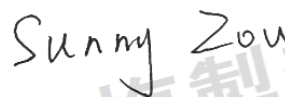


TEST REPORT

Applicant: Seeed Technology Co., Ltd.
Address: 9F, G3 Building, TCL International E City,
Zhongshanyuan Road, Nanshan District, Shenzhen,
Guangdong Province, P.R.C
Equipment Type: Wio-SX1262 Wireless Module
Model Name: Wio-SX1262 (refer to section 2.3)
Brand Name: Seeed Studio
Test Standard: MIC Ordinance Regulating Radio Equipment Article
2 paragraph 1 item (8)
Sample Arrival Date: Mar. 28, 2025
Test Date: Apr. 11, 2025 - Apr. 18, 2025
Date of Issue: Apr. 29, 2025

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

**Tested by:** Li Ganming**Checked by:** Ye Hongji**Approved by:** Sunny Zou
(Technical Director)

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Apr. 29, 2025</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1.	GENERAL INFORMATION	4
1.1	Test Laboratory	4
1.2	Test Location	4
2.	PRODUCT INFORMATION	5
2.1	Applicant Information	5
2.2	Manufacturer Information	5
2.3	General Description for Equipment under Test (EUT)	5
2.4	Technical Information	6
3.	SUMMARY OF TEST RESULTS	8
3.1	MEASUREMENT UNCERTAINTY	8
4.	GENERAL TEST CONFIGURATIONS	9
4.1	Test Environment Conditions	9
4.2	Test Equipment List	10
4.3	Description of Test Setup	11
5.	TEST ITEMS	12
5.1	Frequency Tolerance	12
5.2	Permissible value for occupied bandwidth	13
5.3	Antenna Power	14
5.4	Permissible values for unwanted emission intensity	15
5.5	Antenna Power Error Measurement	17
5.6	Limit on secondary radiated emission(receiver)	18
5.7	Adjacent Channel Leakage Power	19
5.8	Transmit time control equipment	20
5.9	Carrier Sense	22

5.10	Radio Channel.....	23
5.11	Modulation Method.....	23
5.12	Antenna.....	23
ANNEX A	TEST RESULT	24
A.1	Frequency Tolerance	24
A.2	Permission value for occupied bandwidth	27
A.3	Antenna Power.....	30
A.4	Permissible values for unwanted emission intensity	33
A.5	Antenna Power Error Measurement.....	40
A.6	Limit on secondary radiated emission(receiver).....	41
A.7	Adjacent channel leakage power	48
A.8	Transmission time control equipment.....	49
A.9	Carrier sense.....	49
ANNEX B	TEST SETUP PHOTOS	50
ANNEX C	EUT EXTERNAL PHOTOS	50
ANNEX D	EUT INTERNAL PHOTOS	50

1. GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☒ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China

2. PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Seeed Technology Co., Ltd.
Address	9F, G3 Building, TCL International E City, Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong Province, P.R.C

2.2 Manufacturer Information

Manufacturer	Seeed Technology Co., Ltd.
Address	9F, G3 Building, TCL International E City, Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong Province, P.R.C

2.3 General Description for Equipment under Test (EUT)

EUT Name	Wio-SX1262 Wireless Module
Model Name Under Test	Wio-SX1262
Series Model Name	Wio-SX1262-N
Description of Model name differentiation	There is no antenna seat difference. (this information provided by the applicant)
Hardware Version	v1.0
Software Version	v1.0
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

Antenna information:

Antenna Manufacturer	Model	Antenna Type	Antenna Gain
Seeed Technology Co., Ltd.	M01-0401030R0A	FPC Antenna	2.36 dBi
ShenZhen VLG Wireless Technology Co., Ltd	V1194-145-A-01	Dipole Antenna	8.00 dBi
Seeed Technology Co., Ltd.	M04-0101870R0A	Spring Antenna	3.11 dBi
Note: Antenna model M01-0401030R0A and M04-0101870R0A are alternative antennas, the maximum gain antenna is chosen for all test.			

2.4 Technical Information

Network and Wireless connectivity	LoRa
-----------------------------------	------

The requirement for the following technical information of the EUT was tested in this report:

Modulation Technology	LoRa	
Frequency	125 kHz	The frequency range used is 920.6 MHz – 928.0 MHz
Range	250 kHz	The frequency range used is 920.7 MHz – 927.9 MHz
Frequency Bandwidth	125 kHz, 250 kHz	
Number of channel	125 kHz	38
	250 kHz	37
Tested Channel	125 kHz	Low (920.6 MHz), Middle (924.2 MHz), High (928.0 MHz)
	250 kHz	Low (920.7 MHz), Middle (924.3 MHz), High (927.9 MHz)
Antenna Type	Dipole Antenna	
Antenna Gain	8.0 dBi (In test items related to antenna gain, the final results reflect this figure. This value is provided by the applicant.)	
About the Product	The equipment is Wio-SX1262 Wireless Module, used for data transmission.	

Channel List:

125 kHz

Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)
24	920.6(Low)	37	923.2	50	925.8
25	920.8	38	923.4	51	926.0
26	921.0	39	923.6	52	926.2
27	921.2	40	923.8	53	926.4
28	921.4	41	924.0	54	926.6
29	921.6	42	924.2(Middle)	55	926.8
30	921.8	43	924.4	56	927.0
31	922.0	44	924.6	57	927.2
32	922.2	45	924.8	58	927.4
33	922.4	46	925.0	59	927.6
34	922.6	47	925.2	60	927.8
35	922.8	48	925.4	61	928.0(High)
36	923.0	49	925.6	--	--

250 kHz

Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)
1	920.7(Low)	14	923.3	27	925.9
2	920.9	15	923.5	28	926.1
3	921.1	16	923.7	29	926.3
4	921.3	17	923.9	30	926.5
5	921.5	18	924.1	31	926.7
6	921.7	19	924.3(Middle)	32	926.9
7	921.9	20	924.5	33	927.1
8	922.1	21	924.7	34	927.3
9	922.3	22	924.9	35	927.5
10	922.5	23	925.1	36	927.7
11	922.7	24	925.3	37	927.9(High)
12	922.9	25	925.5	--	--
13	923.1	26	925.7	--	--

3. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Part	Description	Channel	Verdict
5.1	Frequency Tolerance	Low/Middle/High	Pass
5.2	Permissible value for occupied bandwidth	Low/Middle/High	Pass
5.3	Antenna Power	Low/Middle/High	Pass
5.4	Permissible values for unwanted emission intensity	Low/Middle/High	Pass
5.5	Antenna Power Error Measurement	Low/Middle/High	Pass
5.6	Limit on secondary radiated emission (receiver)	Low/Middle/High	Pass
5.7	Adjacent channel leakage power	Low/Middle/High	Pass
5.8	Transmission time control equipment	Low/Middle/High	Pass
5.9	Carrier Sense	Low/Middle/High	Pass
5.10	Radio channel	N/A	N/A Note 1
5.11	Modulation method	N/A	N/A Note 1
5.12	Antenna	N/A	Pass Note 1
Note 1: see section 2.4 for this information.			

The test channel corresponding to the frequency list

Mode	Frequency Bandwidth	Description	Frequency(MHz)
LoRa	125 kHz	Low/Middle/High(L/M/H)	920.6/924.2/928.0
	250 kHz	Low/Middle/High(L/M/H)	920.7/924.3/927.9

3.1 MEASUREMENT UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Parameters	Uncertainty
Frequency Error / 99% & 90% Bandwidth	$(3.2 \times f \times 10^{-6})$ Hz
Antenna Power	1.82 dB
TX-RX Spurious Emissions	1.84 dB
Transmission Antenna Gain	5.36 dB
Temperature	0.8°C
Humidity	4%
DC / AC Power Source	0.04%
Note: “ f ” is the nominal signal frequency in Hz.	

4. GENERAL TEST CONFIGURATIONS

4.1 Test Environment Conditions

During the measurement, the normal environment conditions were within the listed ranges:

Relative Humidity (%)	49% to 63%	
Atmospheric Pressure (kPa)	86 kPa to 106 kPa	
Temperature	+21.3°C to +25.4°C	
Working Voltage of the EUT	NV (Normal Voltage)	3.30 V
	LV (Low Voltage)	2.97 V
	HV (High Voltage)	3.63 V

Note: When the input voltage deviation from the external power supply is $\pm 10\%$, and the voltage deviation provided to the radio part of the EUT (excluding the power circuit) is kept within $\pm 1\%$, only the normal voltage is used for testing.

Voltage fluctuation results:

The measuring point is a component with schematic number.

External power supply	Rated operating voltage of EUT	Actual measured voltage of EUT	$\pm 1\%$ voltage operating range
2.970 V	3.300 V	3.301 V	3.267 V~3.333 V
3.300 V	3.300 V	3.304 V	3.267 V~3.333 V
3.630 V	3.300 V	3.305 V	3.267 V~3.333 V

4.2 Test Equipment List

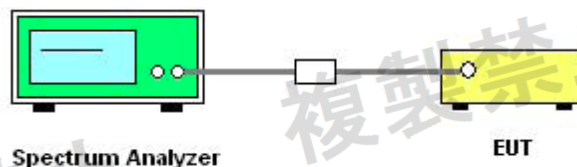
Description	Manufacturer	Model	Serial No.	Calibration Company	Calibration Address	Calibration By	Cal. Date	Cal. Due	Calibration Method
Spectrum Analyzer	KEYSIGHT	N9020A	MY46471071	Ti Testing & Certification Group Co., Ltd. Shenzhen Branch	103, Building B, Ganghongji High tech Intelligent Industrial Park, No. 1008 Songbai Road, Nanshan District, Shenzhen	Zhang Suting	2024.07.04	2025.07.03	c)
Power Sensor	KEYSIGHT	U2063XA	MY58000247	Ti Testing & Certification Group Co., Ltd. Shenzhen Branch	103, Building B, Ganghongji High tech Intelligent Industrial Park, No. 1008 Songbai Road, Nanshan District, Shenzhen	Zhang Suting	2024.07.04	2025.07.03	c)
Multimeter	Fluke	289	44860089	Ti Testing & Certification Group Co., Ltd. Shenzhen Branch	103, Building B, Ganghongji High tech Intelligent Industrial Park, No. 1008 Songbai Road, Nanshan District, Shenzhen	Huang Guoliang	2024.08.07	2025.08.06	c)
DC Power Supply	ITECH	IT6720	600103010717610007	Ti Testing & Certification Group Co., Ltd. Shenzhen Branch	103, Building B, Ganghongji High tech Intelligent Industrial Park, No. 1008 Songbai Road, Nanshan District, Shenzhen	Zhang Suting	2024.07.04	2025.07.03	c)

Note:

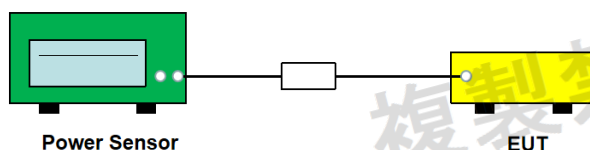
- a) Calibration conducted by the National Institute of Information and Communications Technology (NICT) (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1)
- b) Correction conducted pursuant to the provisions of Article 135 or Article 144 of the 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 measuring instruments and other equipment listed in the right column of Table No. 3 attached hereto, which shall have been given any of calibration, etc. listed above from a) to c)

4.3 Description of Test Setup

4.3.1 For Antenna Port Test

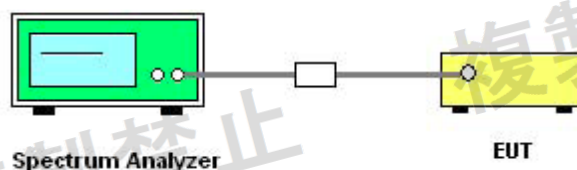


(Diagram 1)



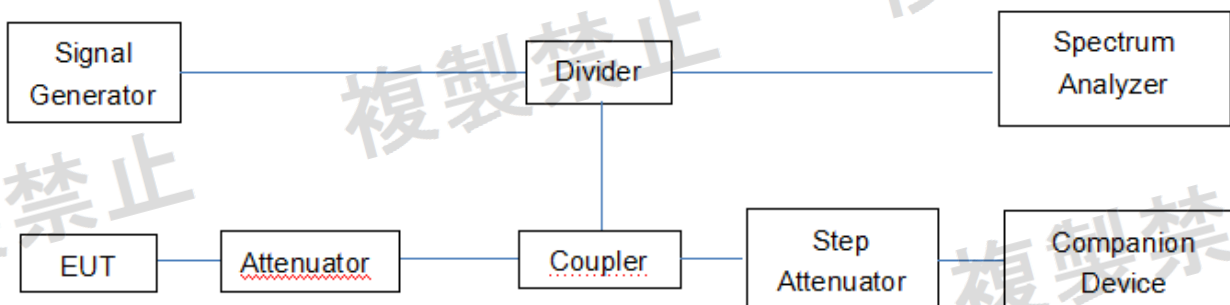
(Diagram 2)

4.3.2 For EIRP Antenna Power Test



(Diagram 3)

4.3.3 For Carrier Sense Test



(Diagram 4)

5. TEST ITEMS

5.1 Frequency Tolerance

5.1.1 Limit

Item	Limits
Frequency Tolerance	$\leq \pm 20$ ppm

5.1.2 Test Setup

See section 4.3.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.1.3 Test Procedure

- 1: In the case of unmodulated waves: Continuous burst transmission of continuous or unmodulated wave of unmodulated wave from test equipment, Measured with a frequency meter.
- 2: In the case of modulated waves (unmodulated waves can not be generated): Transmit a modulated wave whose occupied bandwidth is the maximum * from the test equipment, Set the spectrum analyzer to the setting on the right to measure the frequency. 99% Measure the frequency of "upper limit + lower limit" / 2 of power. (= OBW).

