SGS Korea Co., Ltd.
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TEST REPORT

of

FCC Part 15 Subpart C §15.225
RSS-210 Issue 10, RSS-Gen Issue 5

FCC ID: 2ABFG-YRD642BLEV1
IC Certification: 11626A-YRD642BLEV1

Equipment Under Test	:	Digital Door Lock
Model Name	:	YRD642-ACC
Variant Model Name(s)	:	Refer to the page 3
Applicant	:	iRevo-ASSA ABLOY Korea
Manufacturer	:	iRevo-ASSA ABLOY Korea
Date of Receipt	:	2022.03.07
Date of Test(s)	:	2022.03.18 ~ 2022.05.12
Date of Issue	:	2022.05.13

In the configuration tested, the EUT complied with the standards specified above. 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.
3) This test report cannot be reproduced, except in full, without prior written permission of the Company.
4) The data marked ※ in this report was provided by the customer and may affect the validity of the test results.
We are responsible for all the information of this test report except for the data(※) provided by the customer.

Tested by: **Murphy Kim**

Technical Manager: **Jinhyoung Cho**

SGS Korea Co., Ltd. Gunpo Laboratory

INDEX

Table of contents

1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

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1.2. Details of Applicant

Applicant : iRevo-ASSA ABLOY Korea
Address : 10f of JEI PLATZ Bldg., 186, Gasandigital 1-ro, Geumcheon-gu, Seoul, South Korea, 08502
Contact Person : Soo-kyung, Jang
Phone No. : +82 2 2107 5741

1.3. Details of manufacturer

Company : Same as applicant
Address : Same as applicant

1.4. Description of EUT

Kind of Product	Digital Door Lock
Model Name	YRD642-ACC
Variant Model Names	YRD622-ACC, YRD622-ICK
Serial Number	Basic Model: QJVM0001287 Variant Model: 4MVM0001380
Power Supply	DC 6.0 V
Frequency Range	13.56 ㎒ (NFC)
Modulation Technique	ASK
Number of Channels	1 channel
Antenna Type	FPCB antenna
H/W Version	PV04
S/W Version	3.2.0

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Signal Generator	R&S	SMBV100A	255834	May 31, 2021	Annual	May 31, 2022
Spectrum Analyzer	R&S	FSV30	103210	Dec. 08, 2021	Annual	Dec. 08, 2022
Spectrum Analyzer	Agilent	N9020A	MY53421758	Aug. 27, 2021	Annual	Aug. 27, 2022
DC Power Supply	Agilent	U8002A	MY50020026	Dec. 01, 2021	Annual	Dec. 01, 2022
Temperature Chamber	ESPEC CORP.	SH-662	93000533	Jul. 15, 2021	Annual	Jul. 15, 2022
Preamplifier	H.P.	8447F	2944A03909	Aug. 06, 2021	Annual	Aug. 06, 2022
Loop Antenna	Schwarzbeck Mess-Elektronik	FMZB 1519	1519-039	Aug. 23, 2021	Biennial	Aug. 23, 2023
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB 9163	01126	Feb. 07, 2022	Annual	Feb. 07, 2023
EMI Test Receiver	R&S	ESU26	100109	Jan. 18, 2022	Annual	Jan. 18, 2023
Turn Table	Innco systems GmbH	DS 1200 S	N/A	N.C.R.	N/A	N.C.R.
Controller	Innco systems GmbH	CONTROLLER CO3000-4P	CO3000/963/38 330516/L	N.C.R.	N/A	N.C.R.
Antenna Mast	Innco systems GmbH	MA4640-XP-ET	MA4640/536/38 330516/L	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	N/A	N.C.R.	N/A	N.C.R.
Coaxial Cable	RFONE	MWX221-NMSNMS (4 m)	J1023142	Apr. 04, 2022	Semi-Annual	Oct. 04, 2022
Coaxial Cable	micro-coax UTiflex	142A SERIES 502839-8 (10 m)	90000034	Apr. 04, 2022	Semi-Annual	Oct. 04, 2022

1.6. Summary of Test Results

The EUT has been tested according to the following specifications:

Applied standard : FCC Part15 subpart C, IC RSS-210 Issue 10, RSS-Gen Issue 5			
Section in FCC	**Section in IC**	**Test item(s)**	**Result**
15.225(a)(b)(c)(d) 15.209	RSS-210 Issue 10 B.6 RSS-Gen Issue 5 8.9	Radiated Emission, Spurious Emission and Field Strength of Fundamental	Complied
15.225(e)	RSS-210 Issue 10 B.6 RSS-Gen Issue 5 6.11	Frequency Stability	Complied
15.215(c)	RSS-Gen Issue 5 6.7	20 dB Bandwidth & 99 % Bandwidth	Complied
15.207	RSS-Gen Issue 5 8.8	AC Power Line Conducted Emissions	N/A[1)]

Note;

1) The AC power line test was not performed because the EUT use battery power for operation and which do not operate from the AC power lines.

