FCC - TEST REPORT

Report Number	:	**68.950.23.0749.01**	Date of Issue:	**August 19, 2023**
Model No.	:	**HH4V-152600-1000-10**		
Product Type	:	Electronic Fence Receiver		
Applicant	:	Hangzhou Hopechart IoT Technology Co., Ltd.		
Address	:	17th Floor, Hongquan Building, 35 Qizhi Street, Xixing Street, Binjiang District, 310051, Hangzhou city, Zhejiang Province, PEOPLE'S REPUBLIC OF CHINA		
Manufacturer	:	Zhejiang Hongquan Electronic Technology Co., Ltd.		
Address	:	508 Tianzihu Avenue, Tianzihu Town, Anji County, 313300, Huzhou City, Zhejiang Province, PEOPLE'S REPUBLIC OF CHINA		
Test Result	:	■ **Positive** ☐ Negative		
Total pages including Appendices	:	**33**		

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2 Details about the Test Laboratory

Details about the Test Laboratory
Test Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch Building 12 & 13, Zhiheng Wisdomland Business Park, Guankou Erlu, Nantou, Nanshan District Shenzhen 518052 P.R. China
Telephone:	86 755 8828 6998
Fax:	86 755 8828 5299
FCC Registration No.:	514049
FCC Designation Number:	CN5009
IC Registration No.:	10320A

3 Description of the Equipment Under Test

Product:	Electronic Fence Receiver
Model No.:	HH4V-152600-1000-10
FCC ID:	2A2NKHQB204-S01-023
Options and accessories:	N/A
Rating:	Rechargeable Li-ion battery (3.5-4.2VDC) or powered by external USB (5VDC)
RF Transmission Frequency:	905.25MHz-921.5MHz
No. of Operated Channel:	51
Modulation:	LORA
Antenna Type:	FPC antenna
Antenna Gain:	-7.04dBi
Description of the EUT:	The Equipment Under Test (EUT) is an Electronic Fence Receiver which supports LORA function operated at 905.25MHz-921.5MHz.

Operate Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	905.250	14	909.800	28	914.350	42	918.900
1	905.575	15	910.125	29	914.675	43	919.225
2	905.900	16	910.450	30	915.000	44	919.550
3	906.225	17	910.775	31	915.325	45	919.875
4	906.550	18	911.100	32	915.650	46	920.200
5	906.875	19	911.425	33	915.975	47	920.525
6	907.200	20	911.750	34	916.300	48	920.850
7	907.525	21	912.075	35	916.625	49	921.175
8	907.850	22	912.400	36	916.950	50	921.500
9	908.175	23	912.725	37	917.275	---	
10	908.500	24	913.050	38	917.600	---	
11	908.825	25	913.375	39	917.925	---	
12	909.150	26	913.700	40	918.250	---	
13	909.475	27	914.025	41	918.575	---	

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4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2021 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

Test Method:
KDB 558074 D01 15.247 Meas Guidance v05r02
ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

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5 Summary of Test Results

Technical Requirements					
FCC Part 15 Subpart C					
Test Condition		Test Site	Test Result		
			Pass	Fail	N/A
§15.207	Conducted emission AC power port	---	☐	☐	☒
§15.247 (b)(2)	Conducted peak output power	Site 1	☒	☐	☐
§15.247(a)(1)(i)	20dB bandwidth	Site 1	☒	☐	☐
§15.247(a)(1)	Carrier frequency separation	Site 1	☒	☐	☐
§15.247(a)(1)(i)	Number of hopping frequencies	Site 1	☒	☐	☐
§15.247(a)(1)(i)	Dwell Time	Site 1	☒	☐	☐
§15.247(a)(2)	6dB bandwidth and 99% Occupied Bandwidth	---	☐	☐	☒
§15.247(e)	Power spectral density	---	☐	☐	☒
§15.247(d)	Spurious RF conducted emissions	Site 1	☒	☐	☐
§15.247(d)	Band edge	Site 1	☒	☐	☐
§15.247(d) & §15.209 & §15.205	Spurious radiated emissions for transmitter	Site 1	☒	☐	☐
§15.203	Antenna requirement	See note 2	☒	☐	☐

Note 1: N/A=Not Applicable.
Note 2: The EUT uses a FPC antenna, which gain is -7.04dBi. In accordance to §15.203, it is considered sufficiently to comply with the provisions of this section.

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6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2A2NKHQB204-S01-023 complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules.

SUMMARY:

All tests according to the regulations cited on page 5 were.

■ - Performed

☐ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date:	August 07, 2023
Testing Start Date:	August 07, 2023
Testing End Date:	August 16, 2023

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -

Reviewed by:	Prepared by:	Tested by:
John Zhi	Sanvin Zheng	Carry Cai
Project Manager	Project Engineer	Test Engineer

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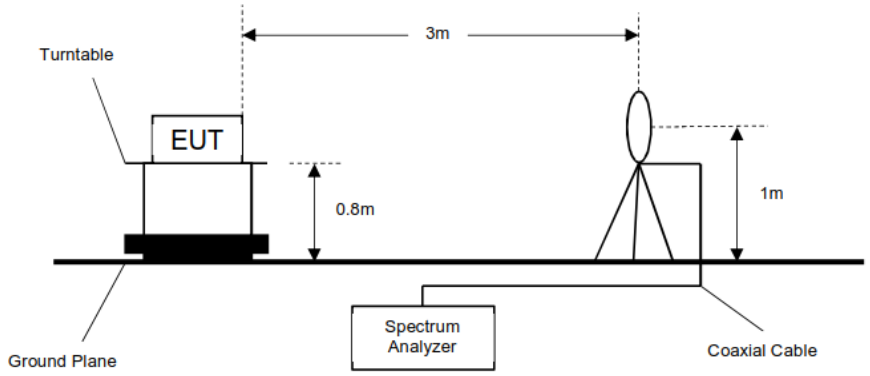
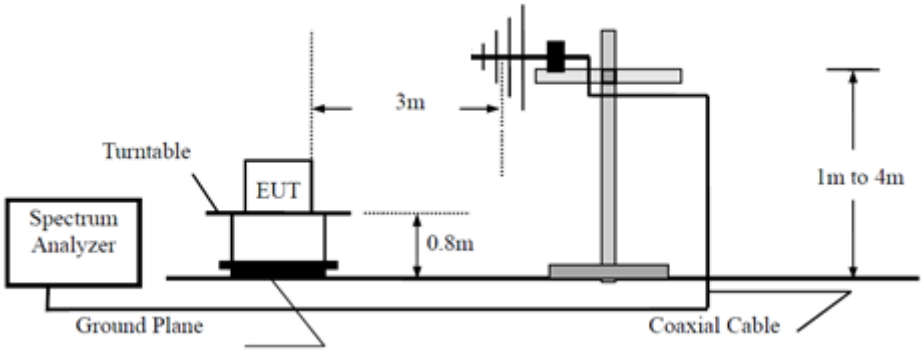
7 Test Setups