5.1.4 Test Deviation

There is no deviation with the original standard.

5.1.5 Test Result

Please refer to ANNEX A.1.

5.2 Permissible value for occupied bandwidth

5.2.1 Limit

It shall be $(200 \times n)$ kHz or less. However, in the case that the center frequency is from 928.15 MHz to 929.65 MHz, it shall be $(100 \times n)$ kHz or less. (n is a number of unit radio channels constituting the radio channel and is an integer from 1 to 5.)

5.2.2 Test set up

See section 4.3.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B

5.2.3 Test procedure

- 1: The test equipment transmits continuous burst transmission.
- 2: Transmit the modulated wave with the largest occupied bandwidth.
- 3: Measure the occupied frequency bandwidth (99% of total power) by setting the spectrum analyzer to the right setting.
- 4: Search spectrum antenna by setting spectrum analyzer as below.
 - Center frequency: Test frequency
 - SPAN: 2 to 3.5 times the allowable value of OBW
 - RBW: About 1% of the allowable value of OBW
 - VBW: equivalent to RBW
 - Number of data points: 400 or more
 - Sweep time: In the case of burst waves, the duration of one burst per sample or more
 - Sweep mode: Continuous sweep
 - Detection mode: positive peak
 - Display mode: Max hold

5.2.4 Test deviation

There is no deviation with the original standard

5.2.5 Test result

Please refer to ANNEX A.2.

5.3 Antenna Power

5.3.1 Limit

It shall be 20 mW or less. However, it shall be 1 mW or less for radio channels consisting of at least one of unit radio channels whose center frequencies are located from 916.0 MHz to 916.8 MHz or from 928.15 MHz to 929.65 MHz.

Regardless of the above specification, on and before July 24, 2012, it shall be 1 mW or less for radio channels consisting of at least one of unit radio channels whose center frequencies are located from 928.15 MHz to 929.65 MHz. It shall be 20 mW or less for radio channels consisting of only unit radio channels whose center frequencies are located from 926.2 MHz to 928.0 MHz only

5.3.2 Test Setup

See section 4.3.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

1: Continuous transmission of normal modulated wave from test equipment, continuous burst transmission

2: Search spectrum antenna by setting spectrum analyzer as below

Center frequency: Test frequency

SPAN: 2 to 3.5 times the OBW tolerance

RBW: 1 MHz

VBW: 3 times or more than RBW

Number of data points: 400 or more

Sweep time: In the case of burst waves, the duration of one burst per sample or more

Sweep mode: Continuous sweep

Detection mode: positive peak

Display mode: Max hold.

5.3.4 Test Deviation

There is no deviation with the original standard.

5.3.5 Test Result

Please refer to ANNEX A.3.

5.4 Permissible values for unwanted emission intensity

5.4.1 Limit

Frequency Band	Spurious emission /Unwanted Emission Intensity (average power)	Reference Bandwidth
$f \leq 710 \text{ MHz}$	- 36 dBm	100 kHz
$710 \text{ MHz} < f \leq 900 \text{ MHz}$	- 55 dBm	1M Hz
$900 \text{ MHz} < f \leq 915 \text{ MHz}$	- 55 dBm	100 kHz
$915 \text{ MHz} < f \leq 930 \text{ MHz}^*$ (Except for $ f-f_c \leq (200+100 \times n) \text{ kHz}$ if bandwidth of unit radio channel is 200kHz, except for $ f-f_c \leq (100+50 \times n) \text{ kHz}$ if bandwidth of unit radio channel is 100kHz. Except for $ f-f_c \leq (100+100 \times 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
$1000 \text{ MHz} < f \leq 1,215 \text{ MHz}$	- 45 dBm	1MHz
$1,215 \text{ MHz} < f$	- 30 dBm	1MHz

5.4.2 Test Setup

See section 4.3.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

- 1: Carrier suppression filter is used as necessary
- 2: Transmit from test equipment with normal modulation state / modulation degree
- 3: Set up spectrum analyzer and search for spurious

SPAN: (described in Table 1)

RBW: (described in Table 1)

VBW: equivalent to RBW

Number of data points: 400 points or more (eg 1001 points)

Sweep time: In the case of burst waves, the duration of one burst per sample or more

Sweep mode: Single sweep

Detection mode: positive peak

5.4.4 Test Deviation

There is no deviation with the original standard.

5.4.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

5.4.6 Test Result

Please refer to ANNEX A.4.

5.5 Antenna Power Error Measurement

5.5.1 Limit

+20%, -80%

5.5.2 Test Setup

See section 4.3.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

1: Continuous transmission of normal modulated wave from test equipment, continuous burst transmission

2: Search spectrum antenna by setting spectrum analyzer as below

Center frequency: Test frequency

SPAN: 2 to 3.5 times the OBW tolerance

RBW: 1 MHz

VBW: 3 times or more than RBW

Number of data points: 400 or more

Sweep time: In the case of burst waves, the duration of one burst per sample or more

Sweep mode: Continuous sweep

Detection mode: positive peak

Display mode: Max hold.

Then Detect peaks from the entire display screen with the Zone marker We will display that level in W units.

Please calculate deviation from the rated power by the following procedure. (Measurement result - rated power) ÷ (rated power) × 100 [%]

5.5.4 Test Deviation

There is no deviation with the original standard.

5.5.5 Test Result

Please refer to ANNEX A.5.

5.6 Limit on secondary radiated emission(receiver)

5.6.1 Limit

Frequency Band	Limit on Secondary Radiated Emissions (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

5.6.2 Test Setup

See section 4.3.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.6.3 Test Procedure

1: The test equipment stops transmission and puts it in a state of reception only.

2: Search for secondary fire by setting spectrum analyzer as below.

SPAN: (described in Limit Table)

RBW: (described in Limit Table)

VBW: equivalent to RBW

Number of data points: 400 points or more

Sweep time: Minimum time to guarantee measurement accuracy

Sweep mode: Single sweep

Detection mode: positive peak

5.6.4 Test Deviation

There is no deviation with the original standard.

5.6.5 EUT Operation during Test

The EUT was programmed to be in continuously receiving mode

5.6.6 Test result

Please refer to ANNEX A.6.

5.7 Adjacent Channel Leakage Power

5.7.1 Limit

Range	Limit
915.9-916.9MHz	i) Spectral power at the edge of a radio channel: It shall be -20dBm or less. ii) Leakage power in unit radio channel adjacent to a radio channel: It shall be -26dBm or less.
920.5-922.3MHz	i) Spectral power at the edge of a radio channel: It shall be -7dBm or less. ii) Leakage power in unit radio channel adjacent to a radio channel: It shall be -15dBm or less. If antenna power is reduced by 1mW or less, each adjacent channel leakage power is -26dBm or less.
922.3-928.1MHz (≤1mw)	i) Leakage power in unit radio channel adjacent to a radio channel: It shall be -26dBm or less.
922.3-928.1MHz (1mw<P<20mw)	i) Leakage power in unit radio channel adjacent to a radio channel: It shall be -15dBm or less.
928.1-929.7MHz	i) Leakage power in unit radio channel adjacent to a radio channel: It shall be -26dBm or less.

5.7.2 Test setup

See section 4.3.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.7.3 Test procedure

- 1: The test equipment transmits continuous burst transmission.
- 2: Transmit the modulated wave with the largest occupied bandwidth.
- 3: Set spectrum analyzer, measure adjacent channel leakage power
 - Center frequency: Test frequency
Radio channel width: $n \times$ unit channel
 - Adjacent channel width: Unit channel - 1 kHz * 1
 - RBW: 1 kHz
 - VBW: 3 times or more than RBW
 - Number of data points: 400 or more
 - Sweep time * 2: In the case of burst waves, the duration of one burst per sample or more
 - Sweep mode: Single sweep
 - Detection mode: positive peak

5.7.4 Test Deviation

There is no deviation with the original standard

5.7.5 Test result

Please refer to ANNEX A.7.

5.8 Transmit time control equipment

5.8.1 Limit

(1) In case the 5ms or more carrier sense is required:

If the center frequency is from 920.6MHz to 922.2MHz, or if the center frequency is from 922.4MHz to 923.4MHz, radio equipment shall stop its emission of radio wave less than 4s after it starts to emit radio wave. It shall wait 50ms or more for the consecutive emission. Meanwhile, it may emit radio wave again without waiting 50ms, if the emission time is less than 4s after its first emission, and this re-emission is started after 128 μ s or more carrier sense, and is finished less than 4s after its first emission.

(2) In case the 128 μ s or more and less than 5ms carrier sense time is required: If the center frequency is from 922.4MHz to 928.0MHz, the following conditions shall be satisfied. Using one unit radio channel: radio equipment shall stop its emission of radio wave less than 400ms after it starts to emit radio wave. The sum of emission time per arbitrary one hour shall be 360s or less. Meanwhile, if the emission time is more than 200ms, it shall wait for ten times or more of the former emission time. If the emission time is more than 6ms and is 200ms or less, it shall wait for 2ms for the consecutive emission.

Using two unit radio channels: radio equipment shall stop its emission of radio wave less than 200ms after it starts to emit radio wave. The sum of emission time per arbitrary one hour shall be 360s or less. Meanwhile if the emission time is more than 3ms, it shall wait for 2ms for the consecutive emission.

Using 3, 4, or 5 unit radio channels: radio equipment shall stop its emission of radio wave less than 100ms after it starts to emit radio wave. The sum of emission time per arbitrary one hour shall be 360s or less. Meanwhile if the emission time is more than 2ms, it shall wait 2ms for the consecutive emission.

(3) In case non carrier sense is required:

The following conditions shall be satisfied:

1. If the center frequency is from 916.0MHz to 916.8MHz, or from 922.4MHz to 928.0MHz, and the antenna power is 1mW or less, radio equipment shall stop its emission of radio wave less than 100ms after it starts to emit radio wave. It shall wait 100ms or more for the consecutive emission. The sum of emission time per arbitrary one hour shall be 3.6s or less. Meanwhile, it may emit radio wave again without waiting 100ms, if the emission time less than 100ms after its first emission

2. If the center frequency is from 928.15MHz to 929.65MHz, radio equipment shall stop its emission of radio wave less than 50ms after it starts to emit radio wave. It shall wait 50ms or more for the consecutive emission. Meanwhile, it may emit radio wave again without waiting 50ms, if the emission time is less than 50ms after its first emission and the re-emission is finished less than 50ms after its first emission.

