



## FCC - TEST REPORT

Report Number : **68.950.23.0498.01** Date of Issue: **August 19, 2023**

Model No. : **HH4V-152500-1000-10**

Product Type : Electronic Fence Emitter

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 Emitter
Model No.:	HH4V-152500-1000-10
FCC ID:	2A2NKHQB204-T01-023
Options and accessories:	N/A
Rating:	9-16VDC 70mA powered by external battery
RF Transmission Frequency:	905.25MHz-921.5MHz
No. of Operated Channel:	51
Modulation:	LORA
Antenna Type:	Spring antenna
Antenna Gain:	0.31dBi
Description of the EUT:	The Equipment Under Test (EUT) is an Electronic Fence Emitter which supports LORA function operated at 905.25MHz-921.5MHz.

#### Operate Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	905.250	14	920.525	28	919.225	42	917.925
1	907.250	15	906.225	29	921.500	43	920.200
2	915.000	16	908.500	30	907.200	44	905.900
3	912.075	17	910.775	31	909.475	45	908.175
4	914.350	18	913.050	32	911.750	46	910.450
5	916.625	19	915.325	33	914.025	47	912.725
6	918.900	20	917.600	34	918.300	48	909.800
7	921.175	21	919.875	35	918.575	49	917.275
8	906.875	22	905.575	36	920.850	50	919.550
9	909.150	23	907.850	37	906.550	---	
10	911.425	24	910.125	38	908.825	---	
11	913.700	25	912.400	39	911.100	---	
12	915.975	26	914.675	40	913.375	---	
13	918.250	27	916.950	41	915.650	---	

## 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

## 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	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247 (b)(2)	Conducted peak output power	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(a)(1)(i)	20dB bandwidth	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(a)(1)	Carrier frequency separation	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(a)(1)(i)	Number of hopping frequencies	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(a)(1)(i)	Dwell Time	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(a)(2)	6dB bandwidth and 99% Occupied Bandwidth	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(e)	Power spectral density	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(d)	Spurious RF conducted emissions	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(d)	Band edge	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(d) & §15.209 & §15.205	Spurious radiated emissions for transmitter	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.203	Antenna requirement	See note 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note 1: N/A=Not Applicable.

Note 2: The EUT uses a spring antenna, which gain is 0.31dBi. In accordance to §15.203, it is considered sufficiently to comply with the provisions of this section.

## 6 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: 2A2NKHQB204-T01-023 complies with Section 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  
Project Manager



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Project Engineer

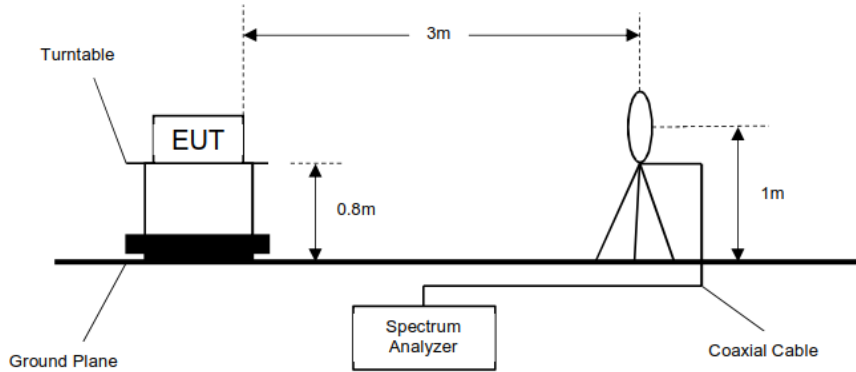


Carry Cai  
Test Engineer

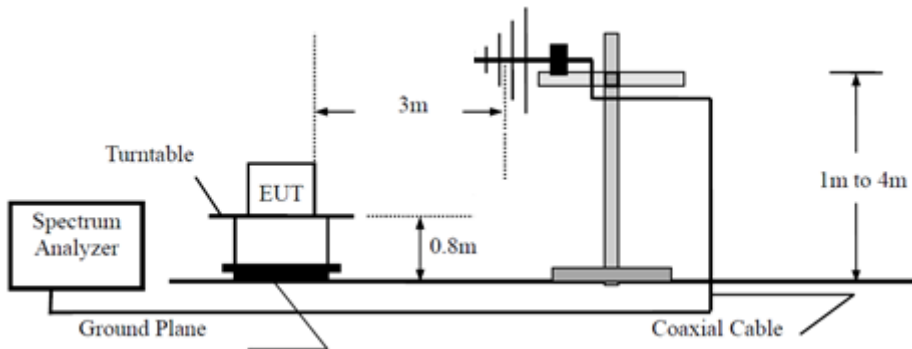
## 7 Test Setups

### 7.1 Radiated test setups

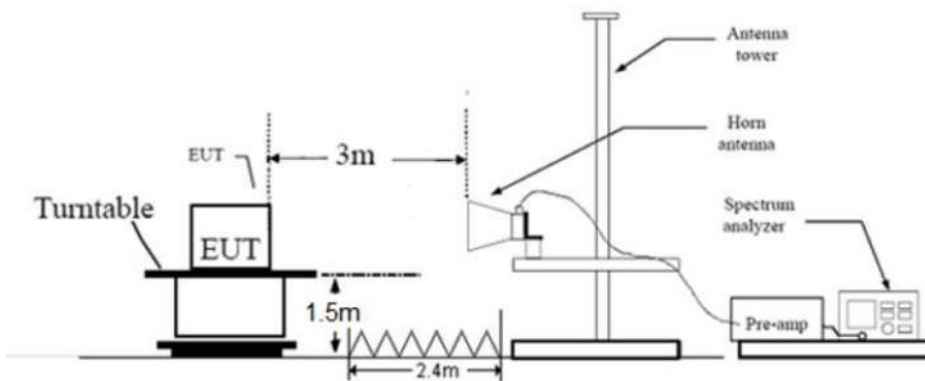
#### 9kHz - 30MHz



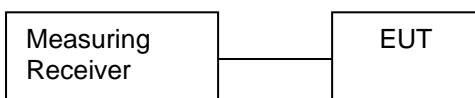
#### 30MHz - 1GHz



#### Above 1GHz



### 7.2 Conducted RF test setups





## 8 Systems test configuration

Auxiliary Equipment Used during Test:

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

Test software information:

Test Software Version	CC2.exe	
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), 11 (913.700MHz), 29 (921.500MHz).

