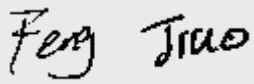
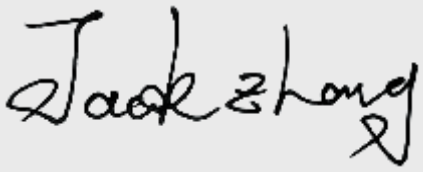
DEKRA Testing and Certification (Suzhou) Co., Ltd.
No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China
TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098

Test report No:
2331052R-RF-US-P06V01

FCC&ISED TEST REPORT

Product Name	LoRa+Wi-Fi+GNSS Module
Trademark	Murata
Model and /or type reference	LBAA0XV2DT
FCC ID	VPYLB2DT
IC	772C-LB2DT
Applicant´s name / address	Murata Manufacturing Co., Ltd. 10-1, Higashikotari 1-chome, Nagaokakyo-shi, Kyoto 617-8555, Japan
Test method requested, standard	FCC CFR Title 47 Part 15 Subpart C Section 15.247 ANSI C63.10: 2013 RSS-Gen Issue 5 / RSS-247 Issue 2
Verdict Summary	IN COMPLIANCE
Tested by (name / position & signature)	Feng Jiao/ Project Engineer 
Approved by (name / position & signature)	Jack Zhang/ Manager 
Date of issue	2023-10-30
Report Version	V1.1
Report template No	Template_FCC 15.247-RF-V1.0

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COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.
In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	May. 15, 2023
Date (start test)	May. 16, 2023
Date (finish test)	Oct. 27, 2023

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
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4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 ˚C – 35 ˚C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT	:	Equipment Under Test
QP	:	Quasi-Peak
CAV	:	CISPR Average
AV	:	Average
CDN	:	Coupling Decoupling Network
SAC	:	Semi-Anechoic Chamber
OATS	:	Open Area Test Site
BW	:	Bandwidth
AM	:	Amplitude Modulation
PM	:	Pulse Modulation
HCP	:	Horizontal Coupling Plane
VCP	:	Vertical Coupling Plane
U_N	:	Nominal voltage
*T*x	:	Transmitter
*R*x	:	Receiver
N/A	:	Not Applicable
N/M	:	Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
2331052R-RF-US-P06V01	V1.0	Initial issue of report.	2023-10-23
2331052R-RF-US-P06V01	V1.1	Add test data (The test report No.: 2331052R-RF-US-P06V01 V1.1 is to replace the test report No.: 2331052R-RF-US-P06V01 V1.0, and test report 2331052R-RF-US-P06V01 V1.0 is obsoleted.)	2023-10-30

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with FCC 15.247.
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result, unless the specification, standard or customer have special requirements.
4. The test results presented in this report relate only to the object tested.
5. The test results relate only to the samples tested.
6. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
7. This report will not be used for social proof function in China market.
8. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:
   - Chapter 1.1 General Description of the Item(s);
   - Chapter 1.2 Antenna Informaion;
   - Chapter 1.3 Data Rate;
   - Chapter 1.4 Channel List;
   - Chapter 1.5 Power Setting

USED EQUIPMENT

AC Power Line Conducted Emission / TR1(Chamber details)

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EMI Test Receiver	R&S	ESCI	100906	2022.09.08 2023.08.26	2023.09.07 2024.08.25
Two-Line V-Network	R&S	ENV216	101044	2023.01.07	2024.01.06
Current Probe	R&S	EZ-17	100678	2023.01.13	2024.01.12
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2023.05.14	2024.05.13
50ohm Termination	Xinghu	N/A	N/A	2023.02.10	2024.02.09
Temperature/Humidity Meter	RTS	RTS-8S	TR1-TH	2022.07.11 2023.07.06	2023.07.10 2023.07.06
Coaxial Cable	Suhner	RG 223	TR1-C1	2023.05.14	2024.05.13
Dekra test software	Dekra	N/A	N/A	N/A	N/A

Conducted Test / TR8

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Wireless Connectivity Tester	R&S	CMW 270	102593	2022.05.23 2023.05.20	2023.05.22 2024.05.19
Coaxial Cable	N/A	N/A	2477	2022.07.07 2023.06.08	2024.07.06 2024.06.07
Coaxial Cable	N/A	N/A	2478	2022.07.07 2023.06.08	2024.07.06 2024.06.07
High and low temperature and fast temperature change test box	ASTUOD	ASTD-FBT-225K	N/A	2022.07.15 2023.05.20	2023.07.14 2024.05.19
Temperature/Humidity Meter	RTS	RTS-8S	RF08	2022.08.24 2023.08.25	2023.08.23 2024.08.24
Test system					
MAX Signal Analyzer	Keysight	N9010A	MY48030494	2022.12.08	2023.12.07
RF Control Unit	Tonscend	JS0806-2	22G8060594	2023.02.04	2024.02.03
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY61252529	2022.07.20 2023.05.20	2023.07.19 2024.05.19
Frequency extender for EXG or MXG	Keysight	N5182BX07	MY59362500	2022.07.20 2023.05.20	2023.07.19 2024.05.19
EXG-B MW Analog Signal Generator	Keysight	N5173B	MY61252566	2022.09.28 2023.08.26	2023.09.27 2024.08.25
Test Software	Tonscend	TS1120	JS1120-3	N/A	N/A

Radiated Emission(30MHz-1GHz) / AC2(Chamber details)

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EMI Test Receiver	R&S	ESCI	100573	2022.09.20 2023.09.17	2023.09.19 2024.09.16
Loop Antenna	R&S	HFH2-Z2E	101149	2023.04.25	2024.04.24
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2023.02.20	2024.02.19
Temperature/Humidity Meter	RTS	RTS-8S	AC2-TH	2022.07.11 2023.05.19	2023.07.10 2024.05.18
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2022.07.20 2023.05.21	2023.07.19 2024.05.20
Dekra test software	Dekra	N/A	N/A	N/A	N/A

Radiated Emission (1GHz-40GHz) / AC5

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EXA Spectrum Analyzer	Keysight	N9020B	MY60112218	2022.12.08	2023.12.07
Pre-Amplifier	SKET	LNPA_0118G-45	SK2021090101	2022.06.20 2023.05.14	2023.06.19 2024.05.13
Preamplifier	CHENGYI	EMC184045SE	980263	2022.07.19 2023.07.09	2023.07.18 2024.07.08
DRG Horn	ETS-Lindgren	3117	00123988	2022.11.01	2023.10.31
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2022.05.30 2023.05.31	2023.05.29 2024.05.30
Filter Switch Box	MVE	MSW-F196	C070001S	2023.05.21	2024.05.20
Temperature/Humidity Meter	RTS	RTS-8S	AC5-TH	2022.07.11 2023.05.19	2023.07.10 2024.05.18
Coaxial Cable	TIMES	HF290A-NMNM-5.00M	651945-0001	2022.11.19	2023.11.18
Coaxial Cable	TIMES	HF290A-NMNM-6.00M	651946-0001	2022.11.19	2023.11.18
Coaxial Cable	TIMES	HF290A-NMNM-0.50M	651944-0001	2022.11.19	2023.11.18
Dekra test software	Dekra	N/A	N/A	N/A	N/A

UNCERTAINTY

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. Uncertainties is complice with standard required as below.

Test item	Uncertainty
AC Power Line Conducted Emission	± 2.92 dB
Peak Power Output	± 1.13 dB
Radiated Emission(30MHz~1GHz)	Horizontal: 30MHz~200MHz: 4.60 dB 200MHz~1GHz: 4.10 dB Vertical: 30MHz~200MHz: 4.80 dB 200MHz~1GHz: 4.10 dB
Radiated Emission(1GHz~26.5GHz)	Horizontal: 1GHz~18GHz: 5.00 dB Vertical: 1GHz~18GHz: 4.80 dB Horizontal: 18GHz~40GHz: 4.70 dB Vertical: 18GHz~40GHz: 4.60 dB
RF antenna conducted test	± 1.13 dB
Radiated Emission Band Edge	± 5.00 dB
DTS Bandwidth	± 279 Hz
Occupied Bandwidth	± 279 Hz
Power Density	± 1.13 dB

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name..... :	LoRa+Wi-Fi+GNSS Module
Model No. ..... :	LBAA0XV2DT
FCC ID..... :	VPYLB2DT
IC..... :	772C-LB2DT
Hardware Version ..... :	1.0
Software Version..... :	0x0307
Manufacturter..... :	Murata Manufacturing Co., Ltd.
Manufacturer Address..... :	10-1, Higashikotari 1-chome, Nagaokakyo-shi, Kyoto 617-8555, Japan
Factory ..... :	Murata Manufacturing Co., Ltd.
Factory Address..... :	10-1, Higashikotari 1-chome, Nagaokakyo-shi, Kyoto 617-8555, Japan

Wireless specifiction..... :	LoRa(DTS/FHSS/Hybird)	
Operating frequency range(s) :	LoRa(DTS) 500kHz bandwidth: 903MHz~914.2MHz LoRa(FHSS) 125kHz bandwidth: 902.3MHz~914.9MHz LR-FHSS 1.523MHz bandwidth: 903MHz~914.2MHz	
Modulation ..... :	LoRa	
Number of channel..... :	LoRa(DTS): 8 LoRa(FHSS): 64 LR -FHSS:8X60	
Data Rate ..... :	125kHz bandwidth LoRa: DR0~3 500kHz bandwidth LoRa: DR4 LR-FHSS: DR5~6	
Device category ..... :	☐	Fixed point-to-point
	☐	Emit multiple directional beams, simultaneously or sequentially
	☒	Other cases

Note: LR-FHSS: Each of the eight channels contains 60 sub-channels, and the frequency hopping function is actually implemented between sub-channels. The RF performance of the eight channels is completely consistent, so the test data of only one typical channel is presented in the report.

Rated power supply .....:	Voltage and Frequency	
	☐	AC: 220 - 240 V, 50/60 Hz
	☐	AC: 100 - 240 V, 50/60 Hz
	☒	DC: 1.8 – 3.6V, Typical 3.3V
	☐	Battery:
	☐	USB
Mounting position.....:	☐	Table top equipment
	☐	Wall/Ceiling mounted equipment
	☐	Floor standing equipment
	☐	Hand-held equipment
	☒	Other: Module

1.2 Antenna Information

Antenna model / type number..... :	ignion NN03-310			
Antenna serial number ..... :	N/A			
Antenna Delivery ..... :	☒	1TX + 1RX		
	☐	2TX + 2RX		
	☐	Others:·····		
Antenna technology..... :	☒	SISO		
	☐	MIMO	☐	Basic
			☐	CDD
			☐	Sectorized
			☐	Beam-forming
Antenna Type..... :	☒	External	☐	Dipole
			☒	chip antenna
			☐	Sectorized
	☐	Internal	☐	PIFA
			☐	PCB
			☐	Metal Antenna
Antenna Gain..... :	0.3dBi			

1.3 Channel List

LoRa(FHSS) 125kHz Bandwidth

Channel NO.	Frequency (MHz)	Channel NO.	Frequency (MHz)	Channel NO.	Frequency (MHz)	Channel NO.	Frequency (MHz)
0	902.3	1	902.5	2	902.7	3	902.9
4	903.1	5	903.3	6	903.5	7	903.7
8	903.9	9	904.1	10	904.3	11	904.5
12	904.7	13	904.9	14	905.1	15	905.3
16	905.5	17	905.7	18	905.9	19	906.1
20	906.3	21	906.5	22	906.7	23	906.9
24	907.1	25	907.3	26	907.5	27	907.7
28	907.9	29	908.1	39	908.3	31	908.5
32	908.7	33	908.9	34	909.1	35	909.3
36	909.5	37	909.7	38	909.9	39	910.1
40	910.3	41	910.5	42	910.7	43	910.9
44	911.1	45	911.3	46	911.5	47	911.7
48	911.9	49	912.1	50	912.3	51	912.5
52	912.7	53	912.9	54	913.1	55	913.3
56	913.5	57	913.7	58	913.9	59	914.1
60	914.3	61	914.5	62	914.7	63	914.9

LoRa(DTS) 500kHz Bandwidth

Channel NO.	Frequency (MHz)	Channel NO.	Frequency (MHz)	Channel NO.	Frequency (MHz)	Channel NO.	Frequency (MHz)
64	903	65	904.6	66	906.2	67	907.8
68	909.4	69	911	70	912.6	71	914.2

LR-FHSS 1.523MHz Bandwidth

Channel NO.	Frequency (MHz)	Channel NO.	Frequency (MHz)	Channel NO.	Frequency (MHz)	Channel NO.	Frequency (MHz)
64	903	65	904.6	66	906.2	67	907.8
68	909.4	69	911	70	912.6	71	914.2

Note: The LR-FHSS mode has 8 channels with 60 sub-channels each, and the channel spacing is 25.4KHz.

1.4 Power Setting

Mode	Frequency（MHz）	Power Setting
Mode 1 LoRa FHSS 125kHz bandwidth	902.3	22
	908.5	22
	914.9	22
Mode 2 LoRa DTS 500kHz bandwidth	903.0	22
	907.8	22
	914.2	22
Mode 3 LR-FHSS 1.523MHz bandwidth	903.0	22
	907.8	22
	914.2	22

Note: The General Description of the Item, antenna information, Channel List and power setting in clause 1 are provided and confirmed by the client.

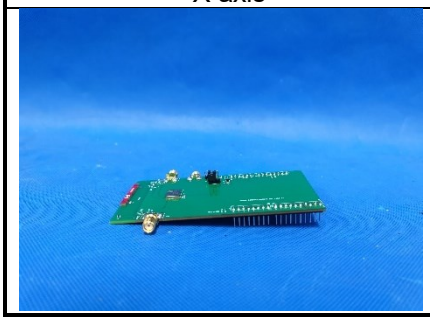
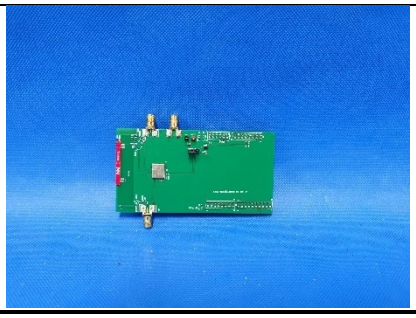
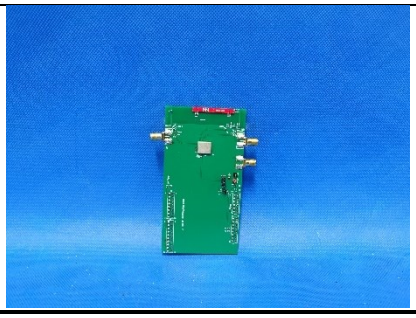
2 DESCRIPTION OF TEST SETUP

2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

Test Mode	Mode 1: Transmit by LoRa with FHSS 125kHz bandwidth(902.3-914MHz).
	Mode 2: Transmit by LoRa with DTS 500kHz bandwidth(903-914.2MHz)
	Mode 3: Transmit by LoRa with LR-FHSS 1.523MHz bandwidth(903-914.2MHz)

Note : For client device, radiated tests was verified over X, Y, Z axis, and shown the worst case Y axis on this report.

X axis	Y axis	Z axis
		

2.2 Support / Auxiliary equipment / unit / Test software for the EUT

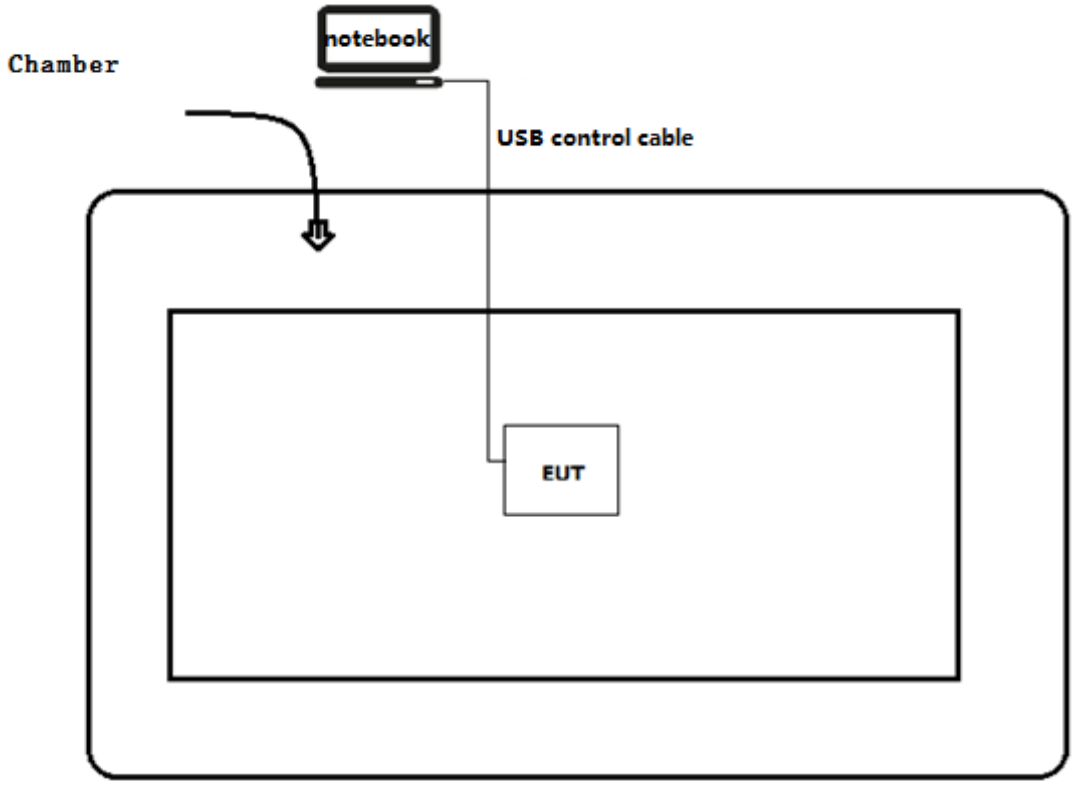
The EUT has been tested with the following auxiliary equipment / unit / software:

Auxiliary equipment	Type / Version	Manufacturer	Supplied by
Notebook	Think pad x280	Lenovo	Adapter
software	Type / Version	Manufacturer	Supplied by
SSCOM	5.13.1	N/A	N/A

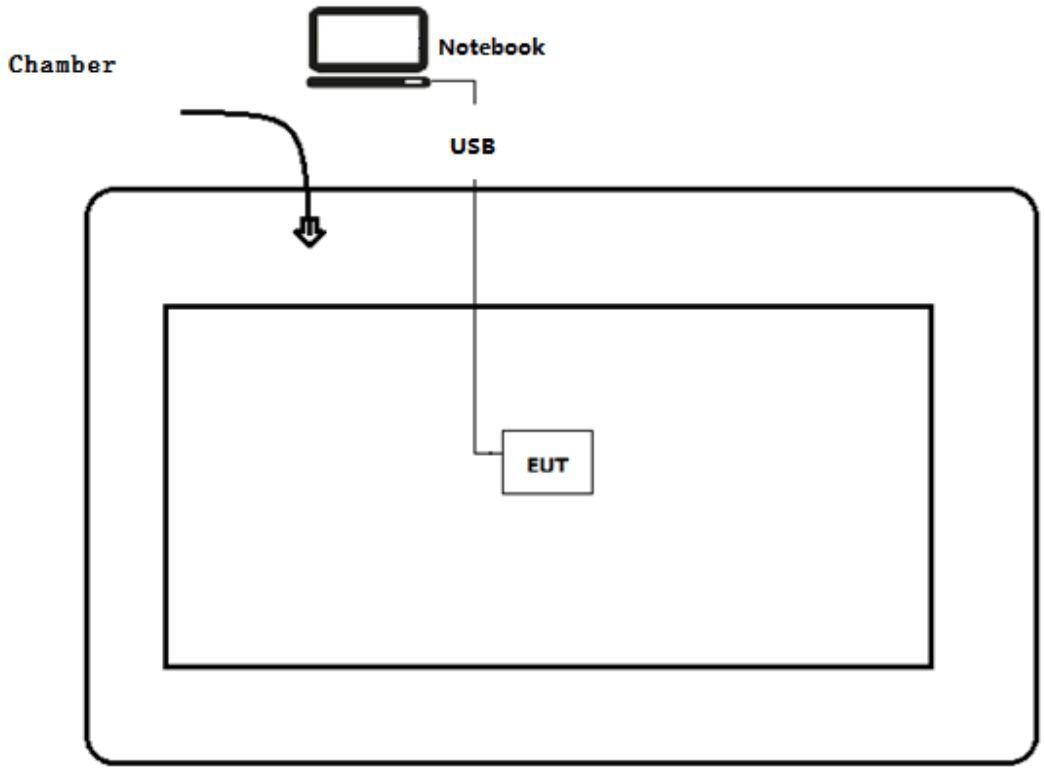
2.3 Test Configuration / Block diagram used for tests

The following test setup / configuration / block diagram has been used during the tests:

Test setup Diagram- Conducted test



Test setup Diagram- Radiated test



2.4 Testing process

1	Setup the EUT as shown in Section 2.4.
2	Run the software “SSCOM” on the notebook computer.
3	Open the serial port and enter the corresponding commands to configure the test mode, test channel, test power and data rate.
4	Verify that the EUT works properly.