5.8.2 Test Setup

See section 4.3.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.8.3 Test Procedure

1: From the reception state of the test equipment, the transmission time is maximum, the transmission pause time is the minimum state

2: Set the spectrum analyzer, measure the transmission signal with the rising trigger

3: Confirm that the transmission time is less than the specified value and the pause time is over the specified value

Center frequency: Test frequency

SPAN: 0 Hz

RBW: 1 MHz

VBW: same level as RBW (1 MHz)

Sweep time: about twice the allowable value (8 seconds)

Sweep mode: positive peak

Trigger condition: level rising

5.8.4 Test Deviation

There is no deviation with the original standard.

5.8.5 EUT Operation during Test

The EUT was programmed to be in switch between transmitting and receiving mode.

5.8.6 Test Result

Please refer to ANNEX A.8.

5.9 Carrier Sense

5.9.1 Limit

- (1) Radio equipment shall check if the interference exists by the career sense procedure before its new emission.
- (2) Carrier sense time shall be 128 μ s or more.
- (3) Carrier sense level, amount of received power at all of unit radio channels included in the radio channel to emit, shall be -80dBm at the antenna input. When the carrier sense level is more than -80dBm, radio equipment shall not emit any radio wave.
- (4) Carrier sense is not necessary if the antenna power is 1mW or less and the conditions of 3.4.1 (3) are satisfied

5.9.2 Test Setup

See section 4.3.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.9.3 Test Procedure

- 1: Adjust the output level of SG so that it becomes the specified level at the receiving end of the test equipment.
- 2: With the SG output OFF state, put the test equipment in the transmission state and check the output from the test equipment with the spectrum analyzer
- 3: Take test equipment into receive state
- 4: Set the SG output to the ON state, the test equipment to the transmission state, and confirm that there is no output by the spectrum analyzer

5.9.4 Test Deviation

There is no deviation with the original standard.

5.9.5 Test Result

Please refer to ANNEX A.9.

5.10 Radio Channel

N/A

Note: Please refer to section 2.4 for this information.

5.11 Modulation Method

N/A

Note: It shall not be specified, please refer to section 2.4 for this information

5.12 Antenna

5.12.1 Limit

3dBi or less (absolute gain).

The value was declared by the manufacture. please refer to section 2.4 for this information.

ANNEX A TEST RESULT

A.1 Frequency Tolerance

Test Data

125 kHz

Test Mode	Test Voltage	Test Channel	Frequency fc (MHz)	Test Frequency f (MHz)	Frequency Error ppm	Limit (ppm)	Refer to Plot	Verdict
Unmodulated	NV	Low	920.6	920.5998625	-0.15	±20	A.1.1	Pass
		Middle	924.2	924.1998625	-0.15	±20	A.1.2	Pass
		High	928.0	927.9998625	-0.15	±20	A.1.3	Pass

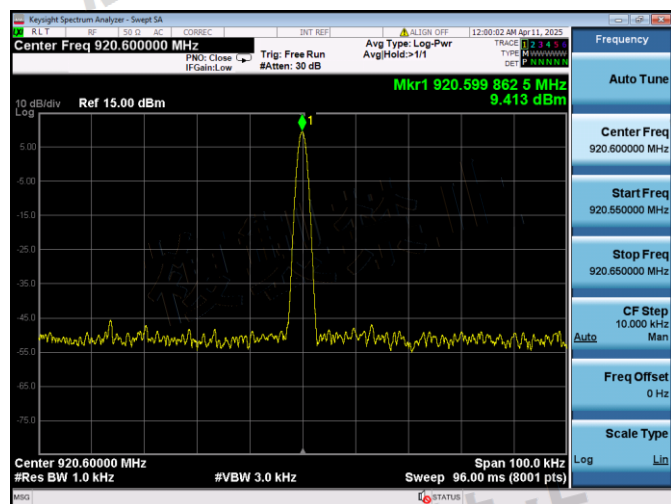
250 kHz

Test Mode	Test Voltage	Test Channel	Frequency fc (MHz)	Test Frequency f (MHz)	Frequency Error ppm	Limit (ppm)	Refer to Plot	Verdict
Unmodulated	NV	Low	920.7	920.6998375	-0.18	±20	A.1.4	Pass
		Middle	924.3	924.2998500	-0.16	±20	A.1.5	Pass
		High	927.9	927.8998625	-0.15	±20	A.1.6	Pass

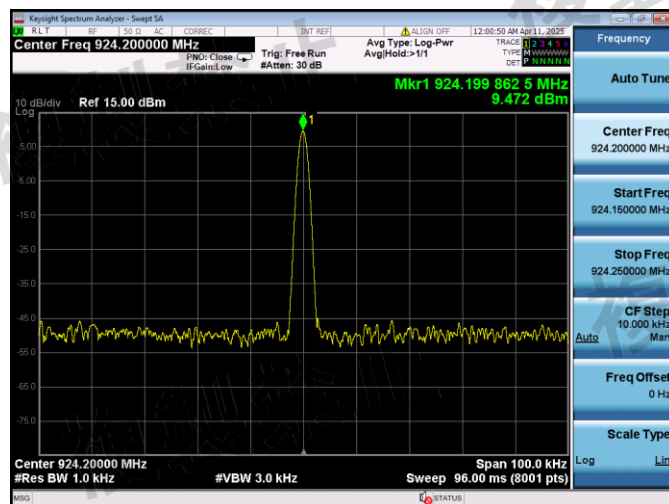
Test Plots

125 kHz

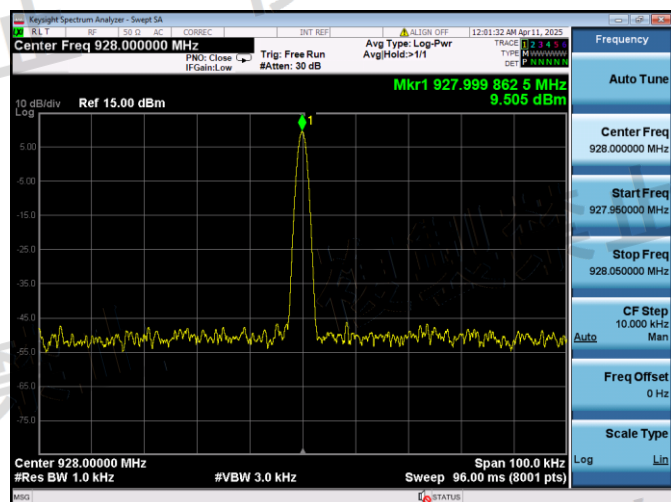
A.1.1 NV Low Channel



A.1.2 NV Middle Channel

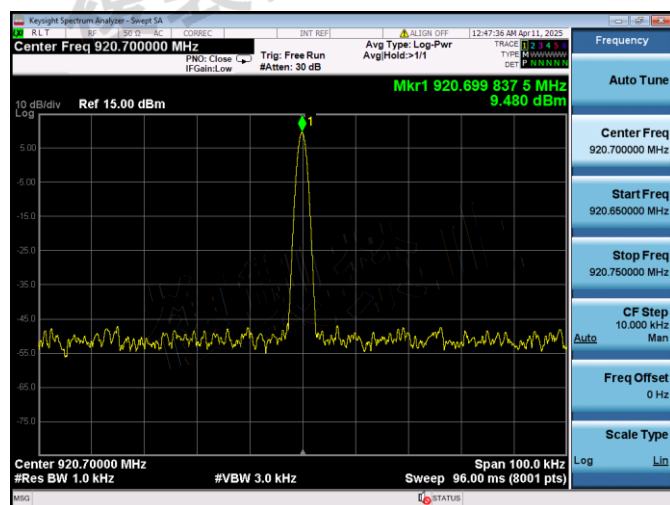


A.1.3 NV High Channel

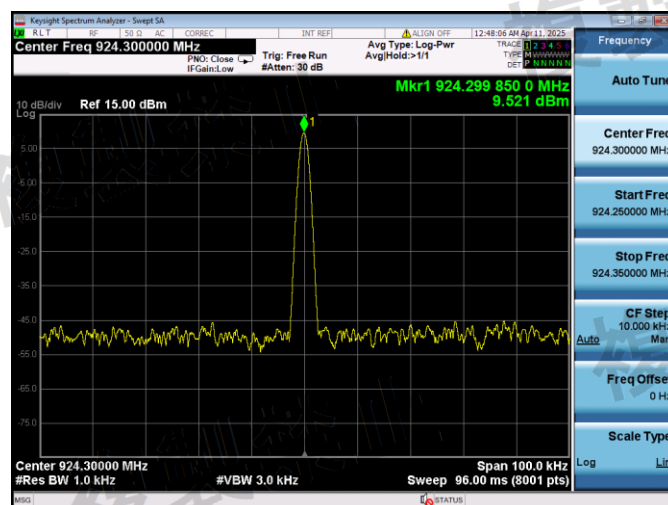


250 kHz

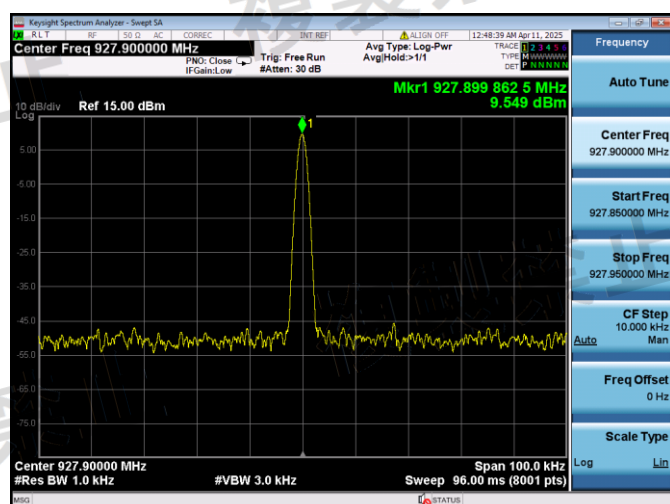
A.1.4 NV Low Channel



A.1.5 NV Middle Channel



A.1.6 NV High Channel



A.2 Permission value for occupied bandwidth

Test Data

125 kHz

Results of Occupied Bandwidth	Test Mode	Test Voltage	Test Channel	Measured Occupied Bandwidth (kHz)	Limit (kHz)	Refer to Plot	Verdict
	LoRa	NV	Low	125.10	200	A.2.1	Pass
			Middle	125.02	200	A.2.2	Pass
			High	125.00	200	A.2.3	Pass

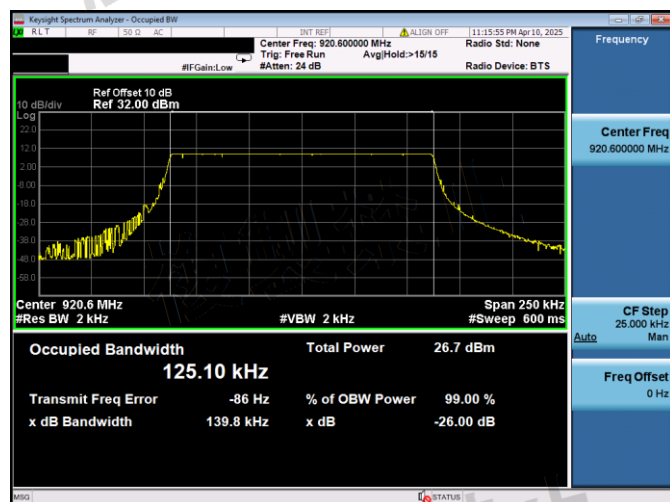
250 kHz

Results of Occupied Bandwidth	Test Mode	Test Voltage	Test Channel	Measured Occupied Bandwidth (kHz)	Limit (kHz)	Refer to Plot	Verdict
	LoRa	NV	Low	247.76	400	A.2.4	Pass
			Middle	247.76	400	A.2.5	Pass
			High	247.63	400	A.2.6	Pass

