

FCC/IC TEST REPORT

Job No. : GPEM2203000113EC
Applicant : iRevo-ASSA ABLOY Korea
Equipment Under Test (EUT) :
Product Name : Digital Door Lock
Model Name : YRD642-ACC
Alt. Model Name : YRD622-ACC, YRD622-ICK
FCC Authorization Type : Certification
Applied Standards : FCC Part 15 Subpart B, Class B
ICES-003 Issue 7:2020
FCC ID : 2ABFG-YRD642BLEV1
IC Certification : 11626A-YRD642BLEV1
Date of Receipt : February 9, 2022
Date of Test : May 3, 2022
Date of Issue : May 30, 2022
Test Results : Complied

Tested by

:



DoHyeon Lee

Reviewed by

:



Julia Choi

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.

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Revision History

Revision	Report number	Description
0	F690501-RF-EMC000649	Initial

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, Korea
Manufacturer	iRevo-ASSA ABLOY Korea
Manufacturer Address	10f of JEI PLATZ Bldg., 186, Gasandigital 1-ro, Geumcheon-gu, Seoul, 08502, Korea
Factory	ASSA ABLOY SMART PRODUCT VIETNAM CO., LTD.
Factory Address	Lot A10, Ba Thien 2 Industrial Park, Thien Ke Ward, Binh Xuyen District, Vinh Phuc Province, Vietnam

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
FCC Registration No.	KR0150
IC Registration No.	7837B
Phone	+ 82 31 548 0710
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1.3 General Information of E.U.T.

Classification	Specification
Product Name	Digital Door Lock
Model Name	YRD642-ACC
Alt. Model Name	YRD622-ACC, YRD622-ICK
Model Differences	- YRD 622-ACC removed 9V emergency power from YRD642-ACC and added cylinder key and related structures. - YRD622-ICK is the addition of mechanical handle and related structure to YRD 622-ACC.
Serial No.	None
EMI Classification	Class B
Test Voltage	DC 6 V (AA Battery 4 EA)
Rated Voltage	DC 6 V
Highest Internal Frequency	2 480 MHz (Bluetooth TX max. Freq.)
H/W Version	PV04
S/W Version	3.2.0
Function	This product is an electronic door locking equipment

1.4 Operating Modes and Conditions

Operating mode	Operating Condition
1) unlocking operation	Unlock to press a number.

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 (m)	Shield	
EUT	-	-	-	-	-	-

1.7 System Configurations

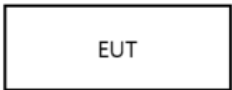
- Test Model : YRD642-ACC (Basic Model)

Description	Model	Serial No.	Manufacturer	Note
Main Board	WGA18 BLE MAIN PV04 220401	PC4M-D460B-E4	-	-
9V PCB Board	WGA18.7 BLE 9V PV01 220110	PC2B-D480B-E1	-	-
Motor	-	-	-	-
Speaker	-	-	-	-
Front Board	WGA18 BLE TS FRONT PV02 211110	PC4F-D460B-E2	-	-
NFC Antenna	ACCENTRA BLE WGA18 TENKEY-ANT PV01 200513	PC2K-D460B-F1	-	-

- Test Model : YRD622-ACC (Alt. Model)

Description	Model	Serial No.	Manufacturer	Note
Main Board	WGA18 BLE MAIN PV04 220401	PC4M-D460B-E4	-	-
Motor	-	-	-	-
Speaker	-	-	-	-
Front Board	WGA18 BLE TS FRONT PV02 211110	PC4F-D460B-E2	-	-
NFC Antenna	ACCENTRA BLE WGA18 TENKEY-ANT PV01 200513	PC2K-D460B-F1	-	-

1.8 Test System Layout

Test System Layout


1.9 Modifications/Notes

- There was no modified item during the test.
- The YRD622-ICK model was excluded from the EMC test because only the mechanical structure of the YRD622-ACC model is different and all other parts are the same.

