

# TEST REPORT

## The Radio Law, Article 2

**Equipment under test** Smart Ashley+Z

**Model name** YDL110DZ

**Applicant** Yasuda Co., Ltd

**Manufacturer** UNION COMMUNITY Co.,Ltd

**Date of test(s)** 2018.12.03 ~ 2018.12.11

**Date of issue** 2018.12.14

**Issued to**

**Yasuda Co., Ltd**

Nagahori YASUDA Bldg 7F, 1-11-9,

Minamisenba, Chuo-ku, Osaka, Japan

Tel: +81-06-6251-7152/ Fax: +81-06-6262-3629



**Issued by**

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si,  
Gyeonggi-do, 14057, Korea

473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea

Tel: +82-31-425-6200 / Fax: +82-31-424-0450

Test and report completed by :	Report approval by :
	
Young-Jin Lee Test engineer	Hyeon-Su, Jang Technical manager

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr



---

### Revision history

Revision	Date of issue	Test report No.	Description
-	2018.12.14	KES-RF-18T0117	Initial



---

## TABLE OF CONTENTS

1.	General information .....	4
1.1.	EUT description .....	4
1.2.	Information about derivative model .....	4
1.3.	Accessory information .....	4
1.4.	Frequency/channel operations .....	5
2.	Summary of tests .....	6
3.	Test results .....	7
3.1.	Frequency tolerance .....	7
3.2.	Occupied Bandwidth .....	8
3.3.	RF output power .....	10
3.4.	Adjacent Channel Leakage power .....	11
3.5.	Transmitter spurious emissions .....	13
3.6.	Receiver spurious emissions .....	19
3.7.	Transmission time .....	23
	Appendix A. Measurement equipment .....	25



## 1. General information

Applicant: Yasuda Co., Ltd  
Applicant address: Nagahori YASUDA Bldg 7F, 1-11-9, Minamisenba, Chuo-ku, Osaka, Japan  
Test site: KES Co., Ltd.  
Test site address: 3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si,  
Gyeonggi-do, 14057, Korea  
473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, Korea  
J-MIC Radio law Article 2

### 1.1. EUT description

Equipment under test Smart Ashley+Z  
Frequency range 2 402 Mhz ~ 2 480 Mhz (BT\_BLE)  
922.5 Mhz ~ 926.3 Mhz (Z-Wave)  
Model: YDL110DZ  
Modulation technique FSK  
Antenna specification Z-Wave: PCB antenna // Peak gain : 2.13 dBi  
Power source DC 6.0 V (Lithium Battery)  
Number of channels 2 402 Mhz ~ 2 480 Mhz (BT\_BLE) : 40ch  
922.5 Mhz ~ 926.3 Mhz (Z-Wave) : 3ch

### 1.2. Information about derivative model

N/A

### 1.3. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source
-	-	-	-	-

#### 1.4. Frequency/channel operations

Ch.	Frequency (MHz)
1	922.5
.	.
2	923.9
.	.
3	926.3

**Note.**

1. This test report is prepared according to the requirements of ISO/IEC 17025.
2. Certificated BT module is mounted in the EUT as following
  - Applicant: PROCHILD INC.
  - Model: PBLN51822m
  - Certificated number: 208-160118



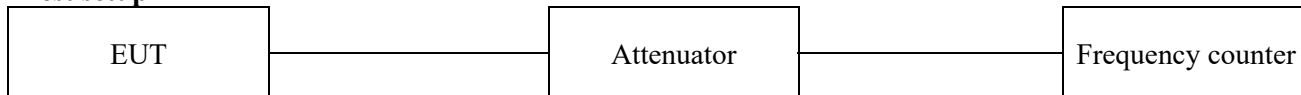
## 2. Summary of tests

Parameter	Test results
Frequency Tolerance	Pass
Occupied Bandwidth	Pass
RF Output Power	Pass
Adjacent Channel Leakage power	Pass
Transmitter Spurious Emission	Pass
Receiver Spurious Emission	Pass
Transmission time	Pass