7.1 Radiated test setups

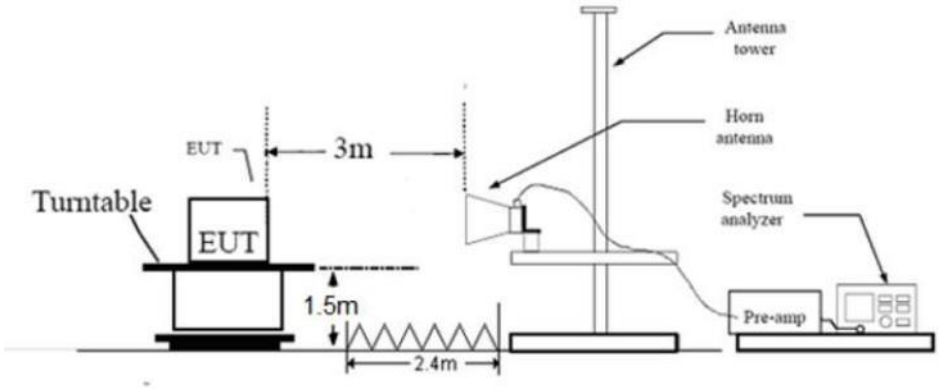
9kHz - 30MHz



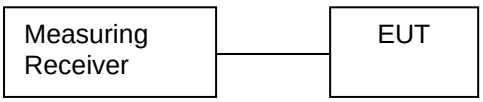
Below 1GHz



Above 1GHz



7.2 Conducted RF test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
Notebook	Thinkpad	X220	---

Test software information:

Test Software Version	EC2GUI.exeTest Tool	
Modulation	Setting TX Power	Packet Type
LORA	22	LORA

The system was configured to hopping mode and non-hopping mode.
Non-hopping mode testing channel is 0 (905.250MHz), 26 (913.700MHz), 50 (921.500MHz).

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9 Technical Requirement

9.1 Conducted peak output power

Test Method

1. The RF output of EUT was connected to the test spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following test receiver settings:
   Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel
   RBW > the 20dB bandwidth of the emission being measured, VBW≥RBW,
   Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power and record the results in the test report.
5. Repeat above procedures until all frequencies measured were completed.

Limits

According to §15.247 (b) (2), conducted peak output power limit as below:

Frequency Range MHz	Limit W	Limit dBm
905.25-921.5	≤1	≤30

Test result as below table

Frequency MHz	Conducted Peak Output Power dBm	Result
Bottom channel 905.250MHz	20.11	Pass
Middle channel 913.700MHz	20.04	Pass
Top channel 921.500MHz	19.86	Pass

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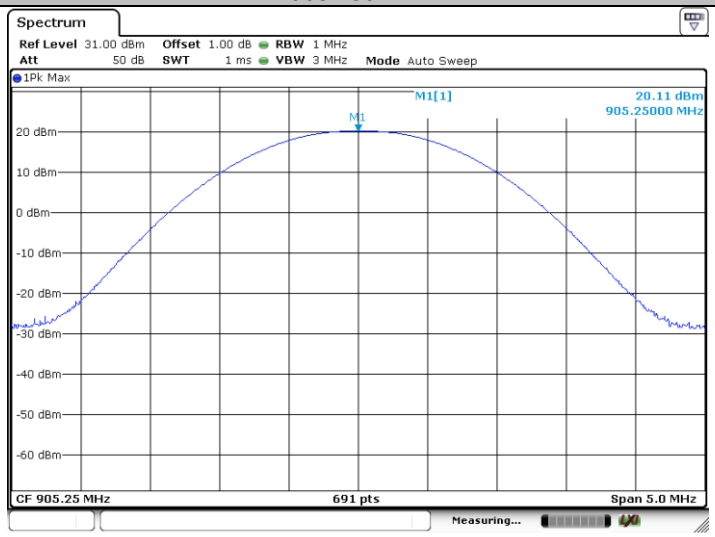
905.250MHz



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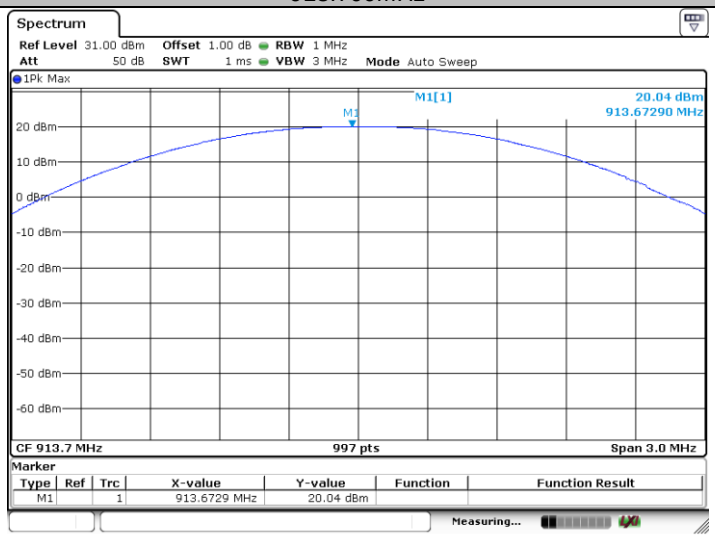
913.700MHz



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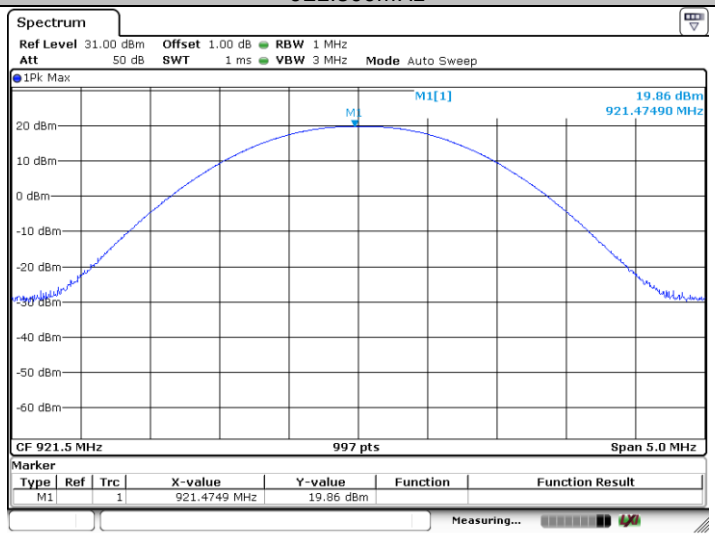
921.500MHz



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9.2 20 dB Bandwidth

Test Method

1. The RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Use the following test receiver settings:
   Span = approximately two times and five times the 20dB bandwidth, centered on a hopping channel, RBW shall be in the range of 1% to 5% of the 20dB bandwidth, VBW shall be at least three times 20dB bandwidth, Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth. Record the results.
5. Repeat above procedures until all frequencies measured were complete.

