

FCC/IC TEST REPORT

Job No. : GPEM2304000247EC
Applicant : iRevo-ASSA ABLOY Korea
Equipment Under Test (EUT) :
Product Name : Digital Door Lock
Model Name : YRD450 NFC
FCC Authorization Type : Certification
Applied Standards : FCC Part 15 Subpart B, Class B
ICES-003 Issue 7:2020
FCC ID : 2ABFG-YRD450-N
IC Certification : 11626A-YRD450N
Date of Receipt : April 18, 2023
Date of Test : April 20, 2023 ~ April 24, 2023
Date of Issue : May 26, 2023
Test Results : Complied

Tested by :



DoHyeon Lee

Reviewed by :



Paul Kang

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.

Remarks :

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The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full.

Contents

1. General Information.....	4
1.1 Client Information.....	4
1.2 Test Laboratory.....	4
1.3 General Information of E.U.T.	4
1.4 Operating Modes and Conditions.....	4
1.5 Peripheral Equipments.....	4
1.6 Cable List.....	5
1.7 System Configurations.....	5
1.8 Test System Layout	5
1.9 Modifications/Notes.....	5
1.10 Applicable Standards for Testing	5
1.11 Summary of Test Results.....	5
2. Emission Test.....	6
2.1 Test Results.....	6
2.2 Test Method and Limits.....	6
2.2.1 Test Method	6
2.2.2 Test Limits.....	6
2.3 Radiated Emission	8
2.3.1 Test Equipments	8
2.3.2 Test Site.....	8
2.3.3 Environment Conditions	8
2.3.4 Test Results	9
Appendix A : Measurement Uncertainty	12

Revision History

Revision	Report number	Description
0	F690501-RF-EMC001356	Initial
1		

1. General Information

1.1 Client Information

Applicant	iRevo-ASSA ABLOY Korea
Applicant Address	10f of JEI PLATZ Bldg., 186, Gasandigital 1-ro, Geumcheon-gu, Seoul, 08502, Republic of Korea
Manufacturer	iRevo-ASSA ABLOY Korea
Manufacturer Address	10f of JEI PLATZ Bldg., 186, Gasandigital 1-ro, Geumcheon-gu, Seoul, 08502, Republic of Korea

1.2 Test Laboratory

Name and Address	SGS Korea Co., Ltd.
- Giheung Laboratory	35, Giheungdanji-ro 121beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
- Gunpo Laboratory	4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807, Republic of Korea
- Dongtan Laboratory	12, Dongtansandan 10-gil, Hwaseong-si, Gyeonggi-do, 18487, Republic of Korea
FCC Registration No.	KR0150
IC Registration No.	7837B
Phone	+ 82 31 428 5719
Fax	+ 82 31 427 2371
e-mail	paul.kang@sgs.com

1.3 General Information of E.U.T.

Classification	Specification
Product Name	Digital Door Lock
Model Name	YRD450 NFC
Serial No.	-
EMI Classification	Class B
Internal Clock Frequency	2 480 MHz
Rated Power	6 Vd.c.(Battery)
Test Voltage	6 Vd.c.(Battery)
H/W Version	PV01
S/W Version	V1.2.29
Port	-
Components	Exterior Keypad, Interior Lock, Strike Plate, Adjustable Deadbolt, Reset Pin, Mounting Plate, AA Batteries, Screws(Strike Plate and Deadbolt Screws, Teal Screw Set B, Black Screw C, Silver Screw D, Optional Security Strike Plate Screws), DoorSense (Housing, Cover, Mounting Tape, Screws, Flush Mount Cap), Smart Module(Included with select models)
Function	Digital Door Lock