### 3. Test results

#### 3.1. Frequency tolerance

##### Test setup



##### Limit

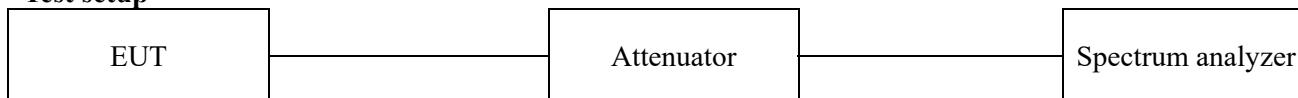
Permission deviation  $\pm 20 \times 10^{-6}$

##### Test results

Test voltage (%)	Test voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Frequency deviation (Hz)	Deviation (ppm)
90	DC 5.4	922.5	922.498252	1748	-1.89
		923.9	923.899001	999	-1.08
		926.3	926.298752	1248	-1.35
100	DC 6.0	922.5	922.498332	1668	-1.81
		923.9	923.899056	944	-1.02
		926.3	926.298808	1192	-1.29
110	DC 6.6	922.5	922.498378	1632	-1.76
		923.9	923.899133	867	-0.94
		926.3	926.298874	1126	-1.22

### 3.2. Occupied Bandwidth

#### Test setup



#### Limit

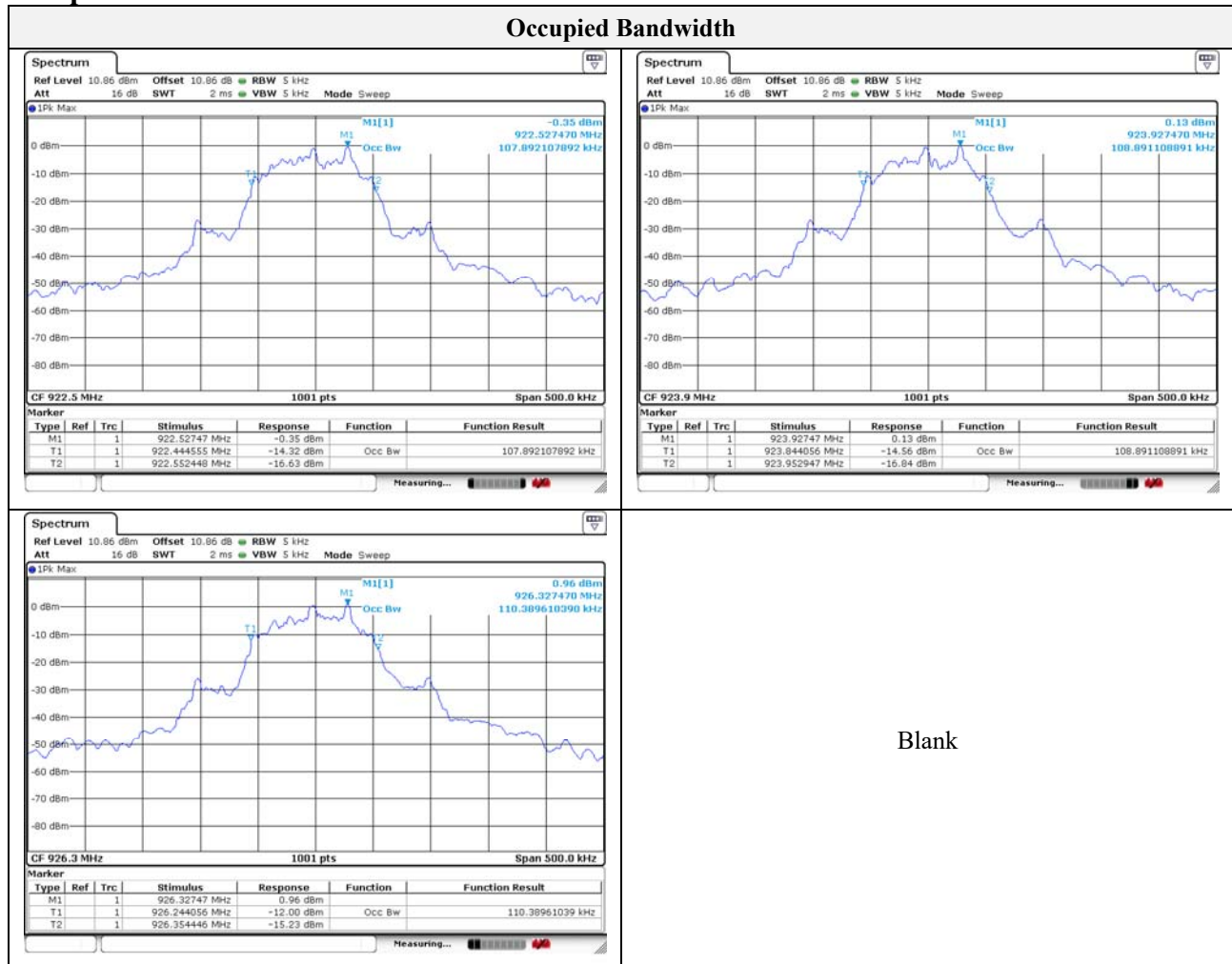
Equal or less than 400 kHz

#### Test results

Test voltage (%)	Nominal Voltage(V)	Occupied Bandwidth (MHz)		