Limit

According to §15.247(a)(1)(i), 20 dB Bandwidth limit as below:

Limit [kHz]
≤500

Test result

Frequency MHz	20 dB bandwidth kHz	Result
Bottom channel 905.250MHz	145.83	Pass
Middle channel 913.700MHz	145.01	Pass
Top channel 921.500MHz	142.63	Pass

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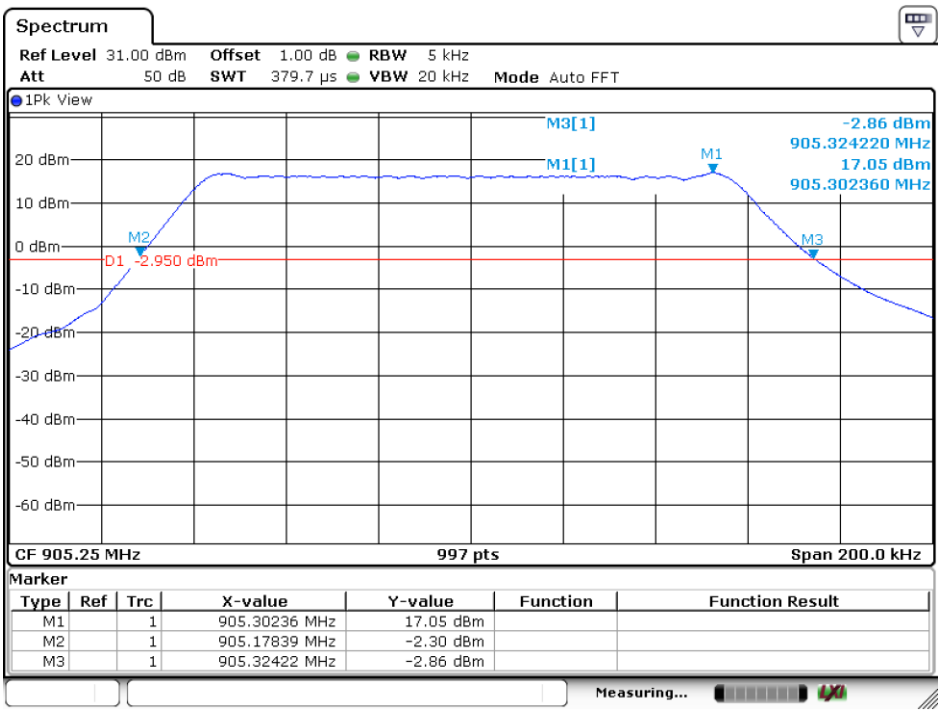
20 dB Bandwidth

Low channel 905.250MHz



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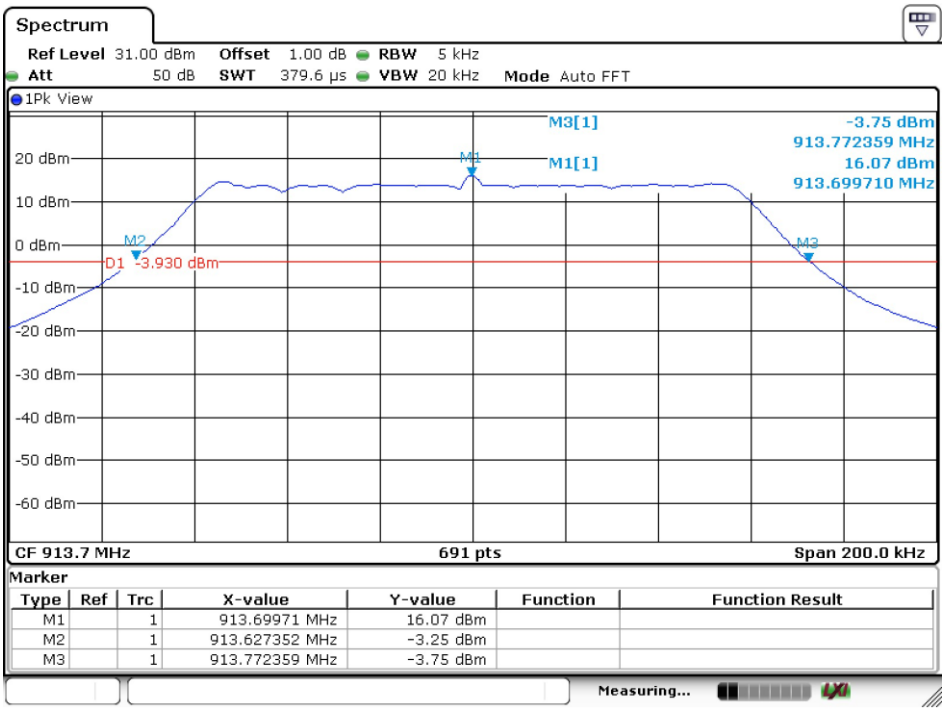
Middle channel 913.700MHz



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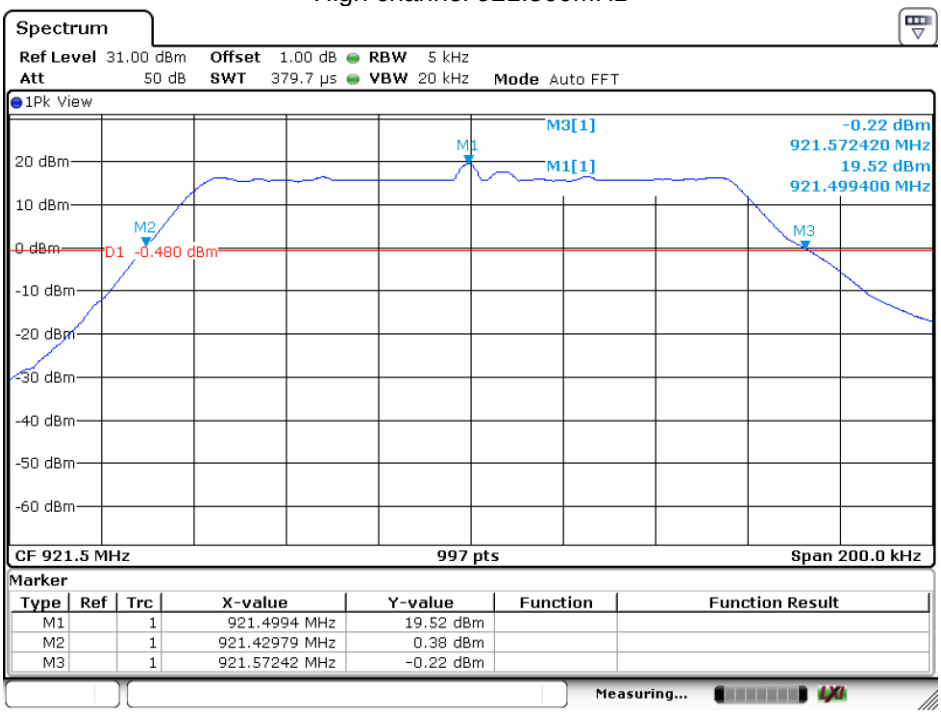
High channel 921.500MHz