Test Plots

125 kHz

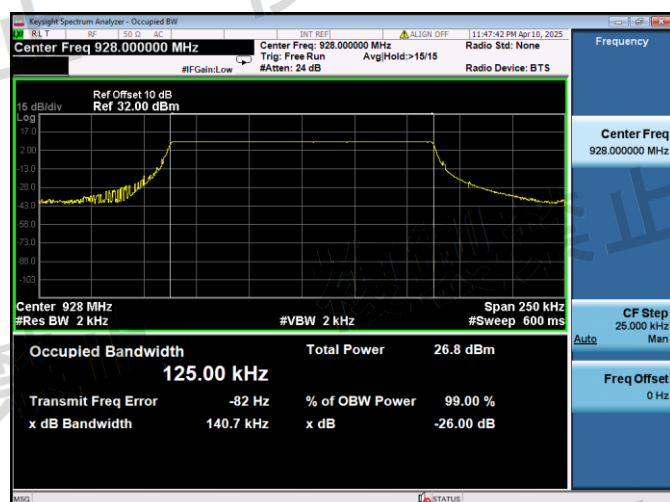
A.2.1. NV Low Channel



A.2.2. NV Middle Channel

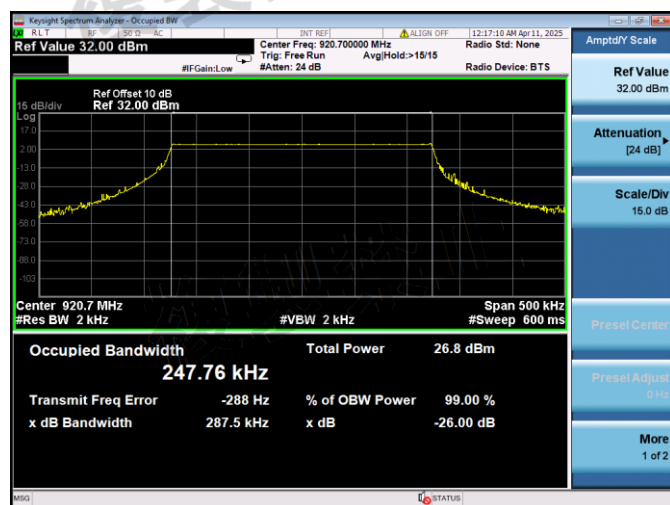


A.2.3. NV High Channel



250 kHz

A.2.4. NV Low Channel



A.2.5. NV Middle Channel



A.2.6. NV High Channel



A.3 Antenna Power

Test Data

125 kHz

Test Mode	Test Voltage	Test Channel	Frequency fc (MHz)	Measurement antenna power (dBm)	Measurement antenna power (mW)	Limit (mW)	Refer to Plot	Verdict
LoRa	NV	Low	920.6	9.72	9.37	20	A.3.1	Pass
		Middle	924.2	9.74	9.42	20	A.3.2	Pass
		High	928.0	9.74	9.42	20	A.3.3	Pass

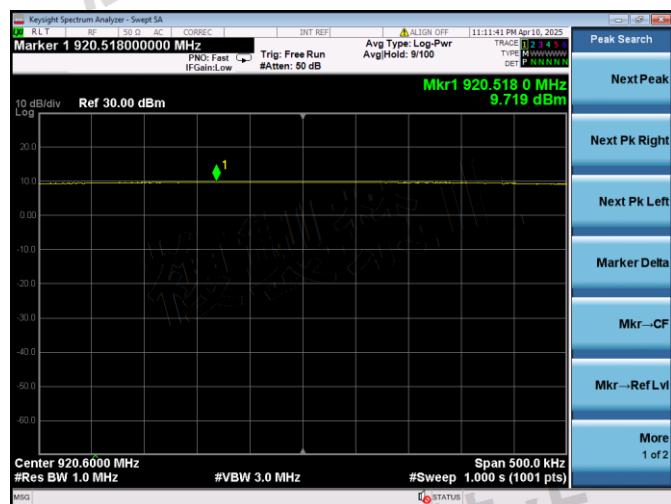
250 kHz

Test Mode	Test Voltage	Test Channel	Frequency fc (MHz)	Measurement antenna power (dBm)	Measurement antenna power (mW)	Limit (mW)	Refer to Plot	Verdict
LoRa	NV	Low	920.7	9.77	9.47	20	A.3.4	Pass
		Middle	924.3	9.78	9.50	20	A.3.5	Pass
		High	927.9	9.82	9.60	20	A.3.6	Pass

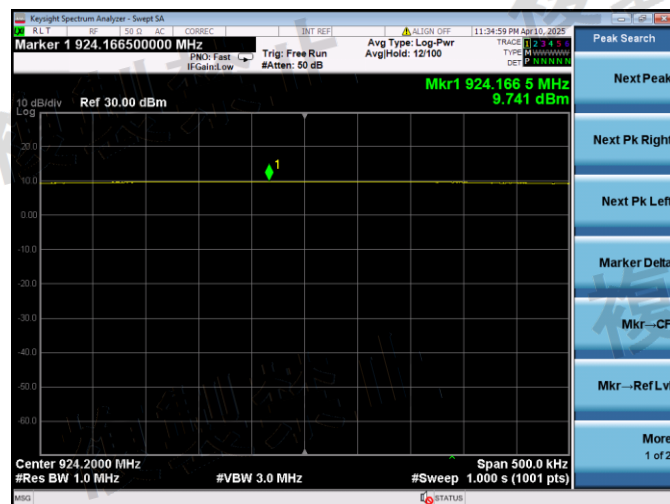
Test Plots

125 kHz

A.3.1. NV Low Channel



A.3.2. NV Middle Channel

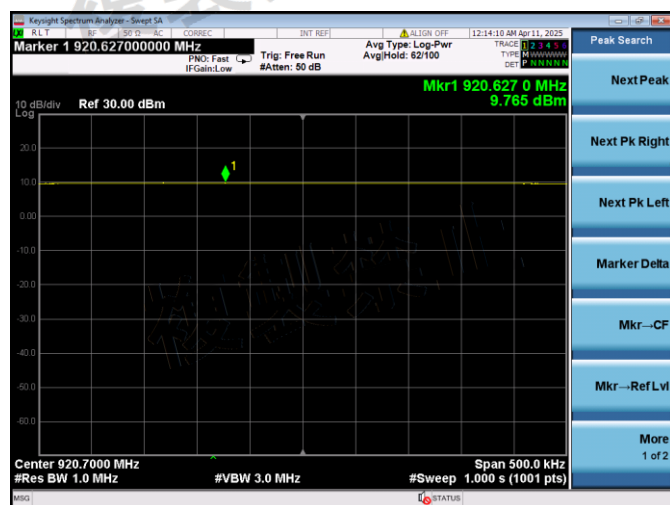


A.3.3. NV High Channel

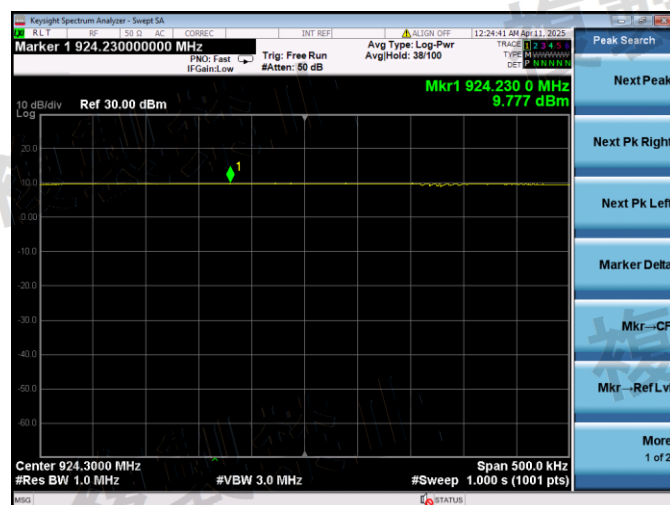


250 kHz

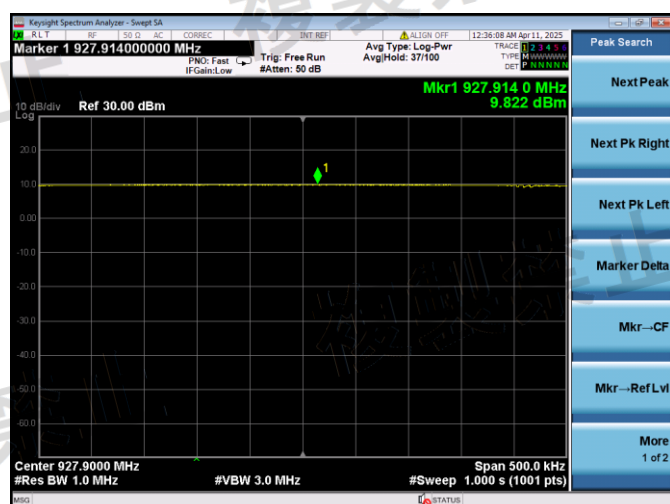
A.3.4. NV Low Channel



A.3.5. NV Middle Channel



A.3.6. NV High Channel



A.4 Permissible values for unwanted emission intensity

Test Data

125 kHz

Mode	Test Voltage	Test Channel	Test Frequency (MHz)	Refer to Plot	Verdict
LoRa	NV	Low	920.6	A.4.1	Pass
		Middle	924.2	A.4.2	Pass
		High	928.0	A.4.3	Pass

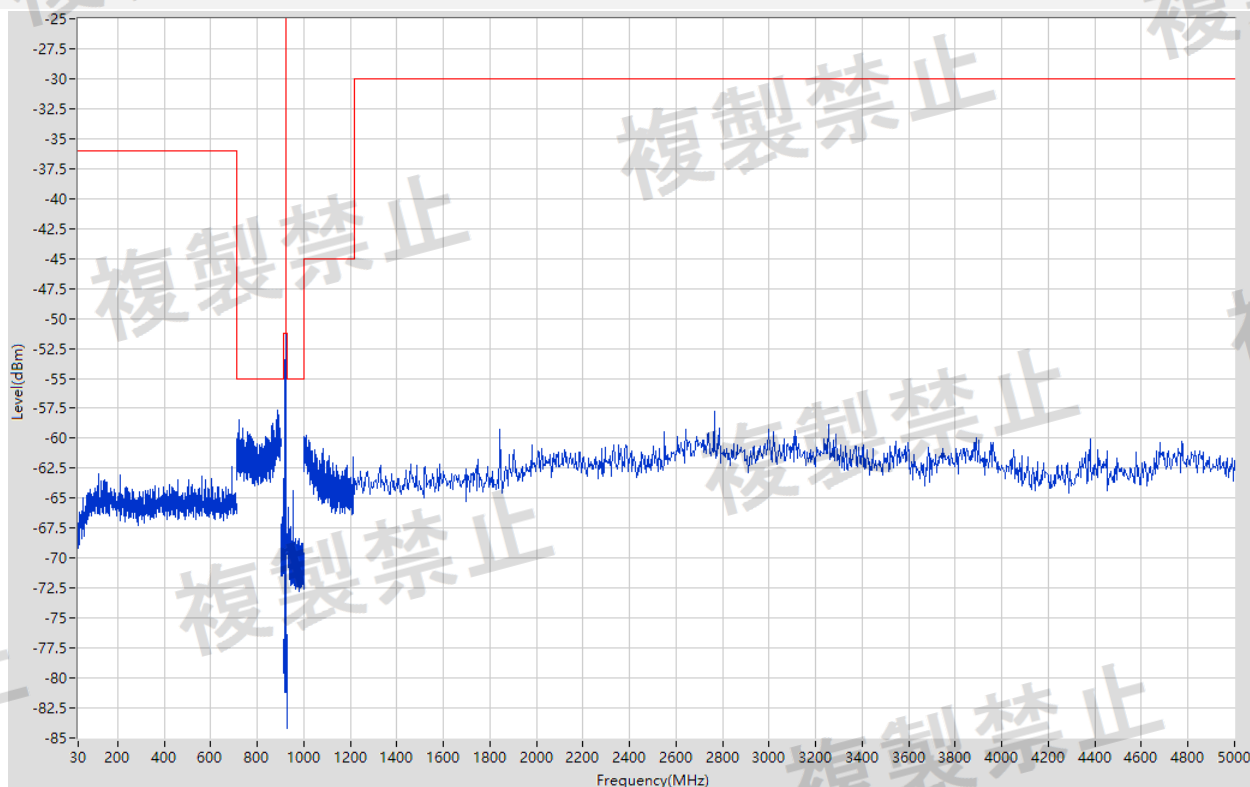
250 kHz

Mode	Test Voltage	Test Channel	Test Frequency (MHz)	Refer to Plot	Verdict
LoRa	NV	Low	920.7	A.4.4	Pass
		Middle	924.3	A.4.5	Pass
		High	927.9	A.4.6	Pass

