

TEST REPORT

The Radio Law, Article 2

Equipment under test LiveCare Camel
Model name LCSGKR4A
Applicant uLikekorea Co.,Inc
Manufacturer uLikekorea Co.,Inc
Date of test(s) 2021.04.26 ~ 2021.05.07
Date of issue 2021.06.17

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Report No.:
KES-RF1-21T0109
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Revision history

Revision	Date of issue	Test report No.	Description
-	2021.06.17	KES-RF1-21T0109	Initial

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1. General information

Applicant: uLikekorea Co.,Inc
Applicant address: 04541 86, Cheonggyecheon-ro, Jung-gu, Seoul, Republic of Korea
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 LiveCare Camel
Frequency range 920.7 MHz
Model: LCSGKR4A
Modulation technique FSK
Antenna specification 920.7 MHz : Wire Monopole Antenna // Peak gain : -3.14 dBi
Power source DC 3.0 V
Number of channels 920.7 MHz
HW version 2.5
SW version 2.0.0

1.2. Information about derivative model

N/A

1.3. Accessory information

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

1.4. Worst case data rate

N/A

1.5. Measurement Uncertainty

Test Item		Uncertainty
Uncertainty for Conduction emission test		2.46 dB
Uncertainty for Radiation emission test (include Fundamental emission)	Below 1GHz	4.40 dB
	Above 1GHz	5.94 dB
Note. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		

1.6. Frequency/channel operations

Ch.	Frequency (MHz)
1	920.7

1.7. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- Article 49-20 and the relevant articles of the Ordinance Regulating Radio Equipment

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The measurement was implemented in accordance with MIC Notice No. 88 and No.22-3 Appendix No.

Note.

1. This test report is prepared according to the requirements of ISO/IEC 17025.

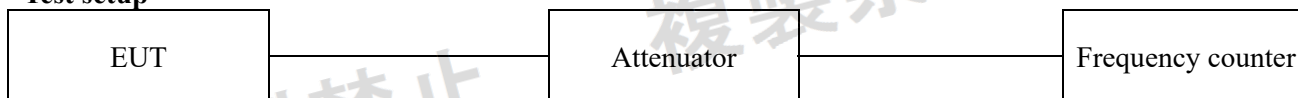
2. Summary of tests

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
Carrier Sensing	Pass

3. Test results

3.1. Frequency tolerance

Test setup



Limit

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

Test results

Test voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Frequency deviation (Hz)	Deviation (ppm)
DC 3.3 V	920.7	920.688 720	-11 280	-12.25
DC 3.0 V	920.7	920.688 280	-11 720	-12.73
DC 2.7 V	920.7	920.688 450	-11 550	-12.54