		Frequency (922.5 MHz)	Frequency (923.9 MHz)	Frequency (926.3 MHz)
90	DC 5.4	108.4	109.9	109.4
100	DC 6.0	107.9	108.9	110.4
110	DC 6.6	108.4	107.9	110.9

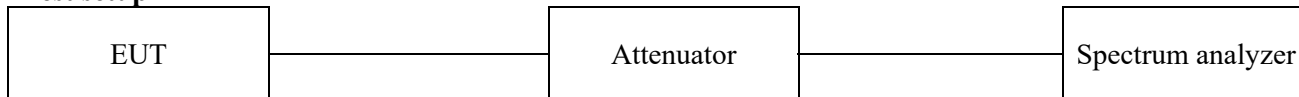


## Test plots



### 3.3. RF output power

#### Test setup



#### Limit

Test mode	Rate power (mW/MHz)	Upper(mW) / +20%	Lower(mW) / -80%
Sub 1GHz	5.0	6.0	1.0

#### Test results

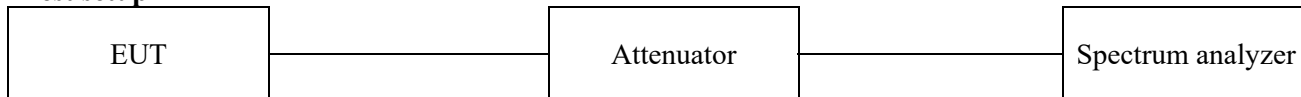
Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Output power (dBm/MHz)	Output power (mW)	Deviation (%)
90	DC 5.4	922.5	0.03	1.03	-79.4
		923.9	0.51	1.12	-77.6
		926.3	1.35	1.36	-72.8
100	DC 6.0	922.5	0.03	1.03	-79.4
		923.9	0.52	1.13	-77.4
		926.3	1.38	1.37	-72.6
110	DC 6.6	922.5	0.03	1.03	-79.4
		923.9	0.52	1.13	-77.4
		926.3	1.37	1.37	-72.6

