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Tel. +82 31 428 5700 / Fax. +82 31 427 2370
http://www.sgsgroup.kr

TEST REPORT

of

ARIB STD-T66

Equipment Under Test	:	FANLIGHT-029 RF MODULE
Model Name	:	FANLIGHT-029
Variant Model Name(s)	:	-
Applicant	:	FANLIGHT Co., Ltd.
Manufacturer	:	FANLIGHT Co., Ltd.
Date of Receipt	:	2026.06.22
Date of Test(s)	:	2026.06.24 ~ 2026.06.24
Date of Issue	:	2026.06.26

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: Gilbert Park

Technical Manager: Haegyu Park

SGS Korea Co., Ltd. Gunpo Laboratory

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
- Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.

Phone No. : +82 31 688 0901
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1.2. Details of Applicant

Applicant : FANLIGHT Co., Ltd.
Address : 22, Nonhyeon-ro 128-gil, Gangnam-gu, Seoul, South Korea

1.3. Details of Manufacturer

Company : Same as applicant
Address : Same as applicant

1.4. Description of EUT

Kind of Product	FANLIGHT-029 RF MODULE
Model Name	FANLIGHT-029
Power Supply	DC 4.5 V
Frequency Range	2 402 ㎒ ~ 2 480 ㎒ (Bluetooth Low Energy)
Modulation Technique	GFSK
Number of Channels	40 channels (Bluetooth Low Energy)
Rated Output Power	0.15 ㎽
Antenna Type	Inverted F Antenna
Antenna Gain	3.424 ㏈i

1.5. Test Equipment List

Date of Test	2026.06.24 ~ 2026.06.24					
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. Date**	**Cal. Authority**	**Cal. Method**
Spectrum Analyzer	R&S	FSV30	103100	Mar. 17, 2026	SICT	c)
Signal Generator	R&S	SMA100B	106887	Oct. 20, 2025	SICT	c)
Attenuator	HUBER+SUHNER	6606 SMA-50-1	0123-2	Oct. 22, 2025	SICT	c)
DC Power Supply	R&S	HMP2020	102132	Apr. 21, 2026	SICT	c)
DIGITAL MULTIMETER	HIOKI	DT4211	N0301231	Sep. 18, 2025	SICT	c)

Note;

a): Calibration conducted by the National Institute of Information and Communications Technology or a designated calibration agency under Article 102-18 paragraph (1).

b): Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law. (Law No. 51 of 1992)

c): Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).

d): Calibration conducted by using other equipment that listed above from a) to c).

1.6. Test Method

Measurement was conducted by the following test method:
The test method of Ordinance Concerning Technical Regulations Conformity Certification etc. of Specified Radio Equipment in Annex 1, the Ministry of Internal Affairs and Communication notification in Annex 43 of Article 88, Paragraph 1 or the test method more than equivalent.

1.7. Summary of Test Results

The EUT has been tested according to the following specifications:

Applied Standard : Radio equipment regulations and ARIB STD-T66		
Section	**Test item**	**Result**
STD-T66 3.2	Frequency Tolerance	Complied
STD-T66 3.2	Occupied Bandwidth (99 %)	Complied
STD-T66 3.2	Spurious Emission Intensity	Complied
STD-T66 3.2	Antenna Power	Complied
STD-T66 3.3	Secondary Radiated Emissions	Complied
STD-T66 3.4	Interference Prevention Function	Complied

1.8. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL007109	2026.06.26	Initial

1.9. Description of test mode

The EUT supports PHY 1M, 37 bytes.

1.10. The reason why the tests are performed only at rated voltage

We confirm that there is the regulator inside of the EUT.

2. Frequency Tolerance

2.1. Test Setup

2.2. Limit

Tolerance of frequency: ±50 × 10^{-6} or less.