3.2. Occupied Bandwidth

Test setup



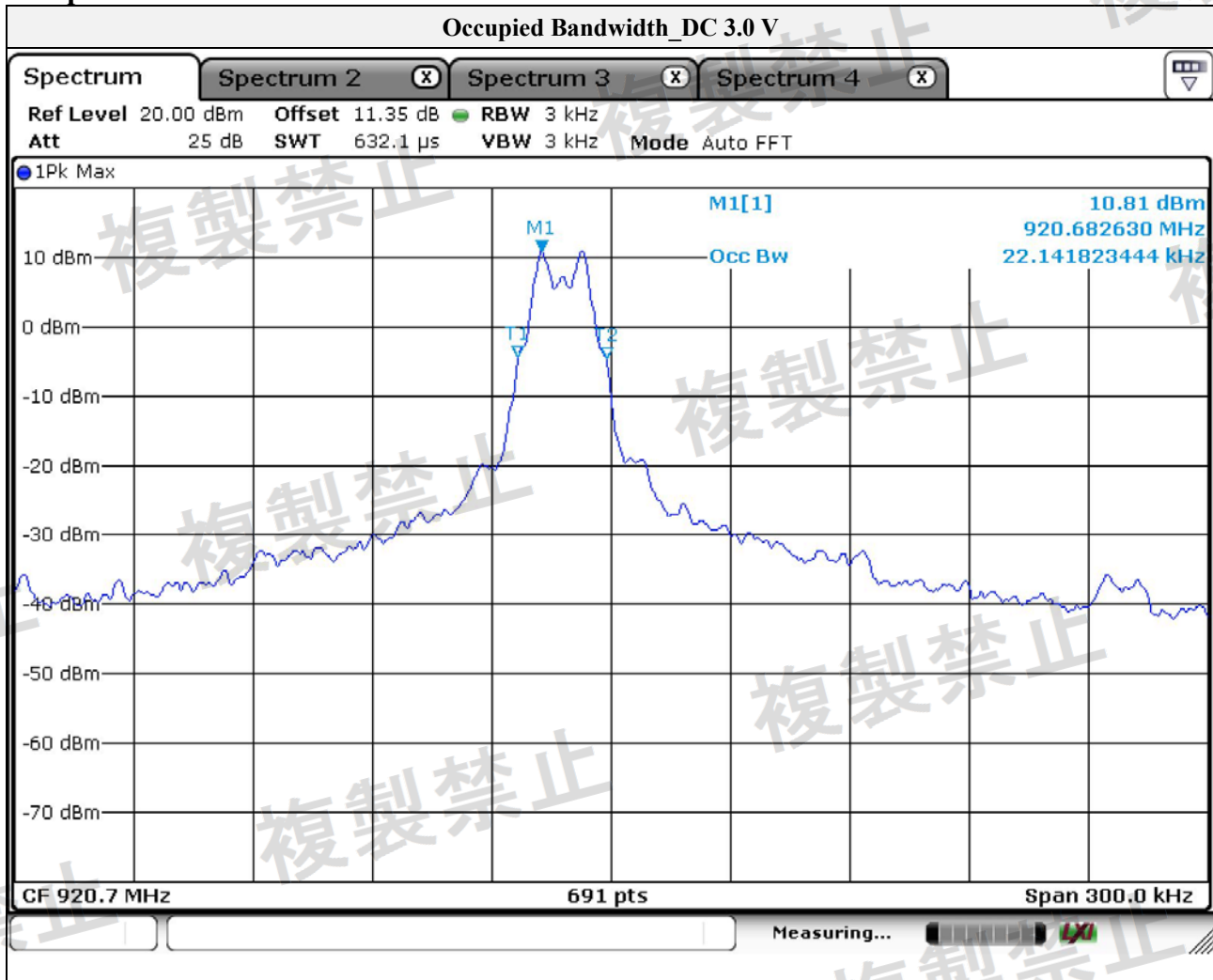
Limit

Equal or less than 200 kHz

Test results

Test voltage (V)	Frequency (MHz)	Occupied Bandwidth (kHz)
DC 3.3 V	920.7	22.14
DC 3.0 V	920.7	22.14
DC 2.7 V	920.7	22.14

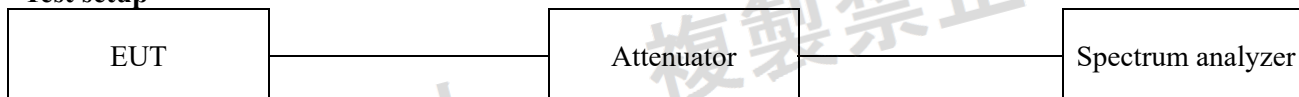
Test plots



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3.3. RF output power

Test setup



Limit

Test mode	Rate power (mW/MHz)	Upper(mW) / +20%	Lower(mW) / -80%
Sub 1GHz	10	12	2

Test results

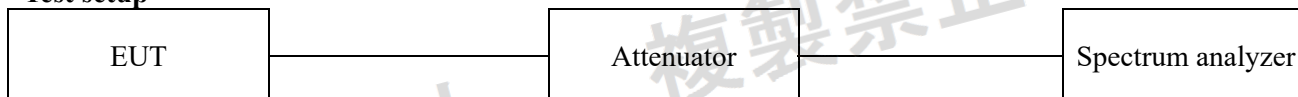
Test voltage (V)	Frequency (MHz)	Output power (dBm)	Output power (mW)	Deviation (%)
DC 3.3 V	920.7	8.45	7.00	-30.00
DC 3.0 V	920.7	8.43	6.97	-30.56
DC 2.7 V	920.7	8.38	6.89	-31.36

Note.