1.4 Operating Modes and Conditions

Operating mode	Operating Condition
1) Dial	Unlock to press a number repeatedly

1.5 Peripheral Equipments

Description	Model	Serial No.	Manufacturer	Note.
-	-	-	-	-

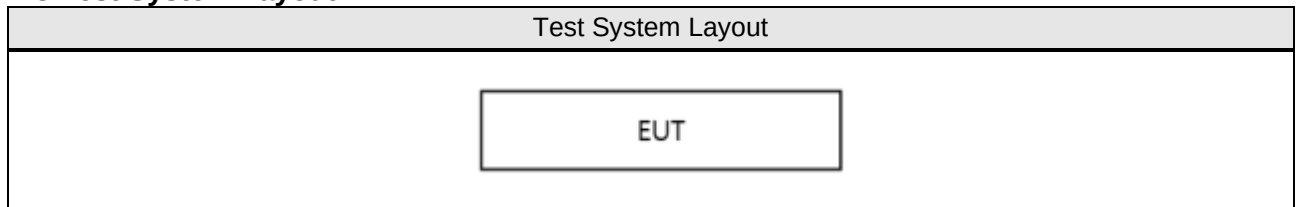
1.6 Cable List

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

1.7 System Configurations

Description	Model	Serial No.	Manufacturer	Note
Main Board	YRD450 FP MAIN PV01	PC4M-D300S-E1	-	-
Front Board	YRD450-NFC TS KEYLESS FRONT PV01	PC4F-D400S-E1	-	-
Speaker	-	-	-	-
Motor	-	1000064	-	-

1.8 Test System Layout



1.9 Modifications/Notes

- 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 7:2020	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 7:2020 ANSI C63.4a:2017	N/A
Radiated Emission	FCC Part 15 Subpart B Section 15.109 ICES-003 Issue 7:2020 ANSI C63.4a:2017	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 7:2020 ANSI C63.4a:2017	N/A
Radiated Emission	FCC Part 15 Subpart B Section 15.109 ICES-003 Issue 7:2020 ANSI C63.4a:2017	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

[FCC Part 15 Subpart B]

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	

[ICES-003 Issue 7 : 2020]

Frequency Range	Limits(dB μ V/m)	Class
	Quasi-peak	
30 MHz ~ 88 MHz	40.0	Class A (10 m method)
88 MHz ~ 216 MHz	43.5	
216 MHz ~ 230 MHz	46.4	
230 MHz ~ 960 MHz	47.0	
960 MHz ~ 1 GHz	49.5	
30 MHz ~ 88 MHz	50.0	Class A (3 m method)
88 MHz ~ 216 MHz	54.0	
216 MHz ~ 230 MHz	56.9	
230 MHz ~ 960 MHz	57.0	
960 MHz ~ 1 GHz	60.0	
30 MHz ~ 88 MHz	30.0	Class B (10 m method)
88 MHz ~ 216 MHz	33.1	
216 MHz ~ 230 MHz	35.6	
230 MHz ~ 960 MHz	37.0	
960 MHz ~ 1 GHz	43.5	
30 MHz ~ 88 MHz	40.0	Class B (3 m method)
88 MHz ~ 216 MHz	43.5	
216 MHz ~ 230 MHz	46.0	
230 MHz ~ 960 MHz	47.0	
960 MHz ~ 1 GHz	54.0	

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

[FCC Part 15 Subpart B]

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.

[ICES-003 Issue 7 : 2020]

Frequency Range	Limits(dB μ V/m)		Class
	Average	Peak	
Above 1 GHz	60.0	80.0	Class A
Above 1 GHz	54.0	74.0	Class B

2.3 Radiated Emission

The initial preliminary exploratory scans were performed over the measuring frequency range (30 MHz to 13 GHz) using a max hold mode incorporating a Peak detector by using the EMI measuring software. The final test data was measured using a Quasi-Peak detector below 1 GHz, 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.

Note. Measuring software

- Giheung Lab.: EMC32(V10.40.10) from R&S
- Gunpo Lab.: EP5RE(V5.3.70) from TOYO
- Dongtan Lab.: EMC32(V10.40.10) from R&S

2.3.1 Test Equipments

Equipment	Model	Manufacturer	Serial No	Cal Due. Date
Horn Antenna	HF906	R & S	100326	2024.02.28
Signal Conditioning Unit	SCU 18	R & S	10117	2023.06.13
Test Receiver	ESU26	R & S	100109	2024.01.18
Hybrid Antenna	VULB9163	SCHWARZBECK	01126	2024.02.09
Amplifier	8447F	HP	2944A03909	2023.08.04
RF Cable(CA-04)	-	-	-	2023.10.04
RF Cable(CA-05)	-	-	-	2023.10.04
RF Cable(CA-06)	MWX221-NMSNMS (4m)	RF ONE	J023142	2023.10.04
RF Cable(CA-07)	PL520-NMNM-10M (10m)	RF ONE	0200324001	2023.10.04

Note: The calibration period of every equipment is 1 year.