## 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

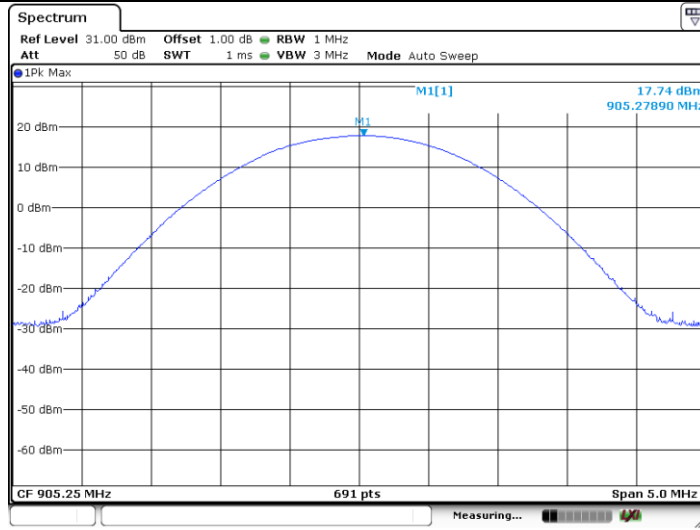
According to §15.247 (b) (2), conducted peak output power limit as below:

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

Test result as below table

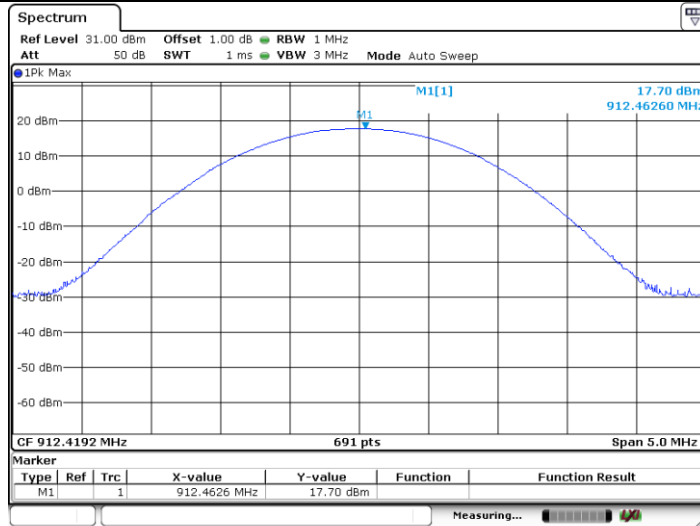
Frequency MHz	Conducted Peak Output Power dBm	Result
Bottom channel 905.250MHz	17.74	Pass
Middle channel 913.700MHz	17.70	Pass
Top channel 921.500MHz	17.62	Pass

905.250MHz



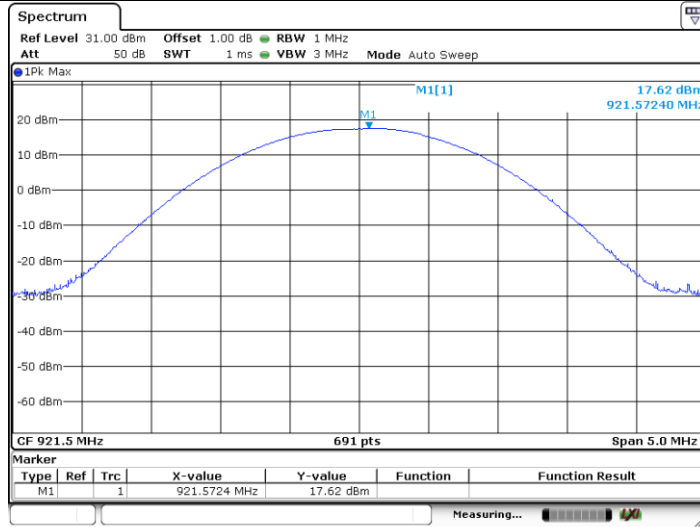
Date: 14 AUG 2023 16:52:32

913.700MHz



Date: 14 AUG 2023 17:06:18

921.500MHz



Date: 16 AUG 2023 10:51:37

## 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]**

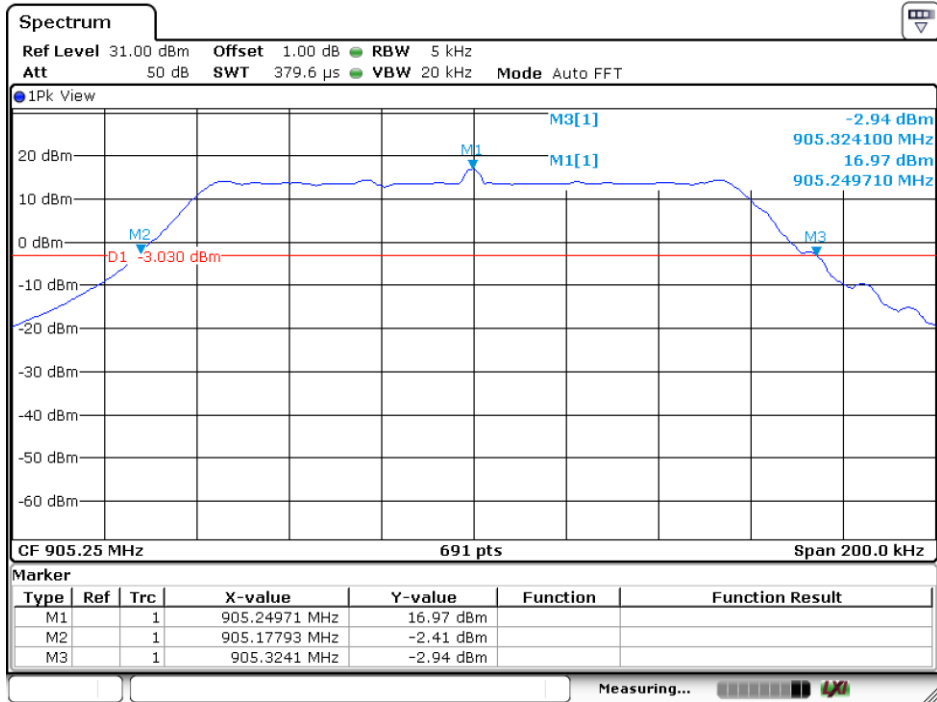
≤500

### Test result

Frequency MHz	20 dB bandwidth kHz	Result
Bottom channel 905.250MHz	146.17	Pass
Middle channel 913.700MHz	150.51	Pass
Top channel 921.500MHz	144.71	Pass