1.7. Sample calculation

Where relevant, the following sample calculation is provided:

1.7.1. Radiation test

Field strength level (dBμV/m) = Measured level (dBμV) + Antenna factor (dB) + Cable loss (dB) - amplifier (dB)

1.8. Information of software for test.

Using the software of Internal to testing of EUT.

1.9. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty	
Occupied Bandwidth	13.12 kHz	
Radiated Emission, 9 kHz to 30 MHz	H	3.66 dB
	V	3.66 dB
Radiated Emission, below 1 GHz	H	4.90 dB
	V	4.82 dB

All measurement uncertainty values are shown with a coverage factor *k* = 2 to indicate a 95 % level of confidence.

1.10. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501-RF-RTL003126	2022.05.13	Initial

1.11. Description of Variant Models

Model name		Description
Basic model	YRD642-ACC	- Basic model
Variant models	YRD622-ACC	- Same to basic model except below - Deleted 9V emergency power, added cylinder key and related structures
	YRD622-ICK	- Same to basic model except below - Added mechanical handles and related structures

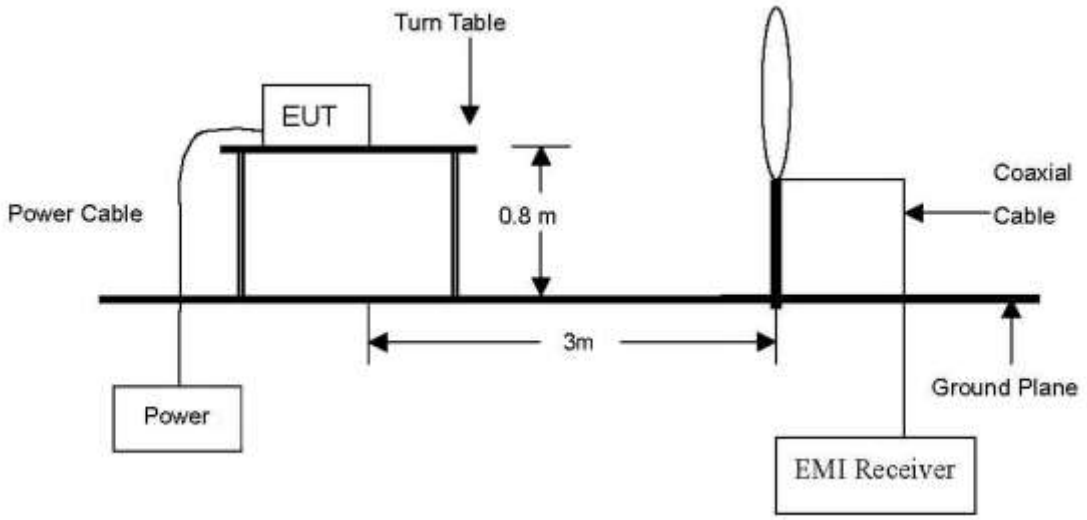
Note;

All the test was performed with basic model and variant model(YRD622-ACC).

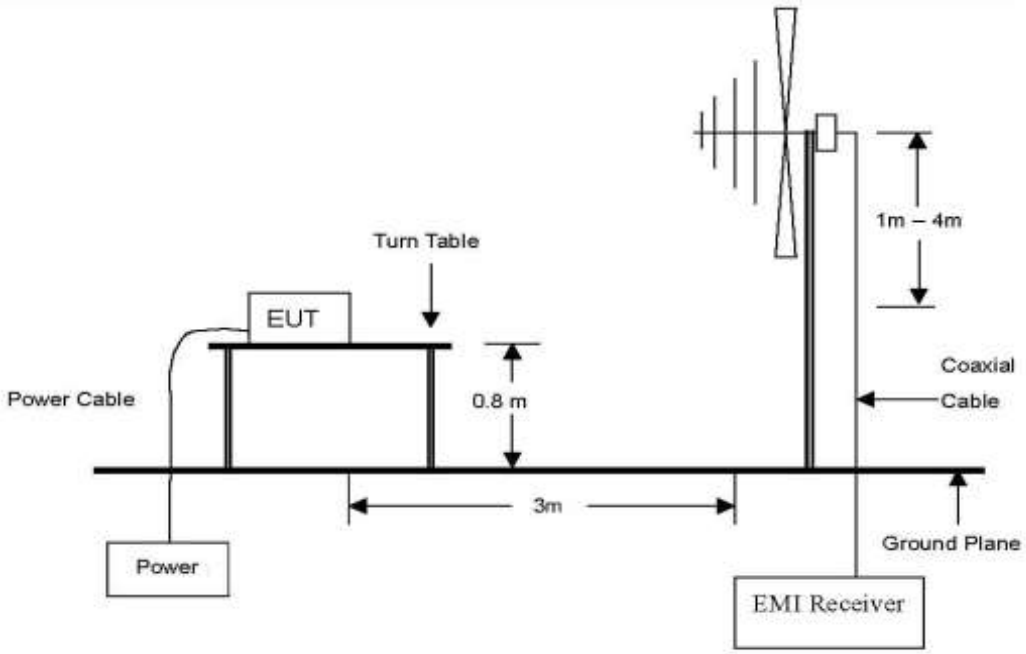
2. Radiated Emissions

2.1. Test Setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒ Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 000 ㎒ Emissions.