2.3.2 Test Site

3 m SEMI-ANECHOIC CHAMBER in Gunpo Laboratory

2.3.3 Environment Conditions

Below 1 GHz

Temperature	(Minimum 20.7, Maximum 20.7) °C
Humidity	(Minimum 43.0, Maximum 43.0) % R.H.
Atmospheric Pressure	(Minimum 100.1, Maximum 100.1) kPa
Test Date	April 20, 2023

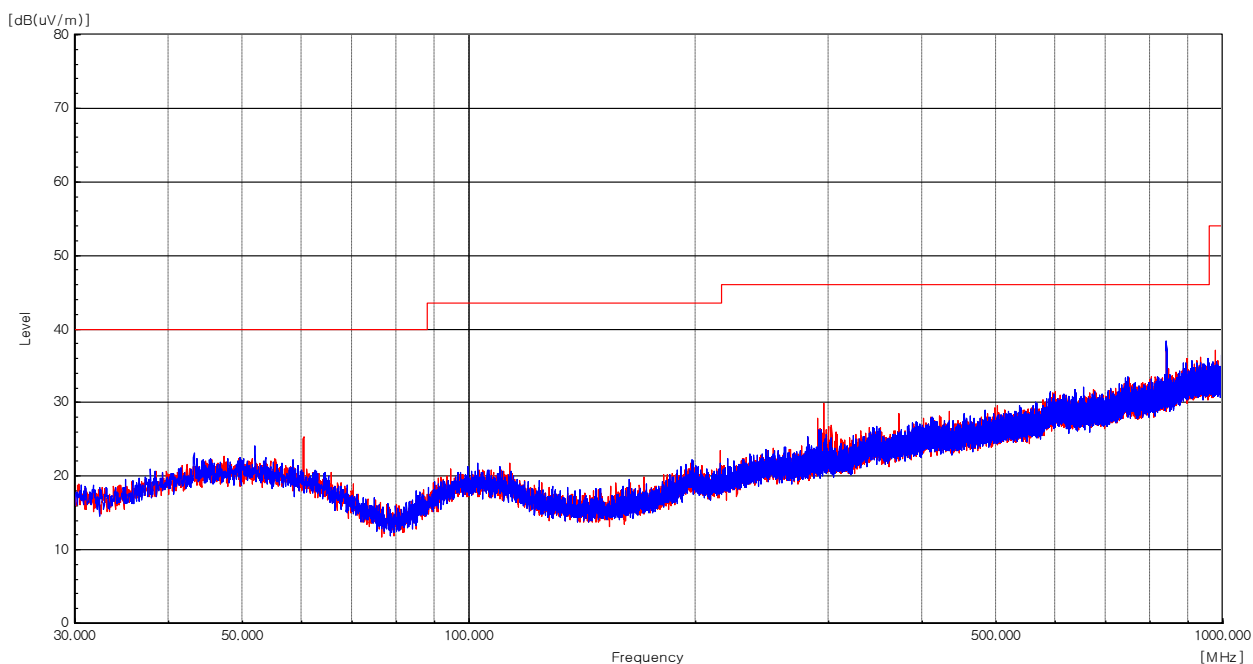
Above 1 GHz

Temperature	(Minimum 19.9, Maximum 20.0) °C
Humidity	(Minimum 30.0, Maximum 30.0) % R.H.
Atmospheric Pressure	(Minimum 101.3, Maximum 101.3) kPa
Test Date	April 24, 2023