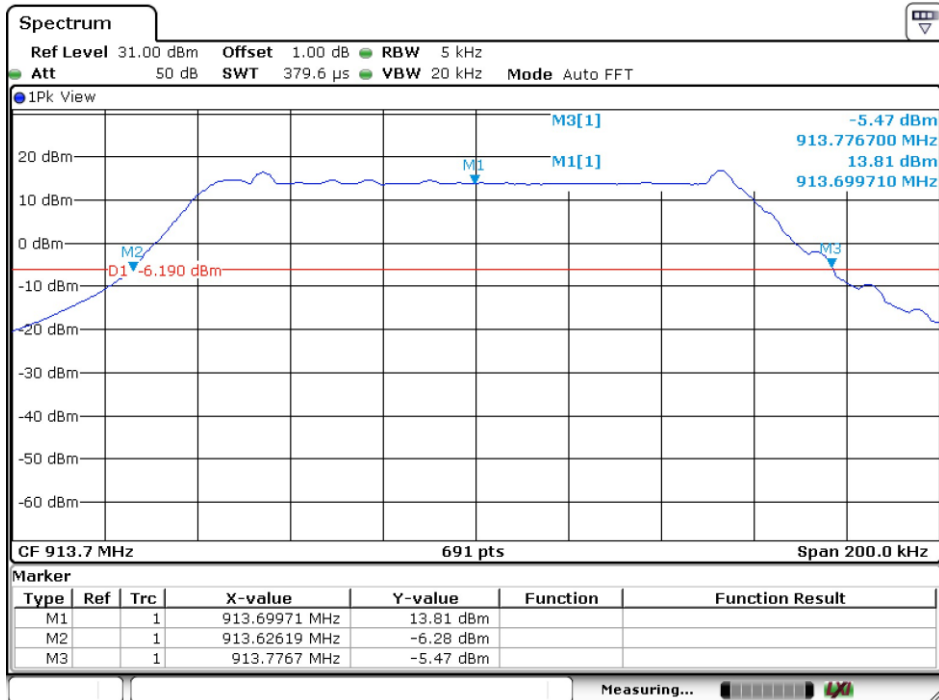
**20 dB Bandwidth**

Low channel 905.250MHz



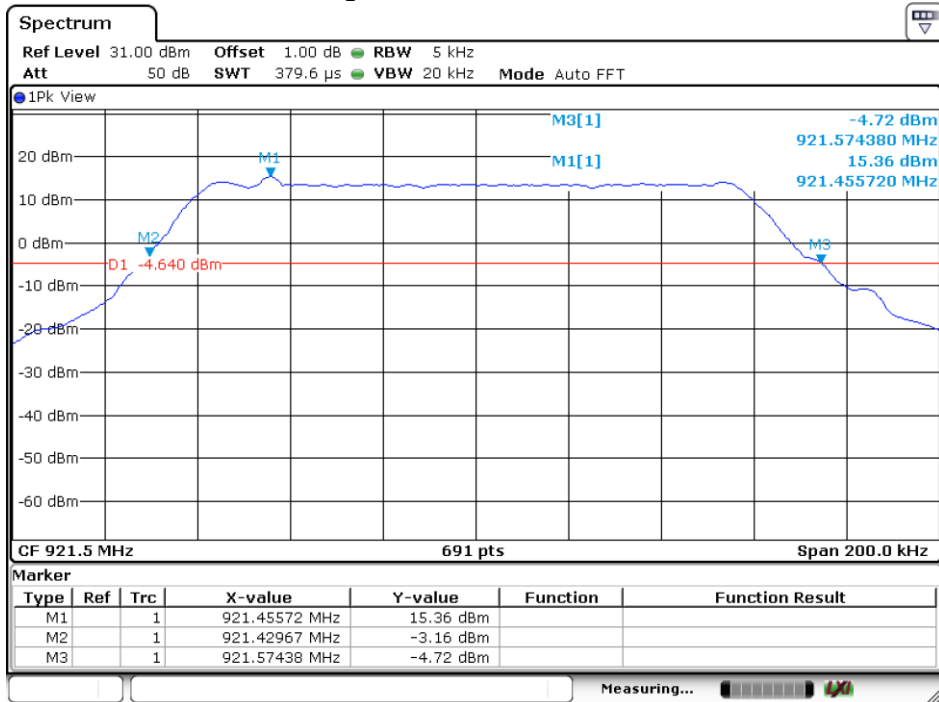
Date: 14.AUG.2023 16:56:22

Middle channel 913.700MHz



Date: 14.AUG.2023 18:48:40

### High channel 921.500MHz



Date: 16.AUG.2023 10:58:43

### 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.

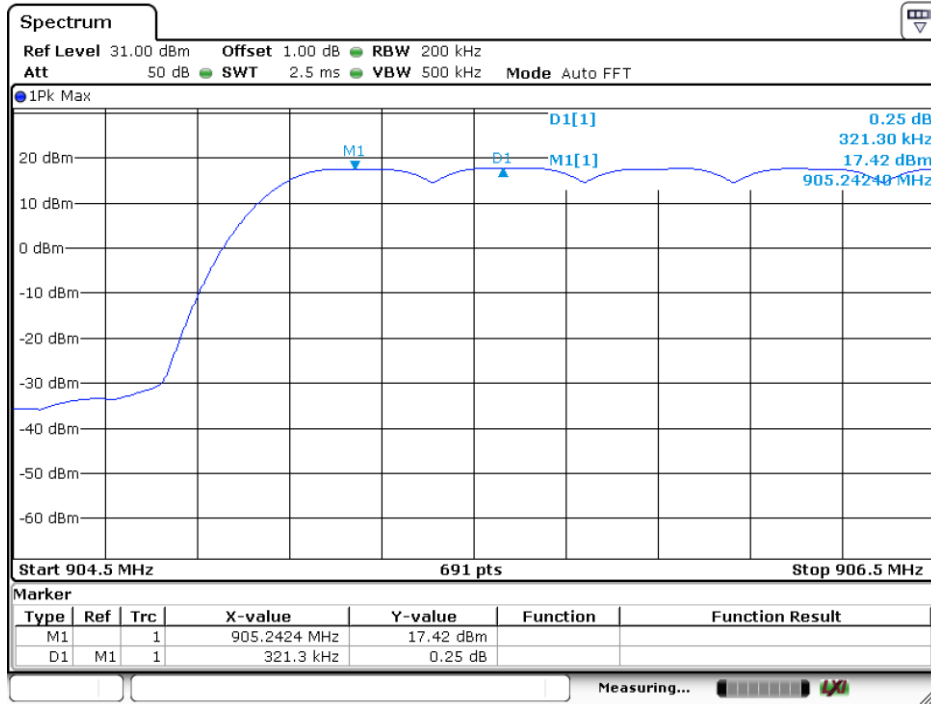
**Limit**

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

<b>Limit kHz</b>	
≥25kHz or ≥20 dB bandwidth which is greater	
<b>Test Frequency</b>	<b>20 dB Bandwidth kHz</b>
905.250MHz	146.17
913.700MHz	150.51
921.500MHz	144.71

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

<b>Test Mode</b>	<b>Carrier Frequency Separation kHz</b>	<b>Result</b>
LORA	321.30	Pass