- Output power is the result which the Burst Ratio is calculated.
- Antenna gain : -3.14 dBi

3.4. Adjacent Channel Leakage power

Test setup



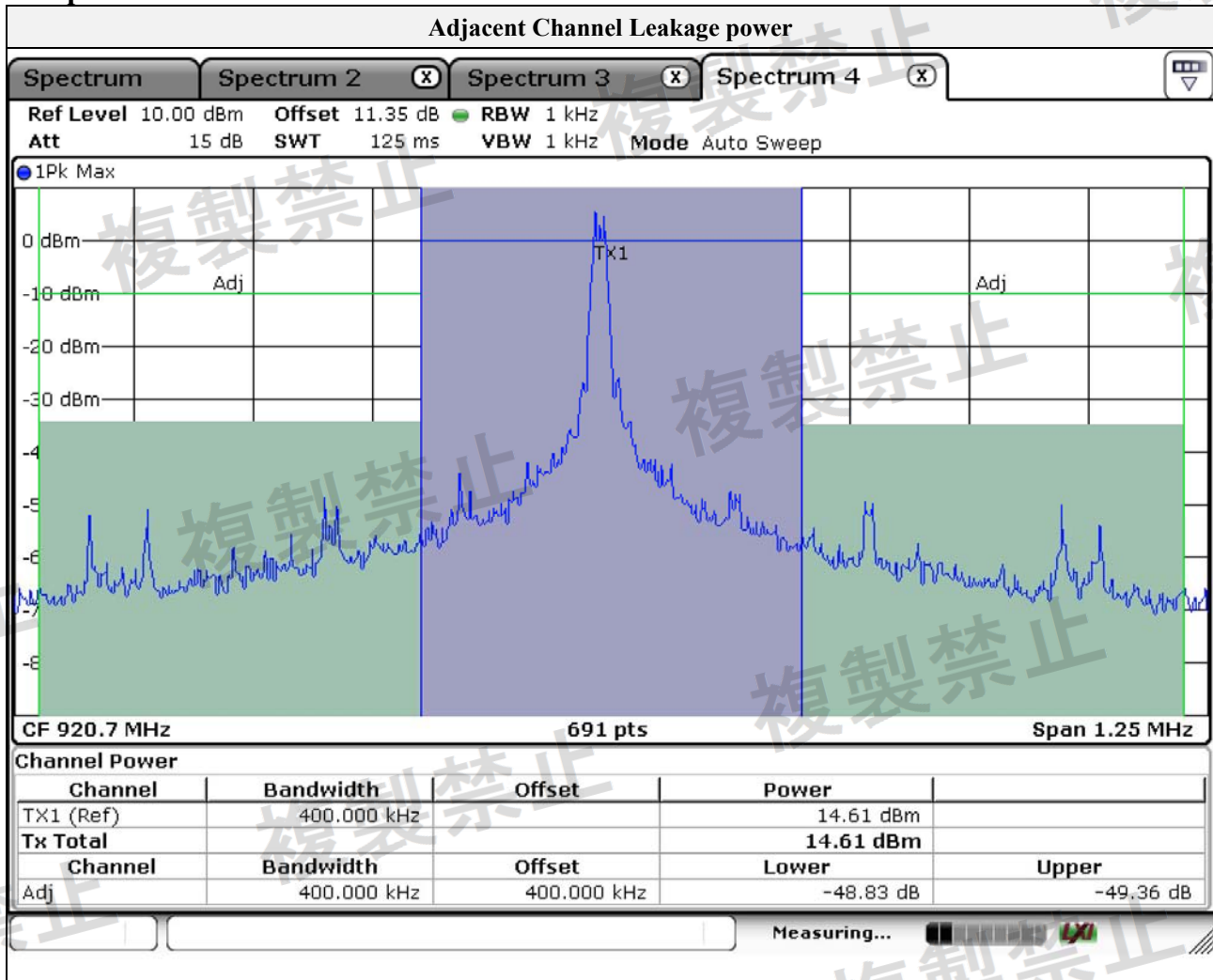
Limit

Equal or less than 15dBm

Test results

Test voltage (V)	Frequency (MHz)	200kHz detuning (dBm)	-200kHz detuning (dBm)
DC 3.3 V	920.7	-49.11	-49.86
DC 3.0 V	920.7	-48.83	-49.36
DC 2.7 V	920.7	-49.26	-49.42

Test plots



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3.5. Transmitter spurious emissions

