003 Issue 6:2016
Date of Receipt : June 28, 2018
Date of Test : July 18, 2018
Date of Issue : July 26, 2018
Test Results : Complied

Tested by :



Luther Choi

Reviewed by :



Julia Choi

This test report does not assure KOLAS accreditation.

Remarks :

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Revision History

Revision	Report number	Description
0	F690501/RF-EMC003726(H)	Initial

1. General Information

1.1 Client Information

Applicant : iRevo-ASSA ABLOY Korea
Address : 205-29, Gasan Digital 1-ro, Geumcheon-gu, Seoul, 08503, Republic of Korea

Manufacturer : iRevo-ASSA ABLOY Korea
Address : 205-29, Gasan Digital 1-ro, Geumcheon-gu, Seoul, 08503, Republic of Korea

1.2 Test Laboratory

Name and Address : SGS Korea Co., Ltd.
4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Republic of Korea, 15807

FCC Registration No. : KR0150

IC Registration No. : 7837B

Phone : + 82 31 548 0710

Fax : + 82 31 548 0719

e-mail : Julia.choi@sgs.com

1.3 General Information of E.U.T.

Classification	Specification	
Product Name	Digital Door Lock	
Model Name	YRD156-ZW-619	
Alt. Model Name	YRD156-ZW-605, YRD156-ZW-0BP	
Model Description	Each model has different colors.	
	Model Name	Color
	YRD156-ZW-619(Basic model)	Silver
	YRD156-ZW-605	Gold
	YRD156-ZW-0BP	Dark Brown
Rated Power	6 Vd.c.	
Test Power	6 Vd.c.(AA battery x 4EA)	
Internal Clock Frequency	916 MHz	
Function	Digital door lock	

1.4 Operating Modes and Conditions

Operating mode	Operating Condition
1) Operating	The state of switching locking and unlocking

1.5 Peripheral Equipments

Description	Model	Serial No.	Manufacturer
-	-	-	-

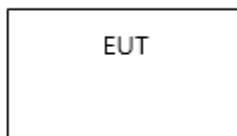
1.6 Cable List

Start		END		Cable Spec.		Used core
Name	I/O Port	Name	I/O Port	Length	Shield	
EUT	-	-	-	-	-	-

1.7 System Configurations

Description	Model	Serial No.	Manufacturer
Main Board	A3P III -D438S-YO BETA JG	SW2.7-1805-00057	-
LED Board	WGA5.8 TS FRONT PV01 1802222	PC2F-D438S-E1	-
Motor	-	-	-

1.8 Test System Layout



1.9 Modifications

- There was no modified item during the test.

1.10 Applicable Standards for Testing

Standards	Status	Deviation
FCC Part 15 : Subpart B ICES-003 ISSUE 6 :2016	Applicable	No Deviation

1.11 Summary of Test Results

Test Item	Standards	Results
Conducted Emission	FCC Part 15 Subpart B Section 15.107 ICES-003 ISSUE 6 :2016	N/A
Radiated Emission	FCC Part 15 Subpart B Section 15.109 ICES-003 ISSUE 6 :2016	Complied

Note : Test methods of all test items are performed according to the basic standards in this table.

EMISSION

2.1 Test Results

Test Items	Standards	Test Results
Conducted Emission	FCC Part 15 Subpart B Section 15.107 ICES-003 ISSUE 6 :2016	N/A
Radiated Emission	FCC Part 15 Subpart B Section 15.109 ICES-003 ISSUE 6 :2016	Complied

2.2 Test Method and Limits

2.2.1 Test Method

Test Items	Measuring Frequency Range	RBW	Measuring Distance
Conducted Emission	0.15 MHz ~ 30 MHz	9 kHz	-
Radiated Emission	30 MHz ~ 1 GHz	120 kHz	10 m & 3 m
	Above 1 GHz	1 MHz	3 m

Note : 10 m method of radiated emission measurement is only applied to Class A equipment over the frequency range of 30 MHz ~ 1 GHz. Except this, 3 m method is applied to Class B equipment over the frequency range of 30 MHz ~ 1 GHz and Class A and Class B equipment above 1 GHz.