#### Note.

1. Output power is the result which the Burst Ratio is calculated.
2. Antenna gain : 2.13 dBi

### 3.4. Adjacent Channel Leakage power

#### Test setup



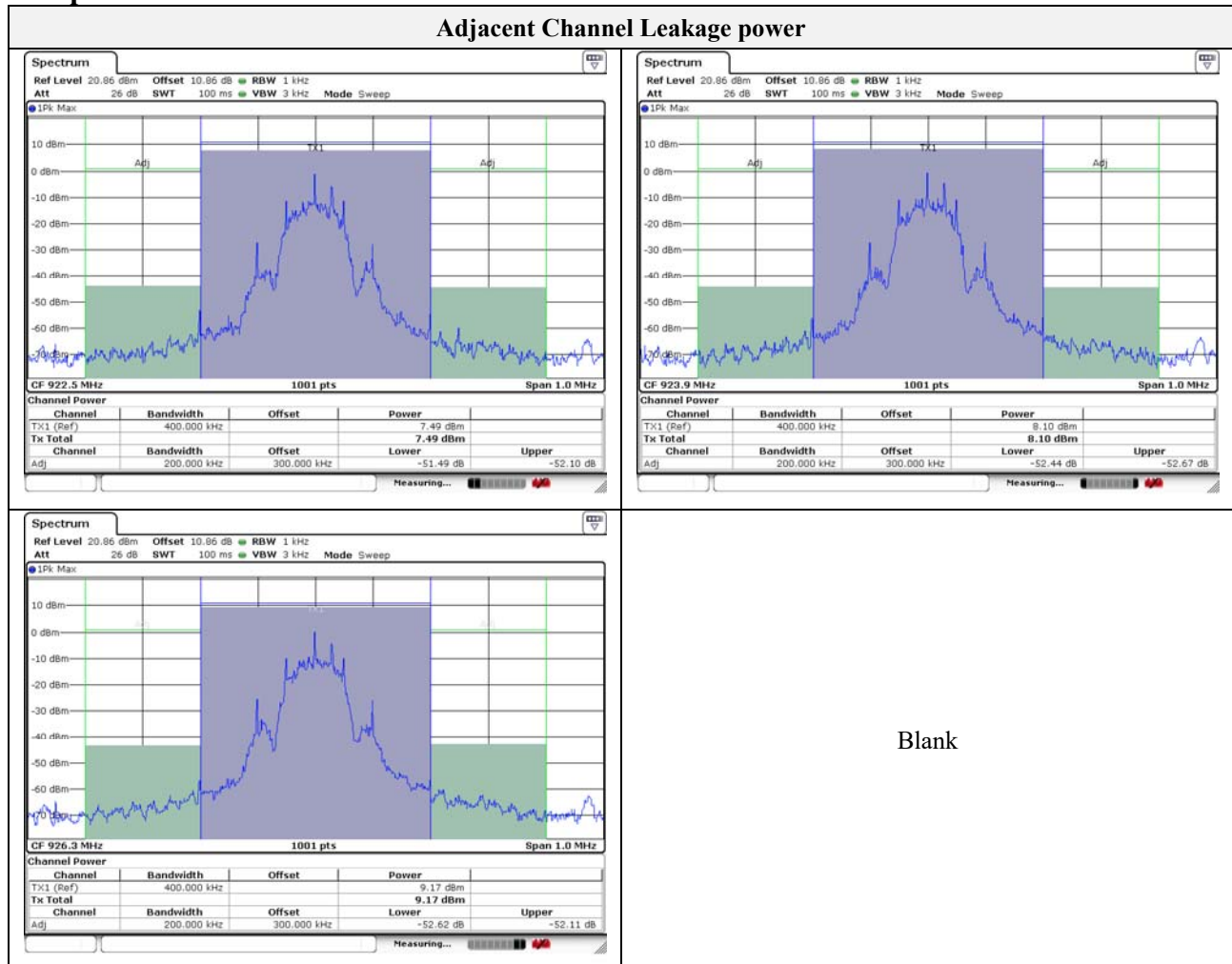
#### Limit

Equal or less than 15dBm

#### Test results

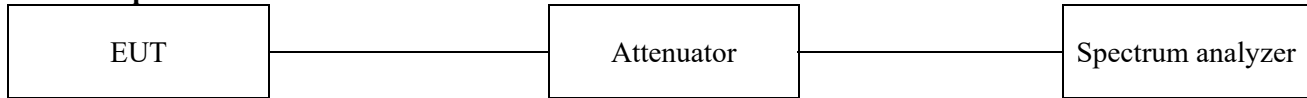
Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	-400kHz detuning (dBm)	400kHz detuning (dBm)
90	DC 5.4	922.5	-51.64	-52.17
		923.9	-52.34	-52.29
		926.3	-52.80	-52.39
100	DC 6.0	922.5	-51.49	-52.10
		923.9	-52.44	-52.67
		926.3	-52.62	-52.11
110	DC 6.6	922.5	-51.41	-52.27
		923.9	-52.31	-52.11
		926.3	-52.32	-52.25

## Test plots



### 3.5. Transmitter spurious emissions

#### Test setup



#### Limit

Frequency Band	Spurious Emission Strength (average power)	Reference Bandwidth
$f \leq 710$ MHz	-36 dBm	100 kHz
710 MHz < $f \leq 900$ MHz	-55 dBm	1 MHz
900 MHz < $f \leq 915$ MHz	-55 dBm	100 kHz
915 MHz < $f \leq 930$ MHz (Except for $ f-f_c  \leq (200 + 100 \times n)$ kHz if bandwidth of unit radio channel is 200 kHz, except for $ f-f_c  \leq (100 + 50 \times n)$ kHz if bandwidth of unit radio channel is 100 kHz. Except for $ f-f_c  \leq (100 + 100 \times n)$ kHz if frequency band is 915.9 MHz < $f \leq 916.9$ MHz and 920.5 MHz < $f \leq 922.3$ MHz. Where $n$ is a number of unit radio channels constituting the radio channel and is an integer from 1 to 5)	-36 dBm	100 kHz
930 MHz < $f \leq 1000$ MHz	-55 dBm	100 kHz
1000 MHz < $f \leq 1215$ MHz	-45 dBm	1 MHz
1215 MHz < $f$	-30 dBm	1 MHz