Date: 16.AUG.2023 11:30:02



## 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).

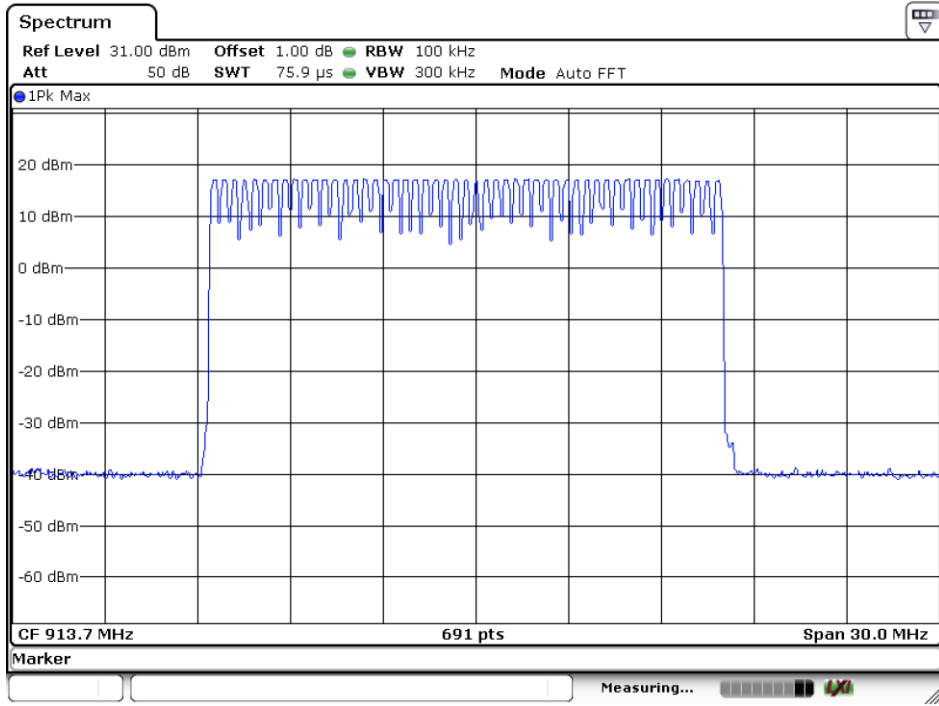
### Limit

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

$$\frac{\text{Limit number}}{\geq 50}$$

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

Number of hopping frequencies	Result
51	Pass



Date: 14.AUG.2023 11:19:28

## 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  $\gg 1 / T$ , 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.

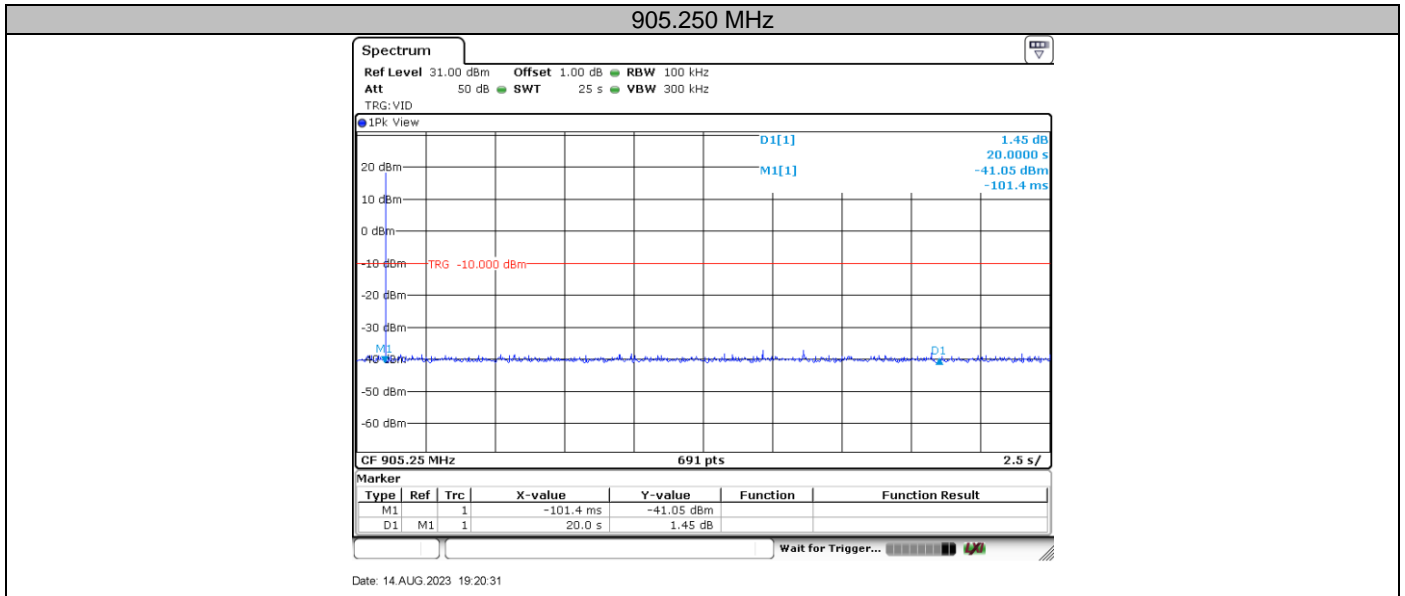
### Limit

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

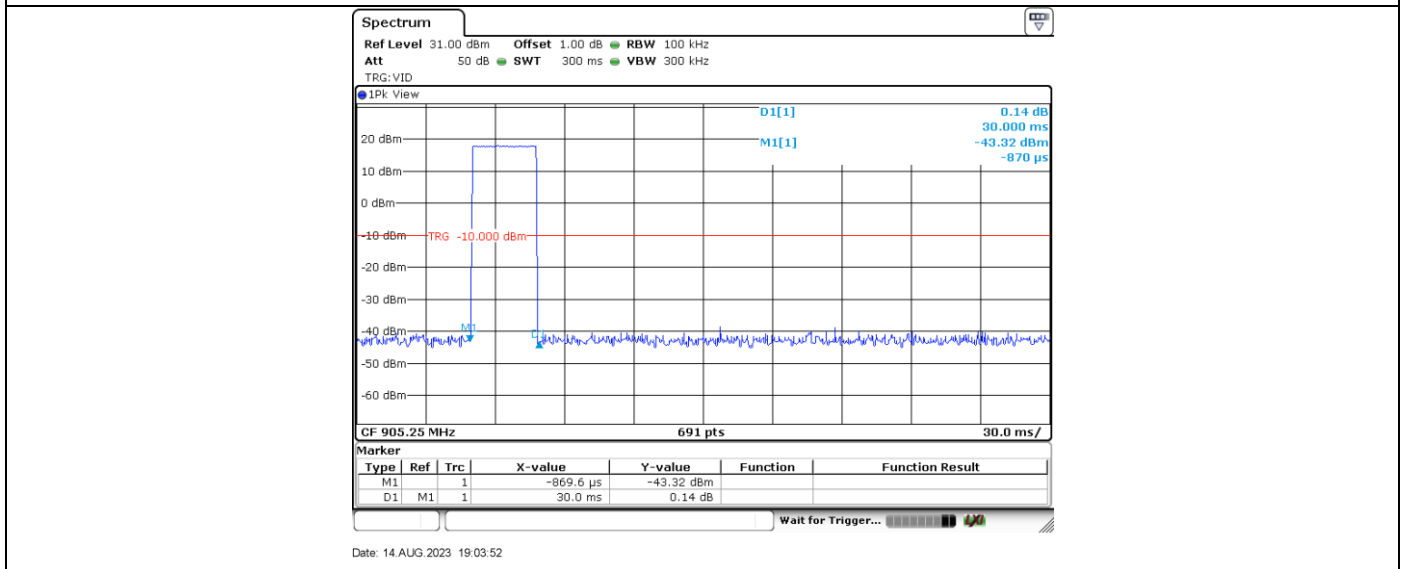
For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