2.2.2 Test Limits

-Conducted Emission Limits

Frequency Range	Limits(dB μ V)		Class
	Quasi-peak	Average	
0.15 MHz ~ 0.5 MHz	79	66	Class A
0.5 MHz ~ 30 MHz	73	60	
0.15 MHz ~ 0.5 MHz	66 to 56	56 to 46	Class B
0.5 MHz ~ 5 MHz	56	46	
5 MHz ~ 30 MHz	60	50	

Note : The lower limit shall apply at the transition frequencies. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

-Radiated Emission Limits below 1 GHz

Frequency Range	Limits(dB μ V/m)	Class
	Quasi-peak	
30 MHz ~ 88 MHz	39.0	Class A (10 m method)
88 MHz ~ 216 MHz	43.5	
216 MHz ~ 960 MHz	46.4	
960 MHz ~ 1 GHz	49.5	
30 MHz ~ 88 MHz	40.0	Class B (3 m method)
88 MHz ~ 216 MHz	43.5	
216 MHz ~ 960 MHz	46.0	
960 MHz ~ 1 GHz	54.0	

-Radiated Emission Limits above 1 GHz (3 m method)

Frequency Range	Limits(dB μ V/m)		Class
	Average	Peak	
Above 1 GHz	59.5	79.5	Class A
Above 1 GHz	54.0	74.0	Class B

Note : The limits of class A equipment is extrapolated using an extrapolation factor of 20 dB/decade because it was measured at 3 m distance not 10 m distance.

2.3 Radiated Emission

The initial preliminary exploratory scans were performed over the measuring frequency range (30 MHz to 5 GHz) using a max hold mode incorporating a Peak detector and using the software of EMC32 (Version V8.53 from R&S). The final test data was measured using a Quasi-Peak detector below 1 GHz and Peak and CISPR-Average detector above 1 GHz.

Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency.

2.3.1 Test Equipments

Equipment	Model	Manufacturer	Serial No	Cal Due. Date
EMI TEST RECEIVER	ESU40	R&S	100075	2019.06.28
BILOG ANTENNA	VULB 9163	SCHWARZBECK	9163-390	2019.04.25
Double Ridged Horn Antenna	HF907	R&S	102578	2019.01.18
AMPLIFIER	8447D	HP	2727A05143	2018.08.16
Microwave Preamplifier	PAM-118A	Com-Power	551074	2018.08.16
3m SEMI-ANECHOIC CHAMBER	-	Will Tech	-	-

Note : The Antenna calibration period is 2 years, but the other equipment calibration period are 1 year.

2.3.2 Test Site

3m SEMI-ANECHOIC CHAMBER in Giheung 2 Laboratory

2.3.3 Environment Conditions

① Below 1 GHz

Temperature : (Minimum 21.4, Maximum 23.5) °C

Humidity : (Minimum 44.0, Maximum 46.0) %R.H.

Atmospheric Pressure : (Minimum 100.7, Maximum 100.7) kPa

Test Date : July 18, 2018

② Above 1 GHz

Temperature : (Minimum 21.9, Maximum 23.7) °C

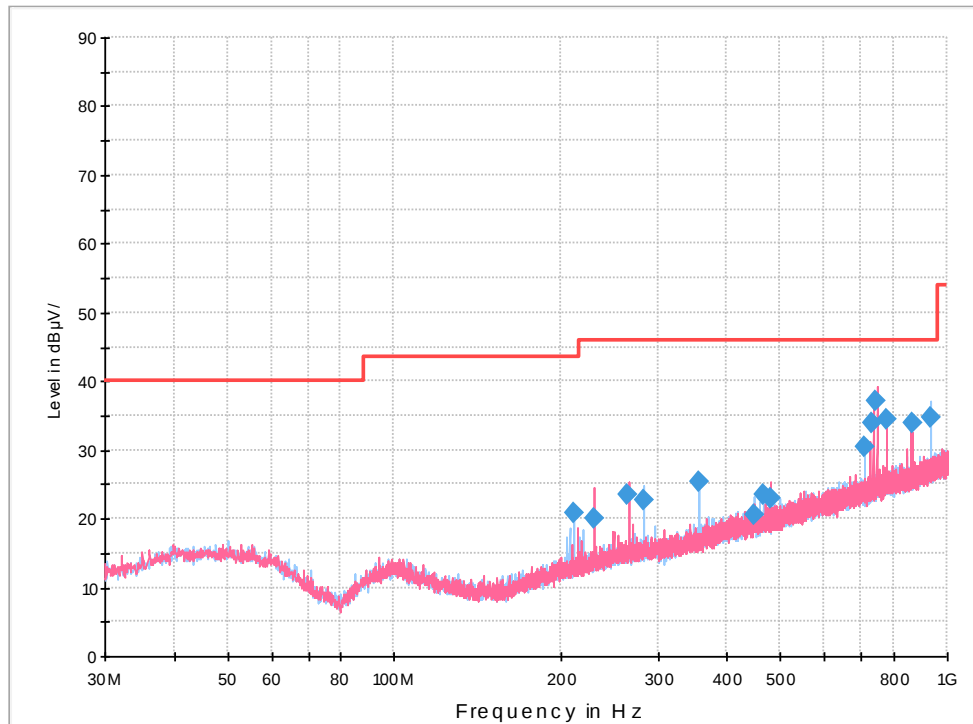
Humidity : (Minimum 45.0, Maximum 47.0) %R.H.