2.3. Test Procedure

1. Connect transmitter output to the spectrum analyzer input port.
2. The EUT should be transmitting at low and high channels.
3. Set the spectrum analyzer as below;

Center frequency:	2 402 ㎒, 2 480 ㎒
Span:	1 ㎒
RBW:	10 ㎑
VBW:	10 ㎑
Sweep time:	Auto
Sweep data points:	1 001 or greater
Detector mode:	Positive peak
Indication mode:	Max hold

4. Find the peak carrier signal and measure its frequency.

2.4. Test Result

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

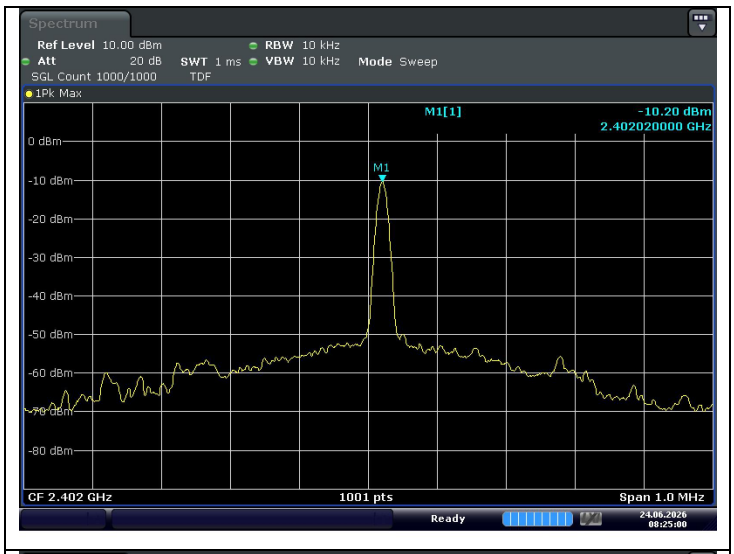
- Test mode: Un-Modulated

Test Voltage (V)	Measured Frequency (㎒)	Reading Frequency (㎒)	Frequency Tolerance (ppm)
V_{nor} = 4.5	Low Ch. (2 402)	2 402.020	8.33
	High Ch. (2 480)	2 480.021	8.47

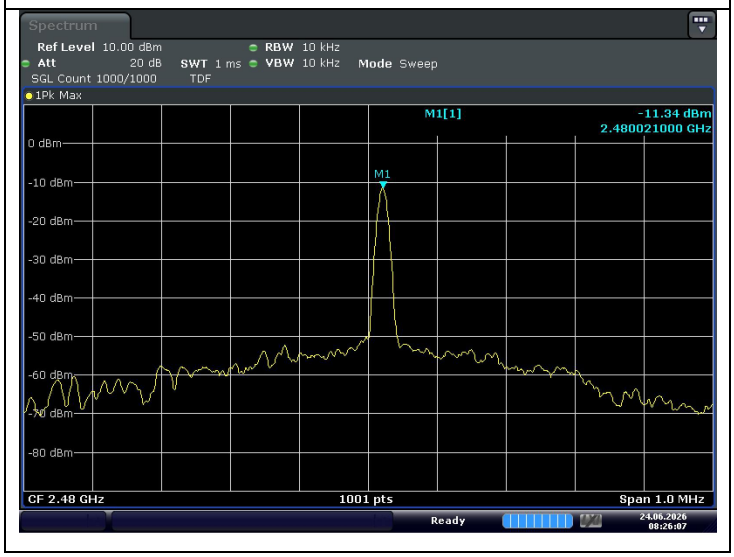
Note;
1. FT (ppm) = [(RF-MF)/MF] × 10^6
   - FT: Frequency Tolerance, RF: Reading Frequency and MF: Measurement Frequency

Test Mode : Un-Modulated

Low Channel



High Channel



3. Occupied Bandwidth (99 %)

3.1. Test Setup

3.2. Limit

26 ㎒ or less

3.3. Test Procedure

1. Connect transmitter output to the spectrum analyzer input port.
2. Measure the signal bandwidth using a spectrum analyzer.
3. Set the spectrum analyzer as below;