3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1 Standards

Standard	Year	Description
FCC CFR Title 47 Part 15 Subpart C Section 15.247	2020	Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz, and 5725 – 5850 MHz.
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
RSS-Gen Issue 5 Amendment 1	2019	General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 2	2017	Digital Transmission Systems (DTSs),Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

3.2 Overview of results

For FCC:

Requirement – Test case	Basic standard(s)	Verdict	Remark
AC Power Line Conducted Emission	FCC 15.207	N/A	---
Emissions in restricted frequency bands	FCC 15.247(d), 15.209	PASS	---
Emissions in non-restricted frequency bands	FCC 15.247(d)	PASS	---
Radiated Emission Band Edge	FCC 15.247(d), 15.209	N/A	---
Fundamental emission output power	FCC 15.247(b)(3)	PASS	---
DTS Bandwidth	FCC 15.247(a)(2)	PASS	---
20dB Bandwidth	FCC 15.247(a)(1)	PASS	---
Power Spectral Density	FCC 15.247(e)	PASS	---
Carrier Frequency Separation	FCC 15.247(a)(1)	PASS	---
Number of Hopping Frequencies	FCC 15.247(a)(1)(iii)	PASS	---
Time of Occupancy (Dwell Time)	FCC 15.247(a)(1)(iii)	PASS	---
Antenna Requirement	FCC 15.203	PASS	---

For ISED:

Requirement – Test case	Basic standard(s)	Verdict	Remark
AC Power Line Conducted Emission	RSS-Gen Issue 5 Section 8.8	N/A	---
Emissions in restricted frequency bands	RSS-Gen Issue 5 Section 8.9	PASS	---
Emissions in non-restricted frequency bands	RSS-247 Issue 2 Section A5.5	PASS	---
Radiated Emission Band Edge	RSS-247 Issue 2 Section A5.5	N/A	---
Fundamental emission output power	RSS-247 Issue 2 SectionA5.4(4)	PASS	---
DTS Bandwidth	RSS-Gen Issue 5 Section 6.6	PASS	---
20dB Bandwidth	RSS-247 Issue 2 Section A5.2(1)	PASS	---
Carrier Frequency Separation	RSS-247 Issue 2 Section 5.1	PASS	---
Number of Hopping Frequencies	RSS-247 Issue 2 Section 5.1	PASS	---
Time of Occupancy (Dwell Time)	RSS-247 Issue 2 Section 5.1	PASS	---
Power Spectral Density	RSS-247 Issue 2 Section A5.2(2)	PASS	---
Antenna Requirement	RSS-Gen Issue 5 Section 6.8	PASS	---

3.3 Test Facility

USA	**:**	**FCC Designation Number: CN1199**
Canada	**:**	**CAB identifier Number: CN0040**

4 TEST RESULTS

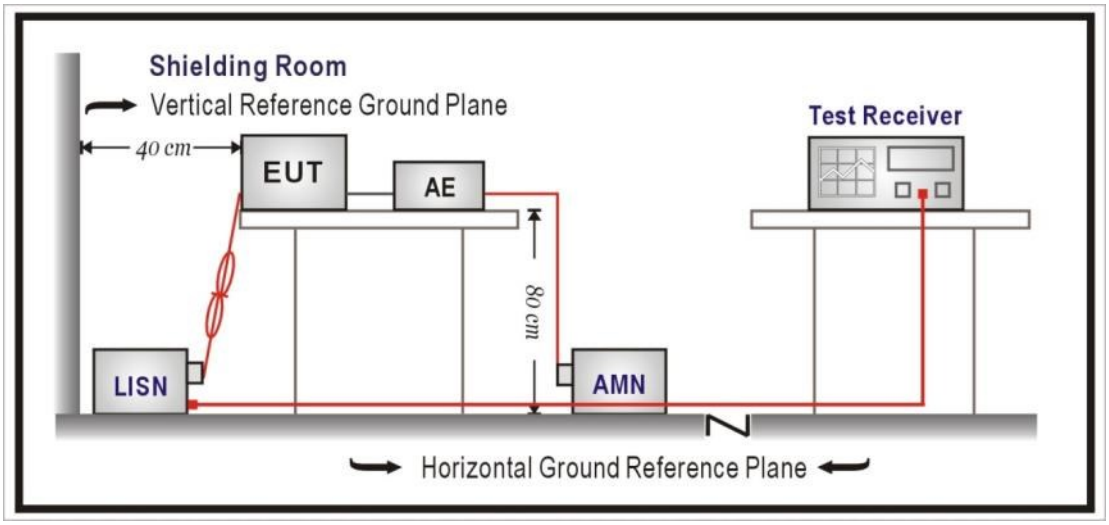
4.1 AC Power Line Conducted Emission	VERDICT: N/A

4.1.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.207	
Frequency range [MHz]	Limit: QP [dB(μV)[1)]]	Limit: AV [dB(μV) [1)]]
0,15 - 0,50	66 - 56 [2)]	56 - 46 [2)]
0,50 - 5,0	56	46
5,0 - 30	60	50

[1)] At the transition frequency, the lower limit applies.
[2)] The limit decreases linearly with the logarithm of the frequency.

4.1.2 Test Setup



4.1.3 Test Procedure

	References Rule	Chapter	Item
☒	ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

4.1.4 Test Data

N/A: The device is powered by DC, so the test item is not applicable.

4.2 Emissions in restricted frequency bands	VERDICT: PASS

4.2.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.205; 15.209

Restricted Bands of operation for FCC

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4	3600 – 4400	Above 38.6
13.36 – 13.41	--	--	--

Restricted Bands of operation for ISED

0.090 - 0.110	13.36 - 13.41	960 - 1427	9.0 - 9.2
0.495 - 0.505	16.42 - 16.423	1435 - 1626.5	9.3 - 9.5
2.1735 - 2.1905	16.69475 - 16.69525	1645.5 - 1646.5	10.6 - 12.7
3.020 - 3.026	16.80425 - 16.80475	1660 - 1710	13.25 - 13.4
4.125 - 4.128	25.5 - 25.67	1718.8 - 1722.2	14.47 - 14.5
4.17725 - 4.17775	37.5 - 38.25	2200 - 2300	15.35 - 16.2
4.20725 - 4.20775	73 - 74.6	2310 - 2390	17.7 - 21.4
5.677 - 5.683	74.8 - 75.2	2483.5 - 2500	22.01 - 23.12
6.215 - 6.218	108 - 138	2655 - 2900	23.6 - 24.0
6.26775 - 6.26825	149.9 - 150.05	3260 - 3267	31.2 - 31.8
6.31175 - 6.31225	156.52475 - 156.52525	3332 - 3339	36.43 - 36.5
8.291 - 8.294	156.7 - 156.9	3345.8 - 3358	Above 38.6
8.362 - 8.366	162.0125 - 167.17	3500 - 4400	--
8.37625 - 8.38675	167.72 - 173.2	4500 - 5150	--
8.41425 - 8.41475	240 - 285	5350 - 5460	--
12.29 - 12.293	322 - 335.4	7250 - 7750	--
12.51975 - 12.52025	399.9 - 410	8025 - 8500	--
12.57675 - 12.57725	608 - 614	--	--

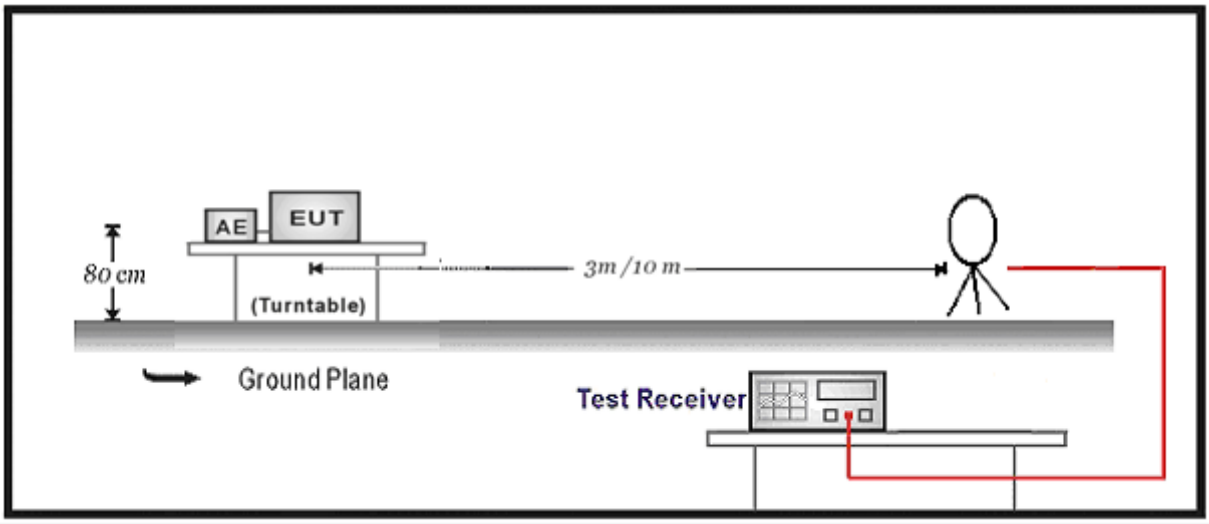
Restricted Band Emissions Limit			
Frequency (MHz)	Field strength (μV/m)	Field strength (dB μV/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30(Note 1)
1.705 - 30	30	29.5	30(Note 1)
30 - 88	100	40	3(Note 2)
88 - 216	150	43.5	3(Note 2)
216 - 960	200	46	3(Note 2)
Above 960	500	54	3(Note 2)

Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

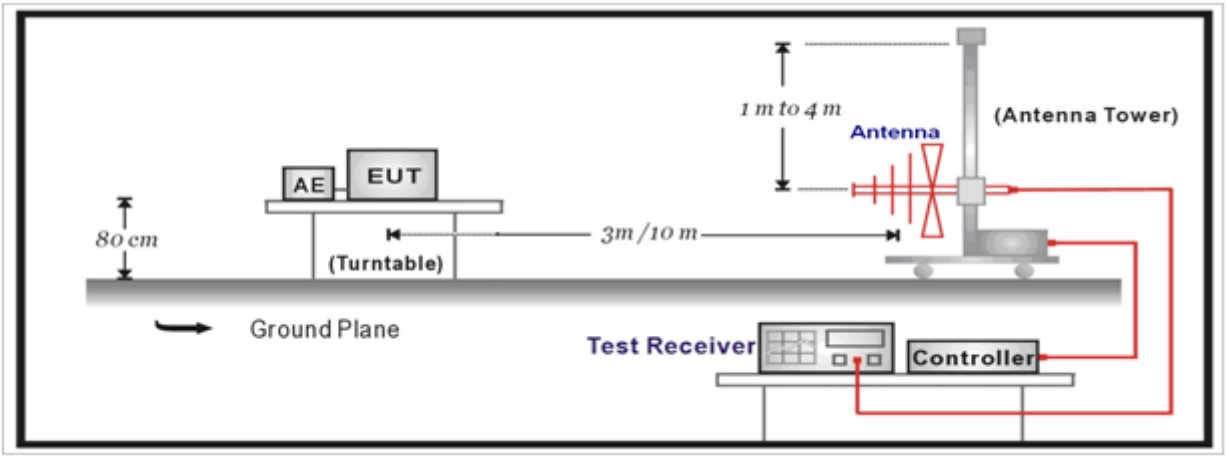
Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

4.2.2 Test Setup

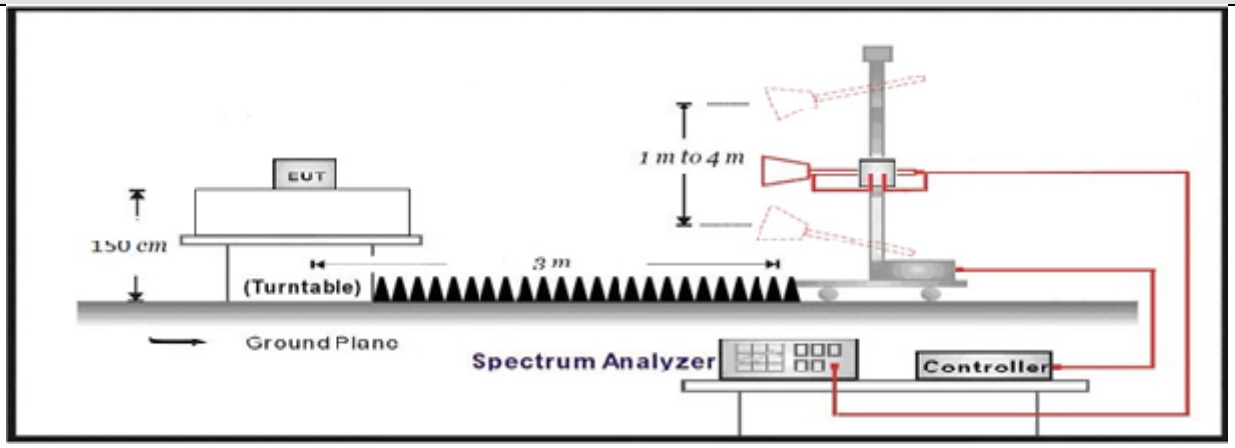
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:

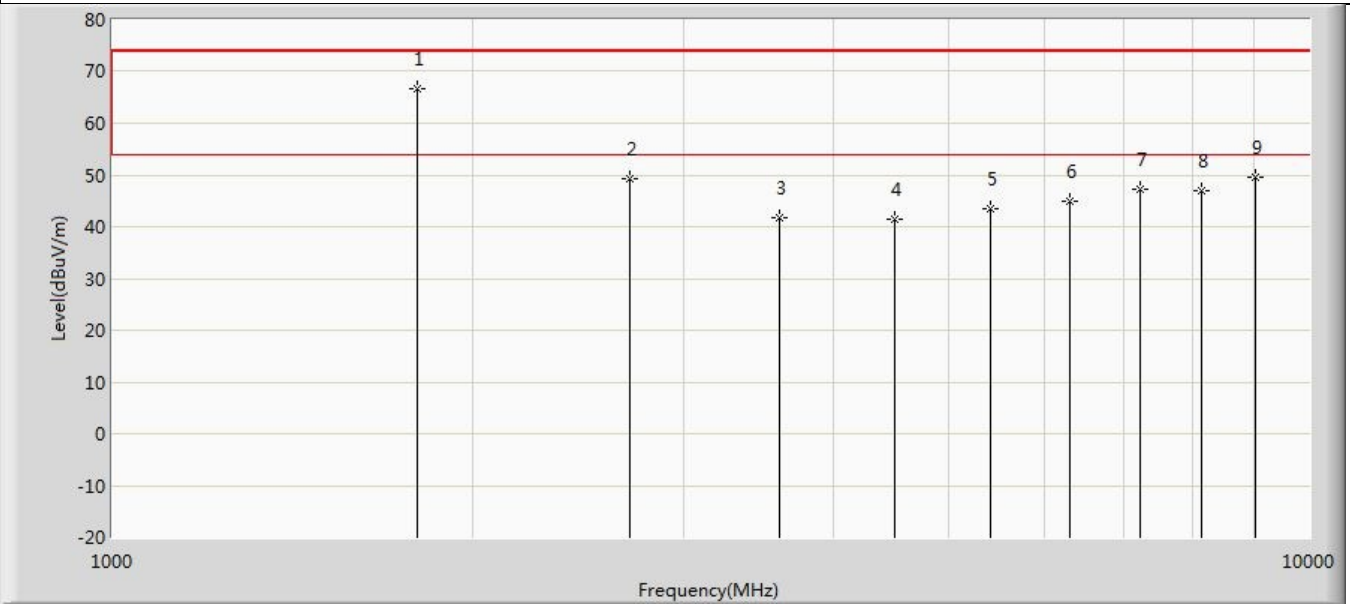


4.2.3 Test Procedure

	References Rule	Chapter	Description
☒	ANSI C63.10	11.12	Emissions in restricted frequency bands
	☒ ANSI C63.10	11.12.1	Radiated emission measurements
	☒ ANSI C63.10	6.3	Radiated spurious emission test
	☒ ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
	☒ ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
	☒ ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz
	☐ ANSI C63.10	11.12.2	Antenna-port conducted measurements
	☐ ANSI C63.10	11.12.2.3	Quasi-peak measurement procedure
	☐ ANSI C63.10	11.12.2.4	Peak power measurement procedure
	☐ ANSI C63.10	11.12.2.5	Average power measurement procedures
	☐ ANSI C63.10	11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
	☐ ANSI C63.10	11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
	☐ ANSI C63.10	11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

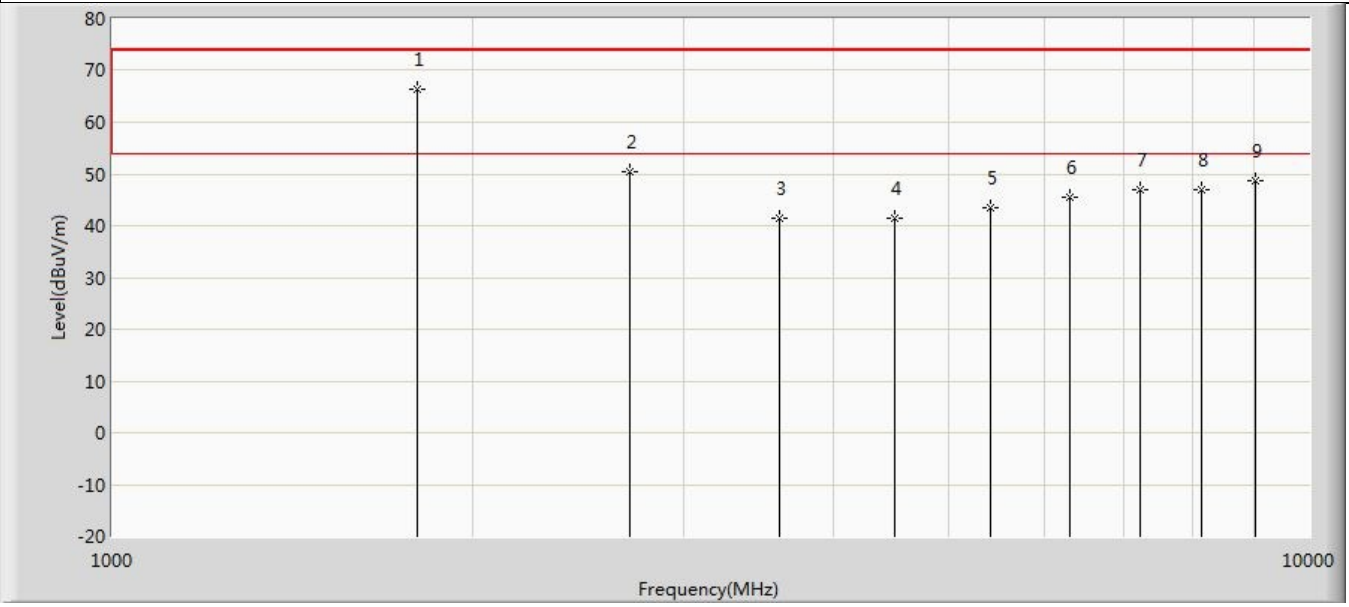
4.2.4 Test Data

Profile: 2331052R	Page No.: 19
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 1:Transmit at 902.3Mhz by lora 125k	