### Test Result

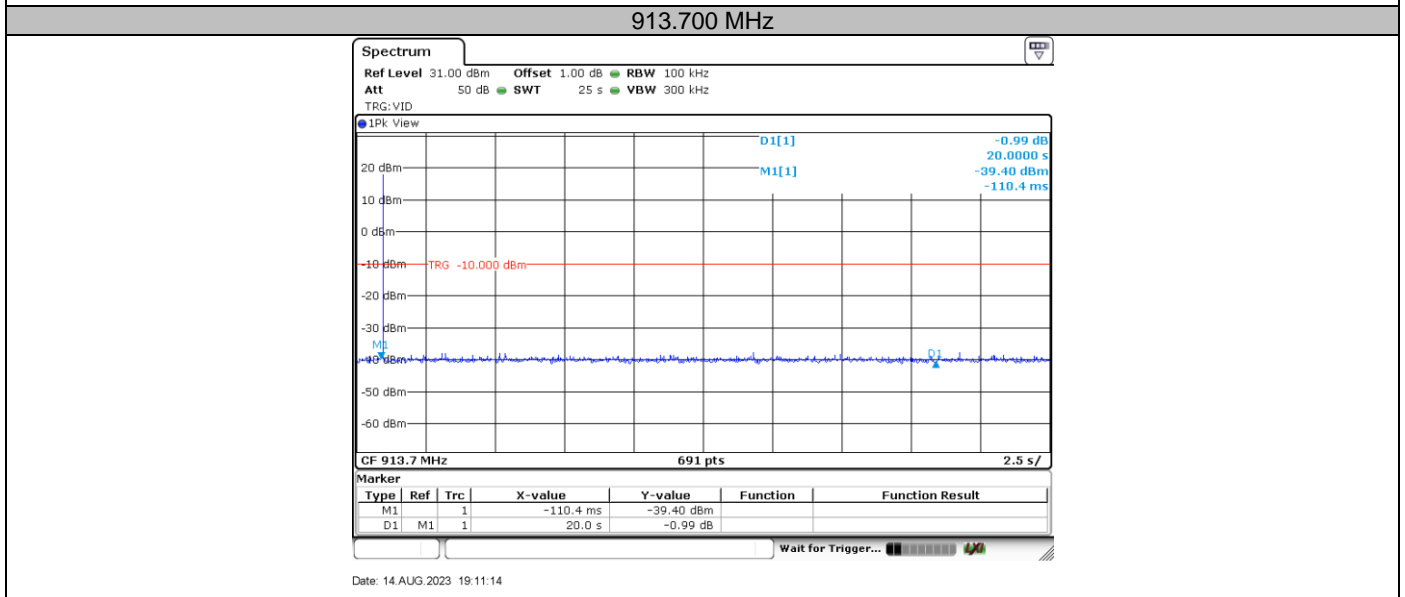
Test Mode	Antenna	Channel (MHz)	Result (ms)	Limit (ms)	Verdict
LORA	ANT 1	905.250	30.000	<400	PASS
		913.700	30.435	<400	PASS
		921.500	30.000	<400	PASS