Test Plots

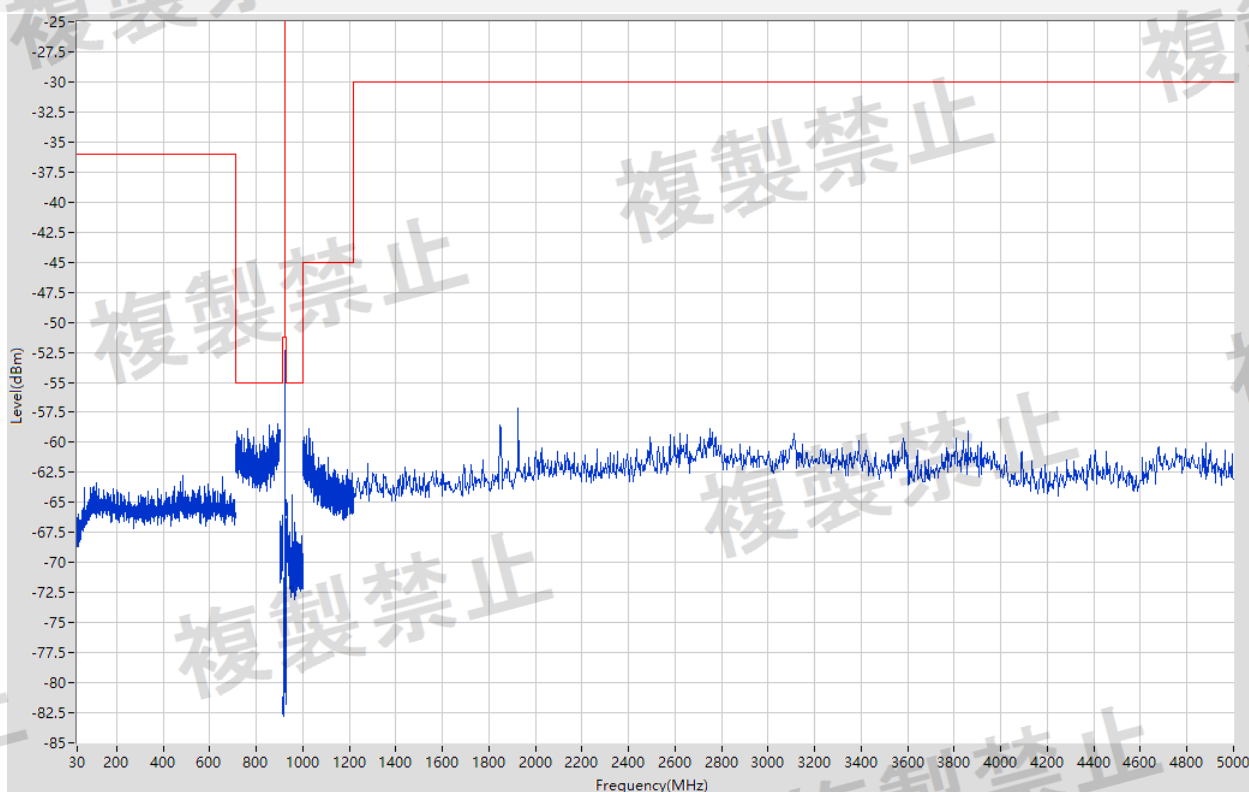
125 kHz

A.4.1 LoRa NV Low Channel



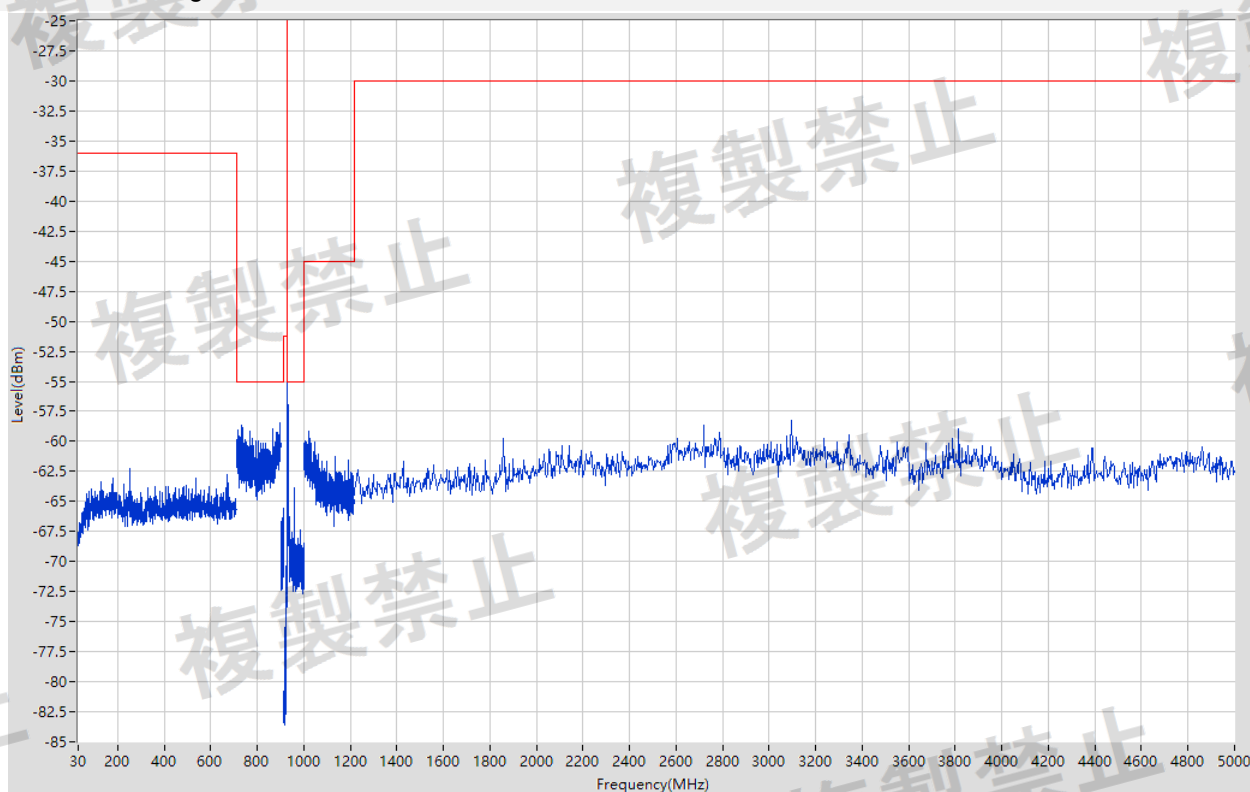
Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)	Verdict	Sweep Point
30	710	0.1	Peak	690.28	-62.37	-36	26.37	Pass	1001
710	900	1	Peak	888.79	-57.69	-55	2.69	Pass	1001
900	915	0.1	Peak	914.76	-63.41	-55	8.41	Pass	1001
915	920.3	0.003	Peak	920.284	-47.26	-51.2	-3.94	N/A	1001
920.9	930	0.003	Peak	920.9	-53.41	-51.2	2.21	Pass	1001
930	1000	0.1	Peak	952.54	-64.39	-55	9.39	Pass	1001
1000	1215	1	Peak	1010.965	-59.75	-45	14.75	Pass	1001
1215	5000	1	Peak	2763.065	-57.78	-30	27.78	Pass	1001

A.4.2 LoRa NV Middle Channel



Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)	Verdict	Sweep Point
30	710	0.1	Peak	482.2	-62.79	-36	26.79	Pass	1001
710	900	1	Peak	893.16	-58.47	-55	3.47	Pass	1001
900	915	0.1	Peak	913.89	-66.06	-55	11.06	Pass	1001
915	923.9	0.003	Peak	923.9	-53.33	-51.2	2.13	Pass	1001
924.5	930	0.003	Peak	924.522	-52.37	-51.2	1.17	Pass	1001
930	1000	0.1	Peak	956.25	-64.41	-55	9.41	Pass	1001
1000	1215	1	Peak	1024.51	-58.82	-45	13.82	Pass	1001
1215	5000	1	Peak	1926.58	-57.13	-30	27.13	Pass	1001

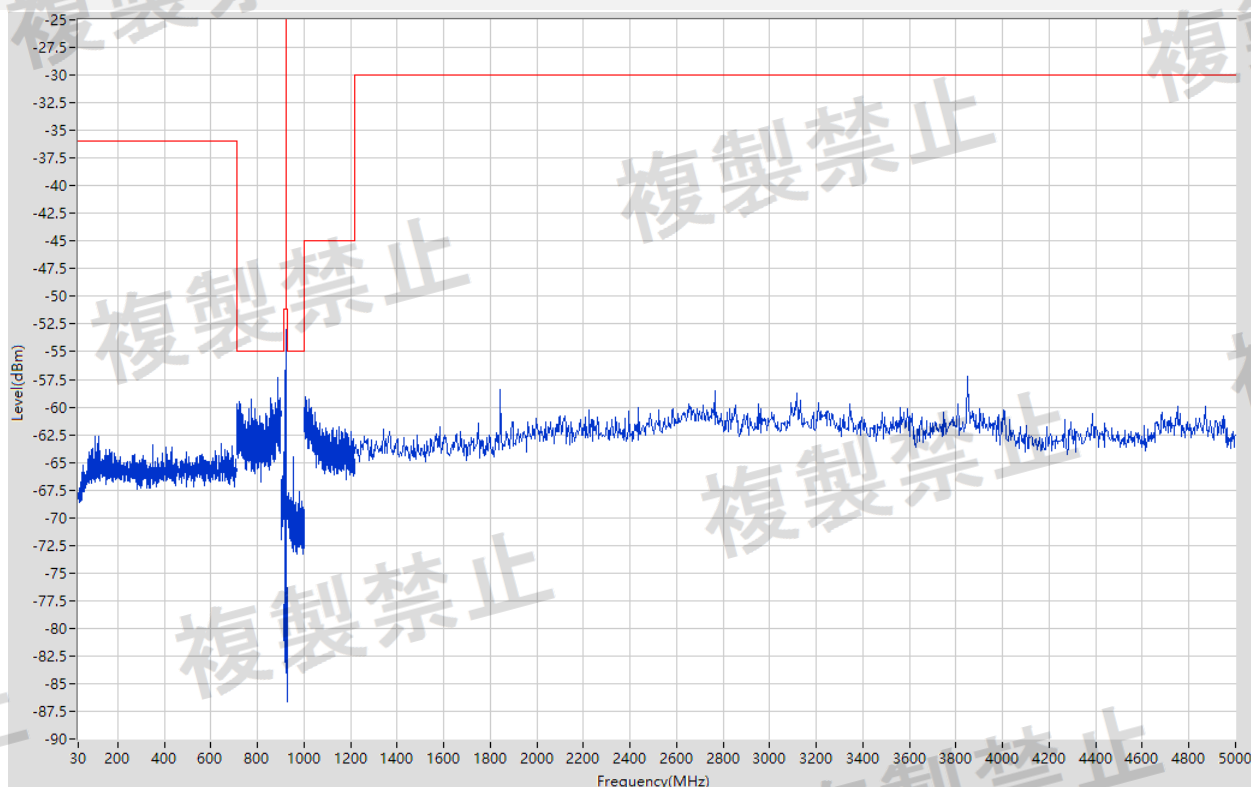
A.4.3 LoRa NV High Channel



Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)	Verdict	Sweep Point
30	710	0.1	Peak	254.4	-62.31	-36	26.31	Pass	1001
710	900	1	Peak	897.53	-58.5	-55	3.5	Pass	1001
900	915	0.1	Peak	913.845	-65.59	-55	10.59	Pass	1001
915	927.7	0.003	Peak	927.7	-52.2	-51.2	1	Pass	1001
928.3	930	0.003	Peak	928.3	-54.07	-51.2	2.87	Pass	1001
930	1000	0.1	Peak	930	-55.19	-55	0.19	Pass	1001
1000	1215	1	Peak	1019.995	-59.11	-45	14.11	Pass	1001
1215	5000	1	Peak	3096.145	-58.29	-30	28.29	Pass	1001