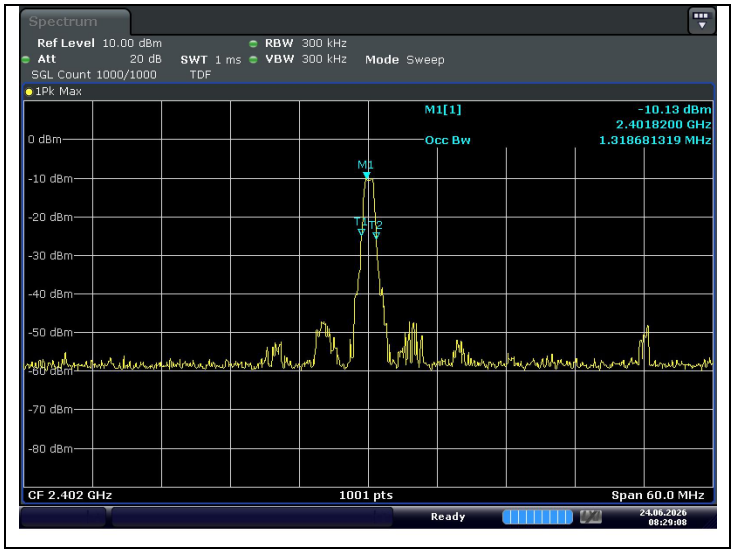
Center frequency:	2 402 ㎒, 2 480 ㎒
Span:	60 ㎒
RBW:	300 ㎑
VBW:	300 ㎑
Sweep time:	Auto
Sweep data points:	1 001 or greater
Detector mode:	Positive peak
Indication mode:	Max hold
BW setting:	99 %

3.4. Test Result

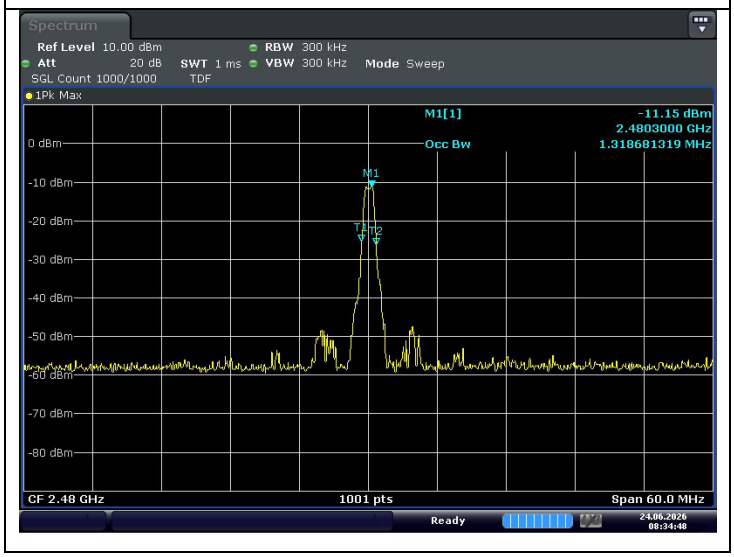
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Test Voltage (V)	Measured Frequency (㎒)	Occupied Bandwidth (㎒)
V_{nor} = 4.5	Low Ch. (2 402)	1.32
	High Ch. (2 480)	1.32

Low Channel



High Channel



4. Spurious Emission Intensity

4.1. Test Setup

4.2. Limit

Below 2 387 ㎒:	2.5 ㎍W (-26 ㏈m)/㎒ or less
2 387 to 2 400 ㎒:	25.0 ㎍W (-16 ㏈m)/㎒ or less
2 483.5 to 2 496.5 ㎒:	25.0 ㎍W (-16 ㏈m)/㎒ or less
Over 2 496.5 ㎒:	2.5 ㎍W (-26 ㏈m)/㎒ or less

4.3. Test Procedure

1. Connect transmitter output to the spectrum analyzer input port.
2. Configure the EUT
   - Test channels: low, high
   - Modulated
   - Rated output power declared in the construction design document
3. Set the spectrum analyzer as below;

[Setting 1]

Frequency range:	30 ㎒ to 12.5 ㎓, except for 2 400 ㎒ to 2 483.5 ㎒
RBW:	1 ㎒
VBW:	1 ㎒
Sweep time:	Minimum time required to make an accurate measurement
Sweep data points:	1 001 or greater
Detector mode:	Positive peak
Indication mode:	Max hold

Note: sweep shall be repeated until the max hold waveform is stable.