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9.3 Carrier Frequency Separation

Test Method

1. The RF output of EUT was connected to the test receiver by RF cable the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit to hopping mode.
3. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels, RBW ≥ 1% of the span, VBW) ≥RBW, Sweep = auto, Detector function = peak
4. By using the Max-Hold function record the separation of two adjacent channels.
5. Measure the frequency difference of these two adjacent channels by spectrum analyzer marker function. Record the results.
6. Repeat above procedures until all frequencies measured were complete.

Limit

According to §15.247(a)(1), Carrier Frequency Separation limit as below:

Limit kHz
≥25kHz or ≥20 dB bandwidth which is greater

Test Frequency	20 dB Bandwidth kHz
905.250MHz	145.83
913.700MHz	145.01
921.500MHz	142.63

Test result: The measurement was performed with the typical configuration (normal hopping status).

Test Mode	Carrier Frequency Separation kHz	Result
LORA	321.00	Pass

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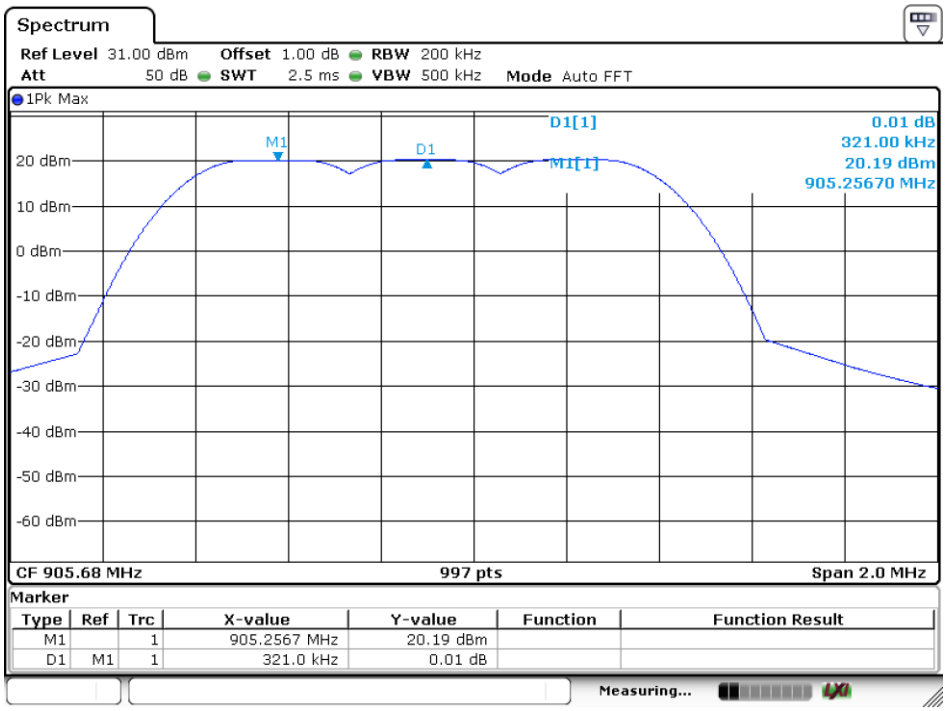

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9.4 Number of hopping frequencies

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit to hopping mode.
3. Use the following spectrum analyzer settings:
   Span = the frequency band of operation, RBW ≥ 1% of the span, VBW ≥RBW,
   Sweep = auto, Detector function = peak
4. Set the spectrum analyzer on Trace = max hold
5. Allow the trace to stabilize. It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

Limit

According to §15.247(a)(1)(i), Number of hopping frequencies limit as below:

Limit number
≥ 50

Test result: The measurement was performed with the typical configuration (normal hopping status).

Number of hopping frequencies	Result
51	Pass

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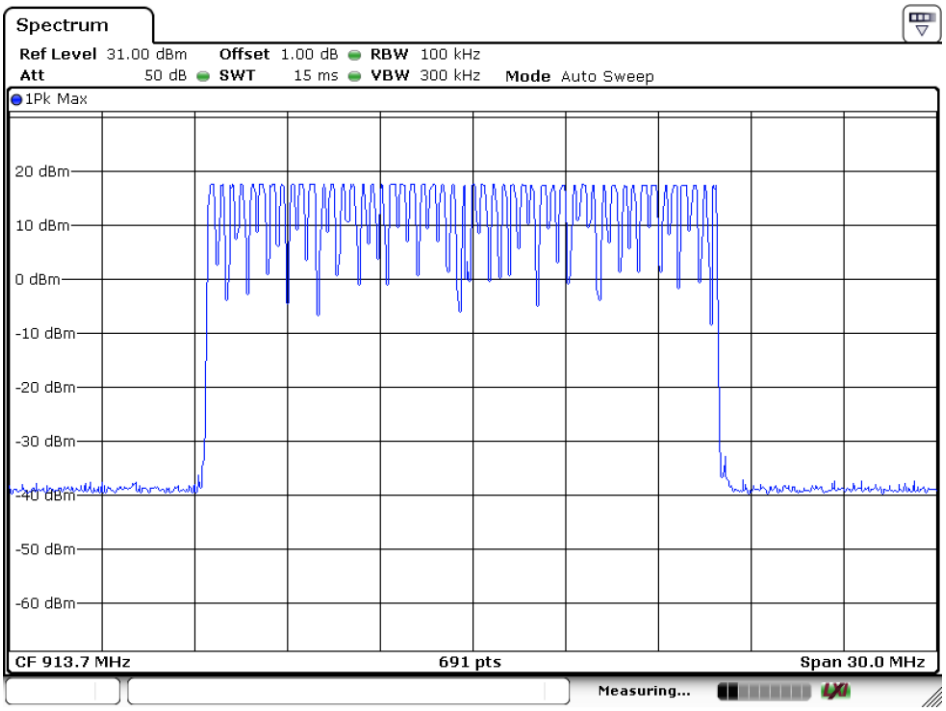

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9.5 Dwell Time

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit to hopping mode.
3. Span: Zero span, centered on a hopping channel.
4. RBW shall be \ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
5. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
6. Detector function: Peak.
7. Trace: Max hold. Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.