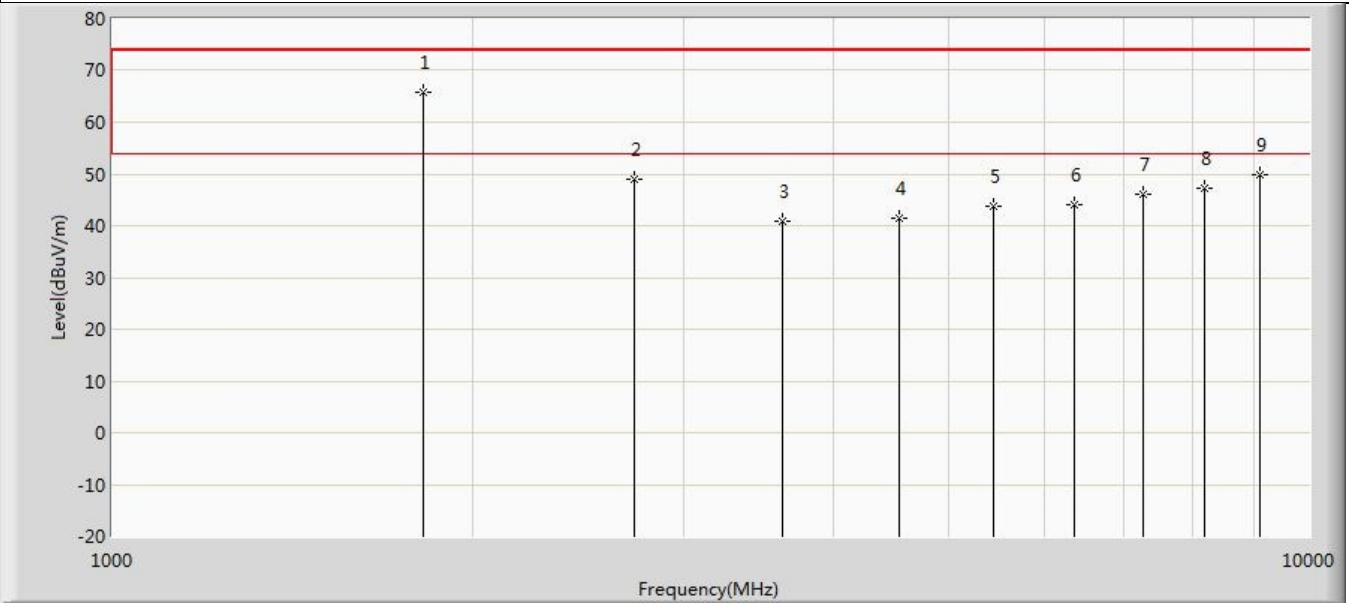
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1801.000	66.543	86.291	-7.457	74.000	-19.748	PK
2		2710.000	49.260	67.745	-24.740	74.000	-18.485	PK
3		3609.200	41.762	58.987	-32.238	74.000	-17.226	PK
4		4511.500	41.364	56.453	-32.636	74.000	-15.089	PK
5		5413.800	43.413	55.368	-30.587	74.000	-11.954	PK
6		6316.100	44.928	54.489	-29.072	74.000	-9.561	PK
7		7218.400	47.312	55.893	-26.688	74.000	-8.581	PK
8		8120.700	46.858	54.489	-27.142	74.000	-7.631	PK
9		9023.000	49.570	55.494	-24.430	74.000	-5.924	PK

Profile: 2331052R	Page No.: 20
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 1:Transmit at 902.3Mhz by lora 125k	



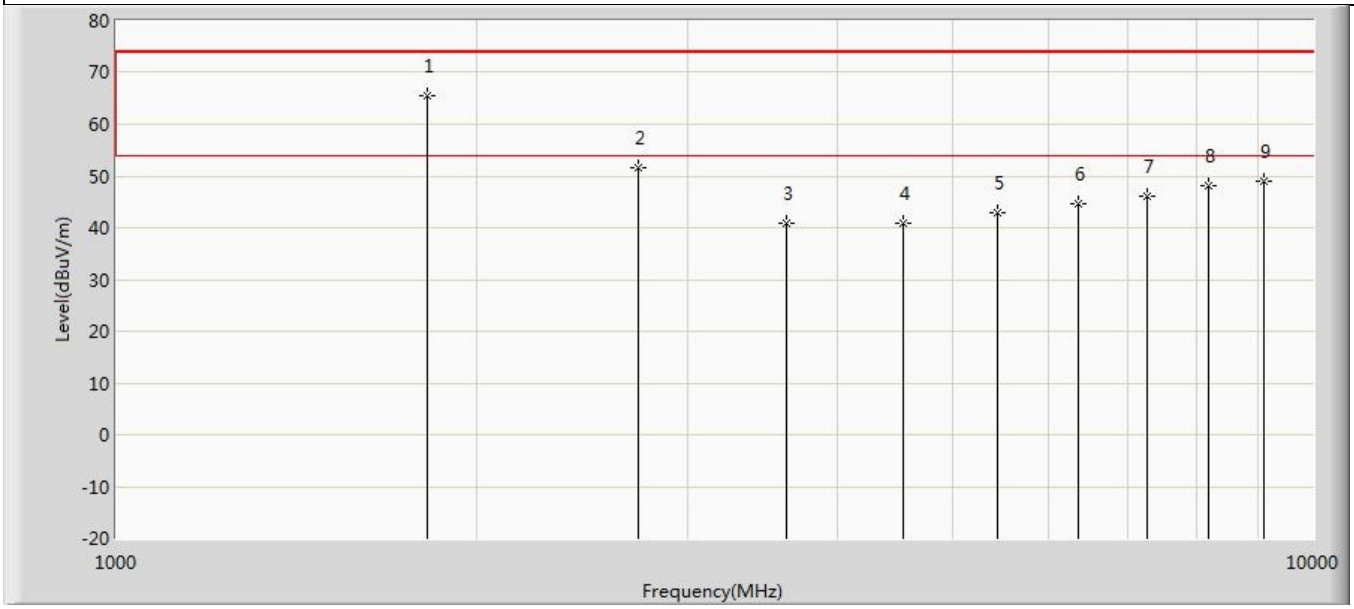
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1801.000	66.467	86.215	-7.533	74.000	-19.748	PK
2		2710.000	50.445	68.930	-23.555	74.000	-18.485	PK
3		3609.200	41.508	58.733	-32.492	74.000	-17.226	PK
4		4511.500	41.433	56.522	-32.567	74.000	-15.089	PK
5		5413.800	43.370	55.325	-30.630	74.000	-11.954	PK
6		6316.100	45.459	55.020	-28.541	74.000	-9.561	PK
7		7218.400	46.915	55.496	-27.085	74.000	-8.581	PK
8		8120.700	47.012	54.643	-26.988	74.000	-7.631	PK
9		9023.000	48.675	54.599	-25.325	74.000	-5.924	PK

Profile: 2331052R	Page No.: 21
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 1:Transmit at 908.5Mhz by lora 125k	



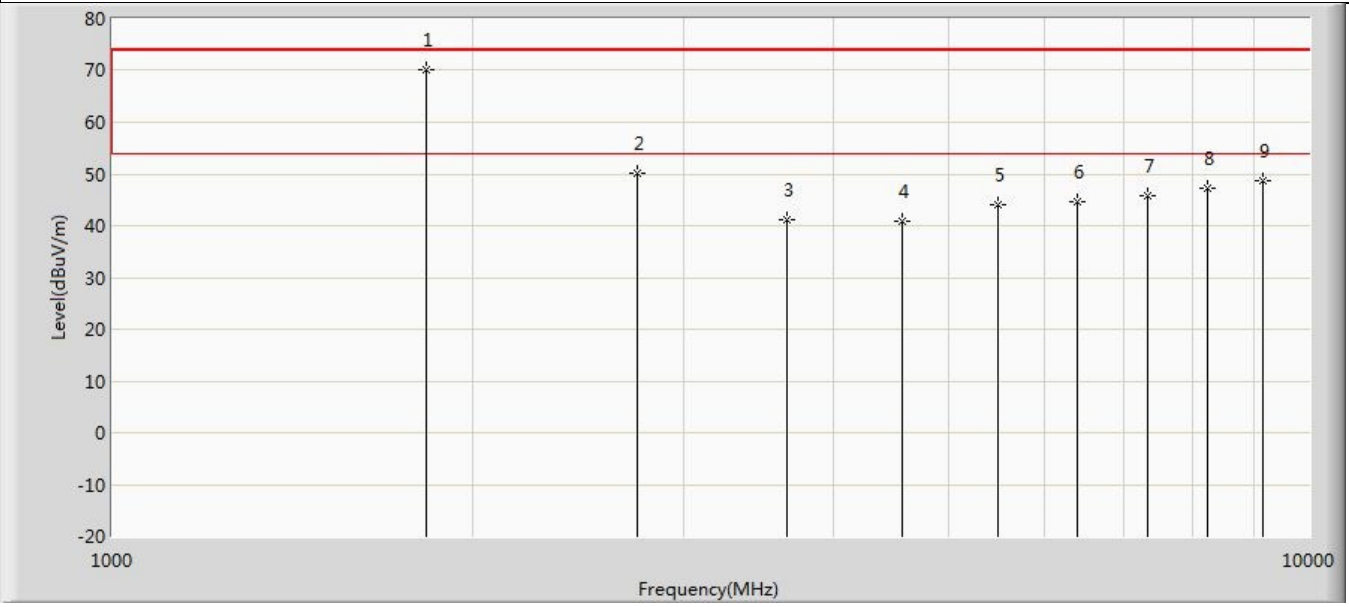
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1819.000	65.922	85.575	-8.078	74.000	-19.653	PK
2		2728.000	48.951	67.417	-25.049	74.000	-18.466	PK
3		3634.000	40.844	58.031	-33.156	74.000	-17.187	PK
4		4542.500	41.456	56.859	-32.544	74.000	-15.402	PK
5		5451.000	43.634	55.238	-30.366	74.000	-11.604	PK
6		6359.500	44.167	53.897	-29.833	74.000	-9.729	PK
7		7268.000	46.078	54.643	-27.922	74.000	-8.564	PK
8		8176.500	47.259	55.221	-26.741	74.000	-7.961	PK
9		9085.000	49.796	55.160	-24.204	74.000	-5.364	PK

Profile: 2331052R	Page No.: 22
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 1:Transmit at 908.5Mhz by lora 125k	



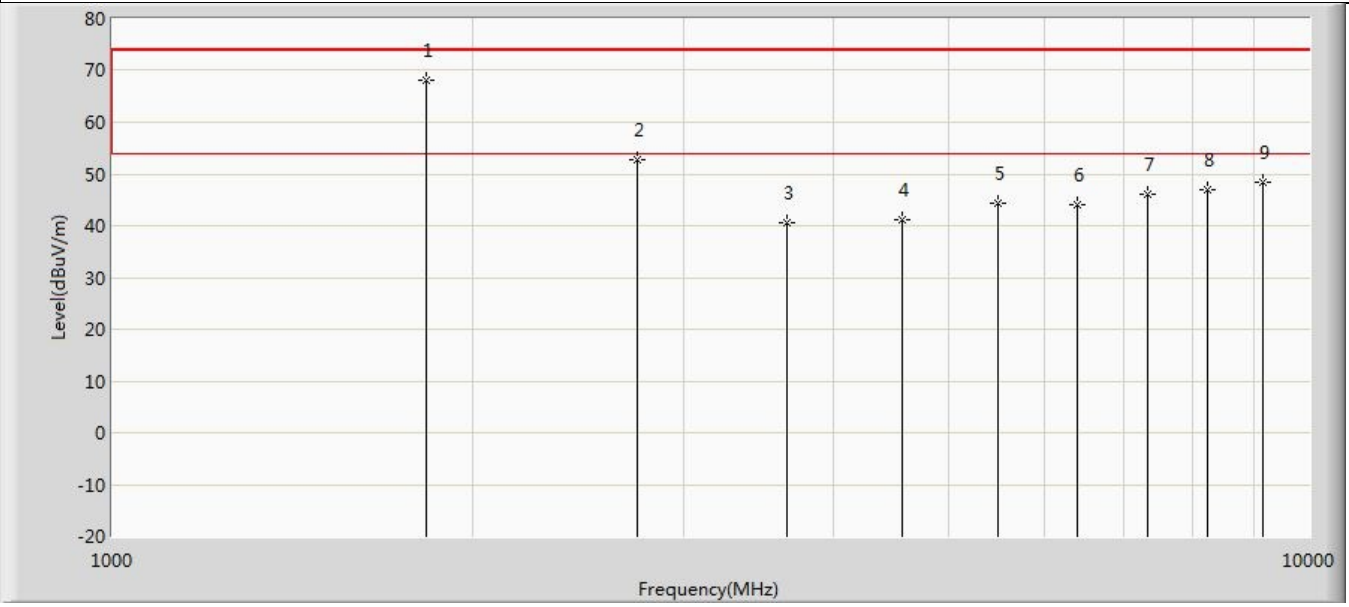
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1819.000	65.650	85.303	-8.350	74.000	-19.653	PK
2		2728.000	51.657	70.123	-22.343	74.000	-18.466	PK
3		3634.000	40.778	57.965	-33.222	74.000	-17.187	PK
4		4542.500	40.927	56.330	-33.073	74.000	-15.402	PK
5		5451.000	43.031	54.635	-30.969	74.000	-11.604	PK
6		6359.500	44.508	54.238	-29.492	74.000	-9.729	PK
7		7268.000	46.006	54.571	-27.994	74.000	-8.564	PK
8		8176.500	48.148	56.110	-25.852	74.000	-7.961	PK
9		9085.000	49.093	54.457	-24.907	74.000	-5.364	PK

Profile: 2331052R	Page No.: 23
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 1:Transmit at 914.9Mhz by lora 125k	



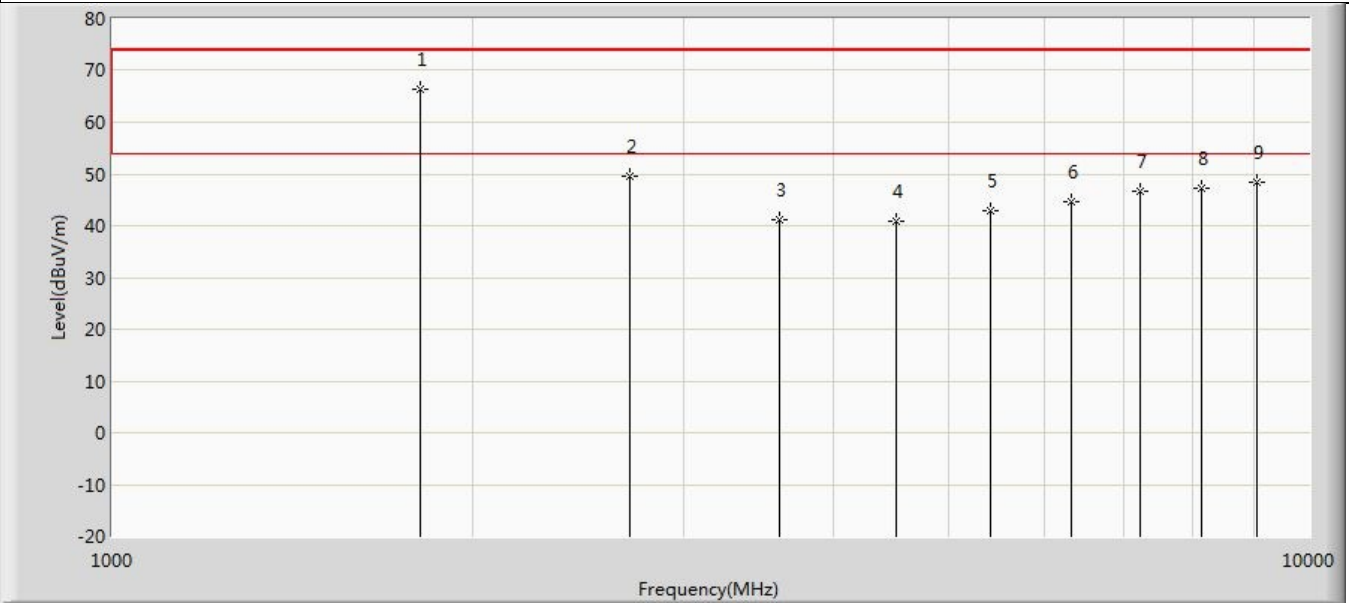
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1828.000	70.096	89.633	-3.904	74.000	-19.537	PK
2		2746.000	50.003	68.450	-23.997	74.000	-18.447	PK
3		3659.600	41.217	58.375	-32.783	74.000	-17.158	PK
4		4574.500	40.880	56.009	-33.120	74.000	-15.129	PK
5		5489.400	43.988	55.651	-30.012	74.000	-11.663	PK
6		6404.300	44.607	54.400	-29.393	74.000	-9.792	PK
7		7319.200	45.752	54.747	-28.248	74.000	-8.995	PK
8		8234.100	47.265	54.949	-26.735	74.000	-7.684	PK
9		9149.000	48.570	54.432	-25.430	74.000	-5.862	PK

Profile: 2331052R	Page No.: 24
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 1:Transmit at 914.9Mhz by lora 125k	



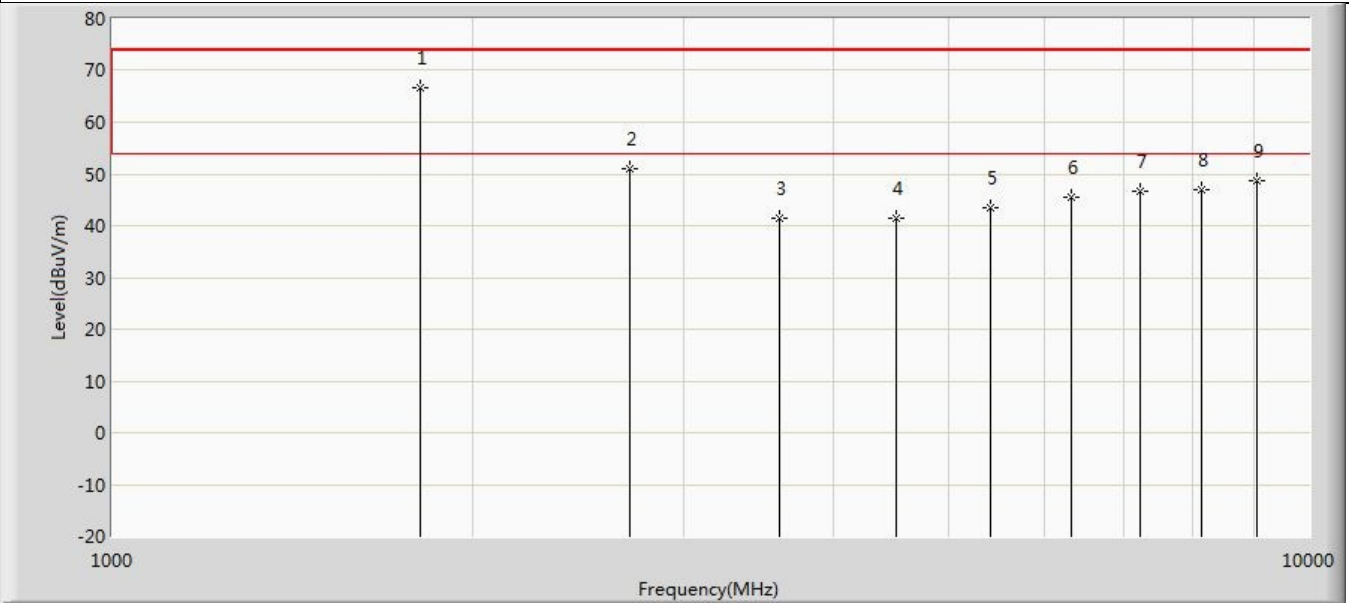
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1828.000	68.232	87.769	-5.768	74.000	-19.537	PK
2		2746.000	52.703	71.150	-21.297	74.000	-18.447	PK
3		3659.600	40.621	57.779	-33.379	74.000	-17.158	PK
4		4574.500	41.144	56.273	-32.856	74.000	-15.129	PK
5		5489.400	44.369	56.032	-29.631	74.000	-11.663	PK
6		6404.300	44.149	53.942	-29.851	74.000	-9.792	PK
7		7319.200	46.074	55.069	-27.926	74.000	-8.995	PK
8		8234.100	46.934	54.618	-27.066	74.000	-7.684	PK
9		9149.000	48.371	54.233	-25.629	74.000	-5.862	PK