[Setting 2]

Center frequency:	Frequency of spurious emission found using [Setting 1]
Span:	0 ㎐
RBW:	1 ㎒
VBW:	1 ㎒
Sweep time:	Minimum time required to make an accurate measurement. For burst type(intermittent) spurious emission, sweep time shall be greater than one burst interval.
Sweep data points:	1 001 or greater
Detector mode:	Sample or RMS

[Setting 3]

Frequency range:	2 374 ㎒ to 2 400 ㎒
	2 483.5 ㎒ to 2 509.5 ㎒
RBW:	30 ㎑
VBW:	30 ㎑
Sweep time:	Minimum time required to make an accurate measurement.
Sweep data points:	1 001 or greater
Detector mode:	Positive peak
Indication mode:	Max hold

4. After configuring the spectrum analyzer to [Setting 1], search for spurious emissions from 30 ㎒ to 12.5 ㎓. If the sweep range does not cover the required measurement frequency range then the measurement range will need to be divided into sufficient sections of size [RBW x Sweep Data Points]. If spurious emissions greater than [Limit -3 ㏈] are found, then more detailed measurements are required, go to step (5).
5. Configure the spectrum analyzer using [Setting 2] and measure the average signal amplitude.
   If the spurious emission is burst type (intermittent), then the average value shall not include signal OFF time.
   If spurious emissions ranging from 30 ㎒ to 2 374 ㎒ and from 2 509.5 ㎒ to 12.5 ㎓ are over the limit, then the test result is 'Fail'.
   If spurious emissions ranging 2 374 ㎒ to 2 400 ㎒ and 2 483.5 ㎒ to 2 509.5 ㎒ are over the limit, then further detailed measurements are required, go to step (6).
6. In the following cases, measure the spurious emissions using [Setting 3]
   - Case1 : FHSS, FHSS+DSSS, FHSS+OFDM
   - **Case2 : Other than FHSS, FHSS+DSSS, FHSS+OFDM, and the spurious emissions in step (5) are over the limit**
7. Calculate the spurious emission value (Calculated Value) using following the formula below:
   Calculated Value = (Measured Value using (6) + 15.2 ㏈)
   Note: 15.2 ㏈ adjustment is derived from the Conversion Factor of RBW
   Conversion Factor of RBW = 10 x Log (Reference Bandwidth / RBW of measurement) = 15.2 [㏈]
   Where: Reference Bandwidth = 1 ㎒
   RBW of measurement = 30 ㎑
8. If the calculated value using (7) is over the limit, go to (9)
9. Configure the spectrum analyzer to [Setting 3] then make the following changes:
   Frequency: Frequency of spurious emission
   Span: 1 ㎒
10. After sweep, send the span data set to the PC
11. Convert measured data from ㏈m to Watts
12. Sum all the data using the formula below. If the sum is within the limit, the test result is Pass, otherwise Fail

$$P_s = \sum_{i=1}^{n} E_i \times \frac{S_w}{RBW \times k \times n}$$ (Equation 4.1)

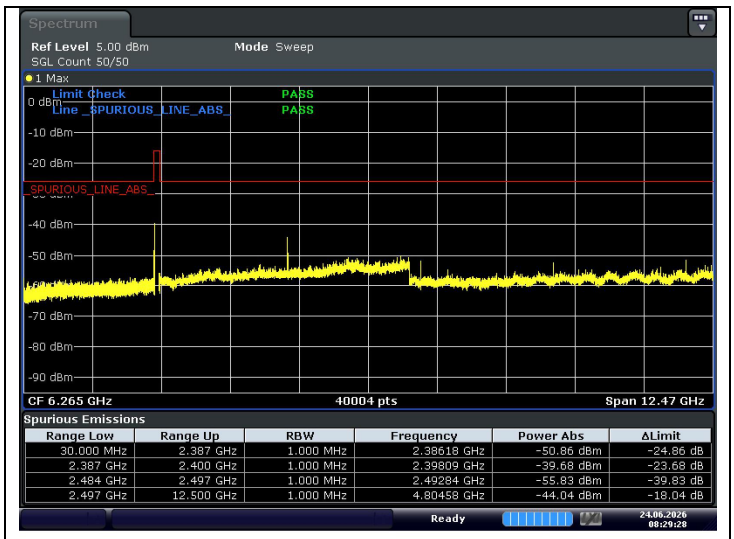
P_s: Sum (Watts)
E_i: Measured value at each point in the Span (Watts)
S_w: Span (1 ㎒)
n: Number of measurement points in the span
k: Correction factor for Equivalent Noise Bandwidth, specific to each spectrum analyzer, check the instrument user guide
RBW: Resolution Bandwidth (㎒)