2.3.4 Test Results

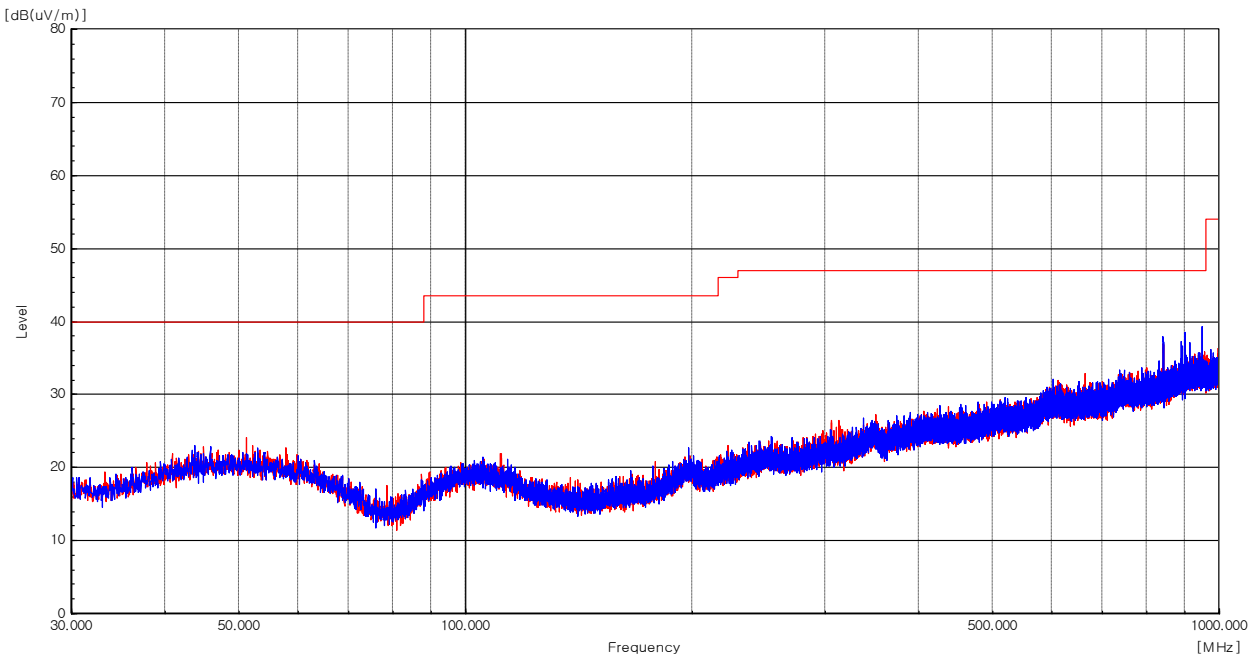
Below 1 GHz (3 m method)

[FCC Part 15 Subpart B]



Freq. (MHz)	Reading (dBμV/m)	Pol. (H/V)	A (°)	H (cm)	AF (dB/m)	CL (dB)	Amp. (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
51.99	23.20	V	290	208	19.50	0.90	28.20	15.40	40.00	24.60
60.31	23.50	H	330	190	18.27	1.04	28.20	14.61	40.00	25.39
295.42	23.60	H	325	105	19.00	2.17	27.61	17.16	46.00	28.84
372.25	23.50	H	310	202	20.70	2.48	27.63	19.05	46.00	26.95
654.64	23.40	V	100	105	25.13	3.29	28.86	22.96	46.00	23.04
842.54	23.10	V	20	100	27.00	3.66	28.73	25.03	46.00	20.97

[ICES-003 Issue 7: 2020]



Freq. (MHz)	Reading (dBμV/m)	Pol. (H/V)	A (°)	H (cm)	AF (dB/m)	CL (dB)	Amp. (dB)	F/R (dBμV/m)	Limit (dBμV/m)	Margin (dB)
51.18	23.10	H	0	105	19.66	0.89	28.20	15.45	40.00	24.55
222.75	23.40	H	285	200	17.17	1.95	27.83	14.69	46.00	31.31
349.74	23.50	H	10	100	20.70	2.45	27.50	19.15	46.00	26.85
663.77	23.50	H	60	106	25.20	3.27	28.89	23.08	46.00	22.92
842.54	23.40	V	145	110	27.00	3.66	28.73	25.33	46.00	20.67
949.68	23.30	V	100	112	27.90	4.23	28.60	26.83	46.00	19.17