Profile: 2331052R	Page No.: 25
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 2:Transmit at 903Mhz by lora 500k	



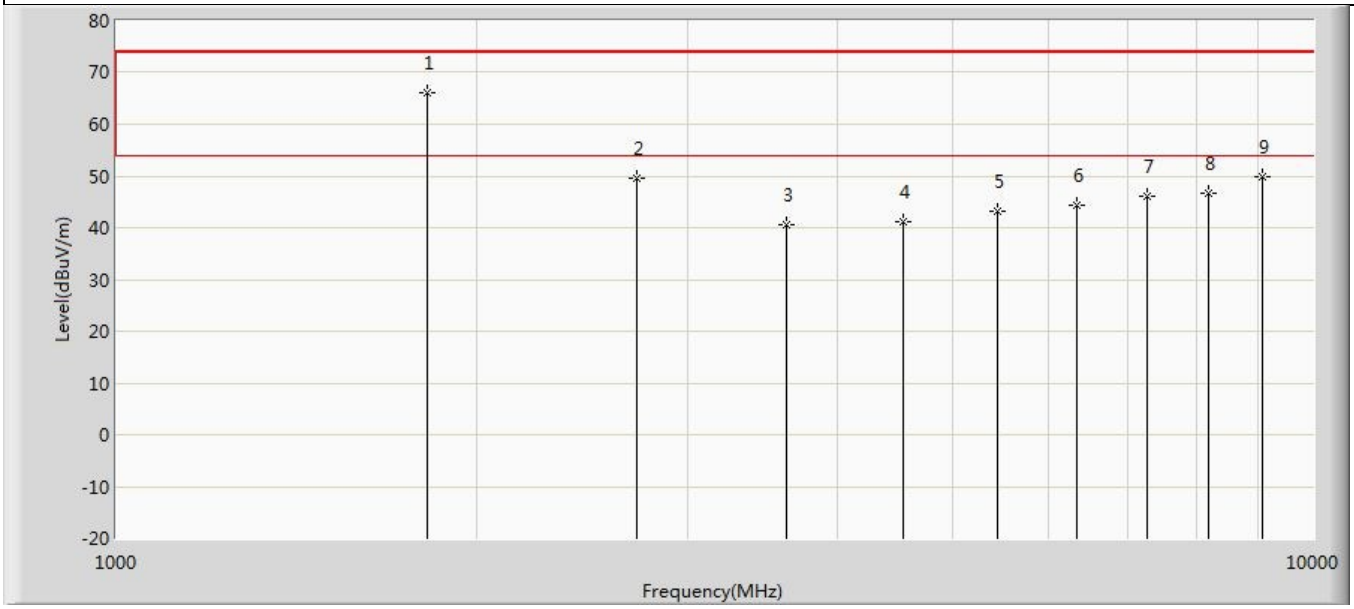
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1810.000	66.401	86.115	-7.599	74.000	-19.715	PK
2		2710.000	49.706	68.191	-24.294	74.000	-18.485	PK
3		3612.000	41.291	58.497	-32.709	74.000	-17.206	PK
4		4515.000	40.974	56.097	-33.026	74.000	-15.122	PK
5		5418.000	42.844	54.888	-31.156	74.000	-12.044	PK
6		6321.000	44.738	54.097	-29.262	74.000	-9.359	PK
7		7224.000	46.677	55.229	-27.323	74.000	-8.552	PK
8		8127.000	47.161	54.869	-26.839	74.000	-7.708	PK
9		9030.000	48.441	54.358	-25.559	74.000	-5.917	PK

Profile: 2331052R	Page No.: 26
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 2:Transmit at 903Mhz by lora 500k	



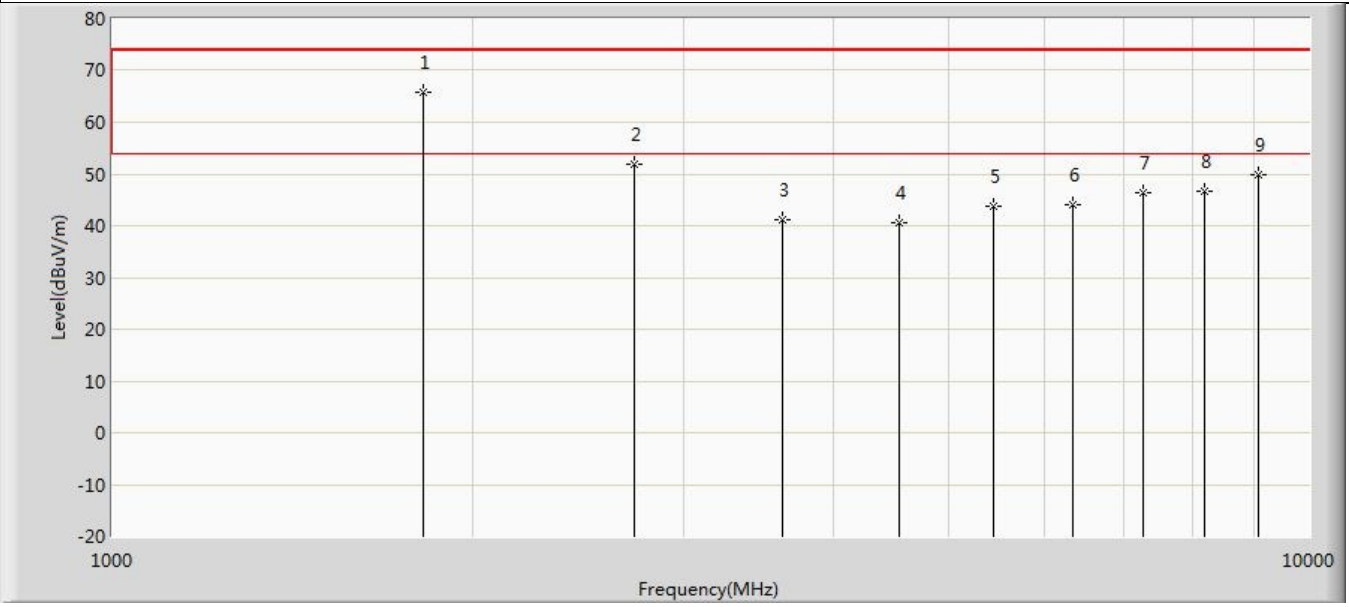
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1810.000	66.535	86.249	-7.465	74.000	-19.715	PK
2		2710.000	50.885	69.370	-23.115	74.000	-18.485	PK
3		3612.000	41.575	58.781	-32.425	74.000	-17.206	PK
4		4515.000	41.527	56.650	-32.473	74.000	-15.122	PK
5		5418.000	43.542	55.586	-30.458	74.000	-12.044	PK
6		6321.000	45.389	54.748	-28.611	74.000	-9.359	PK
7		7224.000	46.758	55.310	-27.242	74.000	-8.552	PK
8		8127.000	46.938	54.646	-27.062	74.000	-7.708	PK
9		9030.000	48.804	54.721	-25.196	74.000	-5.917	PK

Profile: 2331052R	Page No.: 27
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 2:Transmit at 907.8Mhz by lora 500k	



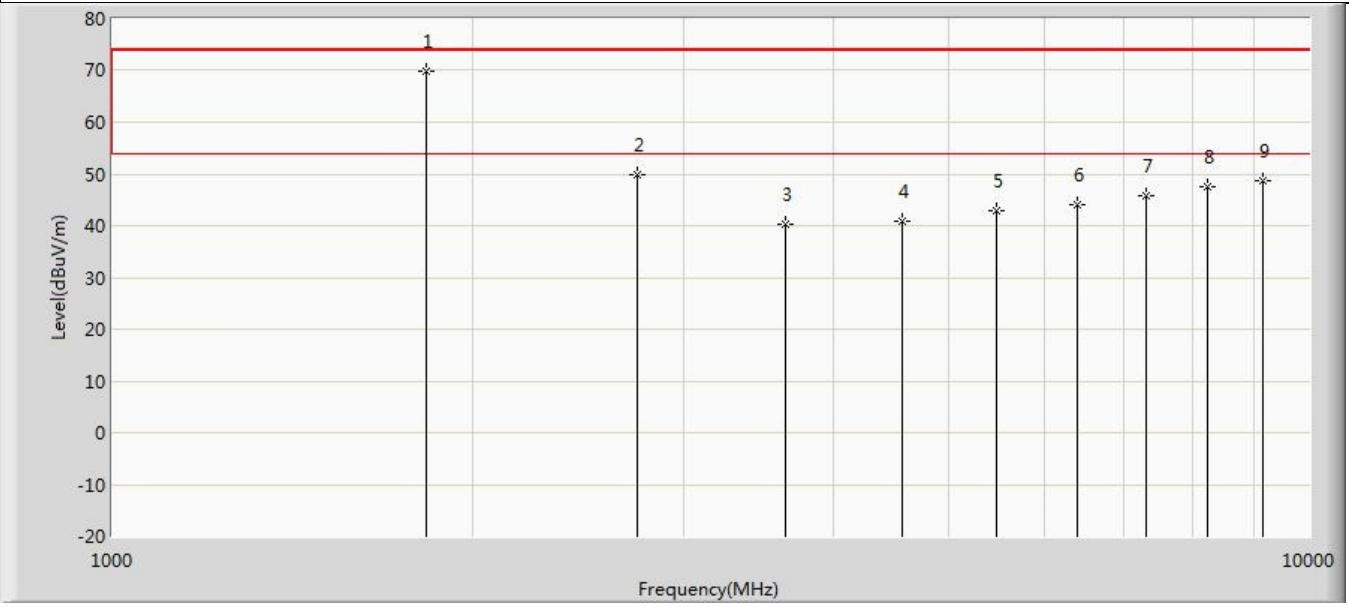
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1819.000	66.029	85.682	-7.971	74.000	-19.653	PK
2		2719.000	49.644	68.083	-24.356	74.000	-18.438	PK
3		3631.200	40.509	57.692	-33.491	74.000	-17.183	PK
4		4539.000	41.257	56.709	-32.743	74.000	-15.452	PK
5		5446.800	43.129	54.705	-30.871	74.000	-11.576	PK
6		6354.600	44.469	54.246	-29.531	74.000	-9.776	PK
7		7262.400	46.199	54.744	-27.801	74.000	-8.545	PK
8		8170.200	46.794	54.771	-27.206	74.000	-7.977	PK
9		9078.000	49.966	55.353	-24.034	74.000	-5.386	PK

Profile: 2331052R	Page No.: 28
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 2:Transmit at 907.8Mhz by lora 500k	



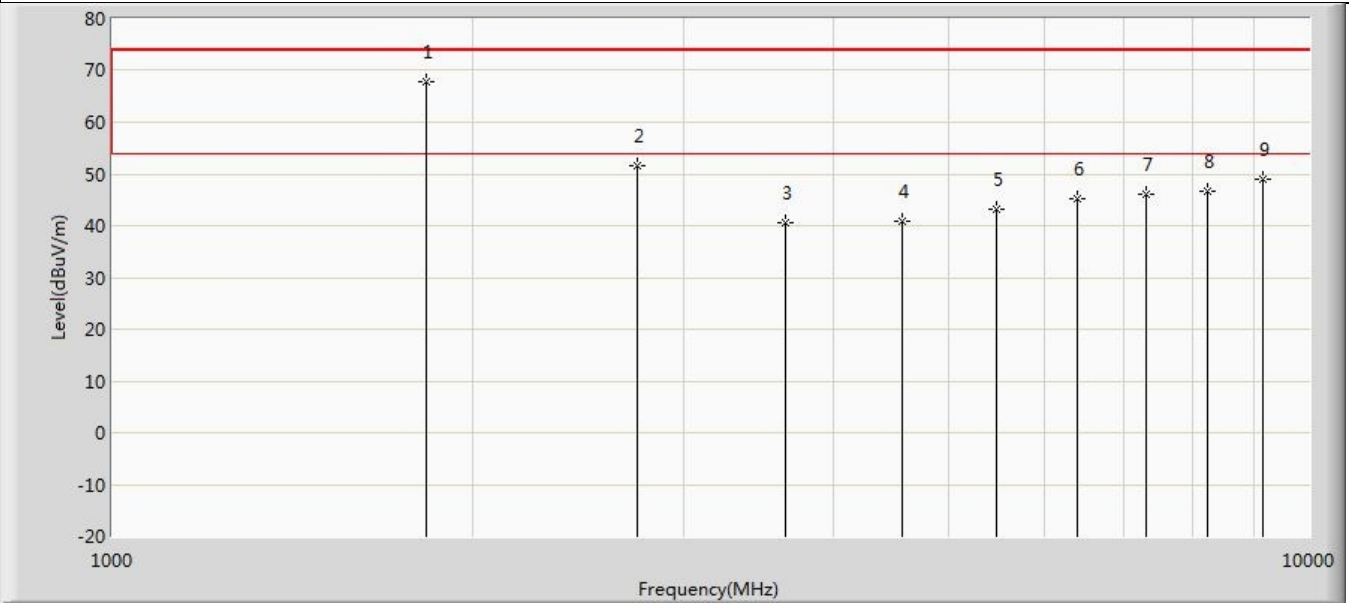
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1819.000	65.680	85.333	-8.320	74.000	-19.653	PK
2		2728.000	51.922	70.388	-22.078	74.000	-18.466	PK
3		3631.200	41.090	58.273	-32.910	74.000	-17.183	PK
4		4539.000	40.713	56.165	-33.287	74.000	-15.452	PK
5		5446.800	43.747	55.323	-30.253	74.000	-11.576	PK
6		6354.600	44.068	53.845	-29.932	74.000	-9.776	PK
7		7262.400	46.331	54.876	-27.669	74.000	-8.545	PK
8		8170.200	46.760	54.737	-27.240	74.000	-7.977	PK
9		9078.000	49.966	55.353	-24.034	74.000	-5.386	PK

Profile: 2331052R	Page No.: 29
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 2:Transmit at 914.2Mhz by lora 500k	



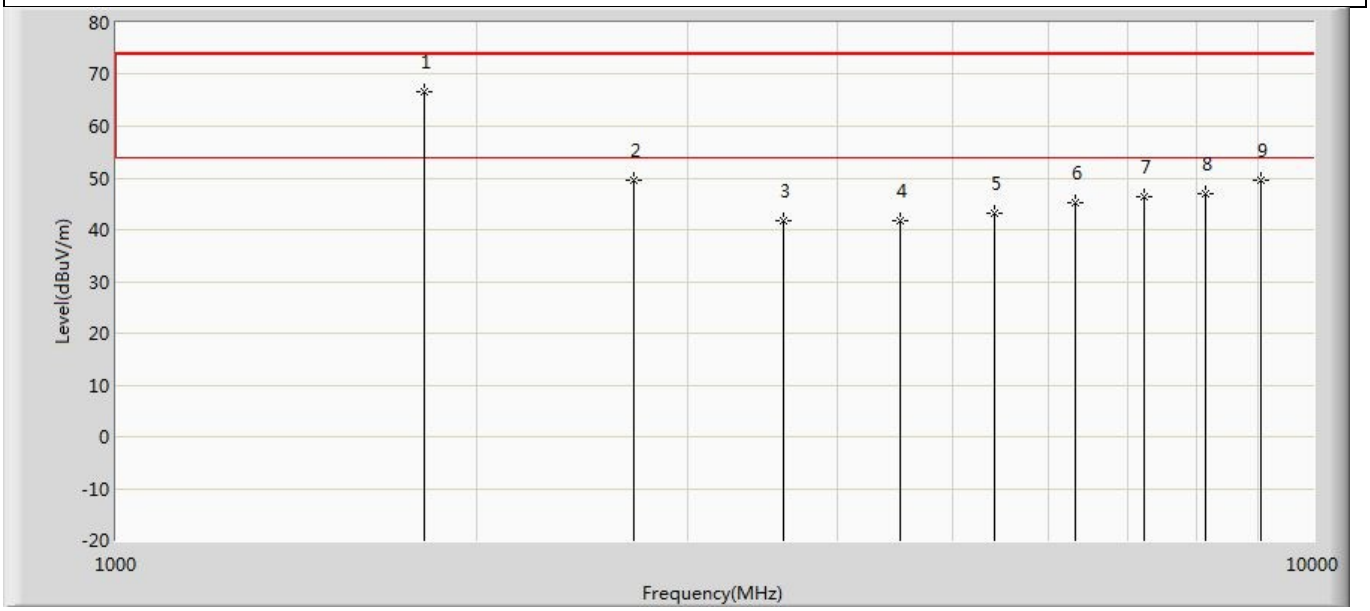
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1828.000	69.841	89.378	-4.159	74.000	-19.537	PK
2		2746.000	49.775	68.222	-24.225	74.000	-18.447	PK
3		3656.800	40.290	57.422	-33.710	74.000	-17.132	PK
4		4571.000	40.755	55.898	-33.245	74.000	-15.143	PK
5		5485.200	42.892	54.527	-31.108	74.000	-11.634	PK
6		6399.400	44.064	53.854	-29.936	74.000	-9.790	PK
7		7313.600	45.757	54.773	-28.243	74.000	-9.016	PK
8		8227.800	47.602	55.250	-26.398	74.000	-7.648	PK
9		9142.000	48.803	54.898	-25.197	74.000	-6.095	PK

Profile: 2331052R	Page No.: 30
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 2:Transmit at 914.2Mhz by lora 500k	



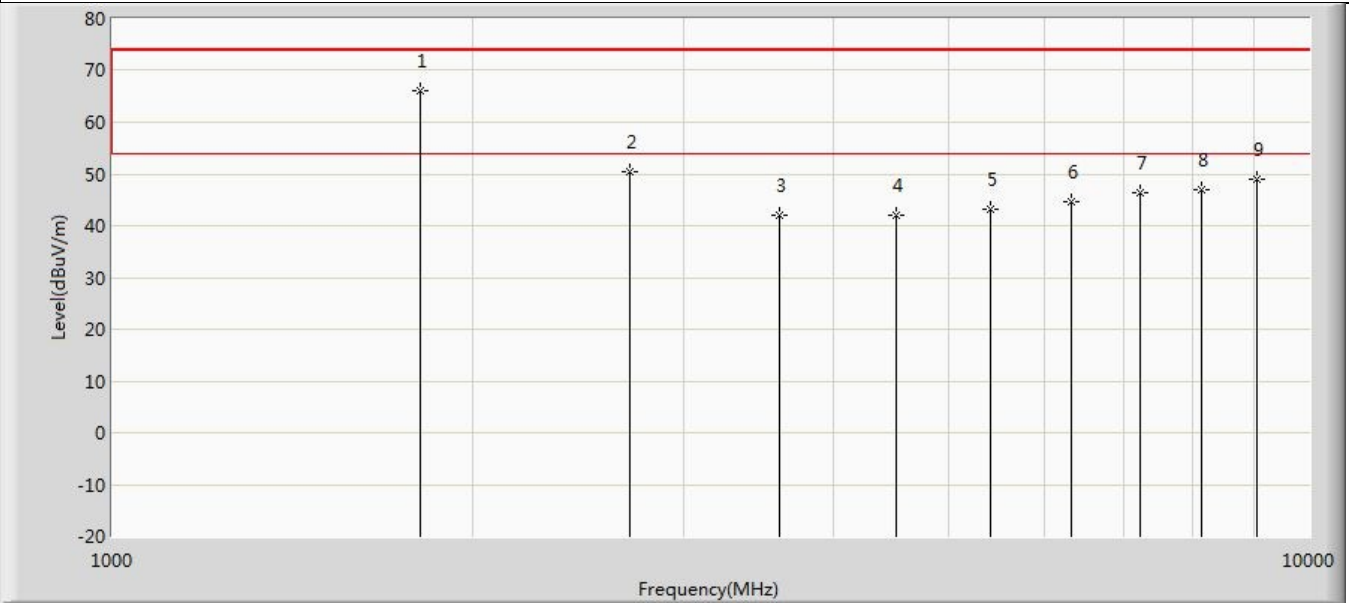
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1828.000	67.761	87.298	-6.239	74.000	-19.537	PK
2		2746.000	51.693	70.140	-22.307	74.000	-18.447	PK
3		3656.800	40.606	57.738	-33.394	74.000	-17.132	PK
4		4571.000	40.851	55.994	-33.149	74.000	-15.143	PK
5		5485.200	43.049	54.684	-30.951	74.000	-11.634	PK
6		6399.400	45.270	55.060	-28.730	74.000	-9.790	PK
7		7313.600	46.172	55.188	-27.828	74.000	-9.016	PK
8		8227.800	46.802	54.450	-27.198	74.000	-7.648	PK
9		9142.000	49.051	55.146	-24.949	74.000	-6.095	PK