4.4. Test Result

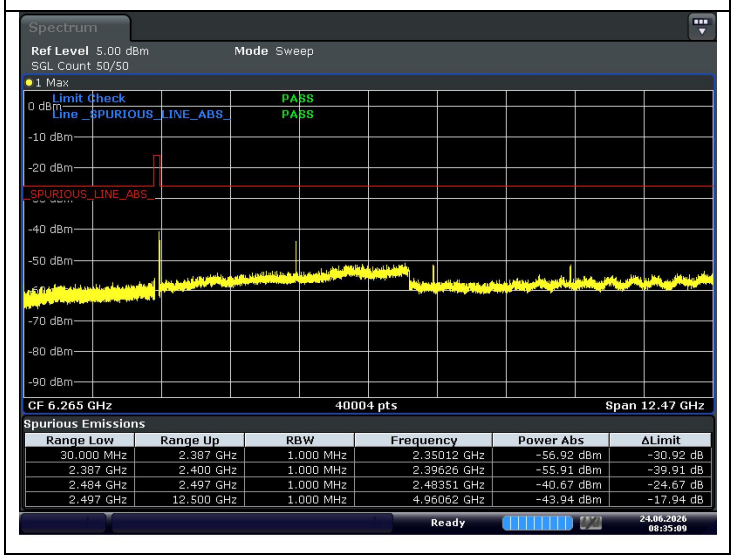
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Test Voltage (V)	Frequency Range (㎒)	Measured	Low Ch. (2 402 ㎒)	High Ch. (2 480 ㎒)	Limit
V_{nor} = 4.5	Below 2 387	Frequency (㎒)	2 386.18	2 350.12	-
		Level (dB m/㎒)	-50.86	-56.92	-26
		Level (㎶/㎒)	0.008 204	0.002 032	2.5
	2 387 to 2 400	Frequency (㎒)	2 398.09	2 396.26	-
		Level (dB m/㎒)	-39.68	-55.91	-16
		Level (㎶/㎒)	0.107 647	0.002 564	25.0
	2 483.5 to 2 496.5	Frequency (㎒)	2 492.84	2 483.51	-
		Level (dB m/㎒)	-55.83	-40.67	-16
		Level (㎶/㎒)	0.002 612	0.085 704	25.0
	Above 2 496.5	Frequency (㎒)	4 804.58	4 960.62	-
		Level (dB m/㎒)	-44.04	-43.94	-26
		Level (㎶/㎒)	0.039 446	0.040 365	2.5

Low Channel



High Channel



5. Antenna Power

5.1. Test Setup

5.2. Limit

The difference between measured output power and the rated output power shall be within a tolerance of +20 % or less. In addition, the rated output power shall not be over the limits shown below.

Limit (rated output power, upper limit)
- LE 10 ㎽ or less

5.3. Test Procedure

1. Connect transmitter output to the spectrum analyzer input port.
2. Configure the EUT
   - Modulated
   - Rated output power declared in the construction design document
3. Set the spectrum analyzer as below;

[Setting 1] – Search for peak power frequency according to below settings.

Center frequency:	2 402 ㎒, 2 480 ㎒
Span:	10 ㎒
RBW:	1 ㎒
VBW:	3 ㎒
Sweep time:	Auto
Sweep data points:	1 001 or greater
Detector mode:	Positive peak
Indication mode:	Max hold

Find the frequency of maximum transmitted power.

[Setting 2] – Measurement of average antenna power according to below settings.

Center frequency:	Frequency of peak power found using [Setting 1]
Span:	0 ㎐
RBW:	3 ㎒
VBW:	3 ㎒
Detector mode:	Sample
Sweep time:	Minimum time required to make an accurate measurement. For burst type (intermittent) transmission, sweep time shall be greater than one burst interval.
Sweep data points:	1 001 or greater

Measure the Average Burst Power of the frequency.

4. After configuring the spectrum analyzer to [Setting 1], find the frequency of maximum transmitted power.
5. After configuring the spectrum analyzer to [Setting 2], measure the Average Burst Power of the frequency Found in (4).