1.10 Applicable Standards for Testing

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

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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 18 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(V9.26.01) 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	2023.02.18
Signal Conditioning Unit	SCU 18	R & S	10117	2022.06.09
Test Receiver	ESU26	R & S	100109	2023.01.18
Hybrid Antenna	VULB9163	SCHWARZBECK	01126	2023.02.07
Amplifier	8447F	HP	2944A03909	2022.08.06

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 21.6, Maximum 21.7) °C
Humidity	(Minimum 37.0, Maximum 38.0) % R.H.
Atmospheric Pressure	(Minimum 100.8, Maximum 100.8) kPa
Test Date	May 3, 2022

Above 1 GHz

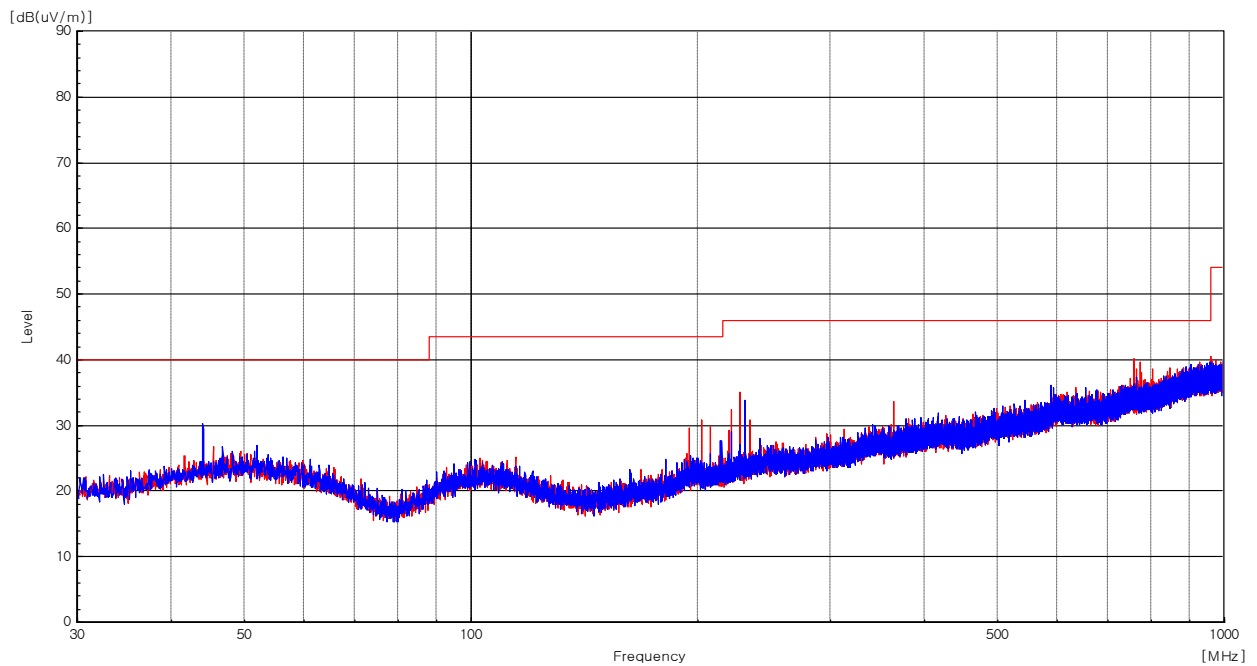
Temperature	(Minimum 21.6, Maximum 21.7) °C
Humidity	(Minimum 37.0, Maximum 38.0) % R.H.
Atmospheric Pressure	(Minimum 100.8, Maximum 100.8) kPa
Test Date	May 3, 2022

2.3.4 Test Results

Below 1 GHz (3 m method)