Atmospheric Pressure : (Minimum 100.7, Maximum 100.7) kPa

Test Date : July 18, 2018

2.3.4 Test Results

① Below 1 GHz



Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
210.813 000	20.8	15 000.0	120.000	200.0	H	280.0	-13.3	22.7	43.5
230.584 000	20.1	15 000.0	120.000	200.0	V	96.0	-12.5	25.9	46.0
264.318 000	23.5	15 000.0	120.000	200.0	V	96.0	-11.3	22.5	46.0
283.438 000	22.6	15 000.0	120.000	100.0	H	0.0	-10.9	23.4	46.0
355.546 000	25.4	15 000.0	120.000	100.0	H	0.0	-9.1	20.6	46.0
449.227 000	20.6	15 000.0	120.000	100.0	H	156.0	-7.6	25.4	46.0
465.494 000	23.4	15 000.0	120.000	300.0	H	236.0	-7.4	22.6	46.0
480.404 000	23.0	15 000.0	120.000	100.0	V	236.0	-7.2	23.0	46.0
708.003 000	30.5	15 000.0	120.000	100.0	H	246.0	-3.5	15.5	46.0
733.241 000	33.8	15 000.0	120.000	100.0	V	236.0	-3.1	12.2	46.0
743.720 000	37.2	15 000.0	120.000	100.0	V	236.0	-2.9	8.8	46.0
778.939 000	34.5	15 000.0	120.000	100.0	V	236.0	-2.4	11.5	46.0
862.385 000	33.9	15 000.0	120.000	100.0	V	236.0	-1.0	13.1	46.0
931.151 000	34.6	15 000.0	120.000	200.0	H	47.0	0.0	11.4	46.0

Measurement Uncertainty (Horizontal) : 5.28 dB (The confidential level is about 95 %, k = 2)

Measurement Uncertainty (Vertical) : 5.34 dB (The confidential level is about 95 %, k = 2)