Measurement Uncertainty: See the Appendix A

Note: • AF = Antenna Factor

• Pol.(H) = Horizontal

• Margin = Limit – F/S

• A: Angle

• CL = Cable Loss

• Pol.(V) = Vertical

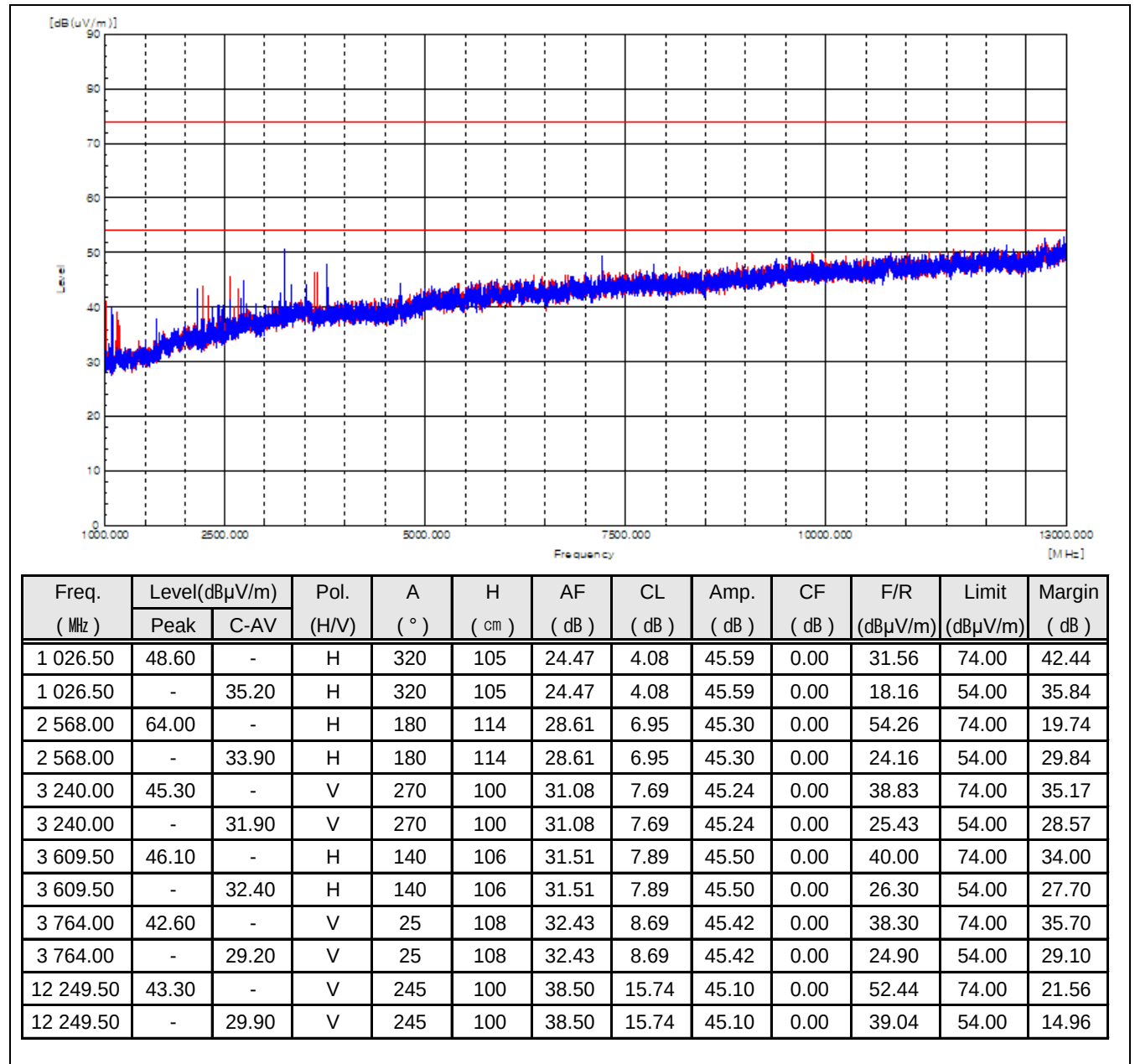
• F/R = Reading + AF + CL – Amp.