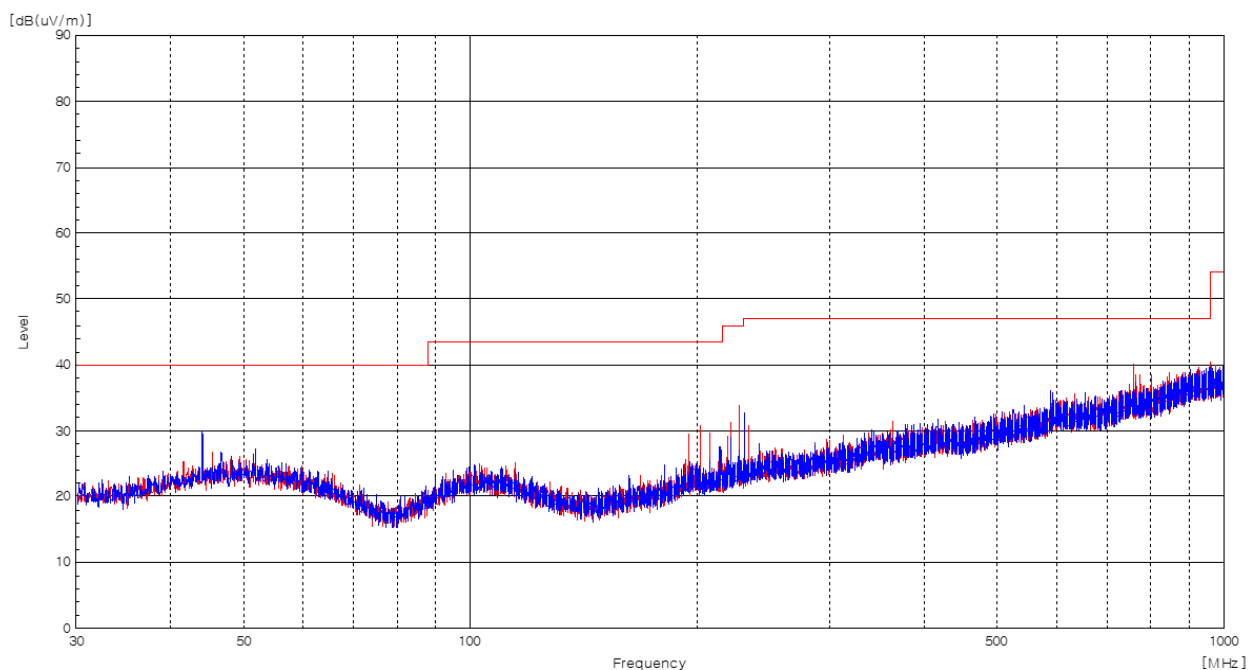
- Test Model : YRD642-ACC (Basic Model)

[FCC Part 15 Subpart B]



Freq. (MHz)	Reading (dBμV)	Pol. (H/V)	A (°)	H (cm)	AF (dB/m)	CL (dB)	Amp. (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
44.12	37.90	V	7	105	19.41	1.62	28.17	30.76	40.00	9.24
227.57	42.50	H	333	100	17.60	3.21	27.72	35.59	46.00	10.41
231.00	41.20	V	293	205	17.74	3.22	27.71	34.45	46.00	11.55
363.78	36.80	H	333	100	20.43	3.90	27.71	33.42	46.00	12.58
588.82	34.70	V	91	110	24.83	4.88	28.70	35.71	46.00	10.29
758.67	36.90	H	359	104	26.70	5.54	28.88	40.26	46.00	5.74