Profile: 2331052R	Page No.: 31
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:34
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 3:Transmit at 903Mhz by lora LRFHSS 1.523Mhz	



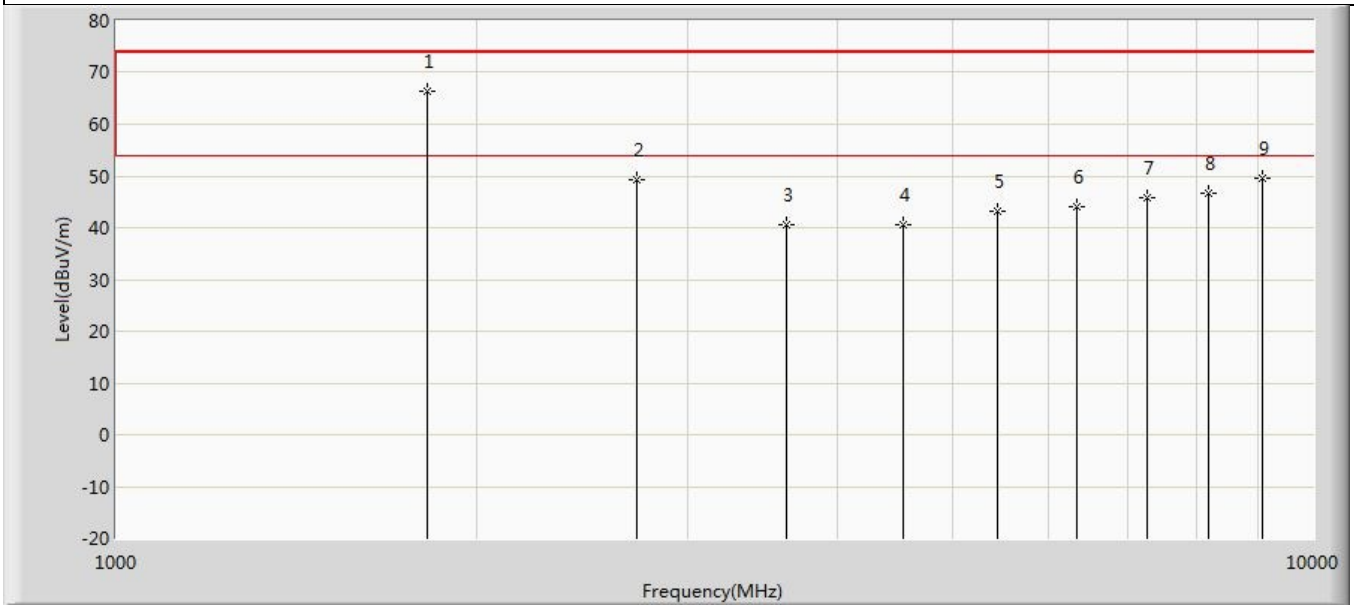
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1810.000	66.770	86.484	-7.230	74.000	-19.715	PK
2		2710.000	49.554	68.039	-24.446	74.000	-18.485	PK
3		3612.000	41.746	58.952	-32.254	74.000	-17.206	PK
4		4515.000	41.720	56.843	-32.280	74.000	-15.122	PK
5		5418.000	43.056	55.100	-30.944	74.000	-12.044	PK
6		6321.000	45.089	54.448	-28.911	74.000	-9.359	PK
7		7224.000	46.409	54.961	-27.591	74.000	-8.552	PK
8		8127.000	46.819	54.527	-27.181	74.000	-7.708	PK
9		9030.000	49.486	55.403	-24.514	74.000	-5.917	PK

Profile: 2331052R	Page No.: 32
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:34
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 3:Transmit at 903Mhz by lora LRFHSS 1.523Mhz	



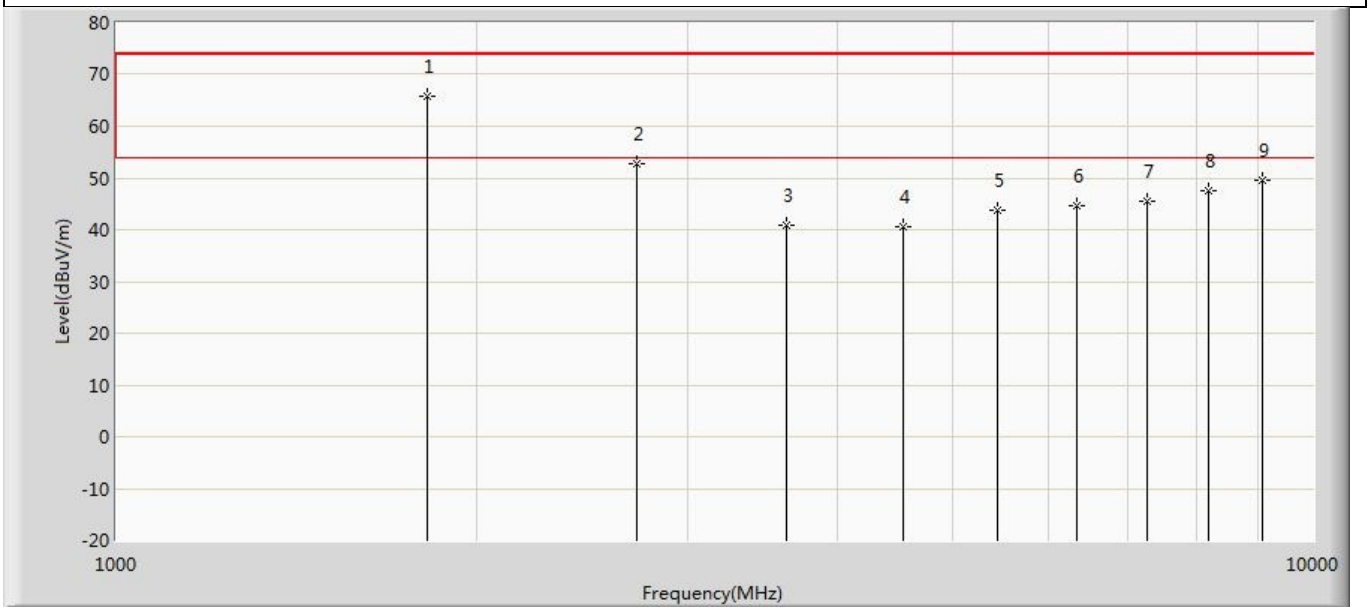
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1810.000	66.104	85.818	-7.896	74.000	-19.715	PK
2		2710.000	50.424	68.909	-23.576	74.000	-18.485	PK
3		3612.000	41.992	59.198	-32.008	74.000	-17.206	PK
4		4515.000	42.157	57.280	-31.843	74.000	-15.122	PK
5		5418.000	43.126	55.170	-30.874	74.000	-12.044	PK
6		6321.000	44.762	54.121	-29.238	74.000	-9.359	PK
7		7224.000	46.438	54.990	-27.562	74.000	-8.552	PK
8		8127.000	47.053	54.761	-26.947	74.000	-7.708	PK
9		9030.000	48.883	54.800	-25.117	74.000	-5.917	PK

Profile: 2331052R	Page No.: 33
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:34
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 3:Transmit at 907.8Mhz by lora LRFHSS 1.523Mhz	



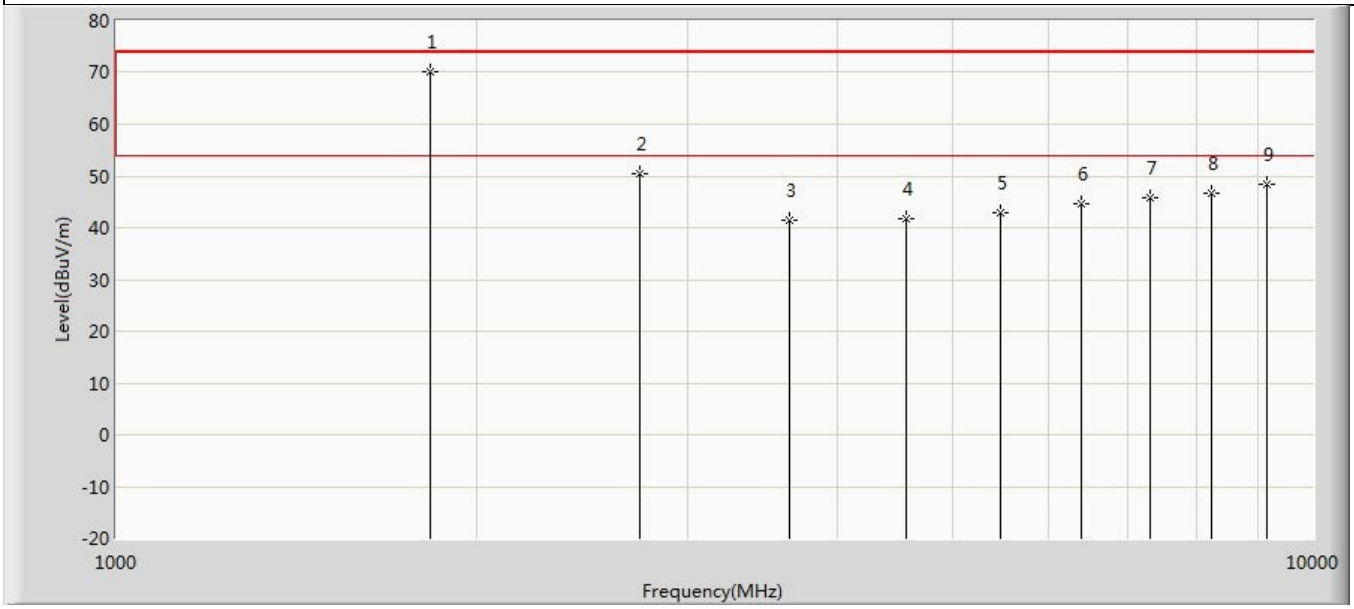
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1819.000	66.263	85.916	-7.737	74.000	-19.653	PK
2		2719.000	49.182	67.621	-24.818	74.000	-18.438	PK
3		3631.200	40.529	57.712	-33.471	74.000	-17.183	PK
4		4539.000	40.615	56.067	-33.385	74.000	-15.452	PK
5		5446.800	43.175	54.751	-30.825	74.000	-11.576	PK
6		6354.600	43.952	53.729	-30.048	74.000	-9.776	PK
7		7262.400	45.677	54.222	-28.323	74.000	-8.545	PK
8		8170.200	46.686	54.663	-27.314	74.000	-7.977	PK
9		9078.000	49.436	54.823	-24.564	74.000	-5.386	PK

Profile: 2331052R	Page No.: 34
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:34
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 3:Transmit at 907.8Mhz by lora LRFHSS 1.523Mhz	



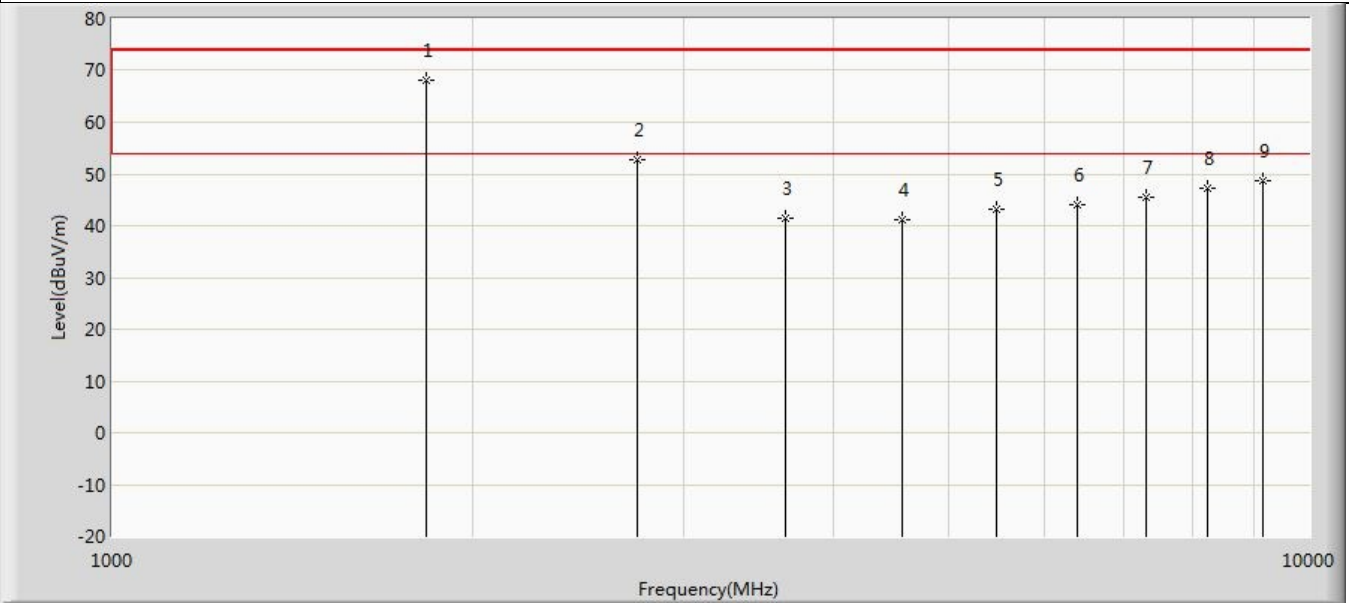
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1819.000	65.666	85.319	-8.334	74.000	-19.653	PK
2		2719.000	52.651	71.090	-21.349	74.000	-18.438	PK
3		3631.200	40.926	58.109	-33.074	74.000	-17.183	PK
4		4539.000	40.666	56.118	-33.334	74.000	-15.452	PK
5		5446.800	43.789	55.365	-30.211	74.000	-11.576	PK
6		6354.600	44.725	54.502	-29.275	74.000	-9.776	PK
7		7262.400	45.636	54.181	-28.364	74.000	-8.545	PK
8		8170.200	47.422	55.399	-26.578	74.000	-7.977	PK
9		9078.000	49.561	54.948	-24.439	74.000	-5.386	PK

Profile: 2331052R	Page No.: 35
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:34
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 3:Transmit at 914.2Mhz by lora LRFHSS 1.523Mhz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1828.000	70.058	89.595	-3.942	74.000	-19.537	PK
2		2737.000	50.533	69.007	-23.467	74.000	-18.475	PK
3		3656.800	41.481	58.613	-32.519	74.000	-17.132	PK
4		4571.000	41.654	56.797	-32.346	74.000	-15.143	PK
5		5485.200	42.992	54.627	-31.008	74.000	-11.634	PK
6		6399.400	44.584	54.374	-29.416	74.000	-9.790	PK
7		7313.600	45.754	54.770	-28.246	74.000	-9.016	PK
8		8227.800	46.723	54.371	-27.277	74.000	-7.648	PK
9		9142.000	48.278	54.373	-25.722	74.000	-6.095	PK

Profile: 2331052R	Page No.: 36
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/06 - 21:34
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 3:Transmit at 914.2Mhz by lora LRFHSS 1.523Mhz	

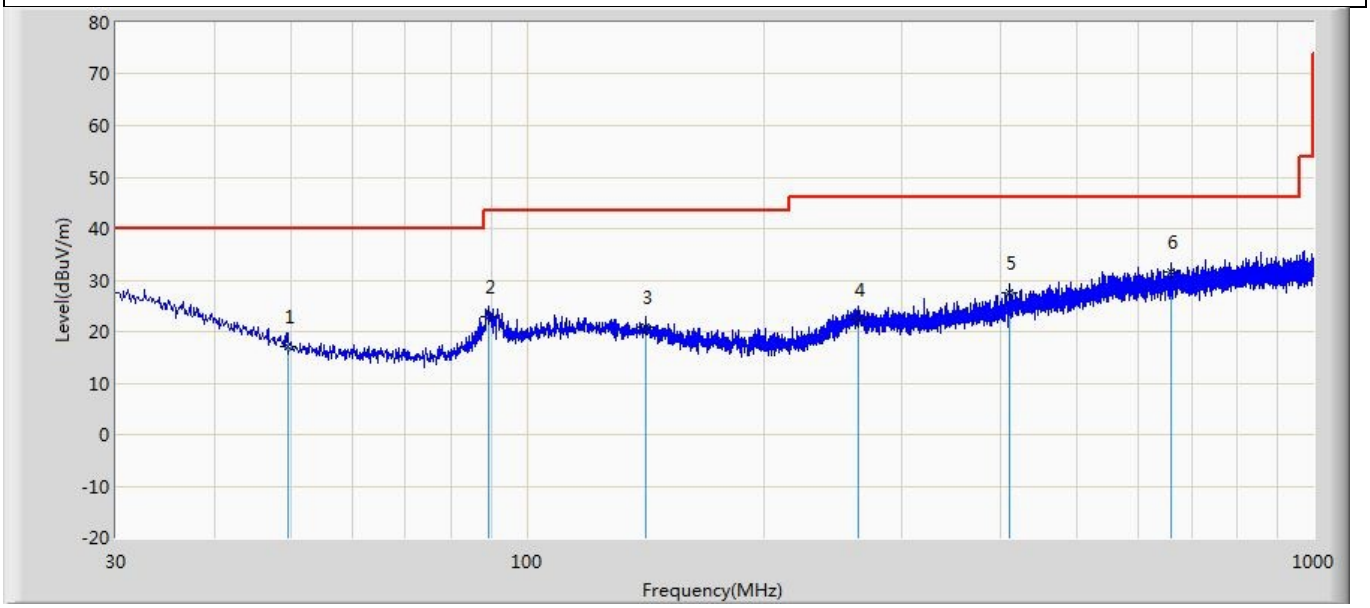


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	1828.000	68.186	87.723	-5.814	74.000	-19.537	PK
2		2746.000	52.888	71.335	-21.112	74.000	-18.447	PK
3		3656.800	41.575	58.707	-32.425	74.000	-17.132	PK
4		4571.000	41.142	56.285	-32.858	74.000	-15.143	PK
5		5485.200	43.318	54.953	-30.682	74.000	-11.634	PK
6		6399.400	43.994	53.784	-30.006	74.000	-9.790	PK
7		7313.600	45.458	54.474	-28.542	74.000	-9.016	PK
8		8227.800	47.291	54.939	-26.709	74.000	-7.648	PK
9		9142.000	48.789	54.884	-25.211	74.000	-6.095	PK

Remark	1. " * ", means this data is the worst emission level. 2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp). 3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed. 4. The emissions of the 2nd harmonics shall apply to the limit of emissions in non-restricted frequency band.