Test setup



Limit

Frequency Band	Spurious Emission Strength (average power)	Reference Bandwidth
$f \leq 710 \text{ MHz}$	-36 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
$915 \text{ MHz} < f \leq 930 \text{ MHz}$ (Except for $ f-f_c \leq (200 + 100 \cdot n) \text{ kHz}$ if bandwidth of unit radio channel is 200 kHz, except for $ f-f_c \leq (100 + 50 \cdot n) \text{ kHz}$ if bandwidth of unit radio channel is 100 kHz. Except for $ f-f_c \leq (100 + 100 \cdot n) \text{ kHz}$ if frequency band is $915.9 \text{ MHz} \leq f \leq 916.9 \text{ MHz}$ and $920.5 \text{ MHz} \leq f \leq 922.3 \text{ MHz}$. 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
$930 \text{ MHz} < f \leq 1000 \text{ MHz}$	-55 dBm	100 kHz
$1000 \text{ MHz} < f \leq 1215 \text{ MHz}$	-45 dBm	1 MHz
$1215 \text{ MHz} < f$	-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 (V)	Test Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
DC 3.3 V	920.7	460.21	-62.30
DC 3.0 V	920.7	460.21	-62.51
DC 2.7 V	920.7	460.21	-62.53

Test item: 710 to 900MHz

Test voltage (V)	Test Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
DC 3.3 V	920.7	893.28	-58.86
DC 3.0 V	920.7	886.58	-58.14
DC 2.7 V	920.7	894.71	-58.42

Test item: 900 to 915MHz

Test voltage (V)	Test Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
DC 3.3 V	920.7	914.99	-59.70
DC 3.0 V	920.7	914.99	-59.48
DC 2.7 V	920.7	914.91	-58.83

Test item: 915 to 930MHz

Test voltage (V)	Test Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
DC 3.3 V	920.7	920.25	-40.88
		921.15	-43.98
		924.72	-59.44
DC 3.0 V	920.7	920.29	-41.81
		921.18	-59.88
		924.72	-59.88
DC 2.7 V	920.7	920.22	-41.50
		921.21	-45.30
		924.67	-59.77

Test item: 930 to 1000MHz

Test voltage (V)	Test Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
DC 3.3 V	920.7	932.69	-64.32
DC 3.0 V	920.7	932.69	-64.90
DC 2.7 V	920.7	932.70	-63.45