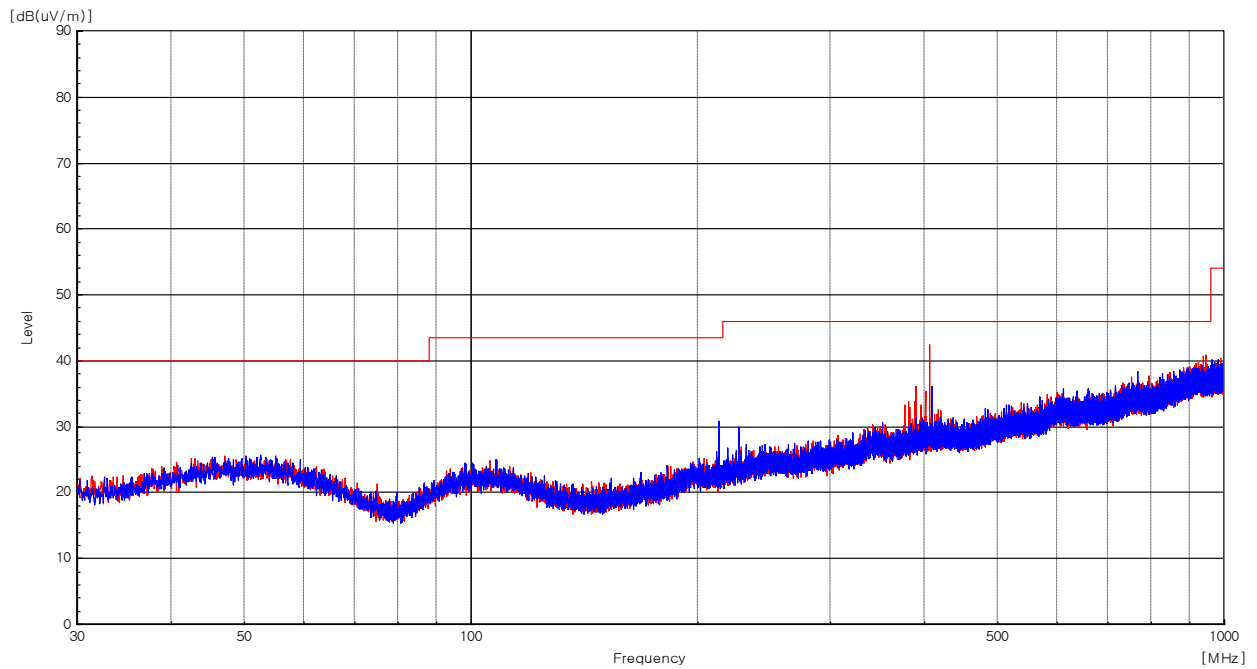
[ICES-003 Issue 7:2020]



Freq. (MHz)	Reading (dBμV)	Pol. (H/V)	A (°)	H (cm)	AF (dB/m)	CL (dB)	Amp. (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
44.15	37.50	V	7	100	19.42	1.62	28.17	30.37	40.00	9.63
227.14	41.70	H	333	111	17.59	3.21	27.72	34.78	46.00	11.22
228.98	41.50	V	293	195	17.66	3.21	27.71	34.66	46.00	11.34
231.45	41.20	V	293	200	17.76	3.23	27.71	34.48	46.00	11.52
588.48	33.80	V	91	100	24.81	4.88	28.70	34.79	46.00	11.21
758.11	35.00	H	359	109	26.70	5.54	28.88	38.36	46.00	7.64