Limit

According to §15.247(a)(1)(i), Dwell Time limit as below:

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

Test Result

Test Mode	Antenna	Channel (MHz)	Result (ms)	Limit (ms)	Verdict
LORA	ANT 1	905.250	30.870	<400	PASS
		913.700	30.435	<400	PASS
		921.500	30.000	<400	PASS

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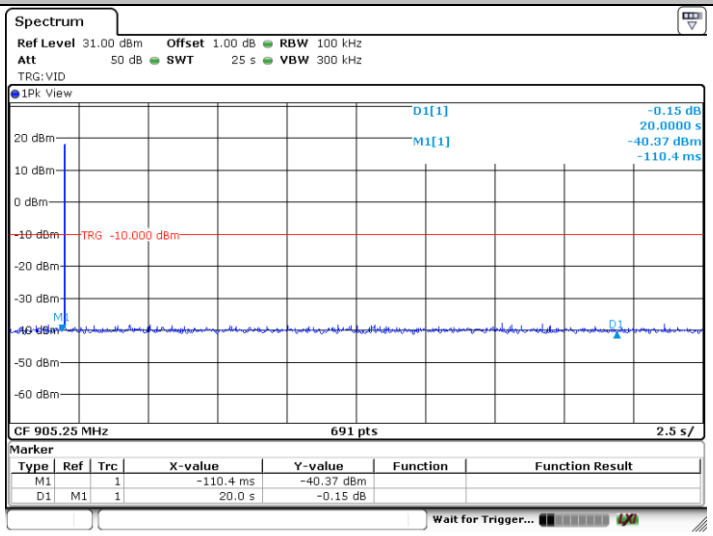
905.250 MHz



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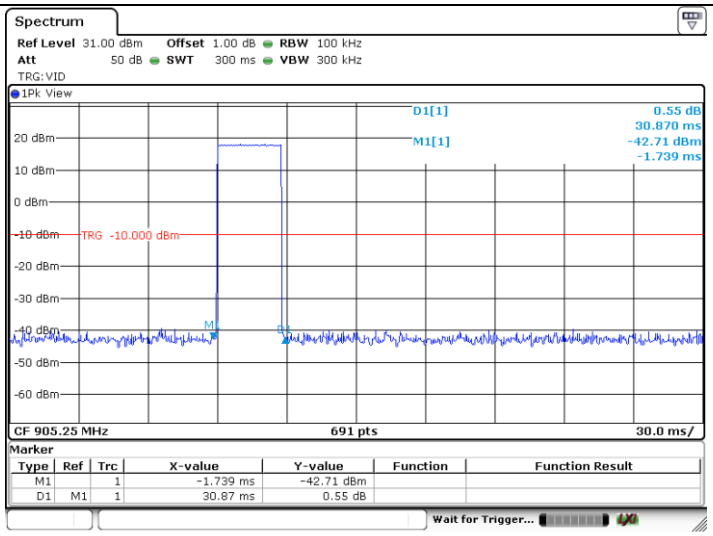

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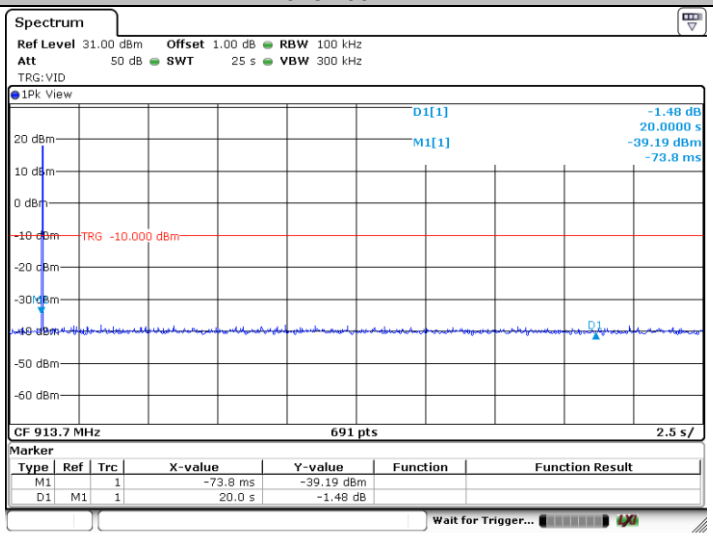
913.700 MHz



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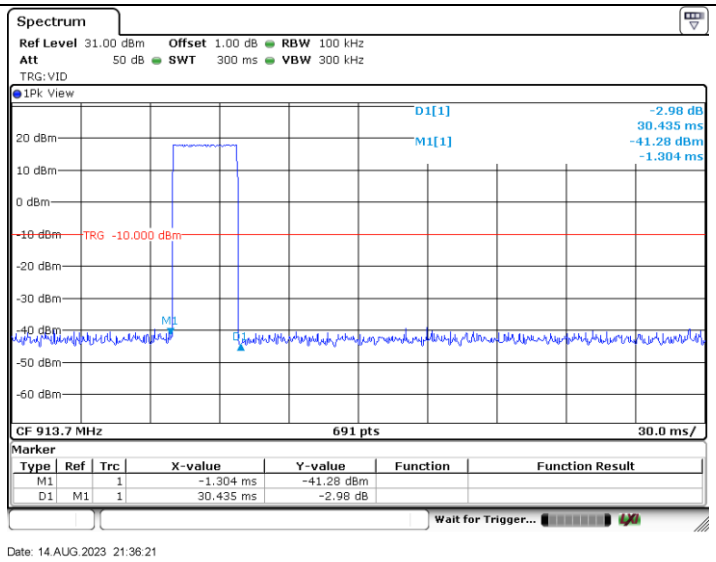