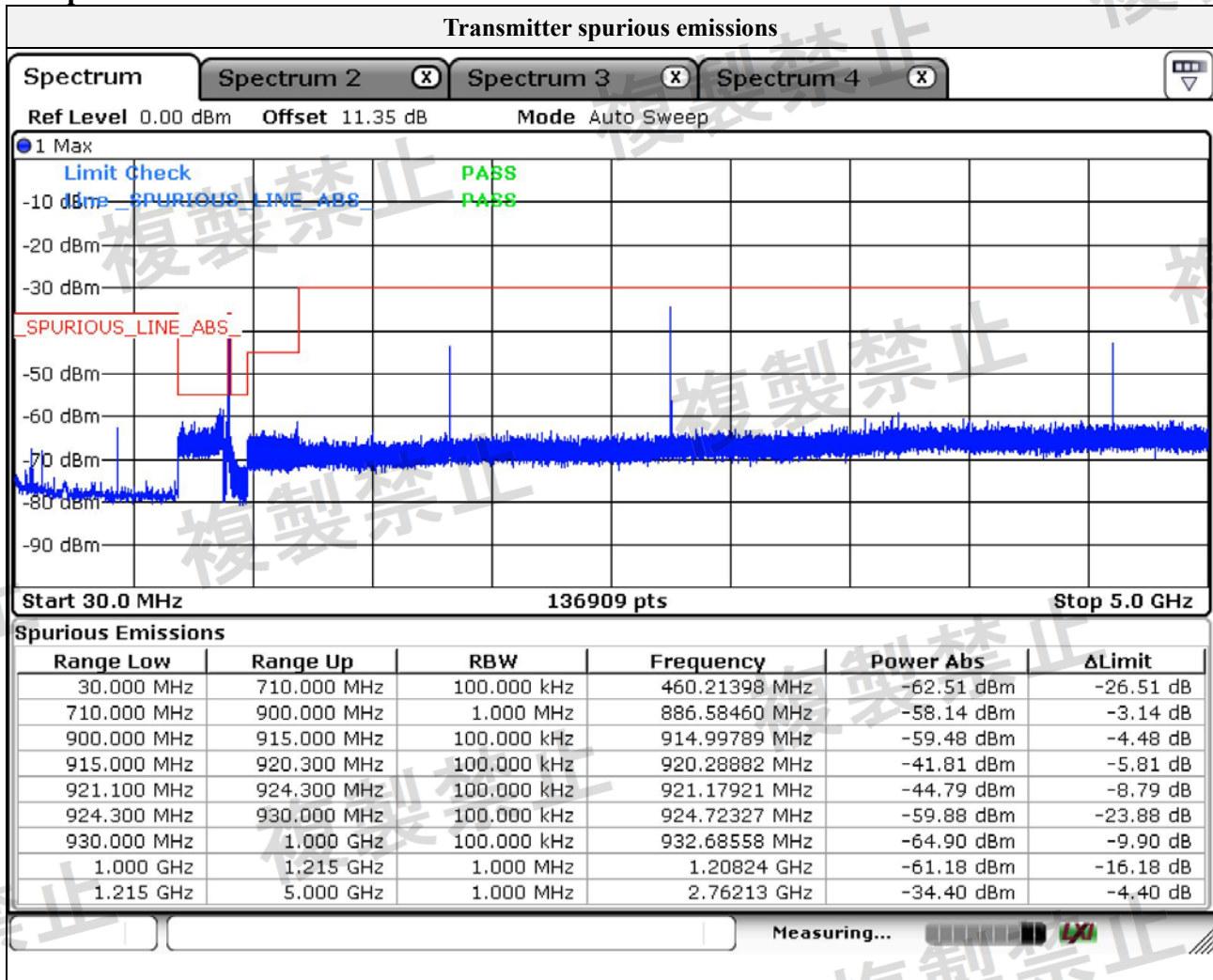
Test item: 1000 to 1215MHz

Test voltage (V)	Test Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
DC 3.3 V	920.7	1 208.62	-60.18
DC 3.0 V	920.7	1 208.24	-61.18
DC 2.7 V	920.7	1 208.14	-61.71

Test item: 1215 to 10000MHz

Test voltage (V)	Test Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
DC 3.3 V	920.7	2 762.13	-34.43
DC 3.0 V	920.7	2 762.13	-34.40
DC 2.7 V	920.7	2 762.13	-34.44

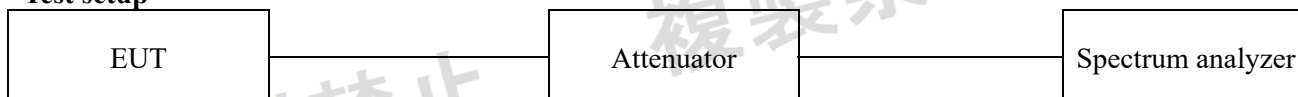
Test plots



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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 (V)	Test Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
DC 3.3 V	920.7	154.55	-68.61
DC 3.0 V	920.7	652.77	-76.78
DC 2.7 V	920.7	356.53	-71.21

Test item: 710 to 900MHz

Test voltage (V)	Test Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
DC 3.3 V	920.7	891.53	-61.98
DC 3.0 V	920.7	829.46	-65.01
DC 2.7 V	920.7	880.25	-65.34

Test item: 900 to 915MHz

Test voltage (V)	Test Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
DC 3.3 V	920.7	905.68	-66.82
DC 3.0 V	920.7	907.99	-67.98
DC 2.7 V	920.7	904.59	-68.07

Test item: 915 to 930MHz

Test voltage (V)	Test Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
DC 3.3 V	920.7	929.84	-69.14
DC 3.0 V	920.7	922.15	-67.35
DC 2.7 V	920.7	927.05	-64.96

Test item: 930 to 1000MHz

Test voltage (V)	Test Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
DC 3.3 V	920.7	935.69	-66.88
DC 3.0 V	920.7	980.52	-67.24
DC 2.7 V	920.7	975.20	-66.81

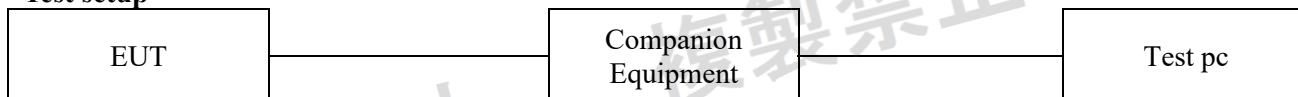
Test item: 1000 to 10000MHz

Test voltage (V)	Frequency (MHz)	Measure frequency (MHz)	Level (dBm)
DC 3.3 V	920.7	2 402.38	-54.09
DC 3.0 V	920.7	5 410.41	-56.42
DC 2.7 V	920.7	4 602.31	-55.30