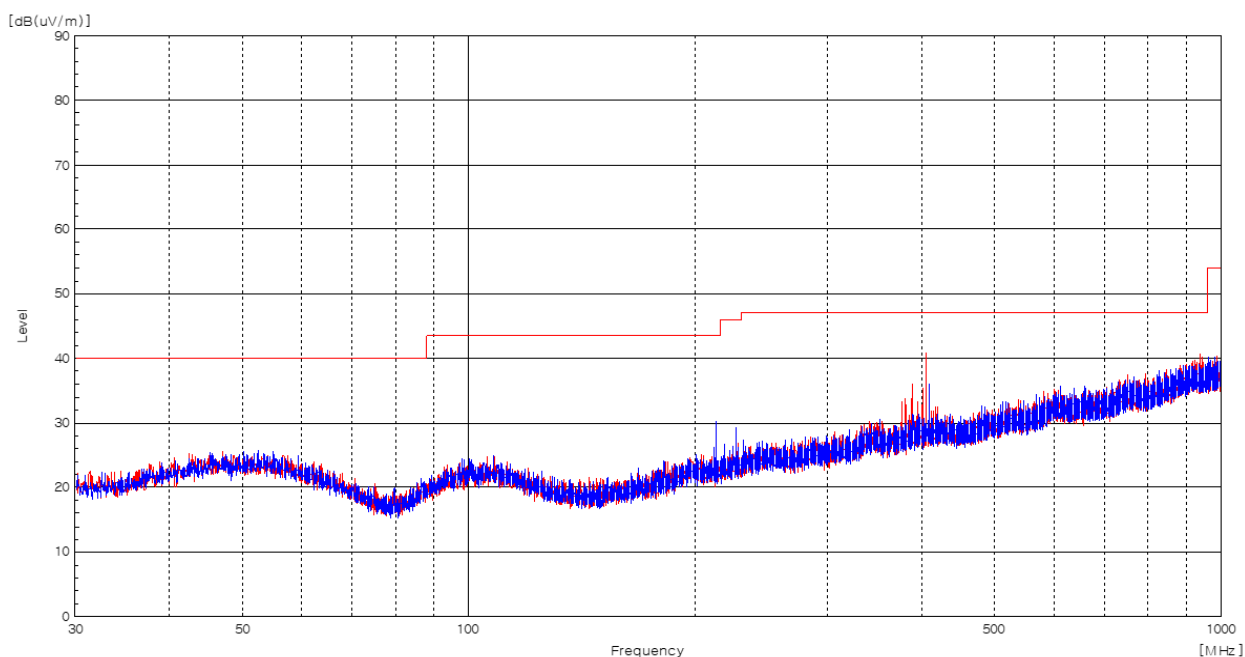
- Test Model : YRD622-ACC (Alt. Model)

[FCC Part 15 Subpart B]



Freq. (MHz)	Reading (dBμV)	Pol. (H/V)	A (°)	H (cm)	AF (dB/m)	CL (dB)	Amp. (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
47.00	32.00	H	134	104	19.70	1.69	28.19	25.21	40.00	14.80
213.89	37.70	V	358	200	16.86	3.12	27.76	29.92	43.50	13.58
226.10	36.20	V	215	198	17.54	3.20	27.72	29.22	46.00	16.78
406.84	43.10	H	295	100	21.74	4.12	28.05	40.91	46.00	5.09
600.75	32.80	H	4	200	25.32	4.88	28.70	34.30	46.00	11.70
767.00	34.80	V	215	207	26.60	5.55	28.87	38.08	46.00	7.92

[ICES-003 Issue 7:2020]