2.2. Limit

FCC

According to §15.225,

(a) The field strength of any emissions within the band 13.553-13.567 ㎒ shall not exceed 15 848 microvolts/meter at 30 meters.

(b) Within the bands 13.410-13.553 ㎒ and 13.567-13.710 ㎒, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110-13.410 ㎒ and 13.710-14.010 ㎒ the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110-14.010 ㎒ band shall not exceed the general radiated emission limits in §15.209.

According to §15.209,

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (㎒)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009-0.490	2400/F(㎑)	300
0.490-1.705	24000/F(㎑)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 ㎒, 76-88 ㎒, 174-216 ㎒ or 470-806 ㎒. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

IC

According to RSS-210 Issue 10, B.6

The field strength of any emission shall not exceed the following limits:

(a) 15.848 millivolts/m (84 dBμV/m) at 30 m, within the band 13.553-13.567 MHz.

(b) 334 microvolts/m (50.5 dBμV/m) at 30 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz.

(c) 106 microvolts/m (40.5 dBμV/m) at 30 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz.

(d) RSS-Gen general field strength limits for frequencies outside the band 13.110-14.010 MHz.

According to RSS-Gen Issue 5, 8.9

Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

Table 5 - General field strength limits at frequencies above 30 MHz

Frequency (MHz)	Field Strength (μV/m at 3 m)
30-88	100
88-216	150
216-960	200
Above 960	500

Table 6 - General field strength limits at frequencies below 30 MHz

Frequency	Magnetic Field Strength (H-Field) (μA/m)	Measurement Distance (m)
9-490 kHz [1]	6.37/F (F in kHz)	300
490-1 705 kHz	63.7/F (F in kHz)	30
1.705-30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

2.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.10-2013.

2.3.1. Test Procedures for emission below 30 ㎒

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
3. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test-receiver system was set to Quasi peak Detect Function with Maximum Hold Mode.

2.3.2. Test Procedures for emission above 30 ㎒

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 ㎓, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna is a bi-log antenna and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. For measurements below 1 ㎓ resolution bandwidth is set to 100 ㎑ for peak detection measurements or 120 ㎑ for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Note;

The test orthogonal plan of EUT was investigated with three axis described in the test setup photo.
The Z-axis was worst-case, all radiated testing of EUT was performed with **Z–axis**.

2.4. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

The following table shows the highest levels of radiated emissions.

- Basic model

- Fundamental within the band 13.553 ㎒ - 13.567 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. Factor (dB/m)	Cable loss (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 30 m	Limit (dB㎶/m) at 30 m	Margin (dB)
13.560	36.22	Peak	H	19.00	0.58	55.80	15.80	84.00	68.20

- Spurious emission within the bands 13.410 ㎒ - 13.553 ㎒ and 13.567 ㎒ - 13.710 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. Factor (dB/m)	Cable loss (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 30 m	Limit (dB㎶/m) at 30 m	Margin (dB)
13.553	29.84	Peak	H	19.00	0.58	49.42	9.42	50.47	41.05
13.567	30.47	Peak	H	19.00	0.58	50.05	10.05	50.47	40.42

- Spurious emission within the bands 13.110 ㎒ - 13.410 ㎒ and 13.710 ㎒ - 14.010 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. Factor (dB/m)	Cable loss (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 30 m	Limit (dB㎶/m) at 30 m	Margin (dB)
13.322	9.41	Peak	H	19.00	0.58	28.99	-11.01	40.51	51.52
*13.389	8.97	Peak	H	19.00	0.58	28.55	-11.45	29.54	40.99
13.767	8.69	Peak	H	19.00	0.58	28.27	-11.73	40.51	52.24

- Spurious emission within the bands 9 ㎑ - 13.110 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. Factor (dB/m)	Cable loss (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 30 or 300 m	Limit (dB㎶/m) at 30 or 300 m	Margin (dB)
*12.292	8.35	Peak	H	19.00	0.58	27.93	-12.07	29.54	41.61
Above 13.000	Not detected								

- Spurious emission within the bands 14.010 ㎒ - 30 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. Factor (dB/m)	Cable loss (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 30 m	Limit (dB㎶/m) at 30 m	Margin (dB)
*16.420	7.05	Peak	H	19.23	0.58	26.86	-13.14	29.54	42.68
20.310	8.86	Peak	H	19.76	0.60	29.22	-10.78	29.54	40.32
*25.550	8.68	Peak	H	19.20	0.73	28.61	-11.39	29.54	40.93
Above 26.000	Not detected	-	-	-	-	-	-	-	-

Remark;

1. Fundamental limit (㎶/m) = 20 log(15 848) = 84.00 dB㎶/m.
2. 30 m distance compensation = 40 log(3/30) = -40 dB㎶/m.
3. 300 m distance compensation = 40 log(3/300) = -80 dB㎶/m.
4. "*" means the restricted band.
5. If the spurious emissions are in the restricted band, the limit complied with §15.209.
6. All data were recorded using a spectrum analyzer employing a peak detector.
   If PK results were meet Quasi-peak limit, Quasi-peak measurements were omitted.