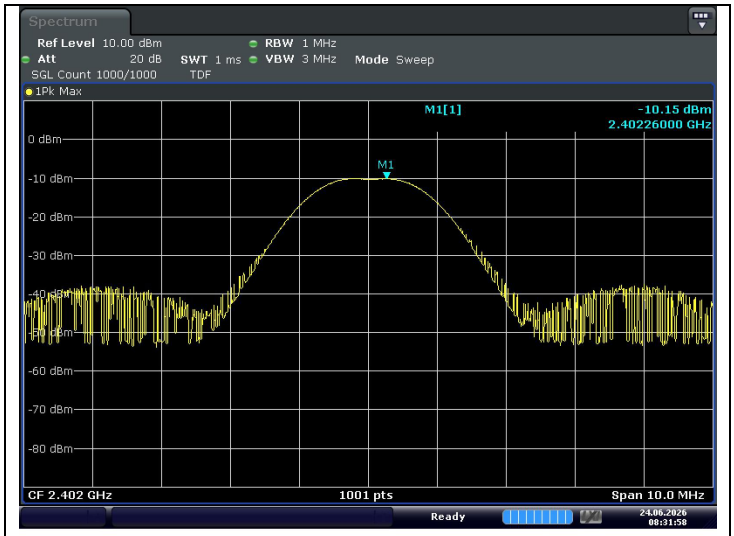
5.4. Test Result

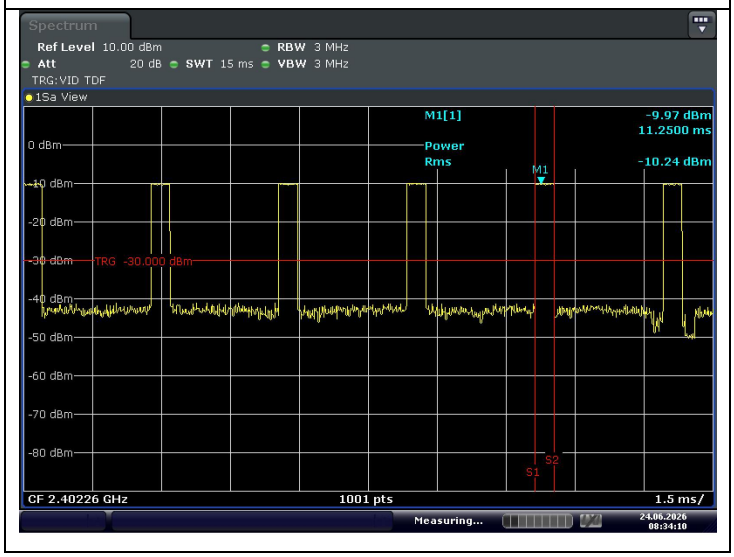
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Test Voltage (V)	Channel	Antenna Gain (dBi)	Rated Output Power		E.I.R.P. (dBm)	Average Burst Power		Tolerance (%)
			(mW)	(dBm)		(mW)	(dBm)	
V_{nor} = 4.5	Low Ch. (2 402 ㎒)	3.424	0.15	-8.24	-4.816	0.094 624	-10.24	-36.92
	High Ch. (2 480 ㎒)	3.424	0.15	-8.24	-4.816	0.075 509	-11.22	-49.66

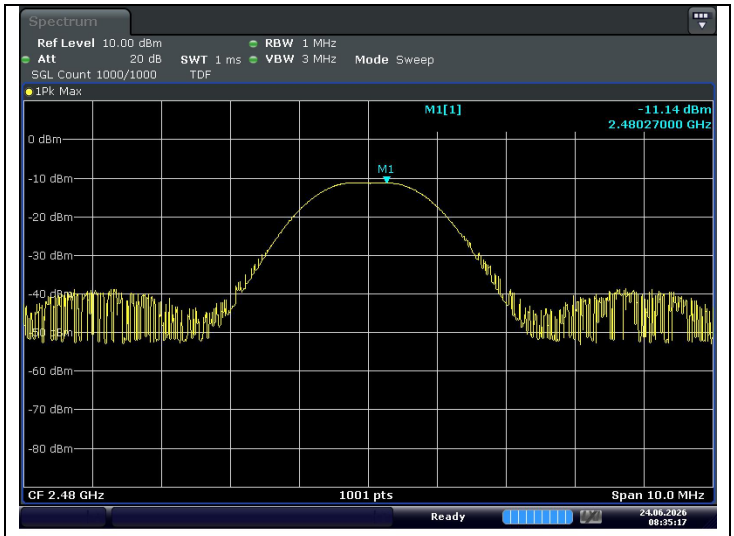
Note;
Antenna Power (mW) = Average Burst Power (mW)
Tolerance (%) = {[Antenna Power (mW) - Rated Output Power (mW)] ÷ Rated Output Power (mW)} × 100
E.I.R.P. (dBm) = Antenna gain (dBi) + Rated Output Power (dBm)