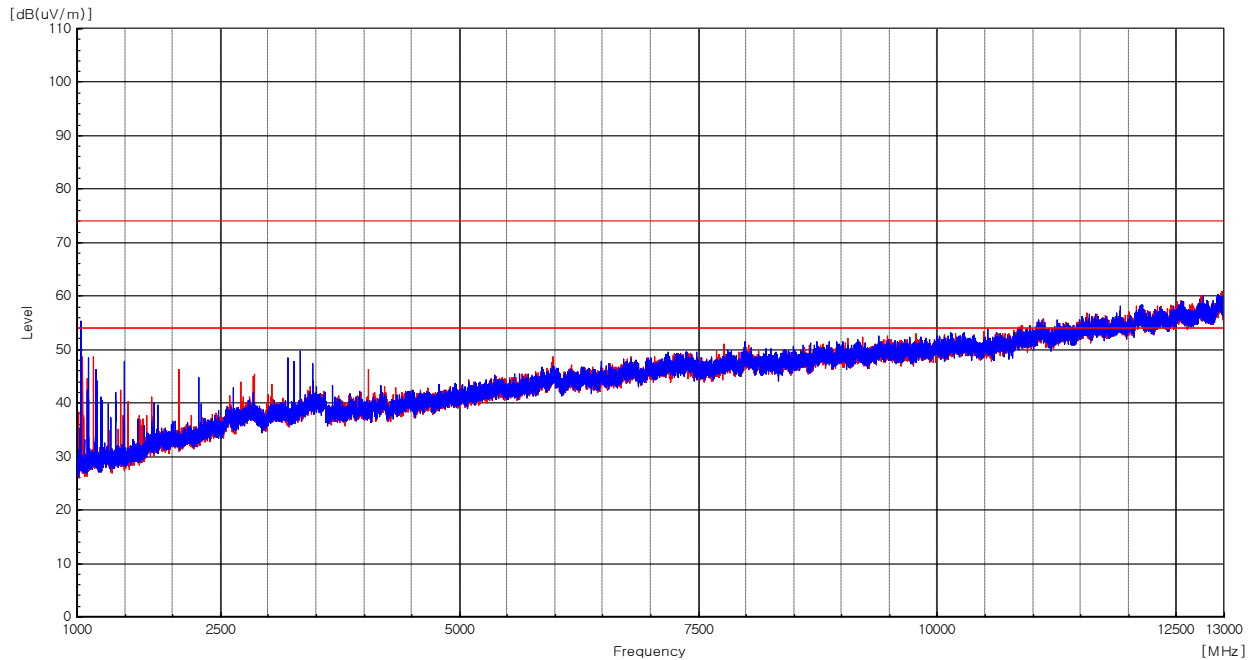
Freq. (MHz)	Reading (dBμV)	Pol. (H/V)	A (°)	H (cm)	AF (dB/m)	CL (dB)	Amp. (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
47.25	32.00	H	134	104	19.70	1.69	28.19	25.20	40.00	14.80
214.00	35.80	V	358	200	16.86	3.12	27.76	28.02	43.50	15.48
226.98	35.00	V	215	198	17.58	3.21	27.72	28.07	46.00	17.93
407.00	39.80	H	295	100	21.74	4.13	28.06	37.61	46.00	8.39
601.20	32.40	H	4	200	25.32	4.88	28.70	33.90	46.00	12.10
767.58	34.50	V	215	207	26.60	5.55	28.86	37.79	46.00	8.21

Measurement Uncertainty :See the Appendix A

- Note:
- AF = Antenna Factor
 - Pol. H = Horizontal
 - H = Height
 - CL = Cable Loss
 - Pol. V = Vertical
 - Margin = Limit – Result
 - Amp. = Amplifier Gain
 - A = Angle
 - F/S = Level + AF + CL – AMP