- Spurious emission above 30 ㎒

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Freq. (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. Factor (dB/m)	AMP + CL (dB)	Actual (dB㎶/m) at 3 m	Limit (dB㎶/m) at 3 m	Margin (dB)
47.22	28.90	Peak	V	19.70	-26.98	21.62	40.00	18.38
60.19	29.00	Peak	H	18.26	-26.93	20.33	40.00	19.67
683.50	31.00	Peak	V	25.30	-24.97	**31.33**	46.00	14.67
Above 700.00	Not detected	-	-	-	-	-	-	-

Remark;

1. Radiated spurious emission measurement as below.
   (Actual = Reading + Antenna Factor + Amp + CL)
2. According to §15.31(o), emission levels are not report much lower than the limits by over 20 dB.

- Variant model (YRD622-ACC)

- Fundamental within the band 13.553 ㎒ - 13.567 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. Factor (dB/m)	Cable loss (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 30 m	Limit (dB㎶/m) at 30 m	Margin (dB)
13.560	34.42	Peak	H	19.00	0.58	54.00	14.00	84.00	70.00

- Spurious emission within the bands 13.410 ㎒ - 13.553 ㎒ and 13.567 ㎒ - 13.710 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. Factor (dB/m)	Cable loss (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 30 m	Limit (dB㎶/m) at 30 m	Margin (dB)
13.553	28.60	Peak	H	19.00	0.58	48.18	8.18	50.47	42.29
13.567	29.18	Peak	H	19.00	0.58	48.76	8.76	50.47	41.71

- Spurious emission within the bands 13.110 ㎒ - 13.410 ㎒ and 13.710 ㎒ - 14.010 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. Factor (dB/m)	Cable loss (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 30 m	Limit (dB㎶/m) at 30 m	Margin (dB)
13.382	8.60	Peak	H	19.00	0.58	28.18	-11.82	40.51	52.33
*13.383	9.26	Peak	H	19.00	0.58	28.84	-11.16	29.54	40.70
13.926	8.43	Peak	H	19.00	0.58	28.01	-11.99	40.51	52.50

- Spurious emission within the bands 9 ㎑ - 13.110 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. Factor (dB/m)	Cable loss (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 30 or 300 m	Limit (dB㎶/m) at 30 or 300 m	Margin (dB)
*12.292	8.27	Peak	H	19.00	0.58	27.85	-12.15	29.54	41.69
Above 13.000	Not detected								

- Spurious emission within the bands 14.010 ㎒ - 30 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. Factor (dB/m)	Cable loss (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 30 m	Limit (dB㎶/m) at 30 m	Margin (dB)
14.266	9.34	Peak	H	19.00	0.58	28.92	-11.08	29.54	40.62
*16.420	7.05	Peak	H	19.23	0.58	26.86	-13.14	29.54	42.68
*25.630	7.72	Peak	H	19.20	0.73	27.65	-12.35	29.54	41.89
Above 26.000	Not detected	-	-	-	-	-	-	-	-

Remark;

1. Fundamental limit (㎶/m) = 20 log(15 848) = 84.00 dB㎶/m.
2. 30 m distance compensation = 40 log(3/30) = -40 dB㎶/m.
3. 300 m distance compensation = 40 log(3/300) = -80 dB㎶/m.
4. "*" means the restricted band.
5. If the spurious emissions are in the restricted band, the limit complied with §15.209.
6. All data were recorded using a spectrum analyzer employing a peak detector.
   If PK results were meet Quasi-peak limit, Quasi-peak measurements were omitted.

- Spurious emission above 30 ㎒

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Freq. (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. Factor (dB/m)	AMP + CL (dB)	Actual (dB㎶/m) at 3 m	Limit (dB㎶/m) at 3 m	Margin (dB)
54.94	28.20	Peak	V	19.31	-26.95	20.56	40.00	19.44
595.79	30.70	Peak	H	25.13	-24.96	30.87	46.00	15.13
915.81	31.10	Peak	V	28.30	-23.80	**35.60**	46.00	10.40

Remark;