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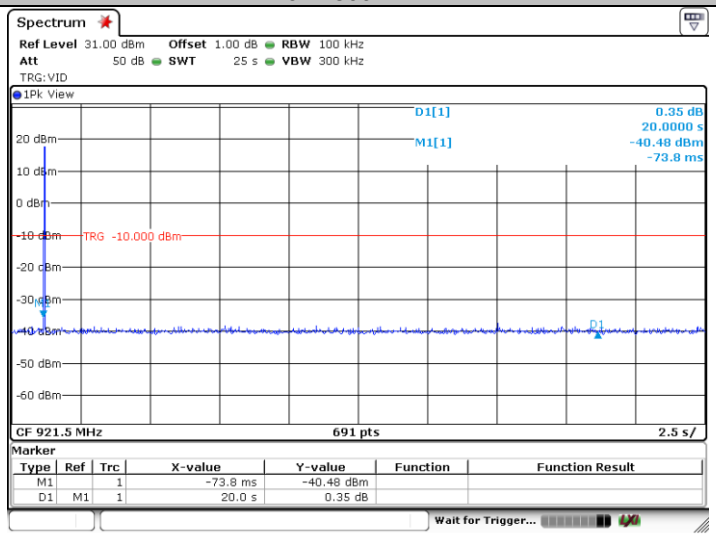
921.500 MHz



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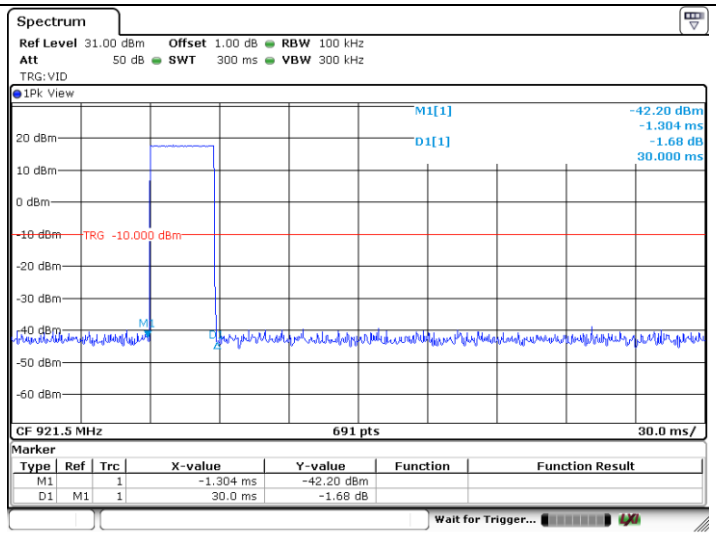

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9.6 Spurious RF conducted emissions

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
4. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency.

Limit

According to §15.247 (d), Spurious RF conducted emissions limit as below:

Frequency Range MHz	Limit (dBc)
30-10000	-20

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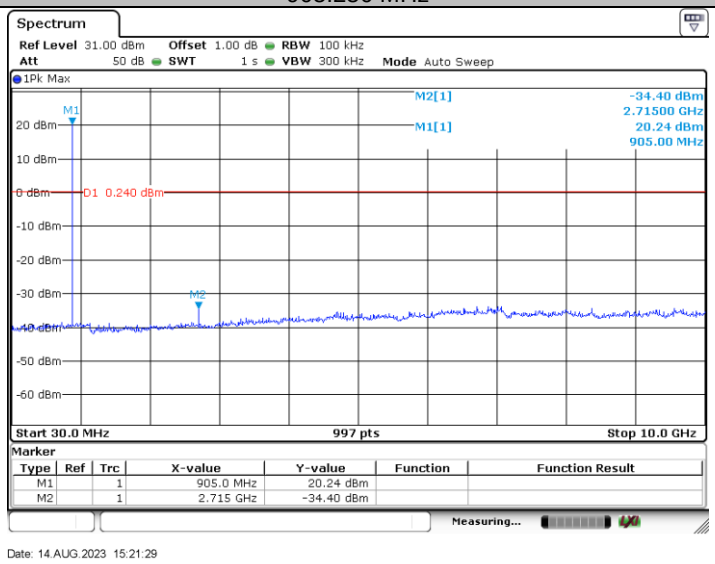
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

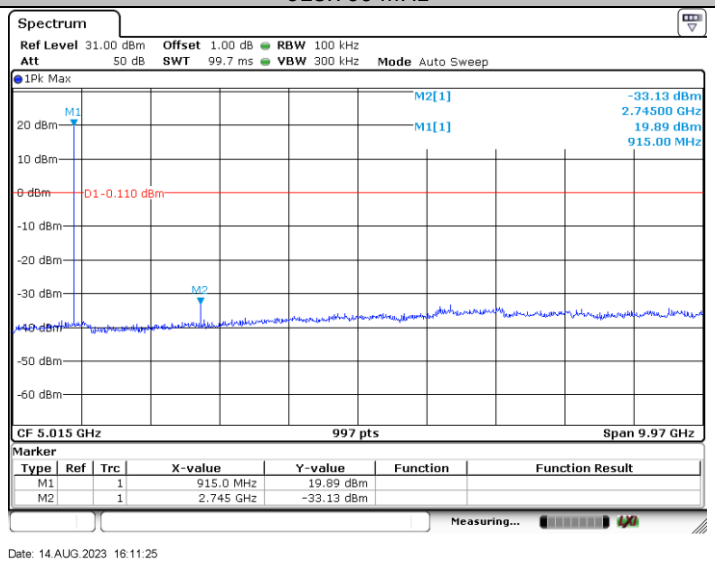
Spurious RF conducted emissions

Test Mode	Antenna	Channel (MHz)	Freq. Range (MHz)	Result (dBm)	Limit (dBm)	Verdict
LORA	ANT 1	905.250	30~10000	-34.40	<=0.24	PASS
		913.700	30~10000	-33.13	<=-0.11	PASS
		921.500	30~10000	-34.16	<=-0.26	PASS

905.250 MHz



913.700 MHz



921.500 MHz

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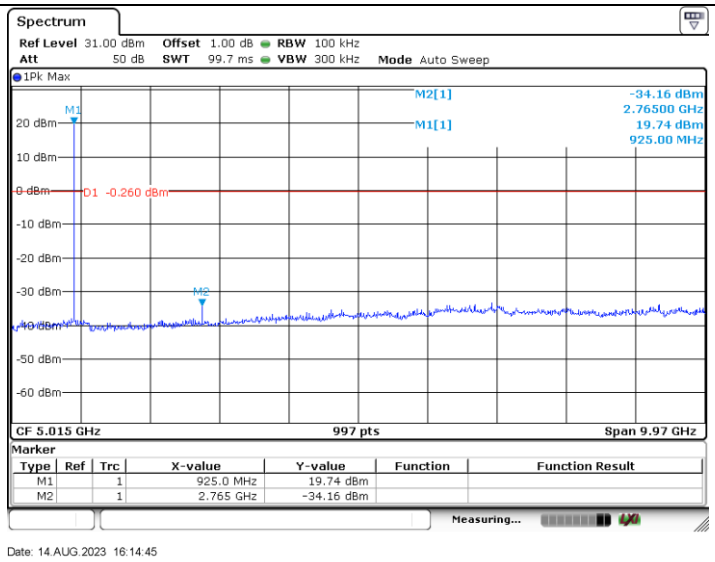

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9.7 Band edge

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
4. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency.
6. Set to the maximum power setting and enable the EUT hopping mode, repeat the test.