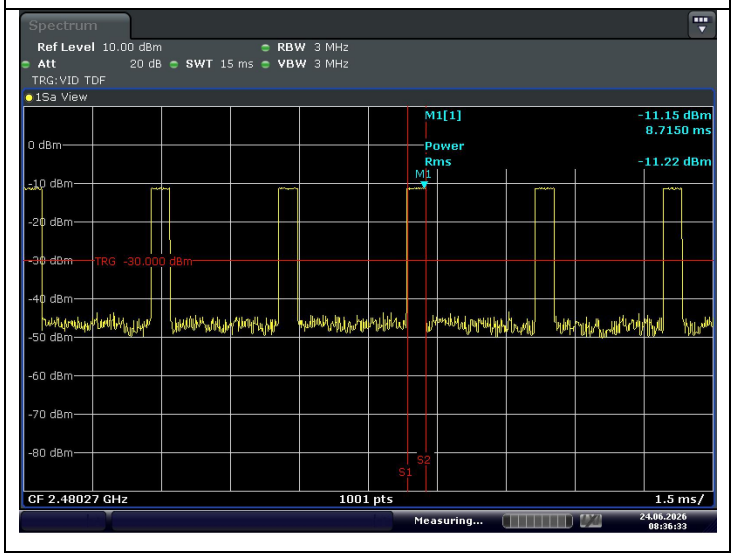
Low Channel


Spectrum
Ref Level 10.00 dBm
RBW 1 MHz
Att 20 dB
SWT 1 ms
VBW 3 MHz
Mode Sweep
SGL Count 1000/1000
TDF
1Pk Max
M1[1]
-10.15 dBm
2.40226000 GHz
M1
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.402 GHz
1001 pts
Span 10.0 MHz
Ready
24.06.2026
08:31:50


Spectrum
Ref Level 10.00 dBm
RBW 3 MHz
Att 20 dB
SWT 15 ms
VBW 3 MHz
TRG:VID TDF
1Sa View
M1[1]
-9.97 dBm
11.2500 ms
Power
Rms
-10.24 dBm
M1
0 dBm
-10 dBm
-20 dBm
-30 dBm
TRG -30.000 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
S2
S1
CF 2.40226 GHz
1001 pts
1.5 ms/
Measuring...
24.06.2026
08:34:10

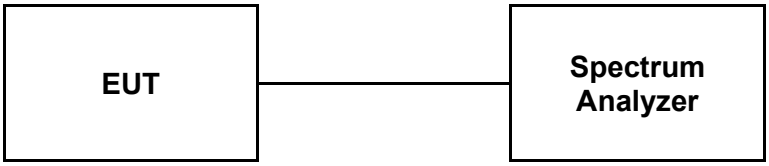
High Channel





6. Secondary Radiated Emissions

6.1. Test Setup



6.2. Limit

Below 1 ㎓: 4 �W (-54 ㏈m) or less
Above 1 ㎓: 20 �W (-47 ㏈m) or less

6.3. Test Procedure

1. Connect transmitter output to the spectrum analyzer input port.
2. The EUT should be receiver at low and high channel.
3. Set the spectrum analyzer as below;

[Setting 1]

Frequency range:		30 ㎒ - 12.5 ㎓
RBW:	Below 1 ㎓:	100 ㎑
	Above 1 ㎓:	1 ㎒
VBW:	Below 1 ㎓:	100 ㎑
	Above 1 ㎓:	1 ㎒
Sweep time:		Auto
Sweep data points:		1 001 or greater
Detector mode:		Positive peak
Indication mode:		Max hold

[Setting 2]

Center Frequency:		Frequency of spurious emission found using [Setting 1]
Span:		0 ㎐
RBW:	Below 1 ㎓:	100 ㎑
	Above 1 ㎓:	1 ㎒
VBW:	Below 1 ㎓:	100 ㎑
	Above 1 ㎓:	1 ㎒
Sweep time:		Auto
Sweep data points:		1 001 or greater
Detector mode:		Sample