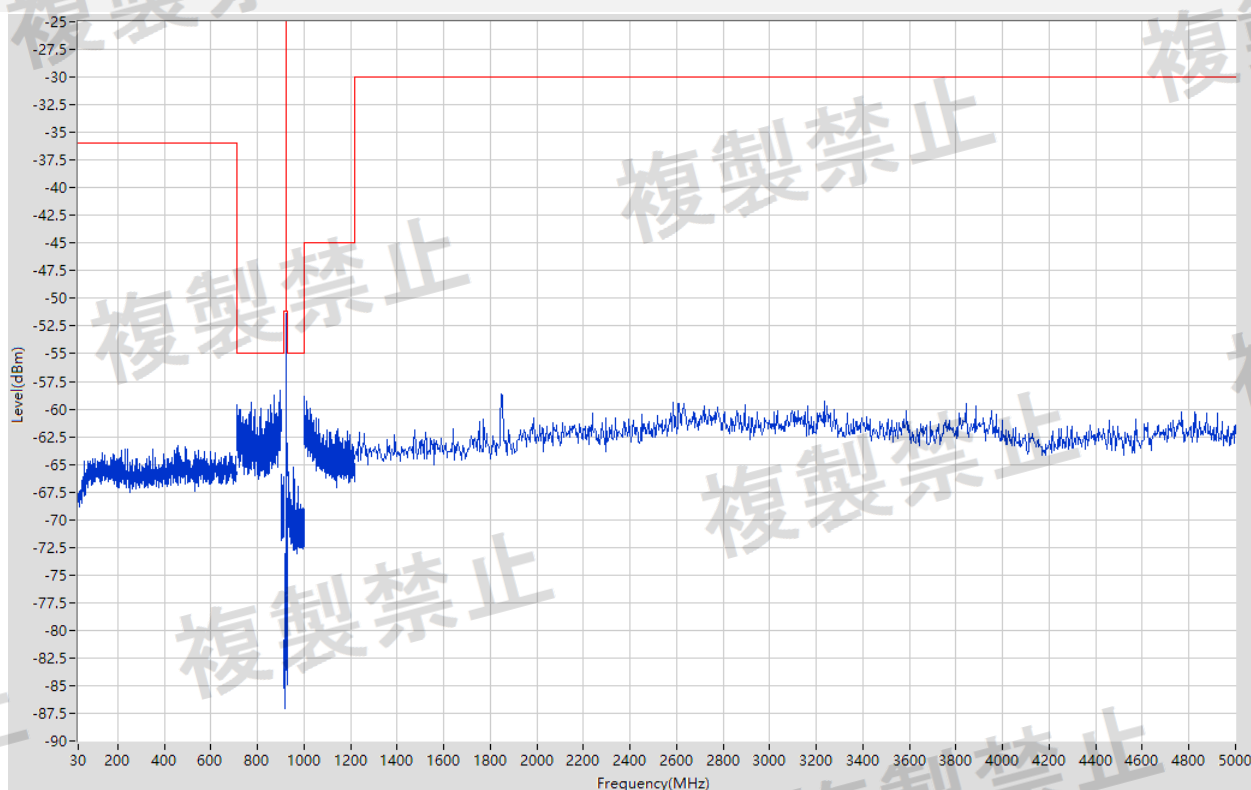
250 kHz

A.4.4 LoRa NV Low Channel



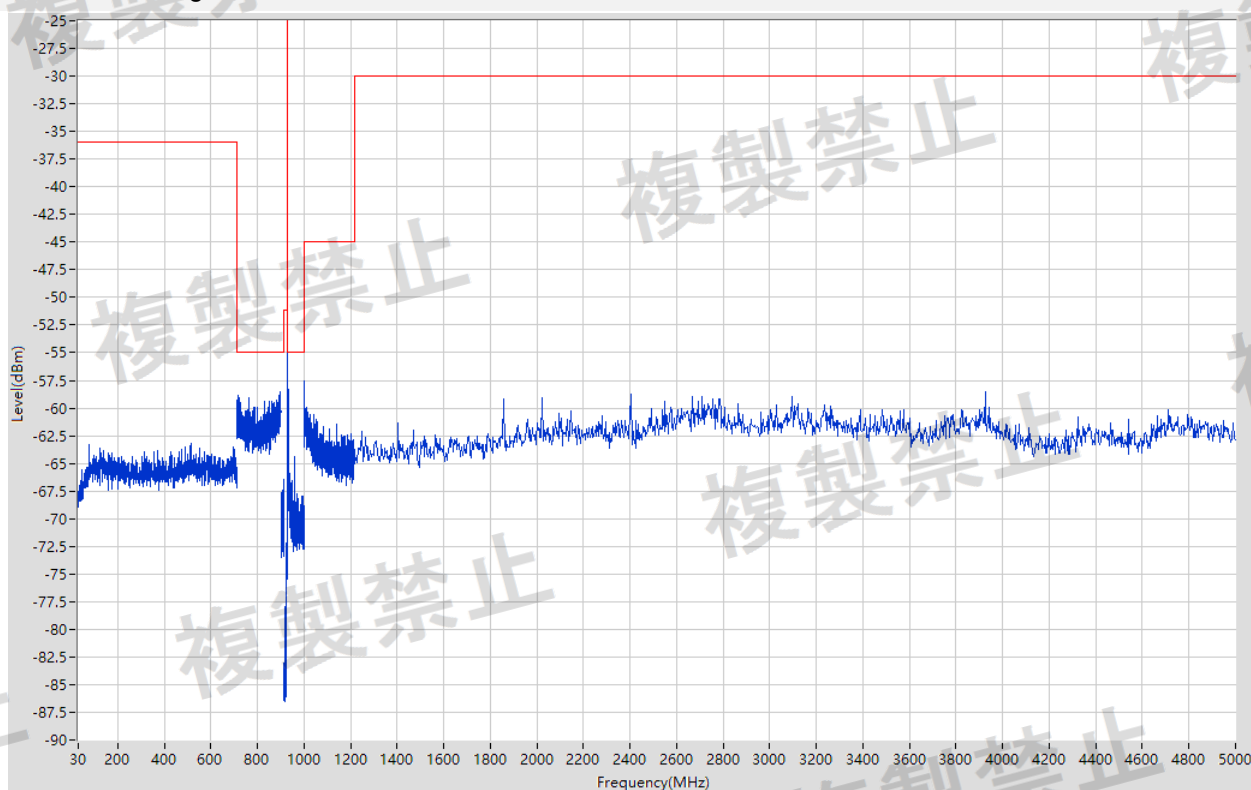
Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)	Verdict	Sweep Point
30	710	0.1	Peak	104.8	-62.61	-36	26.61	Pass	1001
710	900	1	Peak	888.03	-57.35	-55	2.35	Pass	1001
900	915	0.1	Peak	912.06	-64.03	-55	9.03	Pass	1001
915	920.4	0.003	Peak	920.395	-53.64	-51.2	2.44	Pass	1001
921	930	0.003	Peak	921.027	-52.99	-51.2	1.79	Pass	1001
930	1000	0.1	Peak	952.68	-64.48	-55	9.48	Pass	1001
1000	1215	1	Peak	1004.73	-59.06	-45	14.06	Pass	1001
1215	5000	1	Peak	3849.36	-57.19	-30	27.19	Pass	1001

A.4.5 LoRa NV Middle Channel



Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)	Verdict	Sweep Point
30	710	0.1	Peak	457.72	-63.3	-36	27.3	Pass	1001
710	900	1	Peak	899.05	-58.31	-55	3.31	Pass	1001
900	915	0.1	Peak	902.46	-65.94	-55	10.94	Pass	1001
915	924	0.003	Peak	923.991	-53.27	-51.2	2.07	Pass	1001
924.6	930	0.003	Peak	924.611	-51.39	-51.2	0.19	Pass	1001
930	1000	0.1	Peak	930.28	-63.09	-55	8.09	Pass	1001
1000	1215	1	Peak	1001.72	-58.87	-45	13.87	Pass	1001
1215	5000	1	Peak	1847.095	-58.63	-30	28.63	Pass	1001

A.4.6 LoRa NV High Channel



Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)	Verdict	Sweep Point
30	710	0.1	Peak	516.2	-63.16	-36	27.16	Pass	1001
710	900	1	Peak	896.01	-58.51	-55	3.51	Pass	1001
900	915	0.1	Peak	911.85	-66.42	-55	11.42	Pass	1001
915	927.6	0.003	Peak	927.6	-47.07	-51.2	-4.13	N/A	1001
928.2	930	0.003	Peak	928.204	-50.35	-51.2	-0.85	N/A	1001
930	1000	0.1	Peak	930.28	-55.39	-55	0.39	Pass	1001
1000	1215	1	Peak	1001.075	-57.56	-45	12.56	Pass	1001
1215	5000	1	Peak	3925.06	-58.54	-30	28.54	Pass	1001

A.5 Antenna Power Error Measurement

Test Result

125 kHz

Manufacturer declares the conducted power density = 10.0000 mW

Test Voltage	Test Channel	Test Frequency (MHz)	Antenna Power (dBm)	Antenna Power (mW)	Antenna Power Error (%)	Verdict
NV	Low	920.6	7.72	5.9156	-34.27%	Pass
	Middle	924.2	7.74	5.9429	-33.97%	Pass
	High	928.0	7.74	5.9429	-33.97%	Pass

EIRP Antenna Power

Test Voltage	Test Channel	Measured EIRP (dBm)	Limit (dBm)	Verdict
NV	Low	15.72	16	Pass
	Middle	15.74		Pass
	High	15.74		Pass

250 kHz

Manufacturer declares the conducted power density = 10.0000 mW

Test Voltage	Test Channel	Test Frequency (MHz)	Antenna Power (dBm)	Antenna Power (mW)	Antenna Power Error (%)	Verdict
NV	Low	920.7	7.77	5.9841	-40.16%	Pass
	Middle	924.3	7.78	5.9979	-40.02%	Pass
	High	927.9	7.82	6.0534	-39.47%	Pass

EIRP Antenna Power

Test Voltage	Test Channel	Measured EIRP (dBm)	Limit (dBm)	Verdict
NV	Low	15.77	16	Pass
	Middle	15.78		Pass
	High	15.82		Pass

A.6 Limit on secondary radiated emission(receiver)

Test Data

125 kHz

Mode	Test Voltage	Test Channel	Test Frequency (MHz)	Refer to Plot	Verdict
LoRa	NV	Low	920.6	A.6.1	Pass
		Middle	924.2	A.6.2	Pass
		High	928.0	A.6.3	Pass