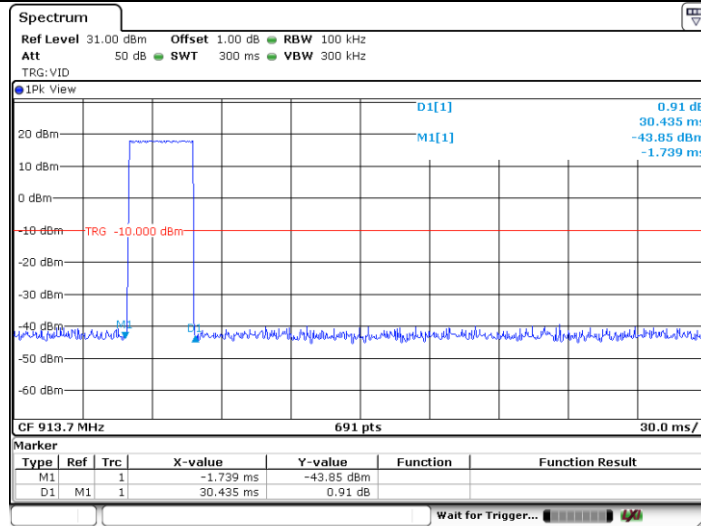
Date: 14 AUG. 2023 19:20:31



Date: 14 AUG. 2023 19:03:52

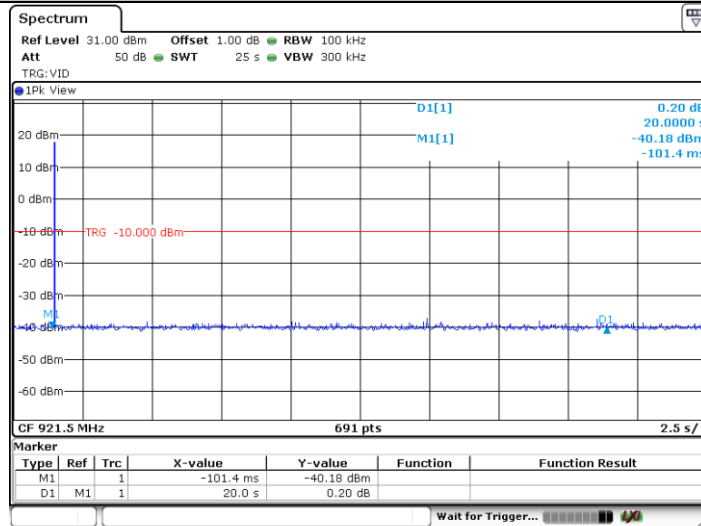


Date: 14 AUG. 2023 19:11:14

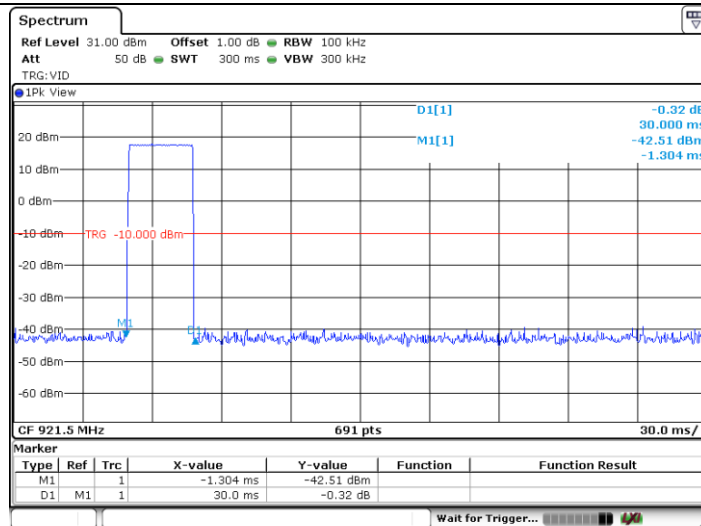


Date: 14 AUG 2023 19:06:51

921.500 MHz



Date: 14 AUG 2023 19:23:28



Date: 14 AUG 2023 19:25:58

## 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.

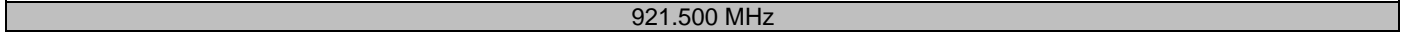
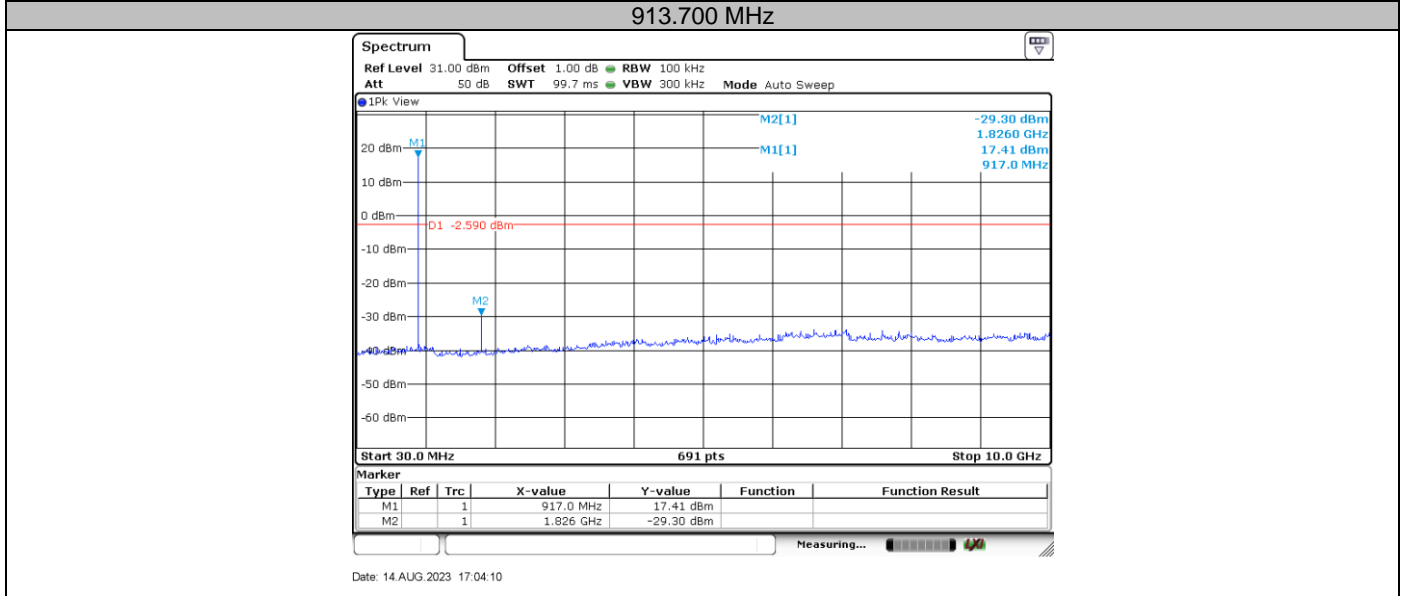
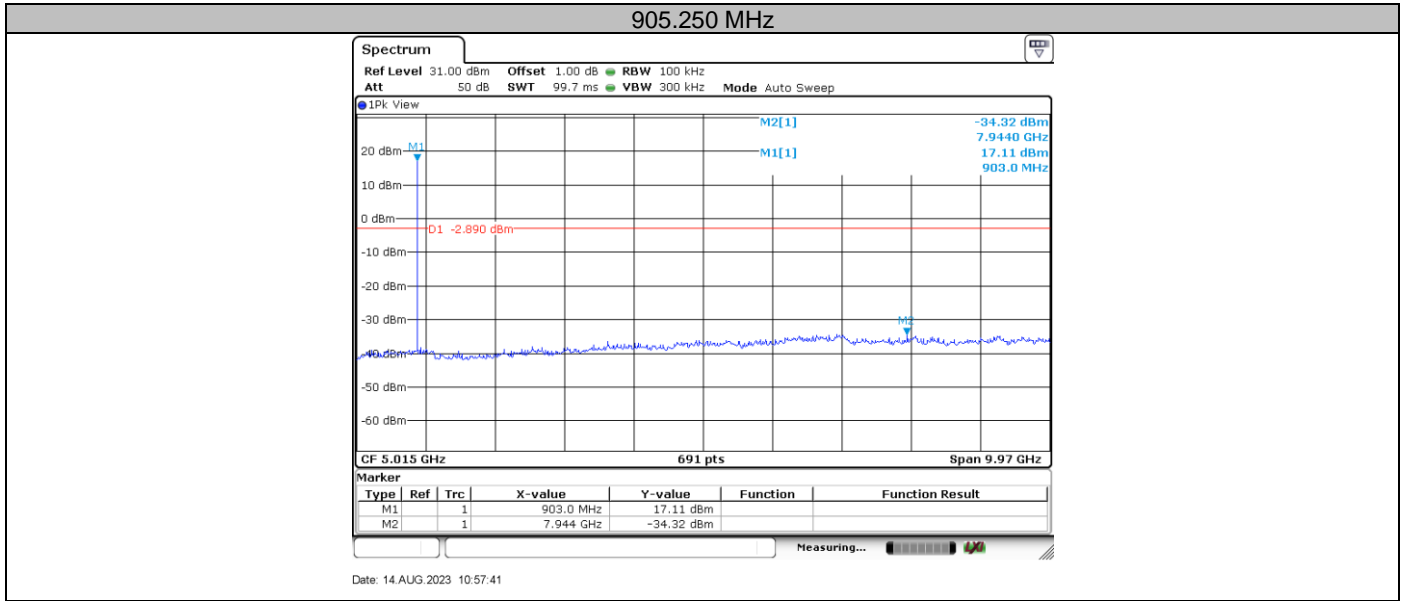
### Limit

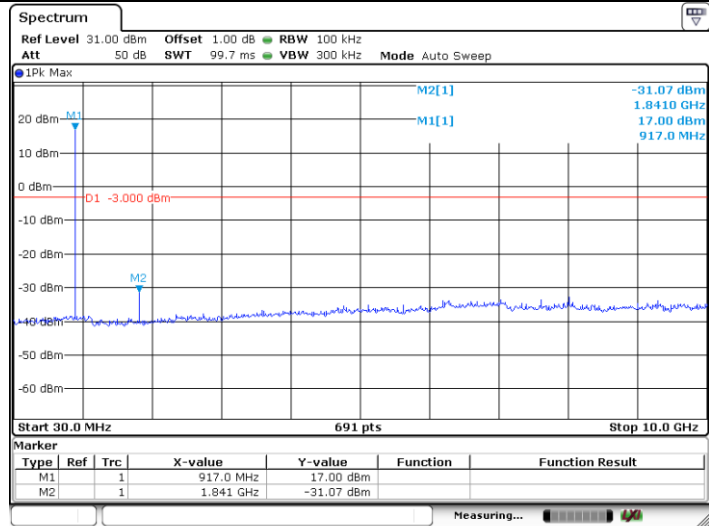
According to §15.247 (d), Spurious RF conducted emissions limit as below:

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

### Spurious RF conducted emissions

Test Mode	Antenna	Channel (MHz)	Freq. Range (MHz)	Result (dBm)	Limit (dBm)	Verdict
LORA	ANT 1	905.250	30~10000	-34.32	<=-2.89	PASS
		913.700	30~10000	-29.30	<=-2.59	PASS
		921.500	30~10000	-31.07	<=-3.00	PASS





Date: 16.AUG.2023 11:02:04



## 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

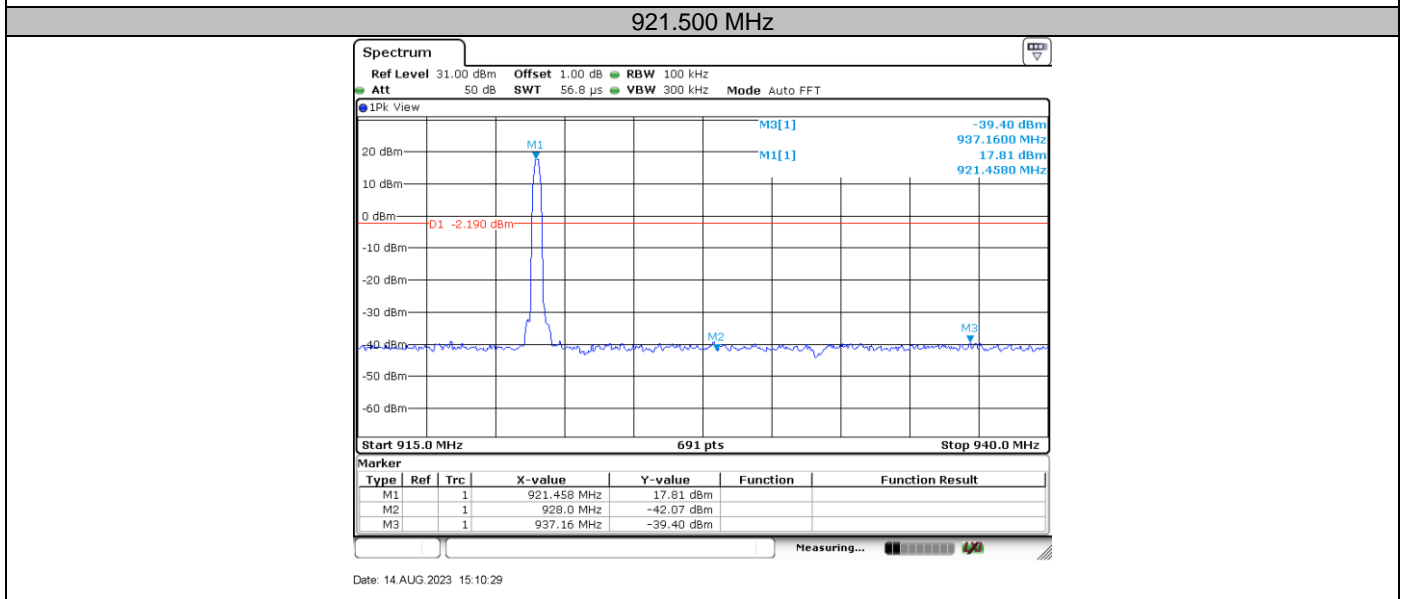
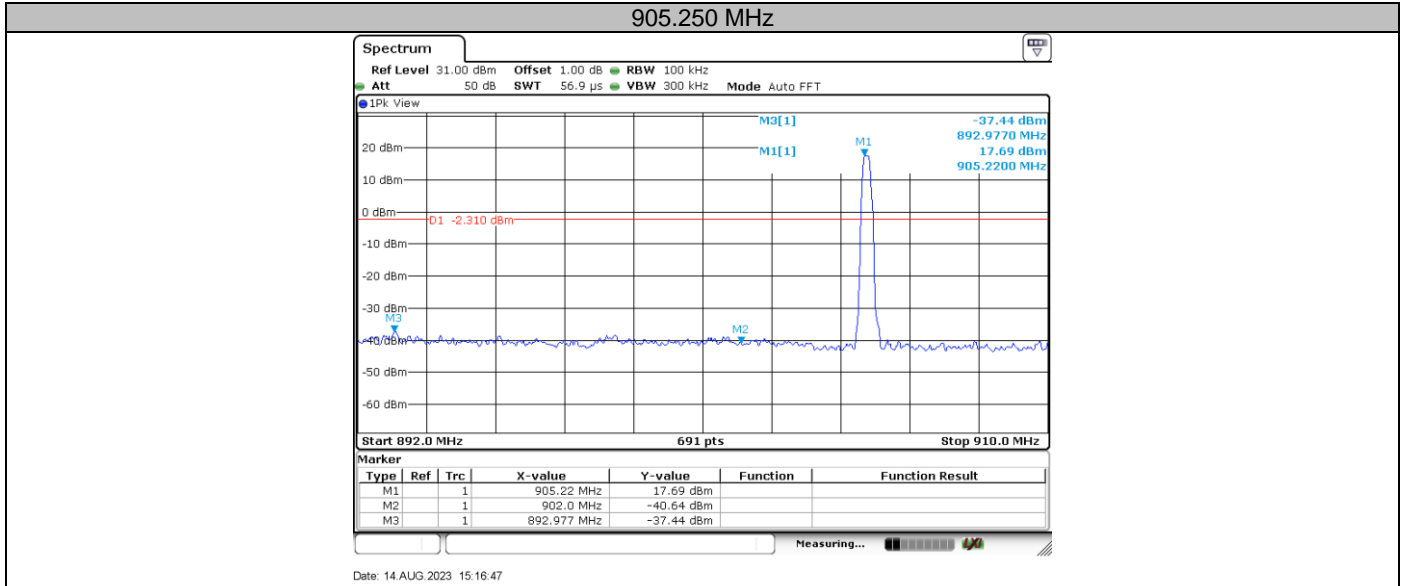
According to §15.247 (d), Band edge limit as below:

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 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.

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

### Band edge testing

Test Mode	Antenna	Ch. Name	Channel (MHz)	Ref. Level (dBm)	Result (dBm)	Limit (dBm)	Verdict
LORA	Ant1	Low	905.250	17.69	-37.44	<=-2.31	PASS
		High	921.500	17.81	-39.40	<=-2.19	PASS



## 9.8 Spurious radiated emissions for transmitter

### Test Method

1. The EUT was placed 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  $f \geq 1$  GHz for peak measurement.For average measurement:  
VBW = 10 Hz, when duty cycle is no less than 98 percent.  
VBW  $\geq 1/T$ , 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 ( $20\log(1/\text{duty cycle})$ ).
- 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.