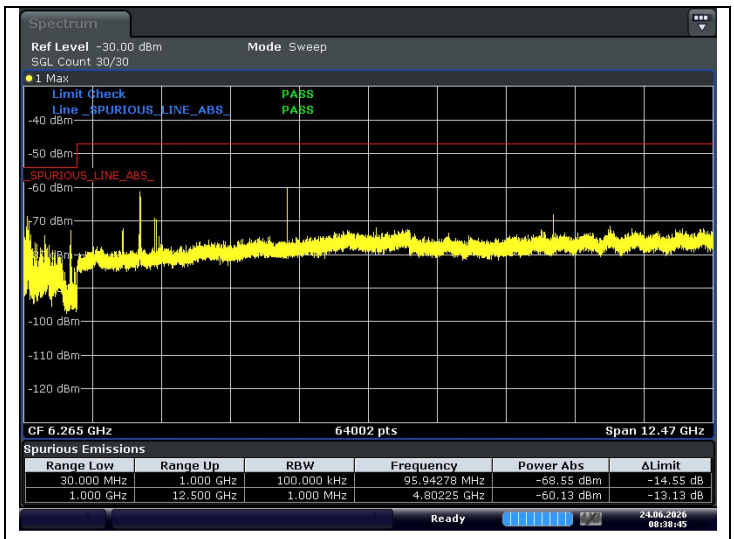
4. Configure the spectrum analyzer to [Setting 1] and then search for spurious emissions in the range 30 ㎒ to 12.5 ㎓. If the sweep range does not cover the required measurement frequency range then the measurement range will need to be divided into sufficient sections of size [RBW x Sweep Data Points].
5. If spurious emissions are found with an amplitude greater than [Limit – 10dB] then perform further detailed measurements as described in (6)
6. Configure the spectrum analyzer using [Setting 2] and measure the average signal amplitude. If the spurious emission is burst type (intermittent), then the average value shall not include signal OFF time.

6.4. Test Result

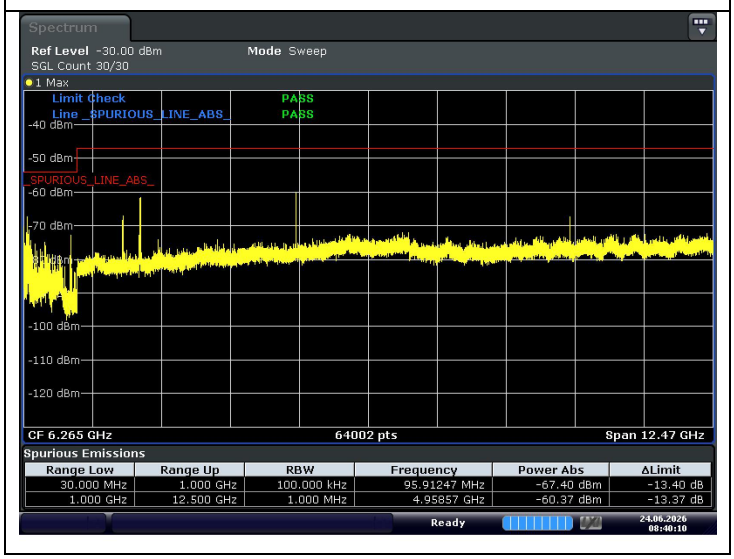
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Test Voltage (V)	Frequency Range	Measured	Low Ch. (2 402 ㎒)	High Ch. (2 480 ㎒)	Limit
V_{nor} = 4.5	30 ㎒ to 1 000 ㎒	Frequency (㎒)	95.942 78	95.912 47	-
		Level (㏈m/100 ㎑)	-68.55	-67.40	-54.00
		Level (㎁/100 ㎑)	0.139 637	0.181 970	4.00
	1 000 ㎒ to 12.5 ㎓	Frequency (㎒)	4 802.25	4 958.57	-
		Level (㏈m /㎒)	-60.13	-60.37	-47.00
		Level (㎁/㎒)	0.970 510	0.918 333	20.00

Low Channel



High Channel



7. Interference Prevention Function

7.1. Test Procedure

(1) For EUTs capable of automatically transmitting identification data
a. Transmit identification data from EUT to Demodulator
b. Confirm identification data is correctly received by Demodulator

(2) For EUTs capable of automatically receiving identification data
c. Transmit identification data from Link Partner to EUT
d. Confirm communication link is established
e. Link Partner shall respond by transmitting different identification data back to the EUT
f. Confirm EUT stops transmitting, or confirm EUT recognizes that the two identification data are different

7.2. Test Result

The unit does meet the requirements. (Pass)

- End of the Test Report -