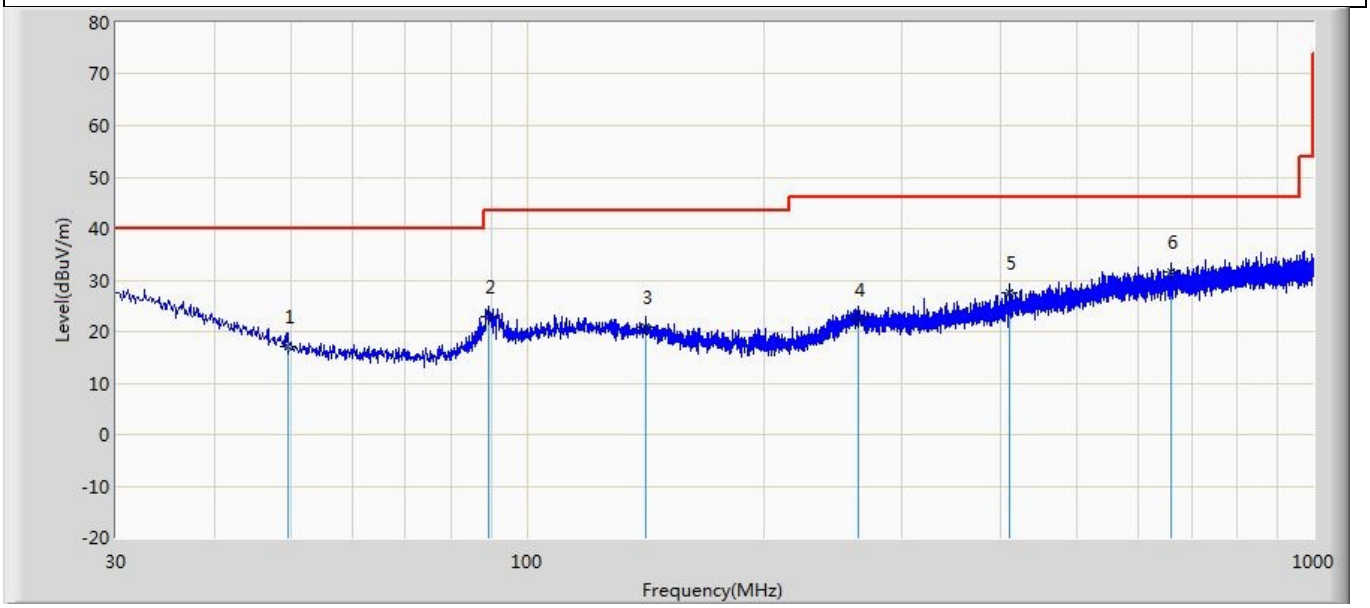
The worst case of Radiated Emission below 1GHz:

Profile: 2331052R	Page No.: 60
Engineer: Yu Liu	
Site: AC2	Time: 2023/06/30 - 21:06
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Horizontal
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 2: Transmit at 914.2MHz by LoRa 500kHz bandwidth	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		49.643	17.180	2.025	-22.820	40.000	15.156	QP
2		89.170	22.789	7.016	-20.711	43.500	15.773	QP
3		141.550	20.780	2.650	-22.720	43.500	18.130	QP
4		263.406	22.389	1.416	-23.611	46.000	20.973	QP
5		411.453	27.421	3.356	-18.579	46.000	24.065	QP
6	*	658.560	31.541	3.596	-14.459	46.000	27.945	QP

Profile: 2331052R	Page No.: 61
Engineer: Yu Liu	
Site: AC2	Time: 2023/06/30 - 21:09
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Vertical
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 2: Transmit at 914.2MHz by LoRa 500kHz bandwidth	

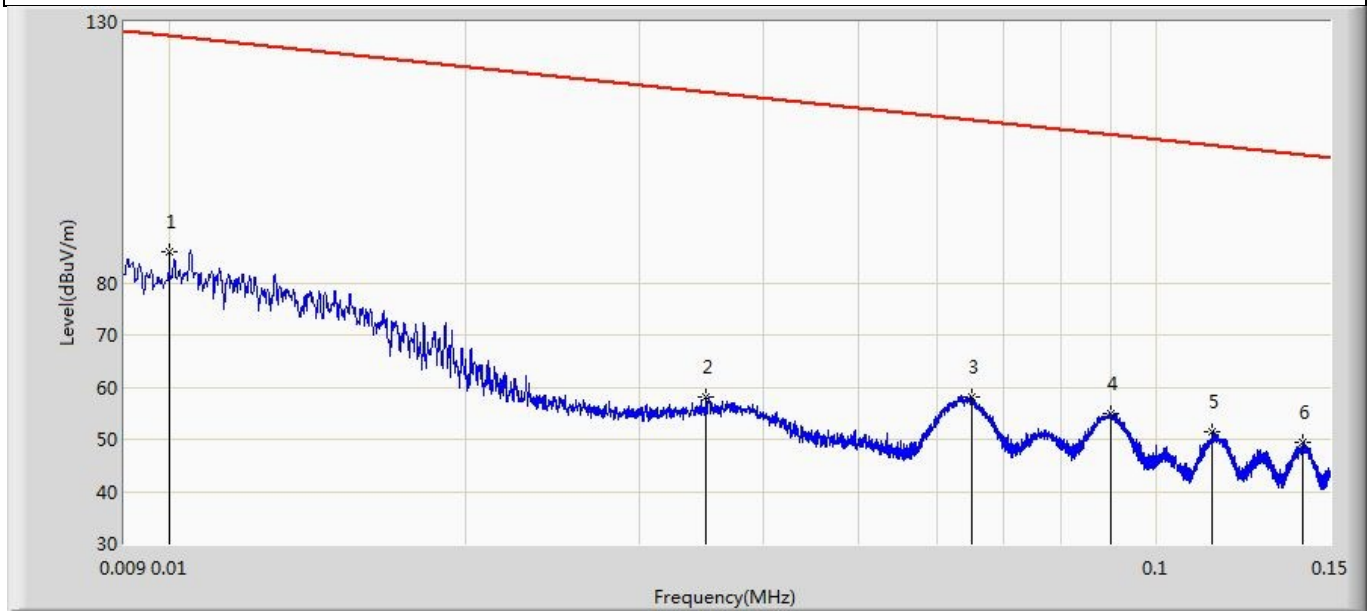


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		49.643	17.180	2.025	-22.820	40.000	15.156	QP
2		89.170	22.789	7.016	-20.711	43.500	15.773	QP
3		141.550	20.780	2.650	-22.720	43.500	18.130	QP
4		263.406	22.389	1.416	-23.611	46.000	20.973	QP
5		411.453	27.421	3.356	-18.579	46.000	24.065	QP
6	*	658.560	31.541	3.596	-14.459	46.000	27.945	QP

Remark	1. " * ", means this data is the worst emission level. 2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp). 3. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary. 4. We tested all the modes and showed the worst mode in the report.

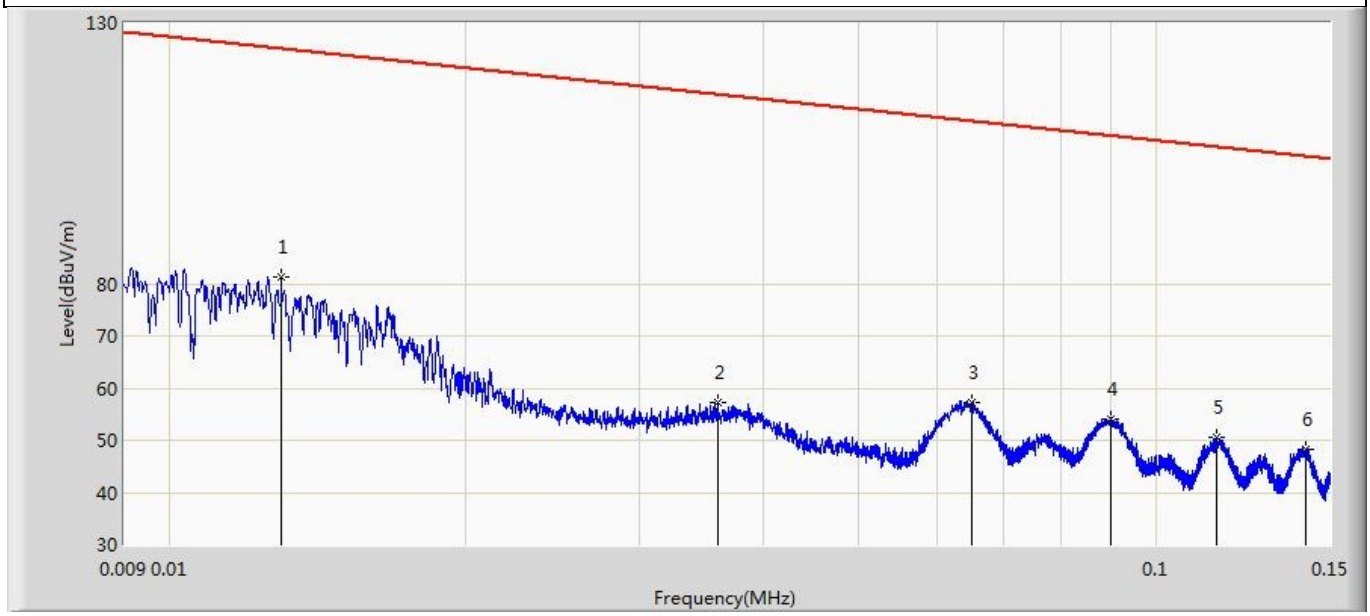
The worst case of Radiated Emission below 1GHz:

Profile: 2331052R	Page No.: 1
Engineer: Yu Liu	
Site: AC2	Time: 2023/07/10 - 09:57
Limit: 15.209	Margin: 0
Probe: RF(0.002331052RMHz)	Polarity: Horizontal
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 2: Transmit at 914.2MHz by LoRa 500kHz bandwidth	



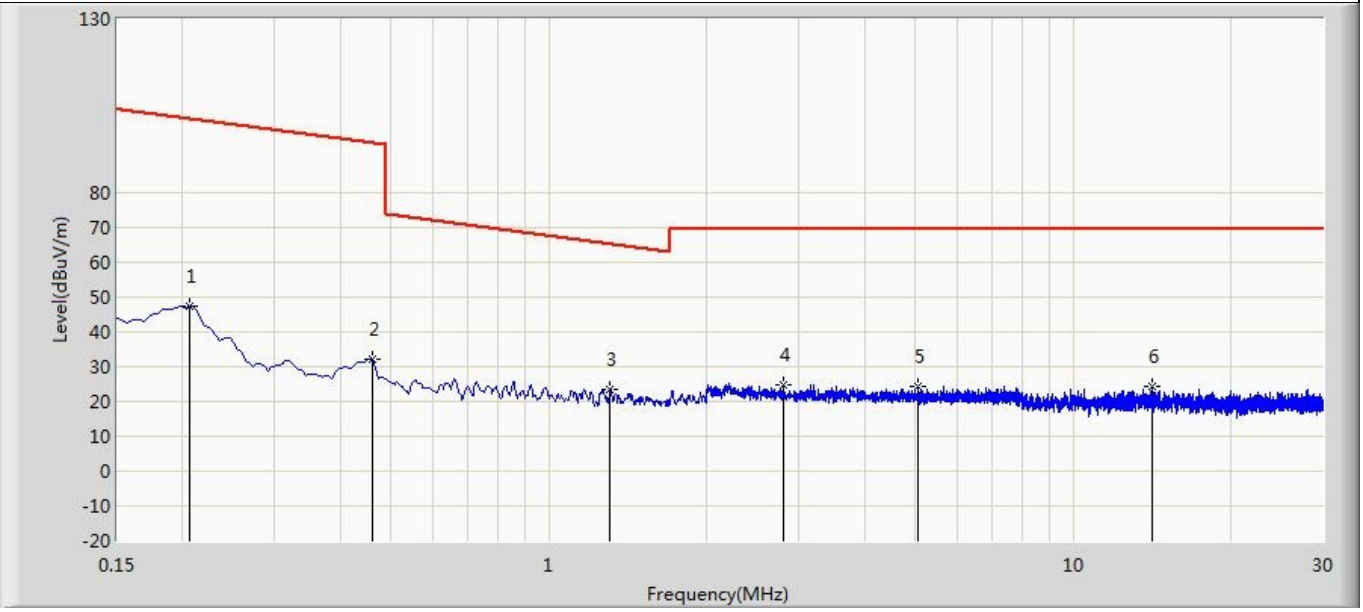
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	0.010	86.076	65.014	-41.409	127.485	21.062	PK
2		0.035	58.154	36.316	-58.456	116.610	21.838	PK
3		0.065	58.200	36.266	-53.036	111.236	21.934	PK
4		0.090	55.069	33.164	-53.342	108.411	21.905	PK
5		0.114	51.346	29.469	-55.013	106.359	21.877	PK
6		0.141	49.424	27.573	-55.090	104.514	21.851	PK

Profile: 2331052R	Page No.: 3
Engineer: Yu Liu	
Site: AC2	Time: 2023/07/10 - 09:58
Limit: 15.209	Margin: 0
Probe: RF(0.002331052RMHz)	Polarity: Vertical
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 2: Transmit at 914.2MHz by LoRa 500kHz bandwidth	



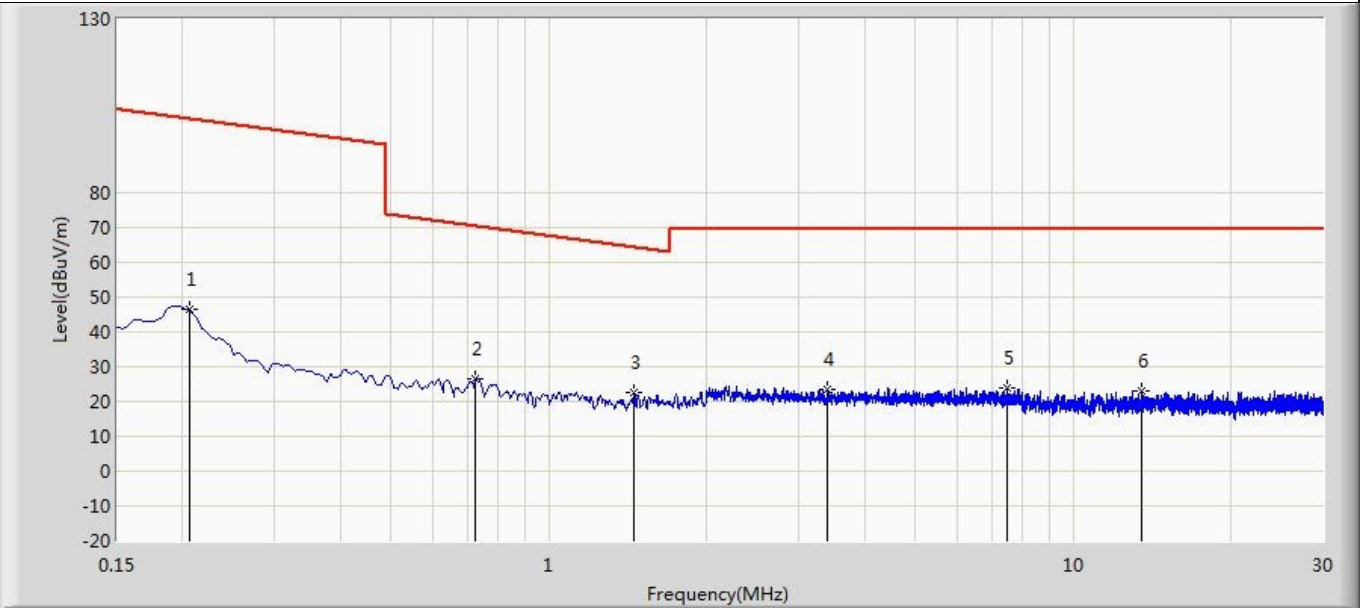
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	0.013	81.409	60.753	-43.799	125.208	20.655	PK
2		0.036	57.338	35.969	-59.027	116.365	21.369	PK
3		0.065	57.252	35.818	-53.984	111.236	21.434	PK
4		0.090	54.103	32.698	-54.308	108.411	21.405	PK
5		0.115	50.443	29.067	-55.840	106.283	21.376	PK
6		0.142	48.315	26.965	-56.137	104.452	21.350	PK

Profile: 2331052R	Page No.: 2
Engineer: Yu Liu	
Site: AC2	Time: 2023/07/10 - 09:58
Limit: 15.209	Margin: 0
Probe: RF(0.002331052RMHz)	Polarity: Horizontal
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 2: Transmit at 914.2MHz by LoRa 500kHz bandwidth	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		0.206	47.538	25.753	-53.685	101.222	21.785	PK
2		0.460	32.198	10.667	-62.051	94.248	21.530	PK
3	*	1.310	23.588	3.341	-41.595	65.183	20.246	PK
4		2.795	24.703	3.844	-44.697	69.400	20.859	PK
5		5.072	24.453	3.867	-44.947	69.400	20.586	PK
6		14.153	24.290	3.154	-45.110	69.400	21.136	PK

Profile: 2331052R	Page No.: 4
Engineer: Yu Liu	
Site: AC2	Time: 2023/07/10 - 09:58
Limit: 15.209	Margin: 0
Probe: RF(0.002331052RMHz)	Polarity: Vertical
EUT: LoRa+Wi-Fi+GNSS Module	Power: DC 3.3V
Note: Mode 2: Transmit at 914.2MHz by LoRa 500kHz bandwidth	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		0.206	46.651	25.366	-54.572	101.222	21.285	PK
2		0.725	26.408	6.125	-43.899	70.307	20.283	PK
3	*	1.452	22.434	2.527	-41.857	64.291	19.907	PK
4		3.404	23.496	3.210	-45.904	69.400	20.286	PK
5		7.497	23.778	3.692	-45.622	69.400	20.086	PK
6		13.497	23.101	2.554	-46.299	69.400	20.547	PK

Remark	1. " * ", means this data is the worst emission level. 2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp). 3. We tested all the modes and showed the worst mode in the report.

4.3 Emissions in non-restricted frequency band	VERDICT: PASS

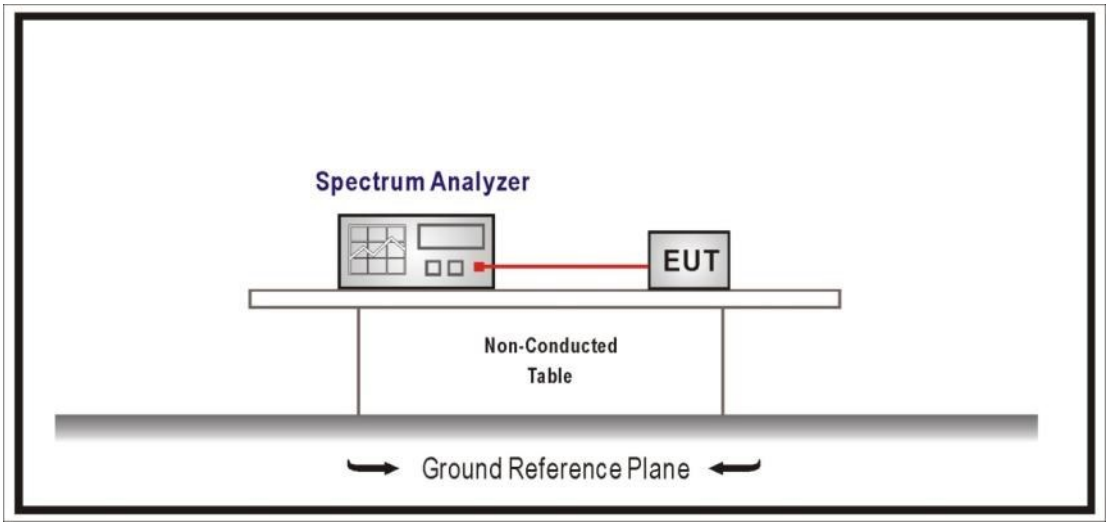
4.3.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.247(d)
RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30dBc(Note1)
RF Output power(PK detector)	20dBc(Note2)

Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

Note 2: If the maximum peak conducted output power procedure was used, then the peak output power 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 (i.e., 20 dBc).