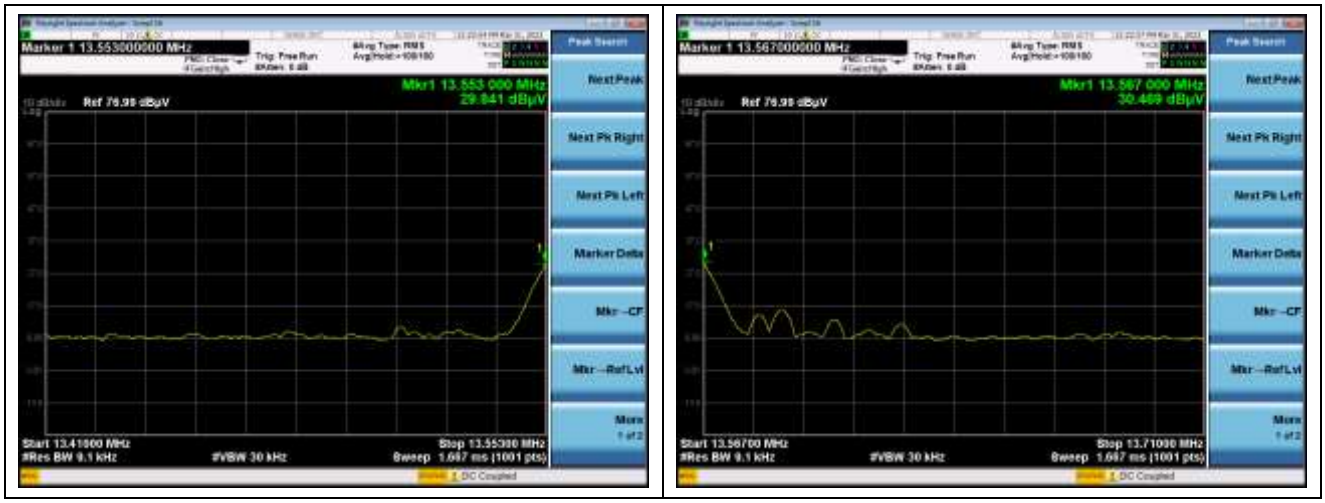
1. Radiated spurious emission measurement as below.
   (Actual = Reading + Antenna Factor + Amp + CL)
2. According to §15.31(o), emission levels are not report much lower than the limits by over 20 ㏈.

Test plots

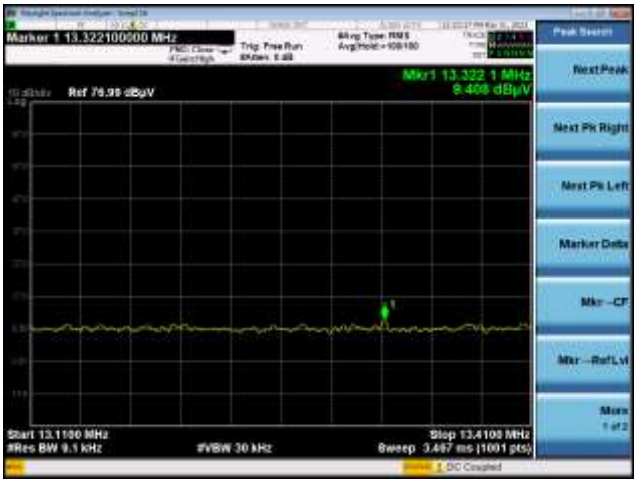
- Basic Model

- Fundamental within the band 13.553 ㎒ - 13.567 ㎒

- Spurious emission within the bands 13.410 ㎒ - 13.553 ㎒ and 13.567 ㎒ - 13.710 ㎒



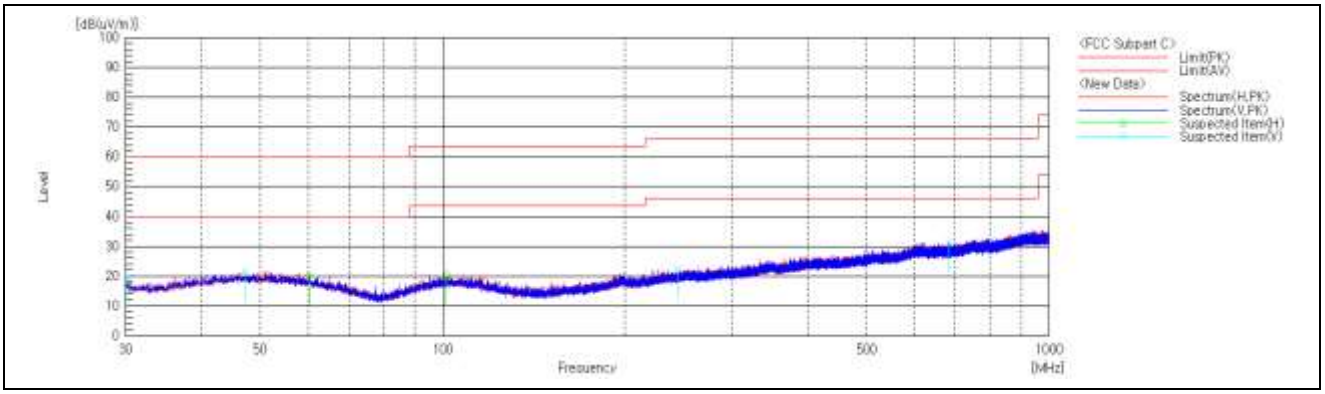
- Spurious emission within the bands 13.110 ㎒ - 13.410 ㎒ and 13.710 ㎒ - 14.010 ㎒