Limit

According to §15.247 (d), Band edge limit as below:

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

Frequency Range MHz	Limit (dBc)
902-928	-20

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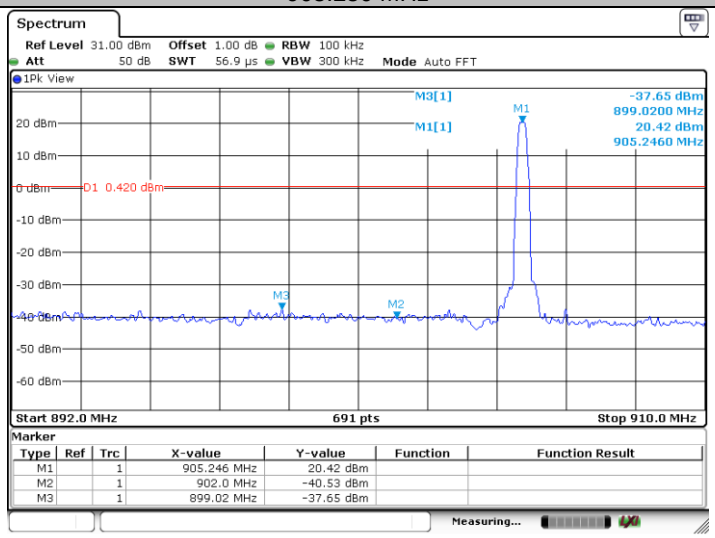
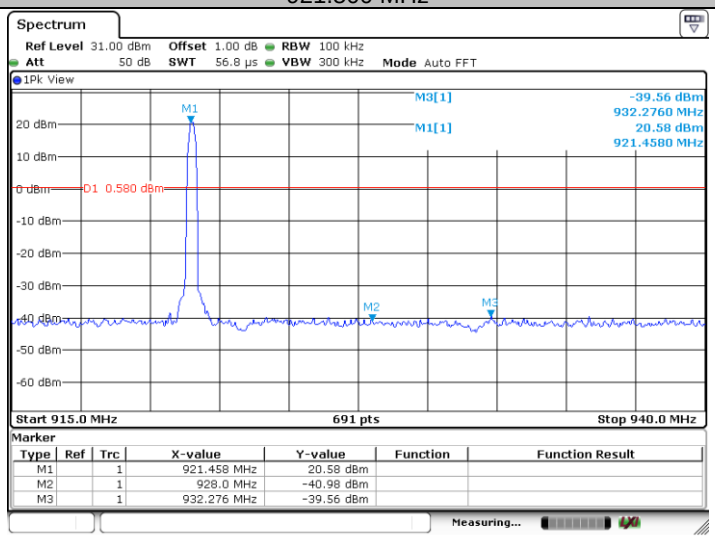
Band edge testing

Test Mode	Antenna	Ch. Name	Channel (MHz)	Ref. Level (dBm)	Result (dBm)	Limit (dBm)	Verdict
LORA	Ant1	Low	905.250	20.42	-37.65	<=0.42	PASS
		High	921.500	20.58	-39.56	<=0.58	PASS

905.250 MHz



921.500 MHz



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9.8 Spurious radiated emissions for transmitter

Test Method

1. The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meters chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
4. The height of antenna 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.
5. 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
6. Use the following spectrum analyzer settings According to C63.10:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥1 GHz for peak measurement.
   For average measurement:
   VBW = 10 Hz, when duty cycle is no less than 98 percent.
   VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum
   power control level for the tested mode of operation.
7. Repeat above procedures until all frequencies measured were complete.

Note:

1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.
2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.
3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (20log(1/duty cycle)).
4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.

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Spurious radiated emissions for transmitter

Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under § 15.247(b)(3), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in§ 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).

Frequency MHz	Field Strength µV/m	Field Strength dBµV/m	Detector	Measurement distance meters
0.009-0.490	2400/F(kHz)	48.5-13.8	AV	300
0.490-1.705	24000/F(kHz)	33.8-23.0	QP	30
1.705-30	30	29.5	QP	30
30-88	100	40	QP	3
88-216	150	43.5	QP	3
216-960	200	46	QP	3
960-1000	500	54	QP	3
Above 1000	500	54	AV	3
Above 1000	5000	74	PK	3

Note 1: Limit 3m(dBµV/m)=Limit 300m(dBµV/m)+40Log(300m/3m) (Below 30MHz)
Note 2: Limit 3m(dBµV/m)=Limit 30m(dBµV/m)+40Log(30m/3m) (Below 30MHz)

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Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Low channel 905.250MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dBuV/m		dBµV/m		dBuV/m	(dB)	
30-1000MHz	59.692778	23.85	H	40.00	QP	16.15	16.97	Pass
	100.378889	21.67	H	43.50	QP	21.83	16.31	Pass
	349.507222	27.48	H	46.00	QP	18.52	20.73	Pass
	902.000000	36.25	H	46.00	QP	9.75	29.26	Pass
	928.000000	35.83	H	46.00	QP	10.17	29.46	Pass
	Other Frequencies	--	H	--	QP	--	--	Pass
	51.070556	22.77	V	40.00	QP	17.23	18.03	Pass
	98.223333	22.08	V	43.50	QP	21.42	16.06	Pass
	351.986111	28.24	V	46.00	QP	17.76	20.67	Pass
	902.000000	36.88	V	46.00	QP	9.12	29.26	Pass
	928.000000	36.32	V	46.00	QP	9.68	29.46	Pass
	Other Frequencies	--	V	--	QP	--	--	Pass

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dBuV/m		dBµV/m		dBuV/m	(dB)	
1000-10000MHz	1810.000000	42.32	H	74.00	PK	31.68	-7.67	Pass
	2559.500000	41.52	H	74.00	PK	32.48	-3.75	Pass
	3150.500000	45.62	H	74.00	PK	28.38	-0.18	Pass
	4019.500000	47.16	H	74.00	PK	26.84	2.94	Pass
	Other Frequencies	--	H	--	PK	--	--	Pass
	2054.500000	40.62	V	74.00	PK	33.38	-5.66	Pass
	2674.500000	42.55	V	74.00	PK	31.45	-3.17	Pass
	3371.500000	45.72	V	74.00	PK	28.28	0.16	Pass
	3996.000000	47.93	V	74.00	PK	26.07	2.90	Pass
	Other Frequencies	--	V	--	PK	--	--	Pass