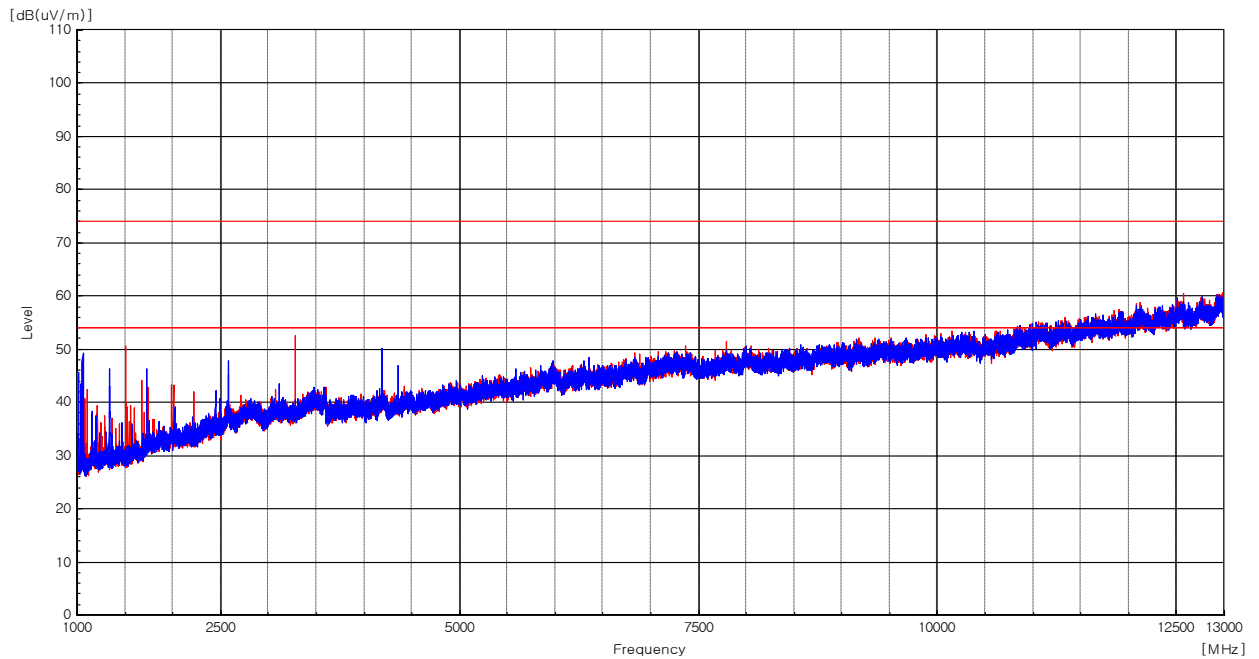
Above 1 GHz (1 GHz - 18 GHz)(3 m method)

- Test Model : YRD642-ACC (Basic Model)



Freq. (MHz)	Level (dBμV)		Pol. (H/V)	A (°)	H (cm)	AF (dB)	CL (dB)	Amp. (dB)	CF (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Peak	C-AV										
1 036.80	72.50	-	V	205	107	24.32	6.95	45.54	0.00	58.23	74.00	15.77
1 036.80	-	33.00	V	205	107	24.32	6.95	45.54	0.00	18.73	54.00	35.27
1 172.80	71.00	-	H	185	100	25.18	7.45	45.34	0.00	58.29	74.00	15.71
1 172.80	-	31.20	H	185	100	25.18	7.45	45.34	0.00	18.49	54.00	35.51
3 332.80	52.50	-	V	228	112	30.70	12.51	45.50	0.00	50.21	74.00	23.79
3 332.80	-	29.50	V	228	112	30.70	12.51	45.50	0.00	27.21	54.00	26.79
4 042.00	46.20	-	H	137	109	32.00	14.31	43.00	0.00	49.51	74.00	24.49
4 042.00	-	29.10	H	137	109	32.00	14.31	43.00	0.00	32.41	54.00	21.59
11 557.20	38.90	-	H	91	100	38.70	25.82	43.72	0.00	59.70	74.00	14.30
11 557.20	-	27.80	H	91	100	38.70	25.82	43.72	0.00	48.60	54.00	5.40
11 881.00	35.10	-	V	153	110	38.50	25.77	43.85	0.00	55.52	74.00	18.48
11 881.00	-	28.00	V	153	110	38.50	25.77	43.85	0.00	48.42	54.00	5.58

- Test Model : YRD622-ACC (Alt. Model)