#### Note.

- "n" is the number of channels to be used simultaneously as a single radio channel.
- Center frequency "(200 + 100 × n) kHz" are excluded.



**Test results**

**Test item: 30 to 710MHz**

Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
90	DC 5.4	922.5	676.4	-77.66
		923.9	547.3	-79.35
		926.3	105.7	-79.62
100	DC 6.0	922.5	412.1	-79.91
		923.9	626.8	-79.86
		926.3	176.4	-80.11
110	DC 6.6	922.5	709.7	-79.22
		923.9	624.7	-79.37
		926.3	667.5	-79.18

**Test item: 710 to 900MHz**

Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
90	DC 5.4	922.5	767.2	-69.06
		923.9	859.9	-69.38
		926.3	721.5	-68.59
100	DC 6.0	922.5	883.0	-68.97
		923.9	766.7	-69.36
		926.3	872.0	-66.60
110	DC 6.6	922.5	790.0	-69.59
		923.9	873.9	-67.09
		926.3	759.1	-68.80



**Test item: 900 to 915MHz**

Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
90	DC 5.4	922.5	914.6	-61.35
		923.9	914.5	-75.17
		926.3	914.6	-76.39
100	DC 6.0	922.5	914.7	-60.70
		923.9	914.7	-64.81
		926.3	914.6	-75.34
110	DC 6.6	922.5	914.2	-64.58
		923.9	914.8	-75.10
		926.3	914.2	-78.04

**Test item: 915 to 930MHz**

Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
90	DC 5.4	922.5	921.9	-44.93
			922.9	-38.15
		923.9	923.5	-41.24
			928.0	-46.08
		926.3	925.8	-42.14
			928.0	-46.71
100	DC 6.0	922.5	921.2	-48.13
			923.0	-37.36
		923.9	923.4	-41.70
			928.0	-52.79
		926.3	925.8	-46.56
			928.0	-45.94
110	DC 6.6	922.5	920.4	-52.71
			922.9	-37.89
		923.9	919.9	-51.25
			924.3	-42.75
		926.3	925.9	-43.35
			928.0	-46.07