- Spurious emission within the bands 9 ㎑ – 13.110 ㎒

- Spurious emission within the bands 14.010 ㎒ – 30 ㎒

- Spurious emission above 30 ㎒

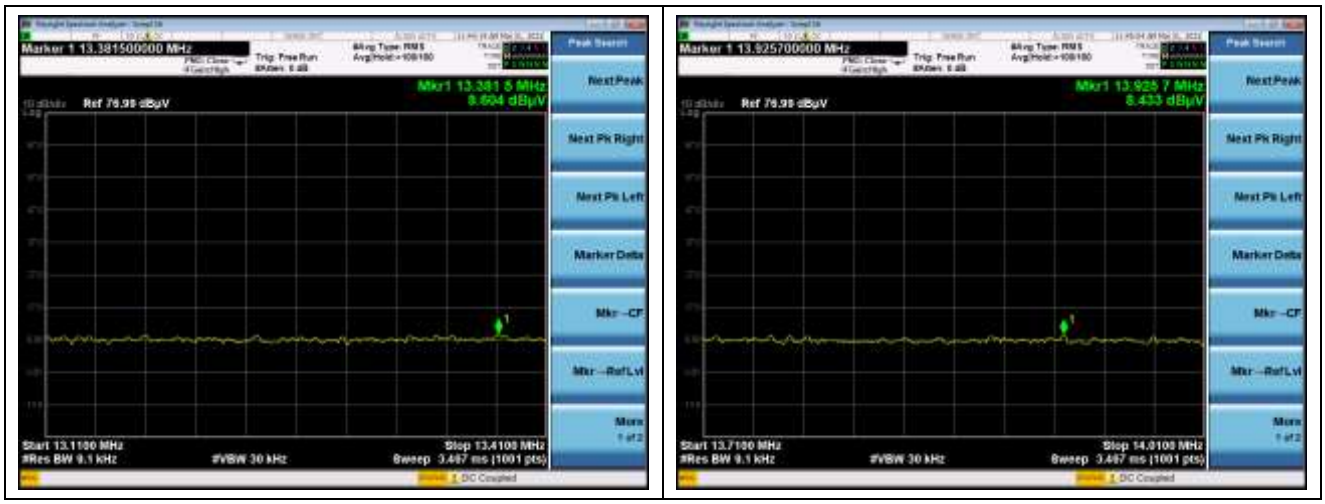


- Variant Model (YRD622-ACC)

- Fundamental within the band 13.553 ㎒ - 13.567 ㎒

- Spurious emission within the bands 13.410 ㎒ - 13.553 ㎒ and 13.567 ㎒ - 13.710 ㎒

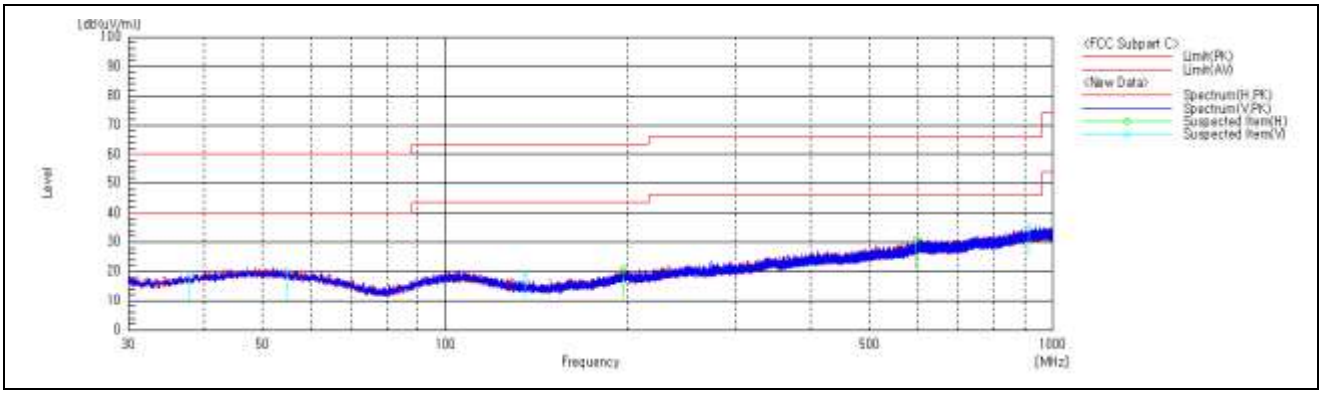
- Spurious emission within the bands 13.110 ㎒ - 13.410 ㎒ and 13.710 ㎒ - 14.010 ㎒