## 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)

## 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 (dB)	Result
	MHz	dBuV/m		dBuV/m		dBuV/m		
30-1000MHz	143.975000	31.62	H	43.50	QP	11.88	12.45	Pass
	290.822222	34.32	H	46.00	QP	11.68	18.60	Pass
	459.548333	39.66	H	46.00	QP	6.34	22.21	Pass
	902.000000	40.78	H	46.00	QP	5.22	29.24	Pass
	905.250000	112.27	H	Fundamental (PK)			29.33	Pass
	905.250000	101.48	H	Fundamental (AV)			29.33	Pass
	928.000000	36.62	H	46.00	QP	9.38	29.46	Pass
	Other Frequencies	--	H	--	QP	--	--	Pass
	42.610000	27.22	V	40.00	QP	12.78	17.20	Pass
	147.639444	24.04	V	43.50	QP	19.46	12.52	Pass
	193.822222	25.61	V	43.50	QP	17.89	16.26	Pass
	902.000000	36.34	V	46.00	QP	9.66	29.24	Pass
	921.500000	99.69	V	Fundamental (PK)			29.33	Pass
	921.500000	88.90	V	Fundamental (AV)			29.33	Pass
	928.000000	36.89	V	46.00	QP	9.11	29.46	Pass
	Other Frequencies	--	V	--	QP	--	--	Pass

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor (dB)	Result
	MHz	dBuV/m		dBuV/m		dBuV/m		
1000-10000MHz	1487.500000	48.80	H	74.00	PK	25.20	-9.61	Pass
	1810.000000	53.82	H	74.00	PK	20.18	-7.67	Pass
	1810.000000	43.03	H	54.00	AV	10.97	-7.67	Pass
	Other Frequencies	--	H	--	PK	--	--	Pass
	1810.000000	48.39	V	74.00	PK	25.61	-7.66	Pass
	2046.000000	40.96	V	74.00	PK	33.04	-5.67	Pass
	2343.500000	41.43	V	74.00	PK	32.57	-4.79	Pass
Other Frequencies	--	V	--	PK	--	--	Pass	



Middle channel 913.700MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor (dB)	Result
	MHz	dBuV/m		dBuV/m		dBuV/m		
30-1000MHz	148.447778	24.79	H	43.50	QP	18.71	12.58	Pass
	193.876111	30.65	H	43.50	QP	12.85	16.27	Pass
	290.822222	27.76	H	46.00	QP	18.24	18.60	Pass
	902.000000	36.30	H	46.00	QP	9.70	29.23	Pass
	921.500000	109.75	H	Fundamental (PK)			29.45	Pass
	921.500000	98.96	H	Fundamental (AV)			29.45	Pass
	928.000000	35.88	H	46.00	QP	10.12	29.46	Pass
	Other Frequencies	--	H	--	QP	--	--	Pass
	43.957222	26.94	V	40.00	QP	13.06	17.58	Pass
	148.447778	22.69	V	43.50	QP	20.81	12.58	Pass
	351.231667	28.13	V	46.00	QP	17.87	20.70	Pass
	902.000000	36.38	V	46.00	QP	9.62	29.24	Pass
	921.500000	98.48	V	Fundamental (PK)			29.45	Pass
	921.500000	87.69	V	Fundamental (AV)			29.45	Pass
	928.000000	36.22	V	46.00	QP	9.78	29.46	Pass
	Other Frequencies	--	V	--	QP	--	--	Pass

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor (dB)	Result
	MHz	dBuV/m		dBuV/m		dBuV/m		
1000-10000MHz	1417.500000	42.41	H	74.00	PK	31.59	-10.08	Pass
	1719.500000	48.59	H	74.00	PK	25.41	-8.39	Pass
	1827.000000*	63.64	H	89.75	PK	26.11	-7.44	Pass
	1827.000000*	52.85	H	78.96	AV	26.11	-7.44	Pass
	Other Frequencies	--	H	--	PK	--	--	Pass
	1629.000000	44.94	V	74.00	PK	29.06	-8.86	Pass
	1827.000000	43.23	V	74.00	PK	30.77	-7.44	Pass
	3061.000000	45.76	V	74.00	PK	28.24	-0.71	Pass
	Other Frequencies	--	V	--	PK	--	--	Pass

## High channel 921.500MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dBuV/m		dBuV/m		dBuV/m		
30-1000MHz	50.262222	24.31	H	40.00	QP	15.69	18.04	Pass
	151.573333	25.72	H	43.50	QP	17.78	12.71	Pass
	359.961667	30.44	H	46.00	QP	15.56	19.79	Pass
	902.000000	35.47	H	46.00	QP	10.53	29.24	Pass
	921.500000	110.35	H	Fundamental (PK)			29.46	Pass
	921.500000	99.56	H	Fundamental (AV)			29.46	Pass
	928.000000	36.96	H	46.00	QP	9.04	29.46	Pass
	Other Frequencies	--	H	--	QP	--	--	Pass
	105.875556	24.04	V	43.50	QP	19.46	16.31	Pass
	197.325000	23.85	V	43.50	QP	19.65	16.72	Pass
	594.701667	34.35	V	46.00	QP	11.65	25.47	Pass
	902.000000	36.63	V	46.00	QP	9.37	29.24	Pass
	921.500000	98.17	V	Fundamental (PK)			29.46	Pass
	921.500000	87.38	V	Fundamental (AV)			29.46	Pass
	928.000000	36.42	V	46.00	QP	9.58	29.46	Pass
	Other Frequencies	--	V	--	QP	--	--	Pass

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dBuV/m		dBuV/m		dBuV/m		
1000-10000MHz	1227.500000	53.21	H	74.00	PK	20.79	-11.59	Pass
	1227.500000	42.42	H	54.00	AV	11.58	-11.59	Pass
	1449.000000	52.51	H	74.00	PK	21.49	-9.90	Pass
	1449.000000	41.72	H	54.00	AV	12.28	-9.90	Pass
	1488.500000	56.92	H	74.00	PK	17.08	-9.60	Pass
	1488.500000	46.13	H	54.00	AV	7.87	-9.60	Pass
	1842.500000*	65.95	H	90.35	PK	24.40	-7.31	Pass
	1842.500000*	55.16	H	79.56	AV	24.40	-7.31	Pass
	Other Frequencies	--	H	--	PK	--	--	Pass
	1364.500000	40.39	V	74.00	PK	33.61	-10.58	Pass
	1448.500000	52.11	V	74.00	PK	21.89	-9.90	Pass
	1448.500000	41.32	V	54.00	AV	12.68	-7.31	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)

## 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



## 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: $0.6 \times 10^{-8}$ 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---