**Test item: 930 to 1000MHz**

Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
90	DC 5.4	922.5	930.6	-64.51
		923.9	930.4	-66.09
		926.3	931.4	-66.43
100	DC 6.0	922.5	930.2	-67.46
		923.9	932.1	-68.26
		926.3	931.5	-60.24
110	DC 6.6	922.5	931.6	-76.12
		923.9	932.1	-67.94
		926.3	931.6	-64.48

**Test item: 1000 to 1215MHz**

Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
90	DC 5.4	922.5	1 004.2	-69.03
		923.9	1 025.9	-69.00
		926.3	1 168.9	-68.66
100	DC 6.0	922.5	1 095.5	-69.28
		923.9	1 100.8	-68.72
		926.3	1 096.8	-69.71
110	DC 6.6	922.5	1 191.5	-69.39
		923.9	1 202.4	-69.55
		926.3	1 121.9	-69.48



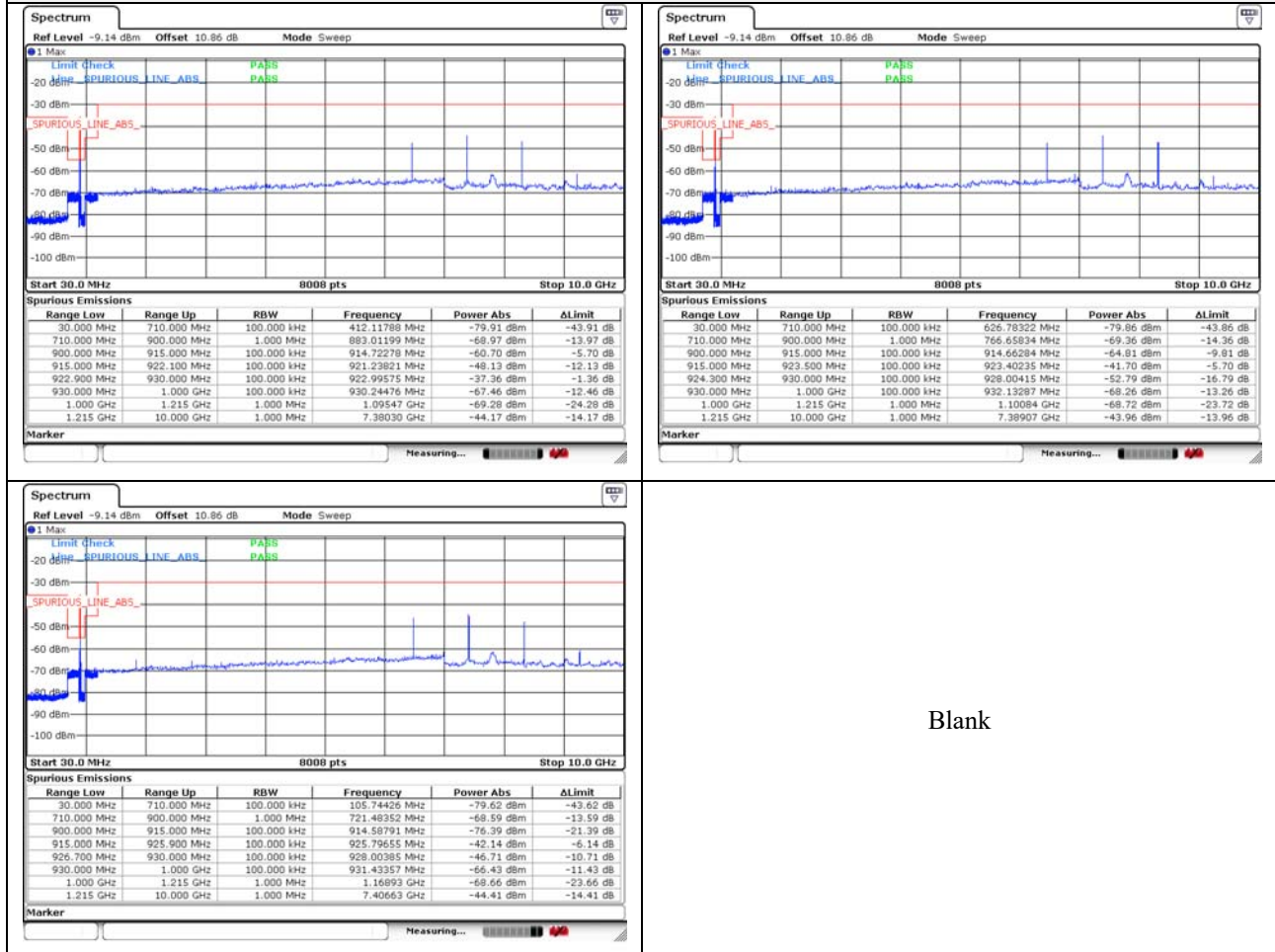


**Test item: 1215 to 10000MHz**

Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
90	DC 5.4	922.5	7 380.3	-43.95
		923.9	7 389.1	-44.43
		926.3	7 406.6	-44.41
100	DC 6.0	922.5	7 380.3	-44.17
		923.9	7 389.1	-43.96
		926.3	7 406.6	-44.29
110	DC 6.6	922.5	7 380.3	-44.19
		923.9	7 389.1	-44.45
		926.3	7 406.6	-44.32

## Test plots

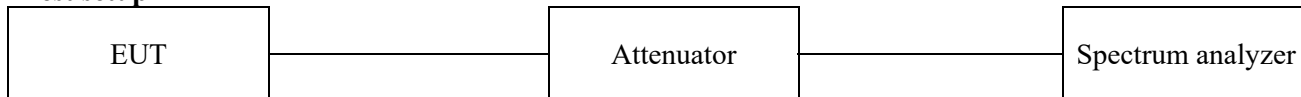
### Transmitter spurious emissions



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr

### 3.6. Receiver spurious emissions

#### Test setup



#### Limit

Frequency Band	Limit on Secondary Radiated Emissions, and so Forth (antenna input)	Reference Bandwidth
$f \leq 710 \text{ MHz}$	-54 dBm	100 kHz
$710 \text{ MHz} < f \leq 900 \text{ MHz}$	-55 dBm	1 MHz
$900 \text{ MHz} < f \leq 915 \text{ MHz}$	-55 dBm	100 kHz
$915 \text{ MHz} < f \leq 930 \text{ MHz}$	-54 dBm	100 kHz
$930 \text{ MHz} < f \leq 1000 \text{ MHz}$	-55 dBm	100 kHz
$1000 \text{ MHz} < f$	-47 dBm	1 MHz



**Test results**

**Test item: 30 to 710MHz**

Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
90	DC 5.4	922.5	699.6	-79.68
		923.9	700.1	-79.52
		926.3	686.6	-78.86
100	DC 6.0	922.5	569.0	-79.75
		923.9	262.0	-80.19
		926.3	702.9	-79.88
110	DC 6.6	922.5	705.6	-80.22
		923.9	675.7	-80.36
		926.3	292.6	-80.16

**Test item: 710 to 900MHz**

Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
90	DC 5.4	922.5	837.5	-68.85
		923.9	759.6	-69.73
		926.3	740.7	-69.41
100	DC 6.0	922.5	870.1	-69.08
		923.9	872.7	-69.59
		926.3	893.3	-69.81
110	DC 6.6	922.5	766.7	-68.95
		923.9	842.0	-69.33
		926.3	854.4	-69.17