4.3.2 Test Setup



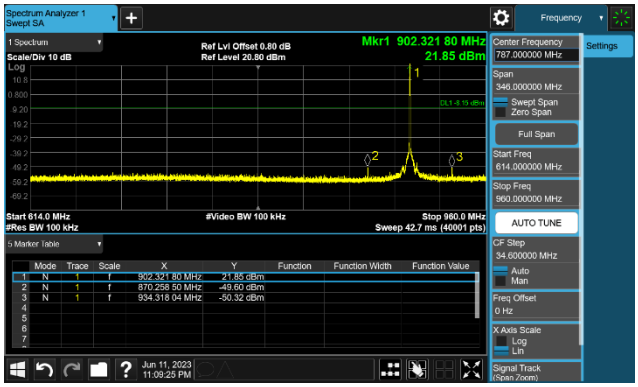
4.3.3 Test Procedure

References Rule			Chapter	Description
☒	ANSI C63.10		11.11	Emissions in non-restricted frequency bands
	☒	ANSI C63.10	11.11.1	General
	☒	ANSI C63.10	11.11.2	Reference level measurement
	☒	ANSI C63.10	11.11.3	Emission level measurement

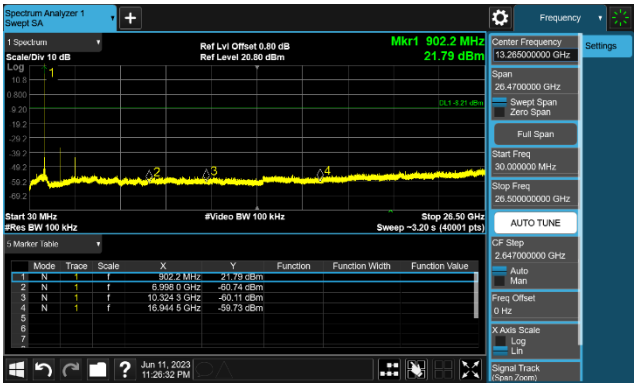
4.3.4 Test Data

LoRa(FHSS) 125kHz bandwidth

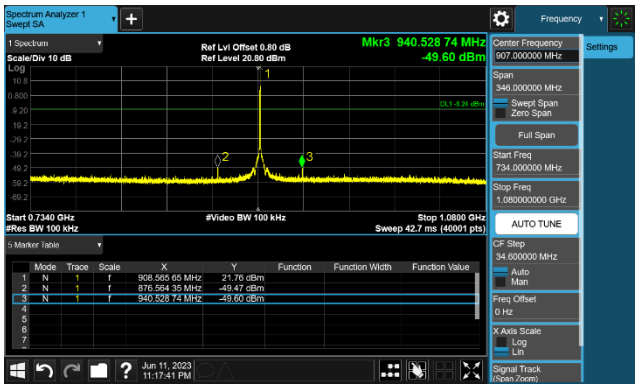
Channel0 902.3MHz



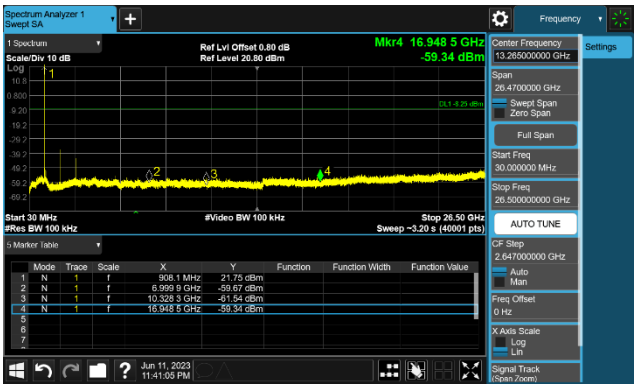
Channel0 902.3MHz



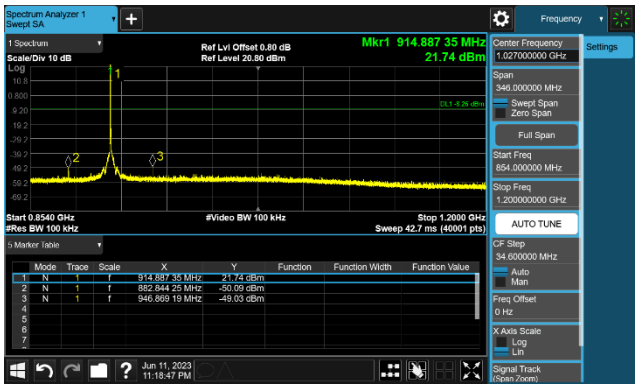
Channel31 908.5MHz



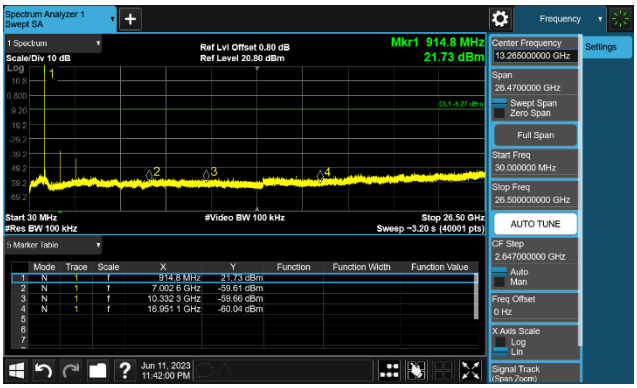
Channel31 908.5MHz

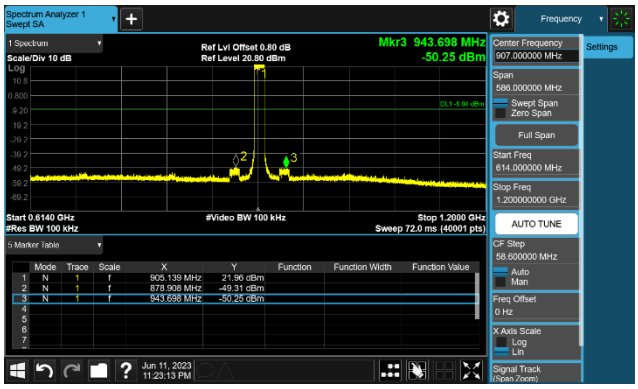
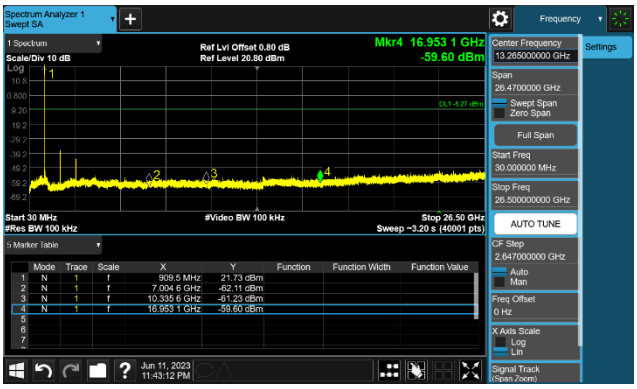


Channel0 914.9MHz



Channel0 914.9MHz

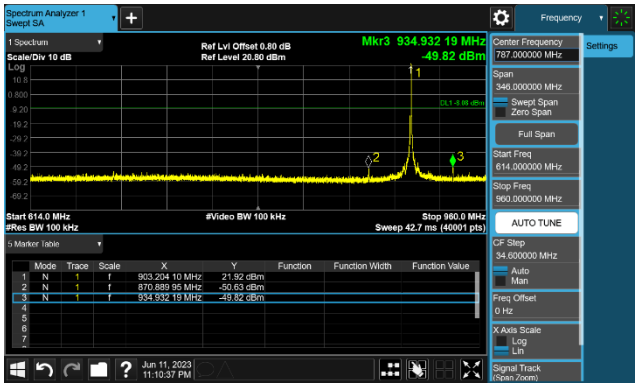


FHSS	FHSS
	

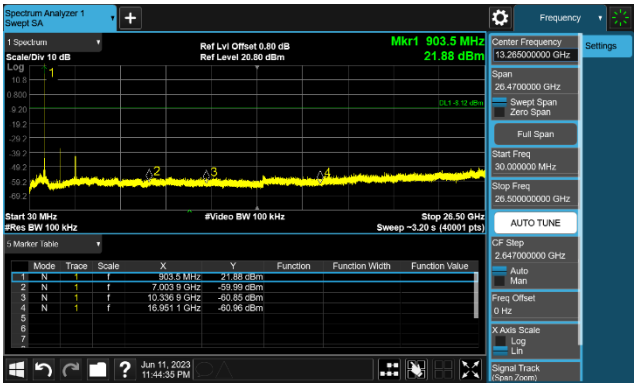
Spectrum Analyzer 1
Swept SA
Frequency
1 Spectrum
Ref Lvl Offset 0.80 dB
Ref Level 20.80 dBm
Mkr3 943.698 MHz
-50.25 dBm
Scale/Div 10 dB
Log
Center Frequency
907.000000 MHz
Span
586.000000 MHz
Swept Span
Zero Span
Full Span
Start Freq
614.000000 MHz
Stop Freq
1.200000000 GHz
AUTO TUNE
CF Step
58.600000 MHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Signal Track
Settings
Start 0.6140 GHz
#Res BW 100 kHz
#Video BW 100 kHz
Stop 1.2000 GHz
Sweep 72.0 ms (40001 pts)
5 Marker Table
Mode Trace Scale X Y Function Function Width Function Value
1 N 1 f 905.139 MHz 21.96 dBm
2 N 1 f 878.908 MHz -49.31 dBm
3 N 1 f 943.698 MHz -50.25 dBm
Jun 11, 2023
11:23:13 PM
Mkr4 16.953 1 GHz
-59.60 dBm
Center Frequency
13.265000000 GHz
Span
26.4700000 GHz
Start Freq
30.000000 MHz
Stop Freq
26.500000000 GHz
CF Step
2.647000000 GHz
Start 30 MHz
Stop 26.50 GHz
Sweep ~3.20 s (40001 pts)
1 N 1 f 909.5 MHz 21.73 dBm
2 N 1 f 7.004 6 GHz -62.11 dBm
3 N 1 f 10.335 6 GHz -61.23 dBm
4 N 1 f 16.953 1 GHz -59.60 dBm
Jun 11, 2023
11:43:12 PM

LoRa(DTS) 500kHz bandwidth

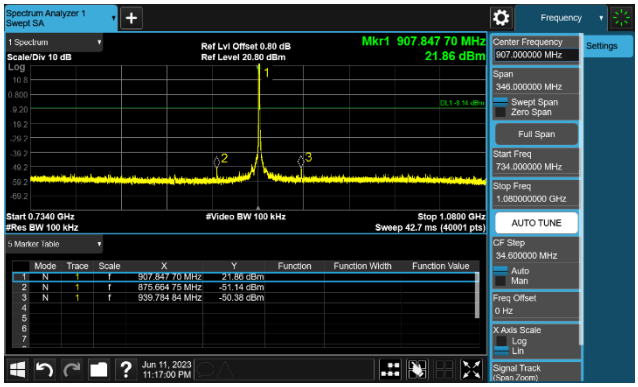
Channel64 903MHz



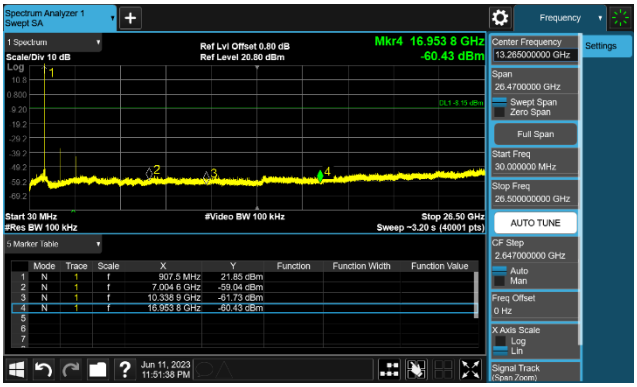
Channel64 903MHz



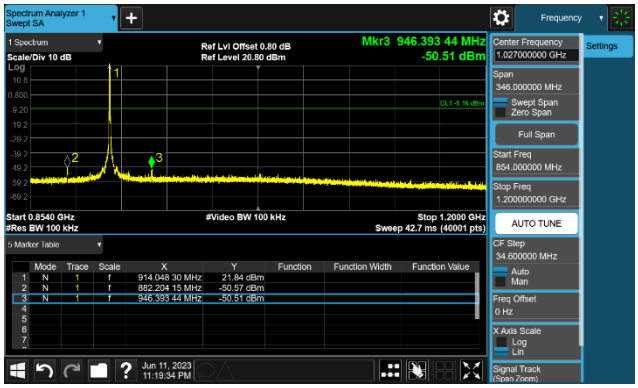
Channel67 907.8MHz



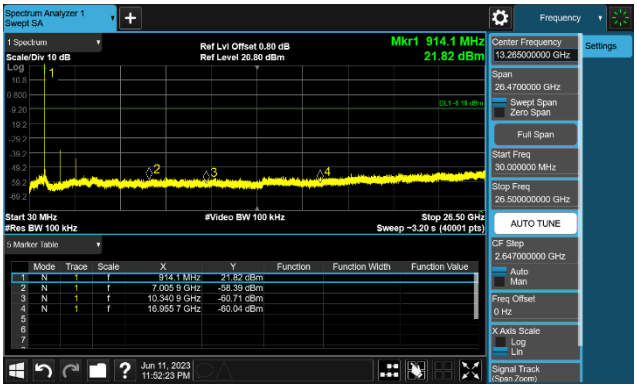
Channel67 907.8MHz



Channel71 914.2MHz

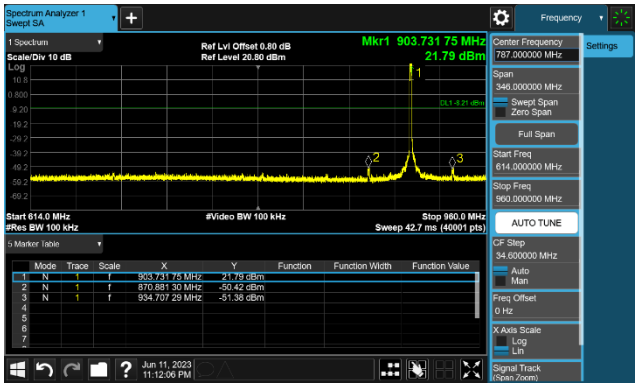


Channel71 914.2MHz

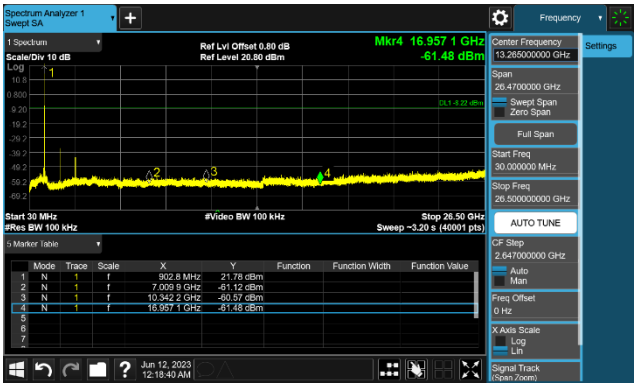


LR-FHSS 1.523MHz bandwidth

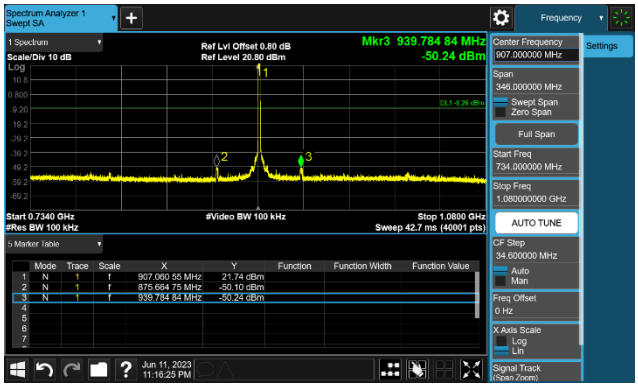
Channel64 903MHz



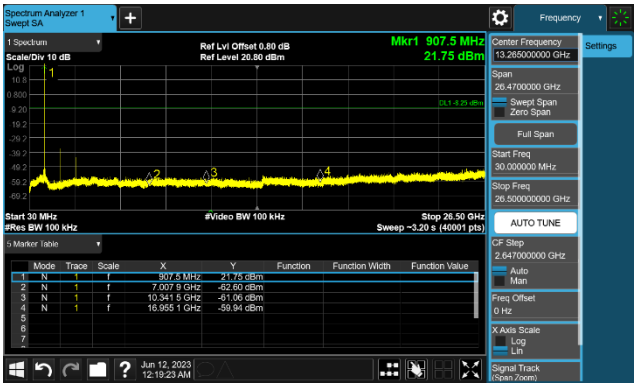
Channel64 903MHz



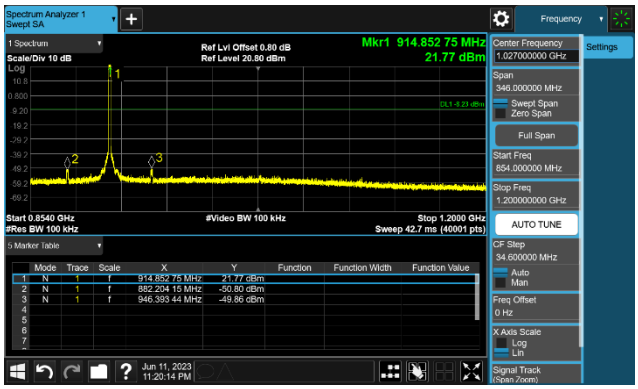
Channel67 907.8MHz



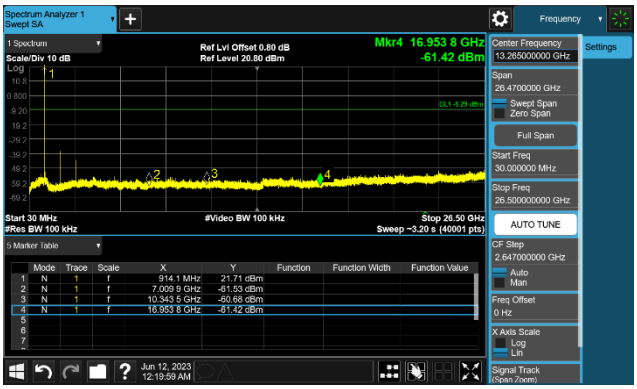
Channel67 907.8MHz



Channel71 914.2MHz



Channel71 914.2MHz



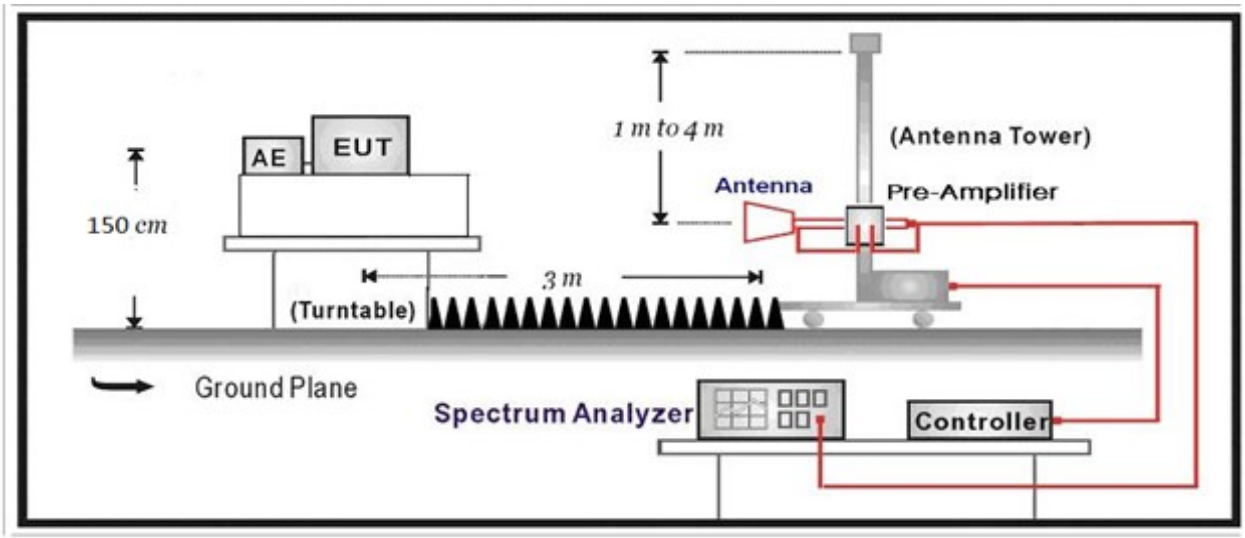
4.4 Radiated Emission Band Edge	VERDICT: N/A

4.4.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.247(d) , 15.205, 15.209			
Frequency bands (MHz)	Detector	Limit (dB μV/m)	RBW (MHz)	Distance (m)
2310-2390 2483.5-2500	PK	74	1	3
	AV	54	1	3
Note: The field strength of emissions appearing within these frequency bands shall not exceed the limits.				