Note : • POL H = Horizontal

• POL V = Vertical

• Margin = Limit – Quasi Peak

• Corr. = Antenna Factor + Cable loss – Amplifier Gain

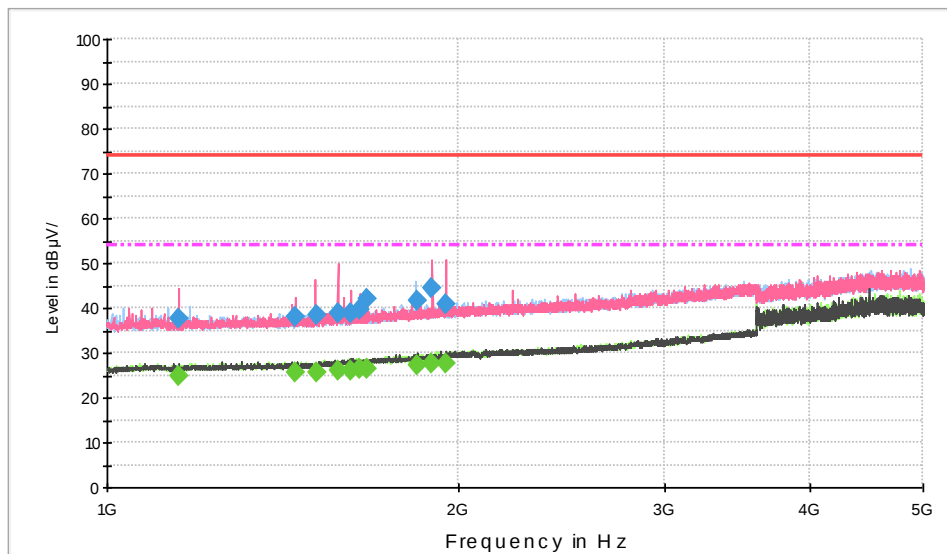
Ex) In case

Freq ; 100 MHz, level ; 30 dB(μV/m), AF ; 10 dB/m, CL ; 4 dB, Amp ; 25 dB

Result = Level + AF + CL – Amp = 30 + 10 + 4 - 25 = 19

Margin = Limit – Result = 43.5 – 19 = 24.5

② Above 1 GHz



Final Result 1

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1 150.600 000	37.7	15 000.0	1000.000	380.0	V	48.0	-10.9	36.3	74.0
1 451.400 000	38.1	15 000.0	1000.000	191.0	V	187.0	-9.6	35.9	74.0
1 511.400 000	38.3	15 000.0	1000.000	150.0	V	159.0	-9.3	35.7	74.0
1 580.200 000	38.9	15 000.0	1000.000	100.0	V	271.0	-8.8	35.1	74.0
1 615.400 000	38.9	15 000.0	1000.000	150.0	V	220.0	-8.6	35.1	74.0
1 648.600 000	39.4	15 000.0	1000.000	115.0	V	242.0	-8.3	34.6	74.0
1 671.400 000	41.8	15 000.0	1000.000	165.0	V	211.0	-8.2	32.2	74.0
1 843.400 000	41.7	15 000.0	1000.000	250.0	H	90.0	-7.1	32.3	74.0
1 898.200 000	44.4	15 000.0	1000.000	207.0	V	193.0	-6.8	29.6	74.0
1 949.000 000	40.9	15 000.0	1000.000	150.0	V	213.0	-6.5	33.1	74.0

Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1 150.600 000	25.0	15 000.0	1000.000	380.0	V	48.0	-10.9	29.0	54.0
1 451.400 000	25.4	15 000.0	1000.000	191.0	V	187.0	-9.6	28.6	54.0
1 511.400 000	25.6	15 000.0	1000.000	150.0	V	159.0	-9.3	28.4	54.0
1 580.200 000	26.1	15 000.0	1000.000	100.0	V	271.0	-8.8	27.9	54.0
1 615.400 000	26.2	15 000.0	1000.000	150.0	V	220.0	-8.6	27.8	54.0
1 648.600 000	26.3	15 000.0	1000.000	115.0	V	242.0	-8.3	27.7	54.0
1 671.400 000	26.4	15 000.0	1000.000	165.0	V	211.0	-8.2	27.6	54.0
1 843.400 000	27.3	15 000.0	1000.000	250.0	H	90.0	-7.1	26.7	54.0
1 898.200 000	27.4	15 000.0	1000.000	207.0	V	193.0	-6.8	26.6	54.0
1 949.000 000	27.6	15 000.0	1000.000	150.0	V	213.0	-6.5	26.4	54.0

Measurement Uncertainty (Horizontal) : 3.82 dB (The confidential level is about 95 %, $k = 2$)

Measurement Uncertainty (Vertical) : 3.94 dB (The confidential level is about 95 %, $k = 2$)

Note : • POL H = Horizontal • POL V = Vertical

• Margin = Limit – MaxPeak or CAverage

• Corr. = Antenna Factor + Cable loss – Amplifier Gain

Ex) In case

Freq ; 1 500 MHz, level ; 30 dB(μV/m), AF ; 10 dB/m, CL ; 4 dB, Amp ; 25 dB

Result = Level + AF + CL – Amp = 30 + 10 + 4 - 25 = 19

Margin = Limit – Result = 43.5 – 19 = 24.5

- End of Test Report -