**Test item: 900 to 915MHz**

Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
90	DC 5.4	922.5	908.2	-79.69
		923.9	903.3	-80.51
		926.3	913.7	-80.38
100	DC 6.0	922.5	911.4	-79.90
		923.9	901.0	-80.12
		926.3	902.5	-80.56
110	DC 6.6	922.5	906.8	-79.57
		923.9	903.0	-78.81
		926.3	910.9	-80.81

**Test item: 915 to 930MHz**

Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
90	DC 5.4	922.5	916.5	-79.76
		923.9	927.9	-79.88
		926.3	929.6	-80.08
100	DC 6.0	922.5	927.5	-80.12
		923.9	917.1	-80.23
		926.3	926.7	-80.13
110	DC 6.6	922.5	921.9	-79.36
		923.9	917.2	-80.34
		926.3	917.1	-80.60



**Test item: 930 to 1000MHz**

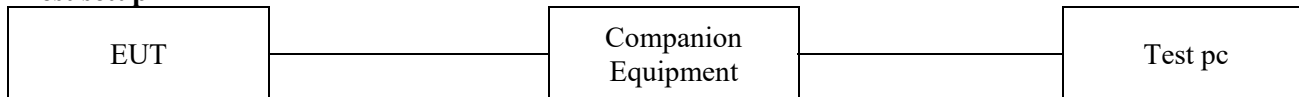
Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
90	DC 5.4	922.5	990.7	-79.69
		923.9	975.0	-79.71
		926.3	966.2	-79.59
100	DC 6.0	922.5	940.2	-78.89
		923.9	962.6	-79.38
		926.3	976.1	-79.85
110	DC 6.6	922.5	987.1	-79.77
		923.9	952.8	-78.06
		926.3	952.3	-79.90

**Test item: 1000 to 10000MHz**

Test voltage (%)	Nominal Voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
90	DC 5.4	922.5	7 810.7	-61.31
		923.9	7 819.7	-60.52
		926.3	7 801.7	-61.61
100	DC 6.0	922.5	7 819.7	-61.83
		923.9	7 774.7	-61.32
		926.3	7 810.7	-61.14
110	DC 6.6	922.5	7 801.7	-61.08
		923.9	7 828.7	-61.54
		926.3	7 792.7	-61.89

### 3.7. Transmission time

#### Test setup



#### Limit

Transmission Starts Time : 2ms or less

Transmission Completion Time : 5ms or less

#### Test results

Test voltage (V)	Test Frequency (MHz)	Transmission Starts Time (ms)	Transmission Completion Time (ms)
DC 6.0	922.5	1.24	4.55
	923.9	1.49	4.78
	926.3	1.23	4.49

#### Note.

1. This device transmission is a response to request by other radio equipment. So carrier sense is not necessary.
2. The manufacturer is declared the response start time as follows:  
Response Start Time : 1.2 ms ~ 1.5 ms



## Test plots







## Appendix A. Measurement equipment

Equipment 24-2 paragraph4「ハ」	Manufacturer	Model	Serial No.	Calibration interval	Calibration due.
Spectrum Analyzer	R&S	FSV30	101389	1 year	2019.01.19
8360B Series Swept Signal Generator	HP	83630B	3844A00786	1 year	2019.01.22
Power Meter	Anritsu	ML2495A	1438001	1 year	2019.01.25
Pulse Power Sensor	Anritsu	MA2411B	1339205	1 year	2019.01.25
Attenuator	Agilent	8493C	51401	1 year	2019.06.29
DC Power Supply	Agilent	6632B	MY43004114	1 years	2019.06.28
Frequency Counter	HP	5352B	3049A01336	1 years	2019.01.23
EMI Test receiver	R&S	ESU26	100552	1 years	2019.04.18

## Peripheral devices

Device	Manufacturer	Model No.	Serial No.
Notebook Computer	Samsung Electronics Co., Ltd.	RV518	HTK991NC600207R
Test Board	N/A	N/A	N/A

**The end of test report.**