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3.7. Transmission time

Test setup



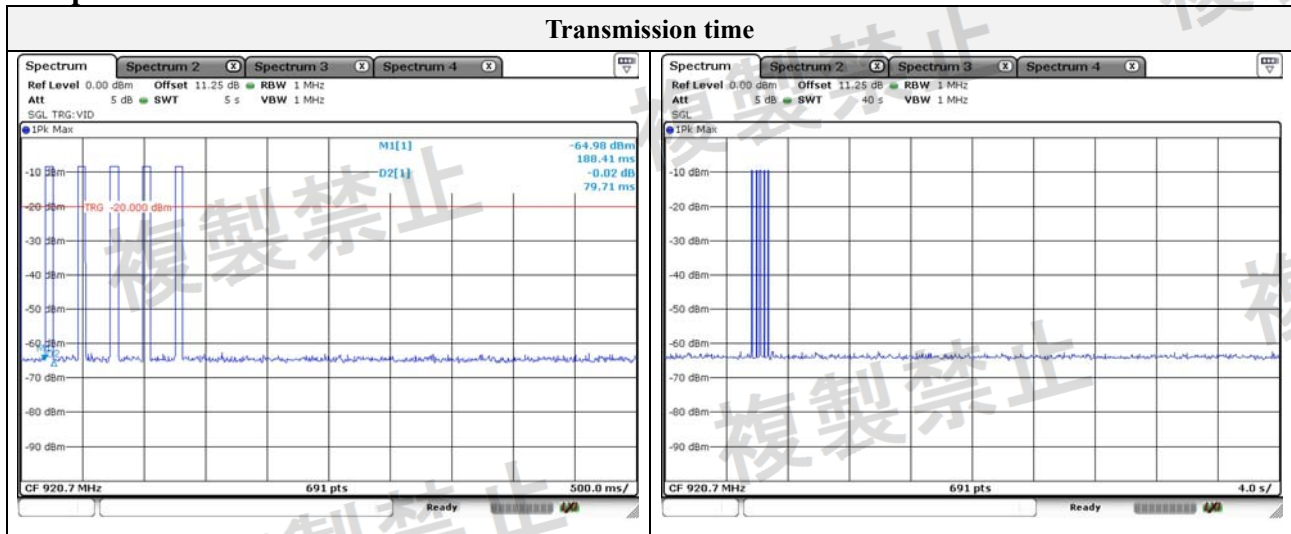
Limit

Transmission Time : 4s or below
Transmission OFF Time : 50ms or more

Test results

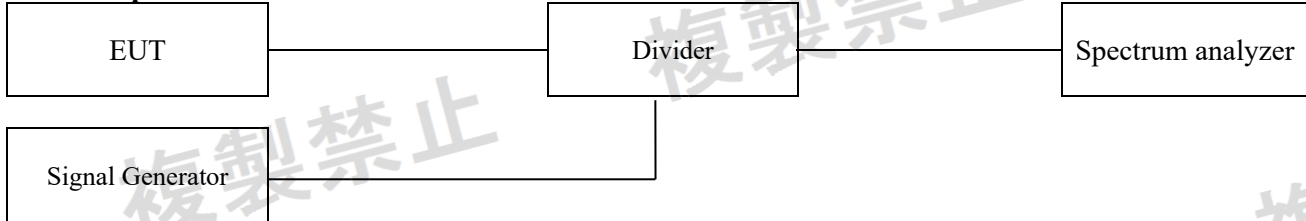
Test voltage (V)	Test Frequency (MHz)	Transmission Time (s)	Transmission OFF Time (s)
DC 3.0 V	920.7	0.398 55	39.601 45

Test plots



3.8. Carrier Sensing

Test setup



Test results

Test voltage (V)	Test Frequency (MHz)	Test results
DC 3.0 V	920.7	PASS

Appendix A. Measurement equipment

Equipment 24-2 paragraph4 「ハ」	Manufacturer	Model	Serial No.	Calibration Interval	Calibration Lab	Calibration due.
Spectrum Analyzer	R&S	FSV30	101389	1 year	HCT	2022.01.14
Signal Generator	ANRITSU	68369B	992113	1 year	HCT	2022.01.15
Power Meter	Anritsu	ML2495A	1438001	1 year	HCT	2022.01.14
Pulse Power Sensor	Anritsu	MA2411B	1339205	1 year	HCT	2022.01.14
Attenuator	KEYSIGHT	8493C	82506	1 year	HCT	2022.01.15
DIVIDER	WEINSCHEL	1515	MF493	1 year	HCT	2022.01.14
DC Power Supply	Agilent	6632B	MY43004114	1 year	MICRO PRECISION	2021.06.22
Frequency Counter	HP	5352B	3049A01336	1 year	HCT	2022.01.16

Peripheral devices

Device	Manufacturer	Model No.	Serial No.
-	-	-	-

The end of test report.

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