- Spurious emission within the bands 9 ㎑ – 13.110 ㎒

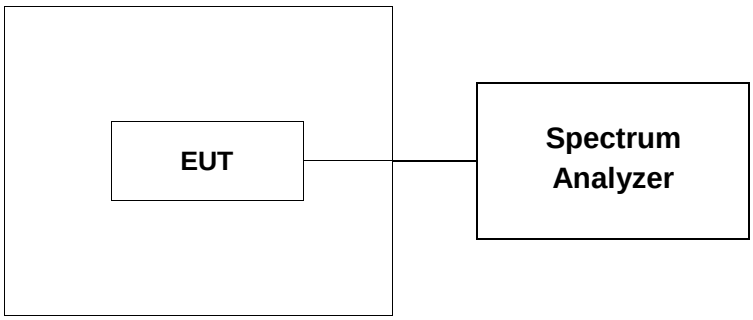
- Spurious emission within the bands 14.010 ㎒ – 30 ㎒

- Spurious emission above 30 ㎒



3. Frequency Stability

3.1. Test Setup



3.2. Limit

FCC

According to §15.225(e), the frequency tolerance of the carrier signal shall be maintained within ± 0.01 % of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85 % to 115 % of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

IC

According to RSS-210, Annex B, Section B.6
Carrier frequency stability shall be maintained to ± 0.01 % (±100 ppm).

3.3. Test Procedures

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the environment into appropriate environment.
4. Set the spectrum analyzer as RBW = 100 ㎐, VBW = 100 ㎐, Span = 10 ㎑, Sweep time = auto.
5. Mark the peak frequency and measure the frequency tolerance using frequency counter function.
6. Repeat until all the results are investigated.

3.4. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Operating Frequency : 13 560 000 Hz
Deviation Limit : ± 0.01 % = ± 1 356 Hz

- Basic model

Startup

Temperature Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
6	-20	13 560 085	85	0.000 627
	-10	13 560 080	80	0.000 590
	0	13 560 065	65	0.000 479
	+10	13 560 060	60	0.000 442
	+20	13 560 010	10	0.000 074
	+30	13 560 005	5	0.000 037
	+40	13 559 995	-5	-0.000 037
	+50	13 560 005	5	0.000 037

Voltage Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
115 % (6.90)	+20	13 560 085	85	0.000 627
85 % (5.10)	+20	13 560 085	85	0.000 627

2 minutes

Temperature Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
6	-20	13 560 080	80	0.000 590
	-10	13 560 080	80	0.000 590
	0	13 560 065	65	0.000 479
	+10	13 560 060	60	0.000 442
	+20	13 560 015	15	0.000 111
	+30	13 560 010	10	0.000 074
	+40	13 560 000	0	0.000 000
	+50	13 560 000	0	0.000 000

Voltage Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
115 % (6.90)	+20	13 560 085	85	0.000 627
85 % (5.10)	+20	13 560 080	80	0.000 590

5 minutes

Temperature Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
6	-20	13 560 080	80	0.000 590
	-10	13 560 085	85	0.000 627
	0	13 560 070	70	0.000 516
	+10	13 560 065	65	0.000 479
	+20	13 560 010	10	0.000 074
	+30	13 560 005	5	0.000 037
	+40	13 560 000	0	0.000 000
	+50	13 560 000	0	0.000 000

Voltage Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
115 % (6.90)	+20	13 560 085	85	0.000 627
85 % (5.10)	+20	13 560 085	85	0.000 627

10 minutes

Temperature Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
6	-20	13 560 080	80	0.000 590
	-10	13 560 085	85	0.000 627
	0	13 560 070	70	0.000 516
	+10	13 560 060	60	0.000 442
	+20	13 560 015	15	0.000 111
	+30	13 560 000	0	0.000 000
	+40	13 560 000	0	0.000 000
	+50	13 560 000	0	0.000 000

Voltage Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
115 % (6.90)	+20	13 560 085	85	0.000 627
85 % (5.10)	+20	13 560 080	80	0.000 590

- Variant model (YRD622-ACC)

Startup

Temperature Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
6	-20	13 560 025	25	0.000 184
	-10	13 560 020	20	0.000 147
	0	13 559 990	-10	-0.000 074
	+10	13 559 975	-25	-0.000 184
	+20	13 559 970	-30	-0.000 221
	+30	13 559 970	-30	-0.000 221
	+40	13 559 975	-25	-0.000 184
	+50	13 559 990	-10	-0.000 074

Voltage Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
115 % (6.90)	+20	13 559 995	-5	-0.000 037
85 % (5.10)	+20	13 560 000	0	0.000 000

2 minutes

Temperature Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
6	-20	13 560 030	30	0.000 221
	-10	13 560 020	20	0.000 147
	0	13 559 990	-10	-0.000 074
	+10	13 559 975	-25	-0.000 184
	+20	13 560 005	5	0.000 037
	+30	13 559 970	-30	-0.000 221
	+40	13 559 975	-25	-0.000 184
	+50	13 559 985	-15	-0.000 111