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Middle channel 913.700MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dBuV/m		dBµV/m		dBuV/m	(dB)	
30-1000MHz	56.243889	23.42	H	40.00	QP	16.58	17.54	Pass
	102.803889	22.79	H	43.50	QP	20.71	16.42	Pass
	257.195556	23.44	H	46.00	QP	22.56	17.87	Pass
	902.000000	36.31	H	46.00	QP	9.69	29.24	Pass
	928.000000	36.46	H	46.00	QP	9.54	29.46	Pass
	Other Frequencies	--	H	--	QP	--	--	Pass
	54.034444	23.70	V	40.00	QP	16.30	17.87	Pass
	105.228889	22.54	V	43.50	QP	20.96	16.31	Pass
	196.031667	23.44	V	43.50	QP	20.06	16.71	Pass
	902.000000	37.02	V	46.00	QP	8.98	29.22	Pass
	928.000000	36.32	V	46.00	QP	9.68	29.46	Pass
	Other Frequencies	--	V	--	QP	--	--	Pass

	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dBuV/m		dBµV/m		dBuV/m	(dB)	
1000-10000MHz	1856.500000	39.00	H	74.00	PK	35.00	-7.29	Pass
	2060.000000	41.43	H	74.00	PK	32.57	-5.69	Pass
	2644.000000	42.93	H	74.00	PK	31.07	-3.18	Pass
	3162.000000	45.41	H	74.00	PK	28.59	-0.18	Pass
	Other Frequencies	--	H	--	PK	--	--	Pass
	2499.000000	42.13	V	74.00	PK	31.87	-4.26	Pass
	2926.500000	45.15	V	74.00	PK	28.85	-2.30	Pass
	3429.000000	45.31	V	74.00	PK	28.69	0.21	Pass
	3847.000000	47.73	V	74.00	PK	26.27	2.79	Pass
	Other Frequencies	--	V	--	PK	--	--	Pass

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High channel 921.500MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dBuV/m		dBµV/m		dBuV/m	(dB)	
30-1000MHz	197.001667	24.12	H	43.50	QP	19.38	16.72	Pass
	350.854444	28.28	H	46.00	QP	17.72	20.72	Pass
	612.323333	34.82	H	46.00	QP	11.18	25.81	Pass
	902.000000	36.46	H	46.00	QP	9.54	29.23	Pass
	928.000000	36.60	H	46.00	QP	9.40	29.46	Pass
	Other Frequencies	--	H	--	QP	--	--	Pass
	96.714444	22.39	V	43.50	QP	21.11	15.80	Pass
	195.762222	24.40	V	43.50	QP	19.10	16.67	Pass
	488.648333	31.92	V	46.00	QP	14.08	23.07	Pass
	902.000000	37.15	V	46.00	QP	8.85	29.23	Pass
	928.000000	37.06	V	46.00	QP	8.94	29.46	Pass
	Other Frequencies	--	V	--	QP	--	--	Pass

	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dBuV/m		dBµV/m		dBuV/m	(dB)	
1000-10000MHz	2272.500000	40.93	H	74.00	PK	33.07	-5.47	Pass
	2567.000000	42.51	H	74.00	PK	31.49	-3.71	Pass
	3155.000000	45.84	H	74.00	PK	28.16	-0.18	Pass
	4013.500000	47.66	H	74.00	PK	26.34	2.93	Pass
	Other Frequencies	--	H	--	PK	--	--	Pass
	2077.500000	40.86	V	74.00	PK	33.14	-5.65	Pass
	2912.500000	44.73	V	74.00	PK	29.27	-2.46	Pass
	3601.500000	46.28	V	74.00	PK	27.72	1.33	Pass
	4954.500000	50.33	V	74.00	PK	23.67	5.78	Pass
	Other Frequencies	--	V	--	PK	--	--	Pass

Remark:

(1) "*" means the emission(s) not within the restrict bands of section 15.205.

(2) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are the noise floor or attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(3) Data of measurement within frequency ranges 9kHz-30MHz are the noise floor or attenuated more than 20dB below the permissible limits or the field strength is too small to be measured, so test data does not present in this report.

(4) Corrected Amplitude = Reading level + Corrector factor
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
(The Reading Level is recorded by software which is not shown in the sheet)

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Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

10 Test Equipment List

List of Test Instruments

Radiated Emission 1# Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 7	68-4-74-19-001	102176	2024-5-20
Loop Antenna	Rohde & Schwarz	HFH2-Z2	68-4-80-14-006	100398	2024-8-6
3m Semi-anechoic chamber	TDK	SAC-3 #1	68-4-90-14-001	----	2024-5-28
Test software	Rohde & Schwarz	EMC32	68-4-90-14-001-A10	Version10.35.02	N/A

Radiated Emission 2# Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	68-4-74-14-002	101269	2024-5-20
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9162	68-4-80-19-003	284	2024-3-5
Wave Guide Antenna	ETS	3117	68-4-80-19-001	00218954	2024-4-26
Pre-amplifier	Rohde & Schwarz	SCU 18F	68-4-29-19-001	100745	2024-5-19
Pre-amplifier	Rohde & Schwarz	SCU 40A	68-4-29-14-002	100432	2024-8-1
Attenuator	Mini-circuits	UNAT-6+	68-4-81-21-002	15542	2024-5-19
3m Semi-anechoic chamber	TDK	SAC-3 #2	68-4-90-19-006	----	2024-5-28
Test software	Rohde & Schwarz	EMC32	68-4-90-19-006-A01	Version10.35.02	N/A

Conducted RF Test System

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	68-4-74-14-004	101030	2024-5-19
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157W	68-4-93-14-003	101226/100929	2024-5-20
Power Splitter	Weinschel	1580	68-4-85-14-001	SC319	2024-5-20
Test software	Tonscend	System for BT/WIFI	68-4-74-14-006-A13	Version 2.6.77.0518	N/A

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Building 12&13, Zhiheng Wisdomland Business Park Guankou Erlu, Nantou, Nanshan District,
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11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Emission in 3m chamber 9kHz-30MHz	4.70dB
Uncertainty for Radiated Emission in new 3m chamber (68-4-90-19-006) 30MHz-1000MHz	Horizontal: 4.63dB; Vertical: 4.78dB;
Uncertainty for Radiated Emission in new 3m chamber (68-4-90-19-006) 1000MHz-18000MHz	Horizontal: 5.38dB; Vertical: 5.38dB;
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.31dB Frequency test involved: 0.6×10^{-8} or 1%

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2021, clause 4.4.3 and 4.5.1.

---The End---

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Building 12&13, Zhiheng Wisdomland Business Park Guankou Erlu, Nantou, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299