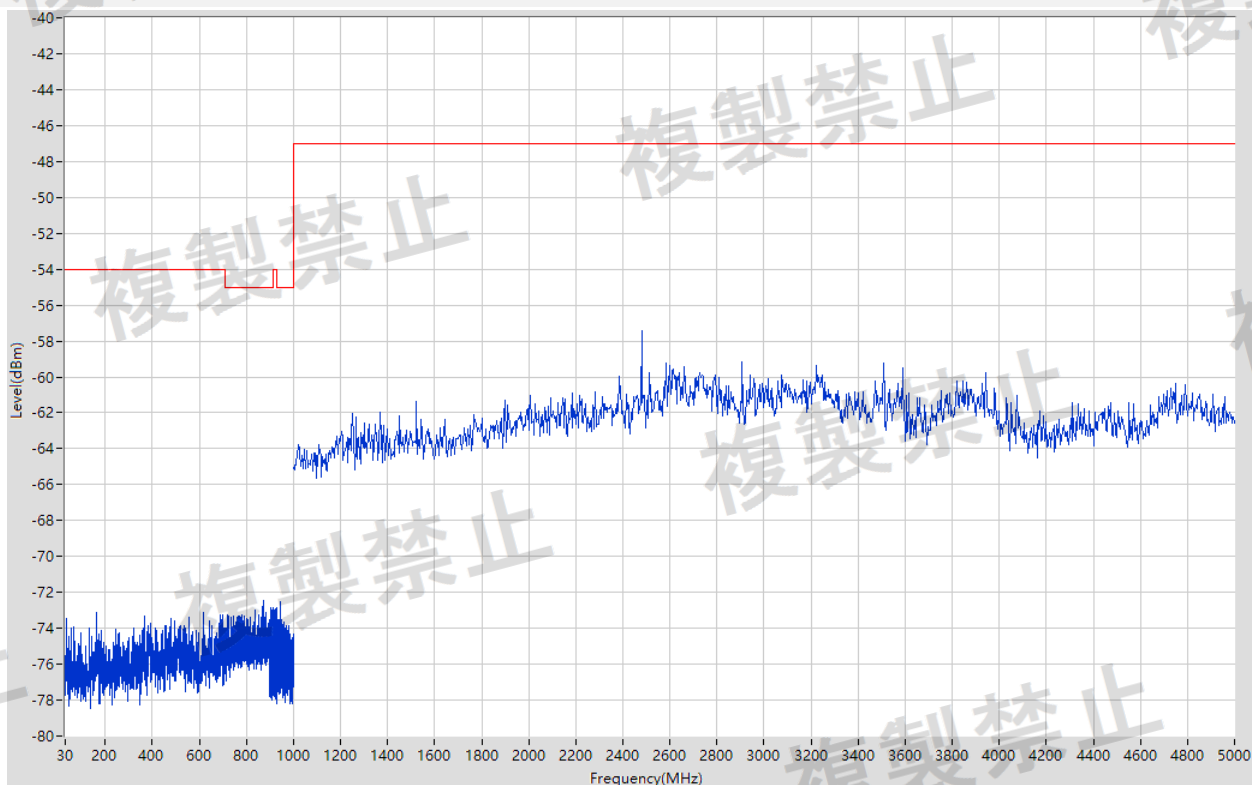
250 kHz

Mode	Test Voltage	Test Channel	Test Frequency (MHz)	Refer to Plot	Verdict
LoRa	NV	Low	920.7	A.6.4	Pass
		Middle	924.3	A.6.5	Pass
		High	927.9	A.6.6	Pass

Test Plots

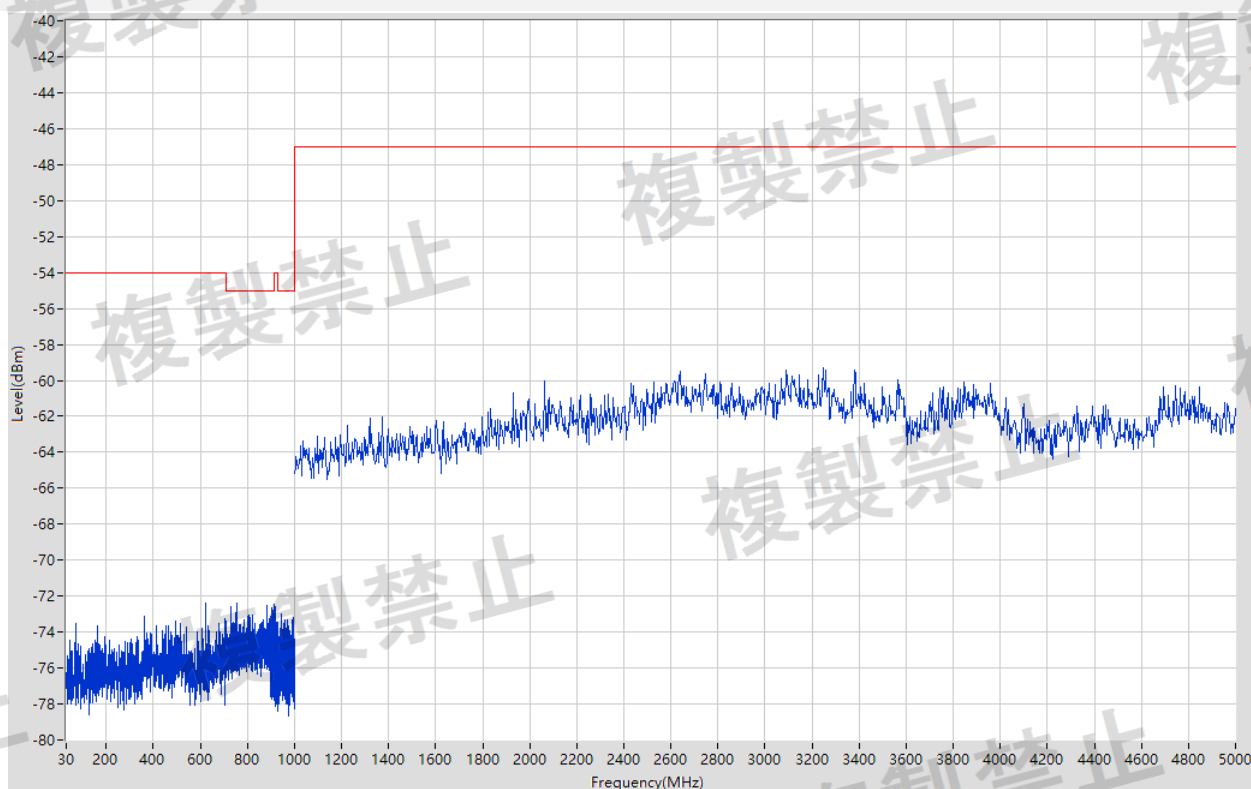
125 kHz

A.6.1 LoRa NV Low Channel



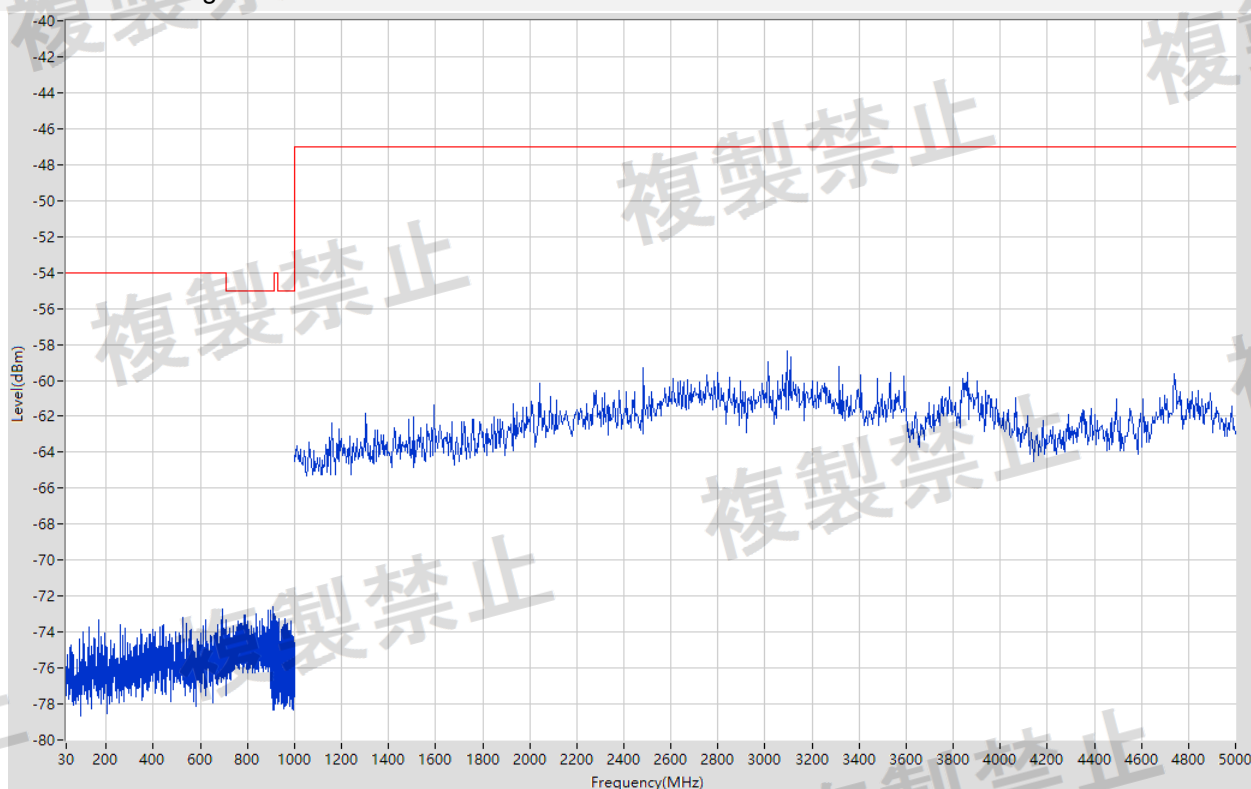
Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)	Verdict	Sweep Point
30	710	0.1	Peak	163.28	-73.14	-54	19.14	Pass	1001
710	900	1	Peak	874.92	-72.48	-55	17.48	Pass	1001
900	915	0.1	Peak	901.875	-72.83	-55	17.83	Pass	1001
915	930	0.1	Peak	929.01	-72.86	-54	18.86	Pass	1001
930	1000	0.1	Peak	943.72	-72.55	-55	17.55	Pass	1001
1000	5000	1	Peak	2480	-57.4	-47	10.4	Pass	1001

A.6.2 LoRa NV Middle Channel



Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)	Verdict	Sweep Point
30	710	0.1	Peak	620.92	-72.4	-54	18.4	Pass	1001
710	900	1	Peak	757.12	-72.42	-55	17.42	Pass	1001
900	915	0.1	Peak	912.24	-72.48	-55	17.48	Pass	1001
915	930	0.1	Peak	918.69	-72.58	-54	18.58	Pass	1001
930	1000	0.1	Peak	943.72	-73.01	-55	18.01	Pass	1001
1000	5000	1	Peak	3248	-59.32	-47	12.32	Pass	1001

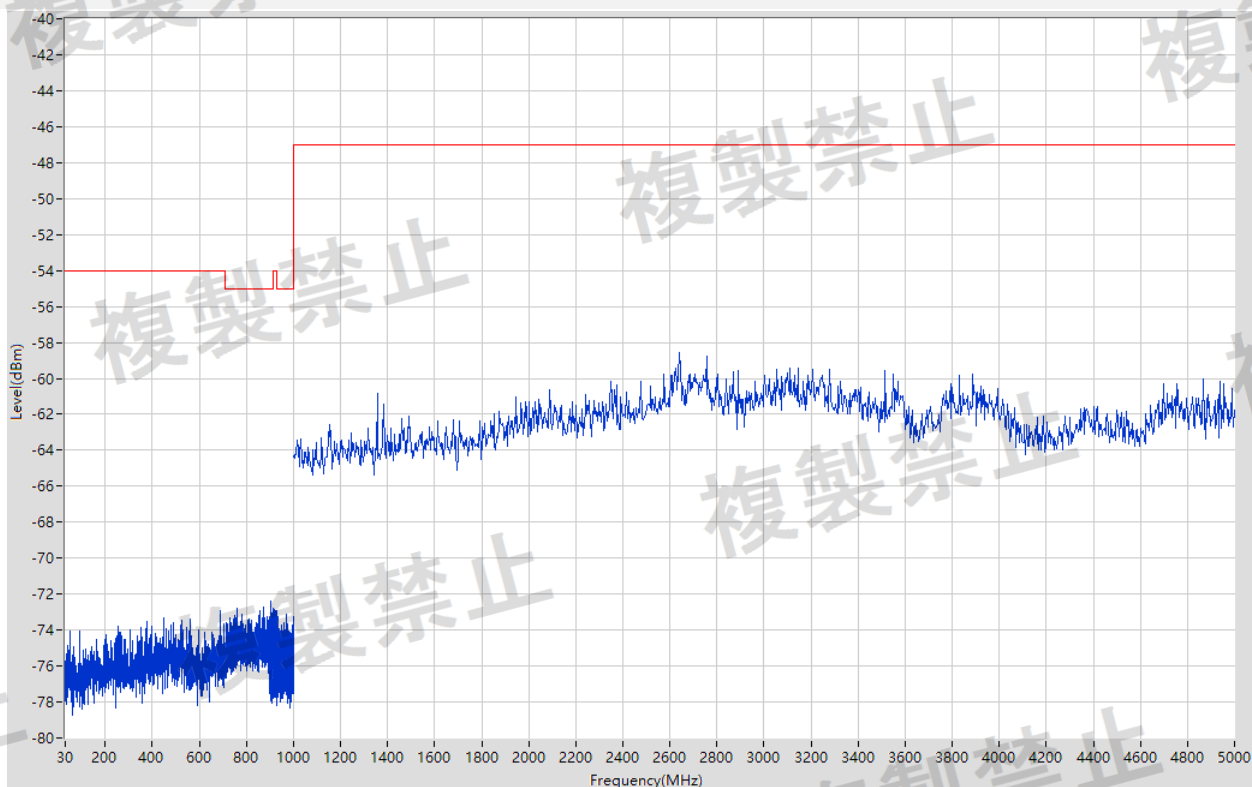
A.6.3 LoRa NV High Channel



Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)	Verdict	Sweep Point
30	710	0.1	Peak	696.4	-72.72	-54	18.72	Pass	1001
710	900	1	Peak	886.51	-72.82	-55	17.82	Pass	1001
900	915	0.1	Peak	908.52	-72.62	-55	17.62	Pass	1001
915	930	0.1	Peak	915.12	-72.99	-54	18.99	Pass	1001
930	1000	0.1	Peak	935.39	-73.27	-55	18.27	Pass	1001
1000	5000	1	Peak	3096	-58.36	-47	11.36	Pass	1001