Freq. (MHz)	Level (dBμV)		Pol. (H/V)	A (°)	H (cm)	AF (dB)	CL (dB)	Amp. (dB)	CF (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Peak	C-AV										
1 058.20	70.50	-	V	205	110	24.43	7.01	45.51	0.00	56.43	74.00	17.57
1 058.20	-	32.70	V	205	110	24.43	7.01	45.51	0.00	18.63	54.00	35.37
1 507.25	71.50	-	H	205	100	24.97	8.52	45.55	0.00	59.44	74.00	14.56
1 507.25	-	33.10	H	205	100	24.97	8.52	45.55	0.00	21.04	54.00	32.96
3 285.00	59.20	-	H	283	104	30.26	12.29	45.28	0.00	56.47	74.00	17.53
3 285.00	-	33.00	H	283	104	30.26	12.29	45.28	0.00	30.27	54.00	23.73
4 192.50	54.00	-	V	205	100	32.00	15.37	43.00	0.00	58.37	74.00	15.63
4 192.50	-	32.40	V	205	100	32.00	15.37	43.00	0.00	36.77	54.00	17.23
11 897.21	38.80	-	H	295	111	38.50	25.77	43.86	0.00	59.21	74.00	14.79
11 897.21	-	28.00	H	295	111	38.50	25.77	43.86	0.00	48.41	54.00	5.59
11 906.20	38.40	-	V	290	100	38.50	26.46	43.86	0.00	59.50	74.00	14.50
11 906.20	-	27.80	V	290	100	38.50	26.46	43.86	0.00	48.90	54.00	5.10

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/S = Level + AF + CL – Amp.

• H: Height

• F/S = Field Strength

• Amp. = Amplifier Gain

Appendix A : Measurement Uncertainty

- Giheung Laboratory

Test Method		Measurement Uncertainty	
Conducted Emission		ENV216	3.5 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	3.2 dB (The confidential level is 95 %, $k=2$)
Conducted Emission - Signal		ISN T800	5.6 dB (The confidential level is 95 %, $k=2$)
		ISNT8-Cat6	5.4 dB (The confidential level is 95 %, $k=2$)
		ISN S751	5.6 dB (The confidential level is 95 %, $k=2$)
Discontinuous		3.4 dB (The confidential level is 95 %, $k=2$)	
Disturbance Voltage at Antenna Terminal		2.0 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	4.4 dB (The confidential level is 95 %, $k=2$)
		Vertical	4.6 dB (The confidential level is 95 %, $k=2$)
	1 GHz ~ 18 GHz	Horizontal	4.0 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	3.4 dB (The confidential level is 95 %, $k=2$)
		ESH2-Z5	3.2 dB (The confidential level is 95 %, $k=2$)
		ESH3-Z6	3.4 dB (The confidential level is 95 %, $k=2$)
Conducted Emission - Signal		ISN T800	5.6 dB (The confidential level is 95 %, $k=2$)
		ISNT8-Cat6	5.6 dB (The confidential level is 95 %, $k=2$)
		ISN S751	7.3 dB (The confidential level is 95 %, $k=2$)
Disturbance Voltage at Antenna Terminal		2.4 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	4.8 dB (The confidential level is 95 %, $k=2$)
		Vertical	5.2 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 %, $k=2$)

- Dongtan Laboratory

Test Method		Measurement Uncertainty	
Conducted Emission	ENV216	3.4 dB (The confidential level is 95 %, $k=2$)	
	ESH2-Z5	3.1 dB (The confidential level is 95 %, $k=2$)	
	ESH3-Z6	3.1 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	5.4 dB (The confidential level is 95 %, $k=2$)	
	ISN S751	5.6 dB (The confidential level is 95 %, $k=2$)	
Discontinuous		3.1 dB (The confidential level is 95 %, $k=2$)	
disturbance Power		3.0 dB (The confidential level is 95 %, $k=2$)	
Radiated Emission	9 kHz ~30 MHz (Triple Loop Ant)	2.7 dB (The confidential level is 95 %, $k=2$)	
	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	4.7 dB (The confidential level is 95 %, $k=2$)
		Vertical	4.7 dB (The confidential level is 95 %, $k=2$)
	1 GHz ~ 18 GHz	Horizontal	4.0 dB (The confidential level is 95 %, $k=2$)
		Vertical	4.0 dB (The confidential level is 95 %, $k=2$)

- End of Test Report -