Voltage Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
115 % (6.90)	+20	13 559 995	-5	-0.000 037
85 % (5.10)	+20	13 560 000	0	0.000 000

5 minutes

Temperature Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
6	-20	13 560 030	30	0.000 221
	-10	13 560 020	20	0.000 147
	0	13 559 990	-10	-0.000 074
	+10	13 559 980	-20	-0.000 147
	+20	13 559 970	-30	-0.000 221
	+30	13 559 970	-30	-0.000 221
	+40	13 559 970	-30	-0.000 221
	+50	13 559 980	-20	-0.000 147

Voltage Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
115 % (6.90)	+20	13 559 995	-5	-0.000 037
85 % (5.10)	+20	13 560 000	0	0.000 000

10 minutes

Temperature Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
6	-20	13 560 030	30	0.000 221
	-10	13 560 020	20	0.000 147
	0	13 559 995	-5	-0.000 037
	+10	13 559 980	-20	-0.000 147
	+20	13 559 995	-5	-0.000 037
	+30	13 559 970	-30	-0.000 221
	+40	13 559 970	-30	-0.000 221
	+50	13 559 980	-20	-0.000 147

Voltage Variations

Power ($V_{d.c}$)	Temperature (℃)	Frequency (㎐)	Freq. Dev. (㎐)	Deviation (%)
115 % (6.90)	+20	13 560 000	0	0.000 000
85 % (5.10)	+20	13 560 000	0	0.000 000

4. 20 dB Bandwidth & 99 % Bandwidth

4.1. Test Setup

4.2. Limit

None; for reporting purposes only.

4.3. Test Procedures

20 dB Bandwidth

1. Span = set to capture all products of the modulation process, including the emission skirts. RBW = 200 Hz, VBW = 200 Hz, Sweep = auto, Detector = peak, Trace = max hold.
2. The marker-to-peak function to set the mark to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is 20 dB bandwidth of the emission.

99 % Bandwidth

1. Set the spectrum analyzer as Span = set to capture all products of the modulation process, including the emission skirts, RBW = 200 Hz, VBW = 200 Hz, Detector = sampling, Trace mode = max hold.
2. Measure lowest and highest frequencies are placed in a running sum until 0.5 % and 99.5 % of the total is reached.
3. The difference between the two recorded frequencies is the occupied bandwidth.

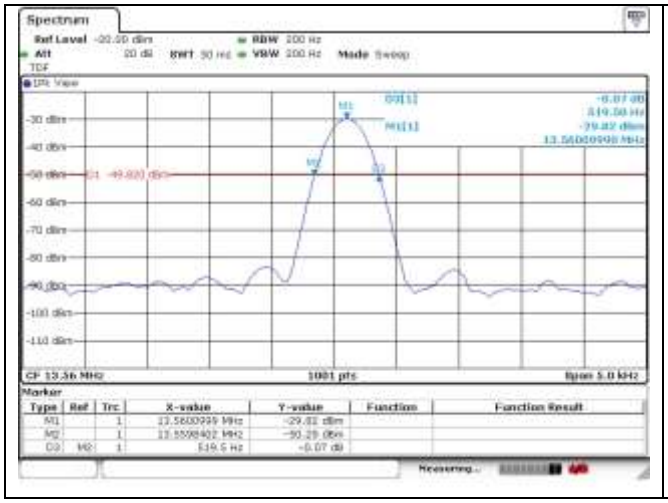
4.3. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

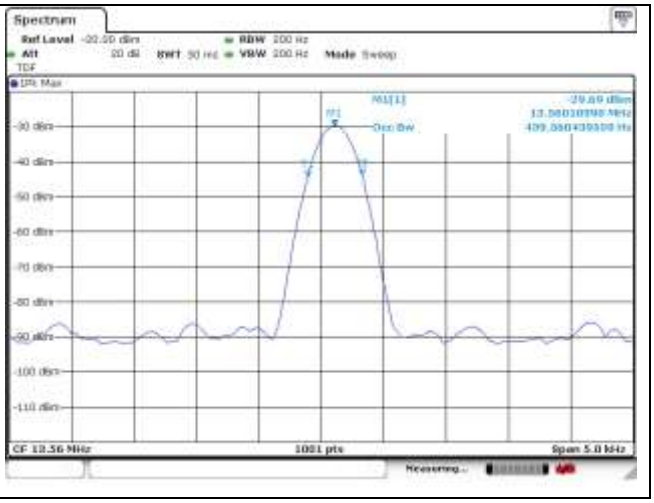
Frequency (㎒)	20 ㏈ Bandwidth (㎑)	99 % Bandwidth (㎑)
13.560	0.520	0.440

-Test plots

20 ㏈ Bandwidth



99 % Bandwidth



-End of the Test report-