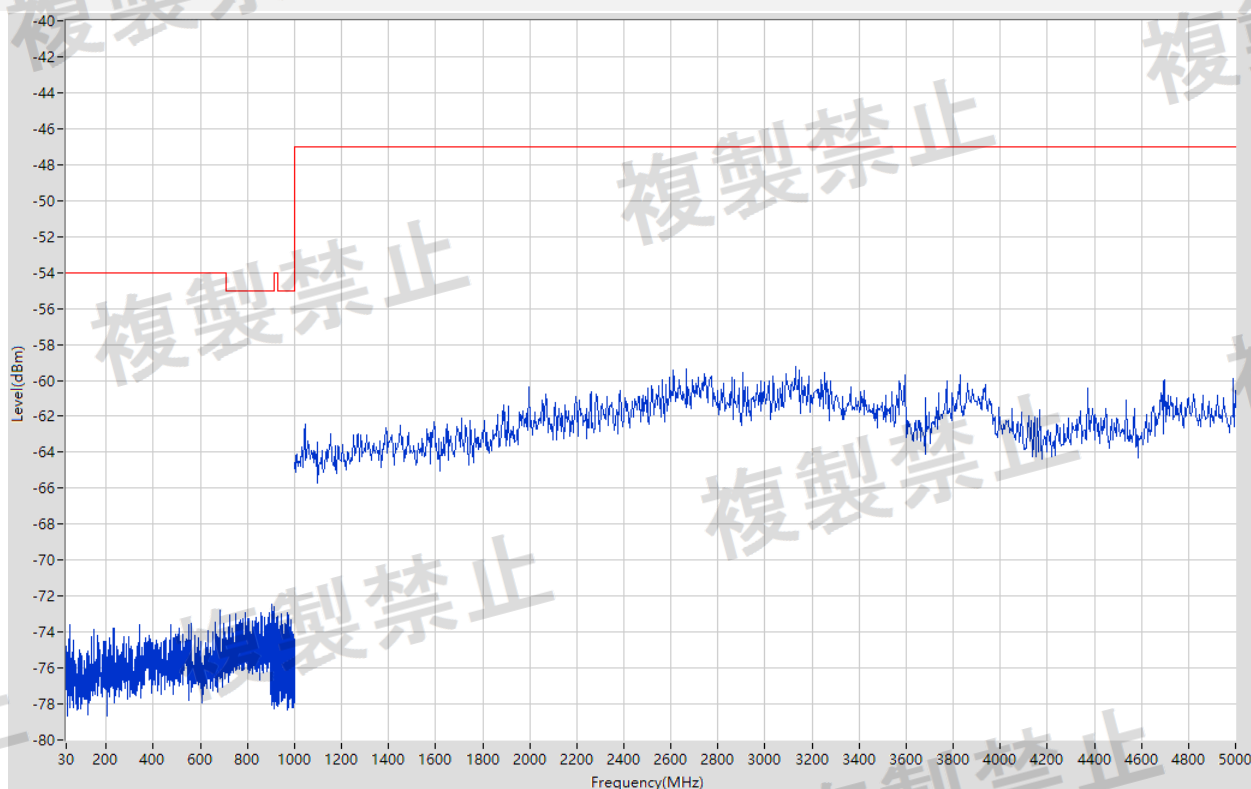
250 kHz

A.6.4 LoRa NV Low Channel



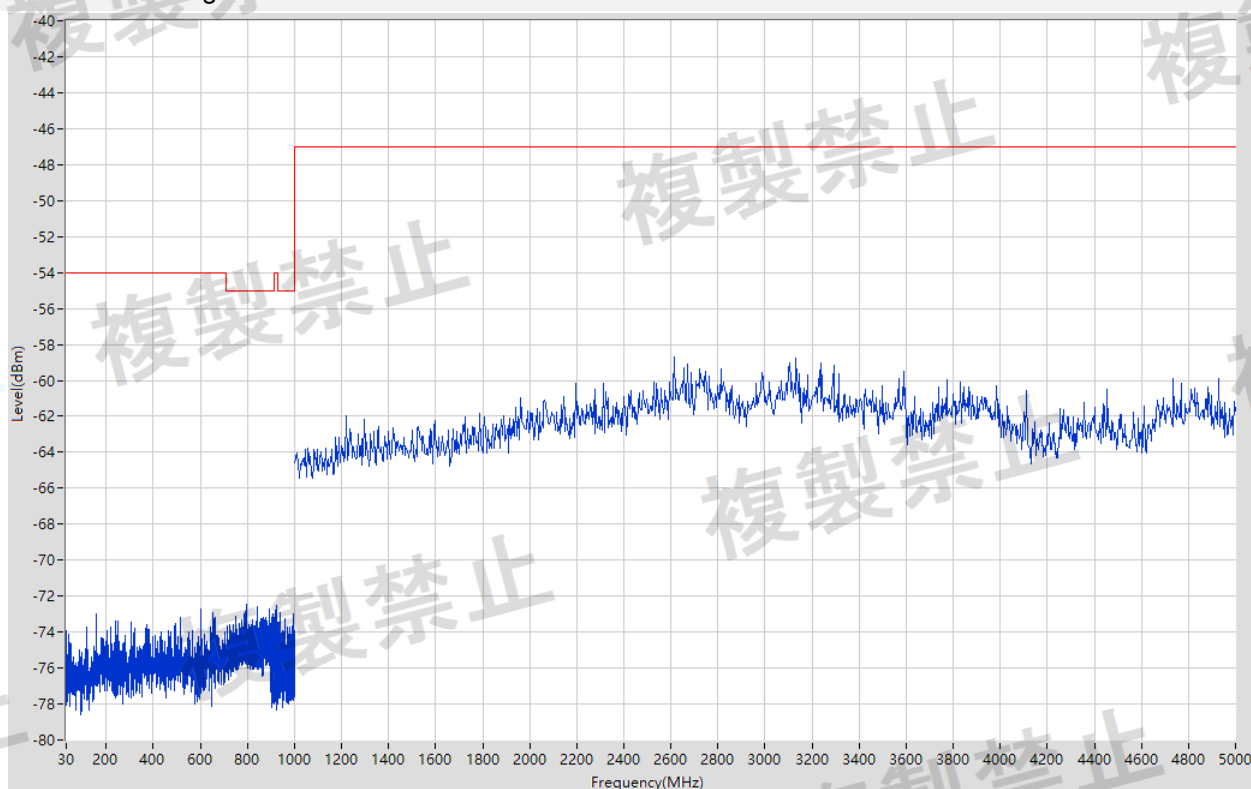
Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)	Verdict	Sweep Point
30	710	0.1	Peak	688.24	-72.91	-54	18.91	Pass	1001
710	900	1	Peak	874.16	-72.75	-55	17.75	Pass	1001
900	915	0.1	Peak	904.335	-72.37	-55	17.37	Pass	1001
915	930	0.1	Peak	915.27	-72.79	-54	18.79	Pass	1001
930	1000	0.1	Peak	971.02	-73.09	-55	18.09	Pass	1001
1000	5000	1	Peak	2640	-58.6	-47	11.6	Pass	1001

A.6.5 LoRa NV Middle Channel



Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)	Verdict	Sweep Point
30	710	0.1	Peak	685.52	-72.81	-54	18.81	Pass	1001
710	900	1	Peak	894.87	-72.89	-55	17.89	Pass	1001
900	915	0.1	Peak	904.275	-72.44	-55	17.44	Pass	1001
915	930	0.1	Peak	928.92	-73.13	-54	19.13	Pass	1001
930	1000	0.1	Peak	971.86	-72.92	-55	17.92	Pass	1001
1000	5000	1	Peak	3128	-59.25	-47	12.25	Pass	1001

A.6.6 LoRa NV High Channel



Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)	Verdict	Sweep Point
30	710	0.1	Peak	602.56	-72.72	-54	18.72	Pass	1001
710	900	1	Peak	794.55	-72.45	-55	17.45	Pass	1001
900	915	0.1	Peak	910.005	-72.97	-55	17.97	Pass	1001
915	930	0.1	Peak	925.185	-72.53	-54	18.53	Pass	1001
930	1000	0.1	Peak	936.93	-72.91	-55	17.91	Pass	1001
1000	5000	1	Peak	2616	-58.72	-47	11.72	Pass	1001

A.7 Adjacent channel leakage power

Test Data

125 kHz

Test Mode	Test Channel	Test Voltage	The edge of channel	Measurement Power(dBm)	Limit (dBm)	Verdict
LoRa	Low	NV	Left	-42.50	-15.0	Pass
			Right	-42.35	-15.0	Pass
	Middle	NV	Left	-41.34	-15.0	Pass
			Right	-40.99	-15.0	Pass
	High	NV	Left	-41.50	-15.0	Pass
			Right	-41.81	-15.0	Pass

250 kHz

Test Mode	Test Channel	Test Voltage	The edge of channel	Measurement Power(dBm)	Limit (dBm)	Verdict
LoRa	Low	NV	Left	-47.77	-15.0	Pass
			Right	-47.25	-15.0	Pass
	Middle	NV	Left	-46.67	-15.0	Pass
			Right	-47.45	-15.0	Pass
	High	NV	Left	-44.04	-15.0	Pass
			Right	-46.48	-15.0	Pass

A.8 Transmission time control equipment

Test Data

125 kHz

Test Mode	Test Channel	Test Voltage	Test TX on time (s)	Test TX off time (ms)	Limit on time (s)	Limit off time (ms)	Verdict	Total TX on time (s/1hour)	Total TX on time Limit (s/1hour)	Verdict
LoRa	Middle	NV	0.20	4.00	<0.4	>2.00	Pass	180.00	360	Pass

250 kHz

Test Mode	Test Channel	Test Voltage	Test TX on time (s)	Test TX off time (ms)	Limit on time (s)	Limit off time (ms)	Verdict	Total TX on time (s/1hour)	Total TX on time Limit (s/1hour)	Verdict
LoRa	Middle	NV	0.20	4.00	<0.4	>2.00	Pass	180.00	360	Pass

A.9 Carrier sense

Test Mode	Test Voltage	Test Channel	Test Result (ID Code)	Verdict
LoRa	NV	Low	GOOD	Pass
		Middle	GOOD	Pass
		High	GOOD	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2531376-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2531376-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2531376-AI.PDF”.

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--END OF REPORT--