• H: Height

• F/R = Final Result

• Amp. = Amplifier Gain

Above 1 GHz (3 m method)



Measurement Uncertainty : See Appendix A

Note: • AF = Antenna Factor
• Pol.(H) = Horizontal
• Margin = Limit – F/S
• A: Angle
• CL = Cable Loss
• Pol.(V) = Vertical
• F/R = Level + AF + CL – Amp.
• H: Height
• F/R = Final Result
• Amp. = 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

Appendix A : Measurement Uncertainty

- Giheung Laboratory

Test Method		Measurement Uncertainty	
Conducted Emission		ENV216	3.7 dB (The confidential level is 95 %, k=2)
		ESH2-Z5	3.2 dB (The confidential level is 95 %, k=2)
		ESH3-Z6	3.2 dB (The confidential level is 95 %, k=2)
		NNLK8129	3.1 dB (The confidential level is 95 %, k=2)
Conducted Emission - Signal		ISN T800	5.4 dB (The confidential level is 95 %, k=2)
		ISN ST08	6.6 dB (The confidential level is 95 %, k=2)
Discontinuous		2.7 dB (The confidential level is 95 %, k=2)	
Radiated Emission	9 kHz ~30 MHz	Horizontal	3.3 dB (The confidential level is 95 %, k=2)
		Vertical	3.3 dB (The confidential level is 95 %, k=2)
	30 MHz ~ 1 000 MHz	Horizontal	4.3 dB (The confidential level is 95 %, k=2)
		Vertical	4.6 dB (The confidential level is 95 %, k=2)
	1 GHz ~ 18 GHz	Horizontal	3.9 dB (The confidential level is 95 %, k=2)
		Vertical	4.0 dB (The confidential level is 95 %, k=2)

- Gunpo Laboratory

Test Method		Measurement Uncertainty	
Conducted Emission		ENV216	4.0 dB (The confidential level is 95 %, k=2)
		ESH2-Z5	3.6 dB (The confidential level is 95 %, k=2)
		ESH3-Z6	3.8 dB (The confidential level is 95 %, k=2)
Conducted Emission - Signal		ISN T800	5.8 dB (The confidential level is 95 %, k=2)
		ISNT8-Cat6	5.8 dB (The confidential level is 95 %, k=2)
		ISN S751	7.5 dB (The confidential level is 95 %, k=2)
Disturbance Voltage at Antenna Terminal		2.9 dB (The confidential level is 95 %, k=2)	
Radiated Emission	9 kHz ~30 MHz	Horizontal	3.4 dB (The confidential level is 95 %, k=2)
		Vertical	3.4 dB (The confidential level is 95 %, k=2)
	30 MHz ~ 1 000 MHz	Horizontal	4.5 dB (The confidential level is 95 %, k=2)
		Vertical	5.1 dB (The confidential level is 95 %, k=2)
	1 GHz ~ 18 GHz	Horizontal	3.7 dB (The confidential level is 95 %, k=2)
		Vertical	3.9 dB (The confidential level is 95 %, k=2)

- Dongtan Laboratory

Test Method		Measurement Uncertainty	
Conducted Emission		ENV216	3.5 dB (The confidential level is 95 %, $k=2$)
		ESH2-Z5	3.3 dB (The confidential level is 95 %, $k=2$)
		ESH3-Z6	3.3 dB (The confidential level is 95 %, $k=2$)
		NNLK8129	3.4 dB (The confidential level is 95 %, $k=2$)
Conducted Emission - Signal		ISN T800	5.7 dB (The confidential level is 95 %, $k=2$)
		ISN ST08	5.5 dB (The confidential level is 95 %, $k=2$)
Discontinuous		2.9 dB (The confidential level is 95 %, $k=2$)	
disturbance Power		3.9 dB (The confidential level is 95 %, $k=2$)	
Radiated Emission	9 kHz ~30 MHz (Triple Loop Ant.)	3.4 dB (The confidential level is 95 %, $k=2$)	
	9 kHz ~30 MHz (Loop Ant.)	Horizontal	3.8 dB (The confidential level is 95 %, $k=2$)
		Vertical	3.8 dB (The confidential level is 95 %, $k=2$)
	30 MHz ~ 1 000 MHz	Horizontal	4.8 dB (The confidential level is 95 %, $k=2$)
		Vertical	5.4 dB (The confidential level is 95 %, $k=2$)
	1 GHz ~ 18 GHz	Horizontal	4.1 dB (The confidential level is 95 %, $k=2$)
		Vertical	4.2 dB (The confidential level is 95 %, $k=2$)

- End of Test Report -