4.4.2 Test Setup

Above 1GHz Test Setup:



4.4.3 Test Procedure

	References Rule	Chapter	Description
☒	ANSI C63.10	6.10	Band-edge testing
	☒ ANSI C63.10	6.10.5	Restricted-band band-edge measurements
	☐ ANSI C63.10	6.10.6	Marker-delta method
☒	ANSI C63.10	11.12	Emissions in restricted frequency bands
	☒ ANSI C63.10	11.12.1	Radiated emission measurements
	☒ ANSI C63.10	6.3	Radiated spurious emission test
☐	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
☐	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
☒	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz
	☐ ANSI C63.10	11.12.2	Antenna-port conducted measurements
	☐ ANSI C63.10	11.12.2.3	Quasi-peak measurement procedure
	☐ ANSI C63.10	11.12.2.4	Peak power measurement procedure
	☐ ANSI C63.10	11.12.2.5	Average power measurement procedures
	☐ ANSI C63.10	11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
	☐ ANSI C63.10	11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
	☐ ANSI C63.10	11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

4.4.4 Test Data

Remark	No restricted band in the range ± 2 channel bandwidths of the Band-edges of the specified emission band! (608 MHz – 614 MHz and 960 MHz – 1240 MHz).

4.5 6dB and 20dB Bandwidth	VERDICT: PASS

4.5.1 Limit

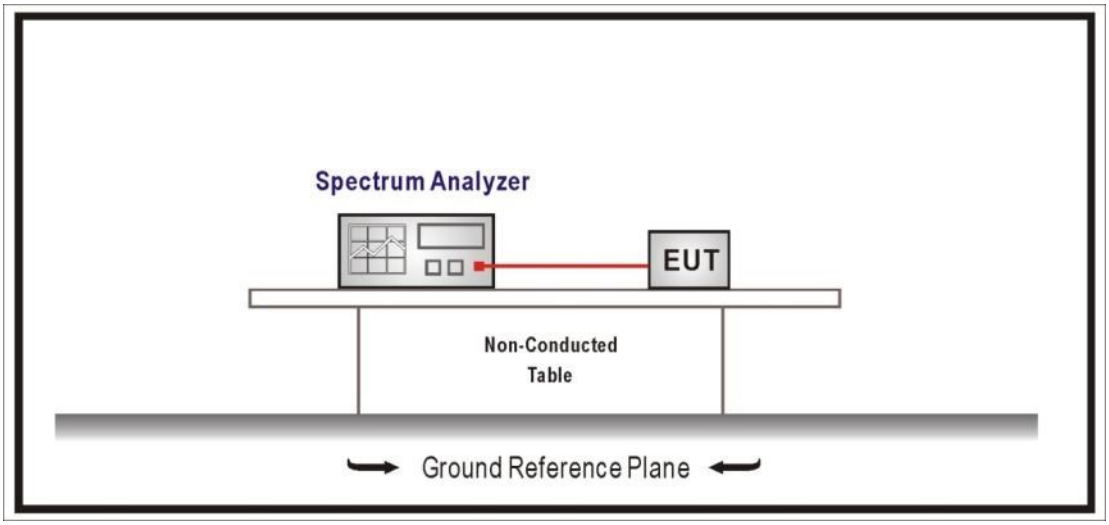
Standard	FCC Part 15 Subpart C Paragraph 15.247 (a)(1)(2)

(1) Systems using digital modulation techniques operate in the2400-2483.5 MHz .The minimum 6 dB bandwidth shall be at least 500 kHz
(2) For frequency hopping systems operating in 902-928 MHz band, the maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Standard	ANSI C63.10 Paragraph 6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs. The occupied bandwidth should within the required frequency range.

4.5.2 Test Setup



4.5.3 Test Procedure

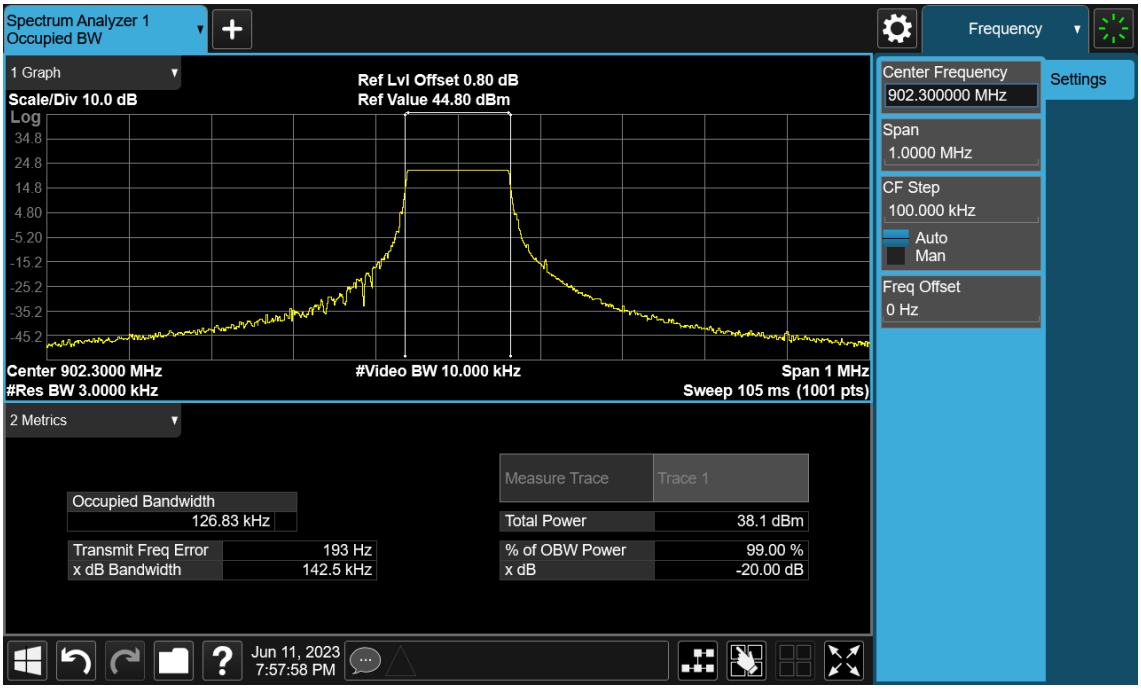
	Reference Rule		Chapter	Description
☒	ANSI C63.10		11.8	DTS bandwidth
	☐	ANSI C63.10	11.8.1	Option 1
	☒	ANSI C63.10	11.8.2	Option 2
☒	ANSI C63.10		6.9	Occupied bandwidth
	☐	ANSI C63.10	6.9.2	relative measurement procedure
	☒	ANSI C63.10	6.9.3	power bandwidth (99%) measurement procedure

4.5.4 Test Data

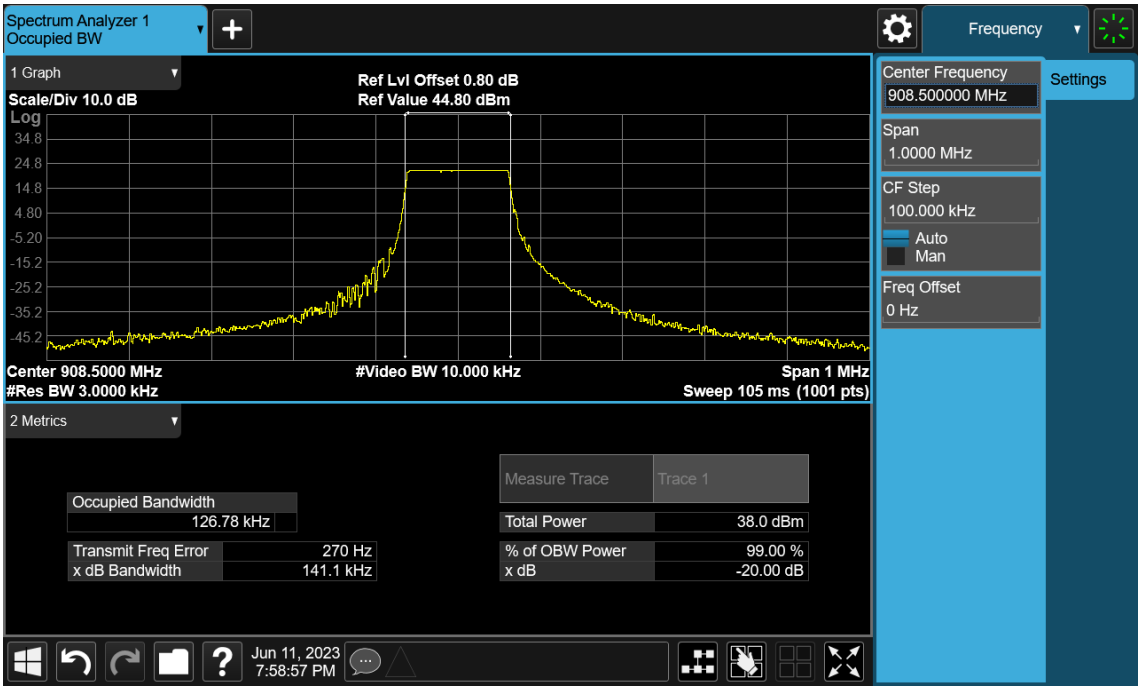
Mode	CH.	Test Freq. (MHz)	20dB Occupied Bandwidth (kHz)	Limit (kHz)	Result
1	00	902.3	142.5	⩽250	Pass
	31	908.5	141.1	⩽250	Pass
	63	914.9	139.6	⩽250	Pass

20dB Occupied Bandwidth

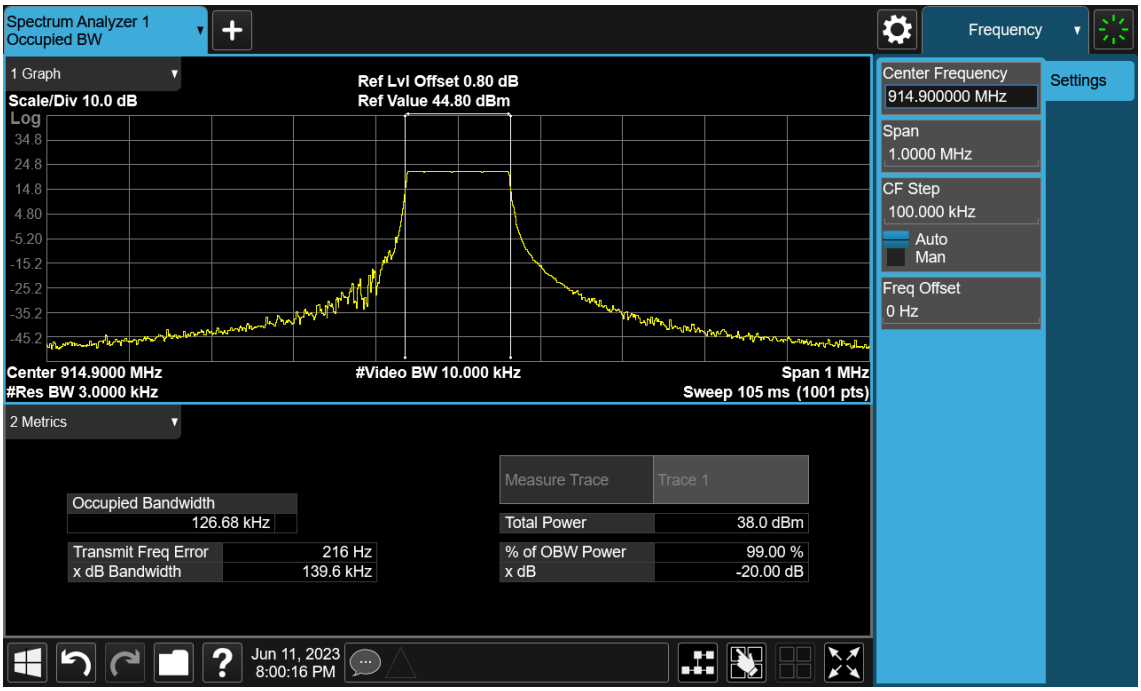
CH00 (902.3MHz)



CH31 (908.5MHz)



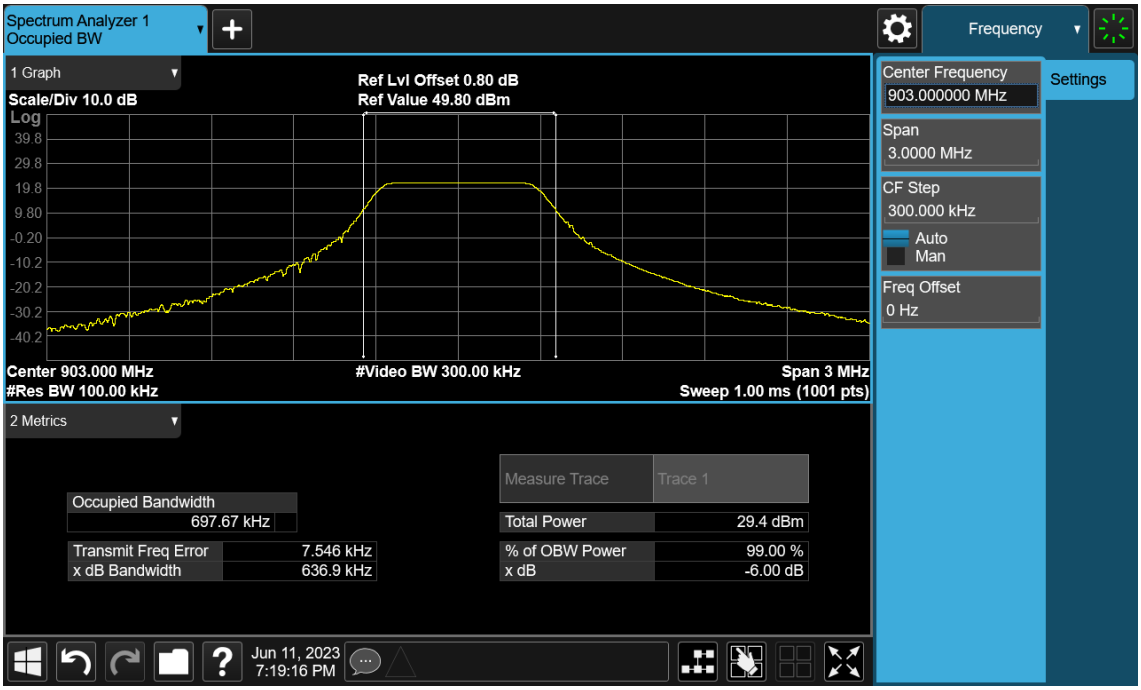
CH63 (914.9MHz)



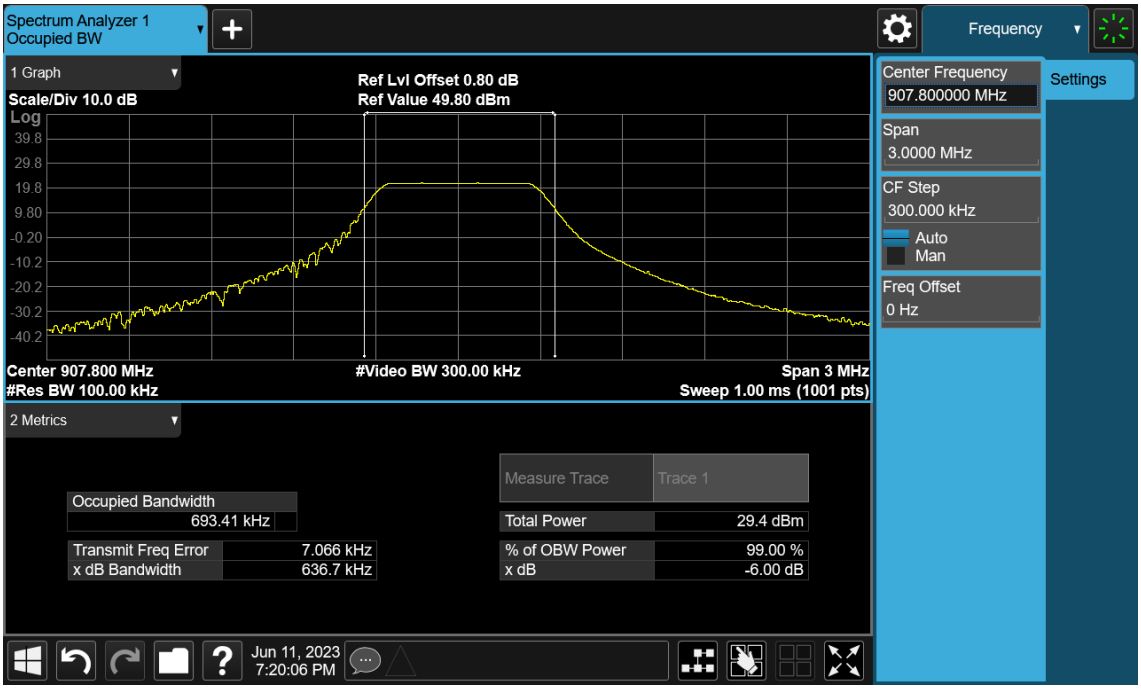
Mode	CH.	Test Freq. (MHz)	6dB Occupied Bandwidth (KHz)	Limit (kHz)	Result
2	64	903	636.9	⩾500	Pass
	67	907.8	636.7	⩾500	Pass
	71	914.2	636.75	⩾500	Pass

6dB Occupied Bandwidth

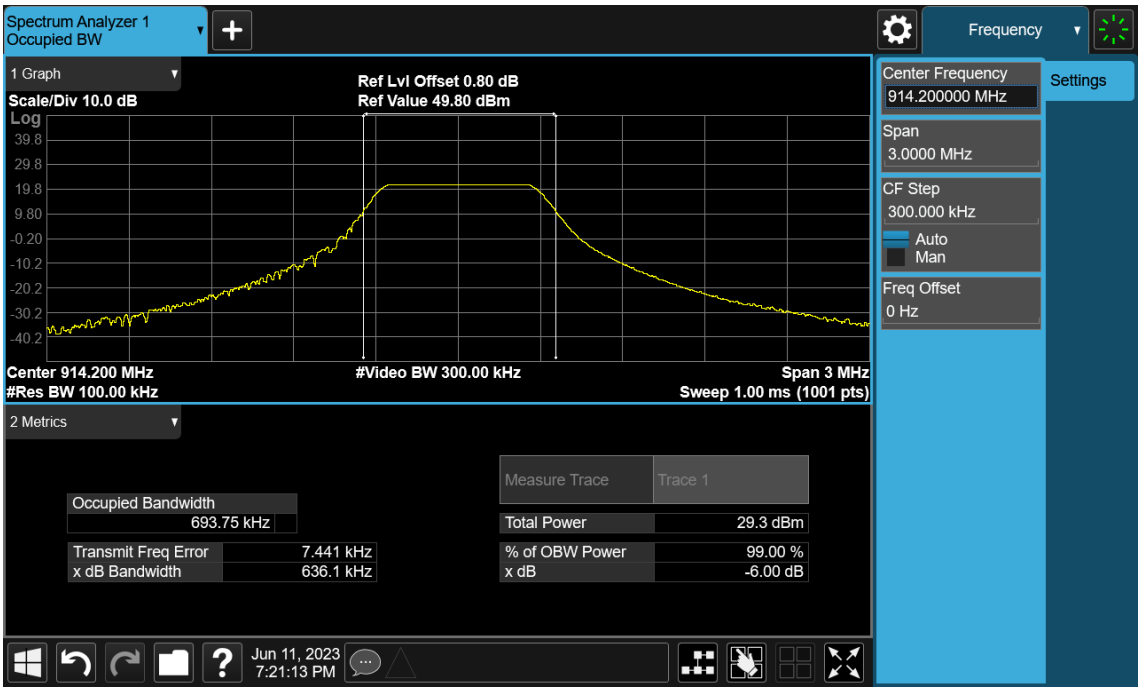
CH64 (903MHz)



CH67 (907.8MHz)



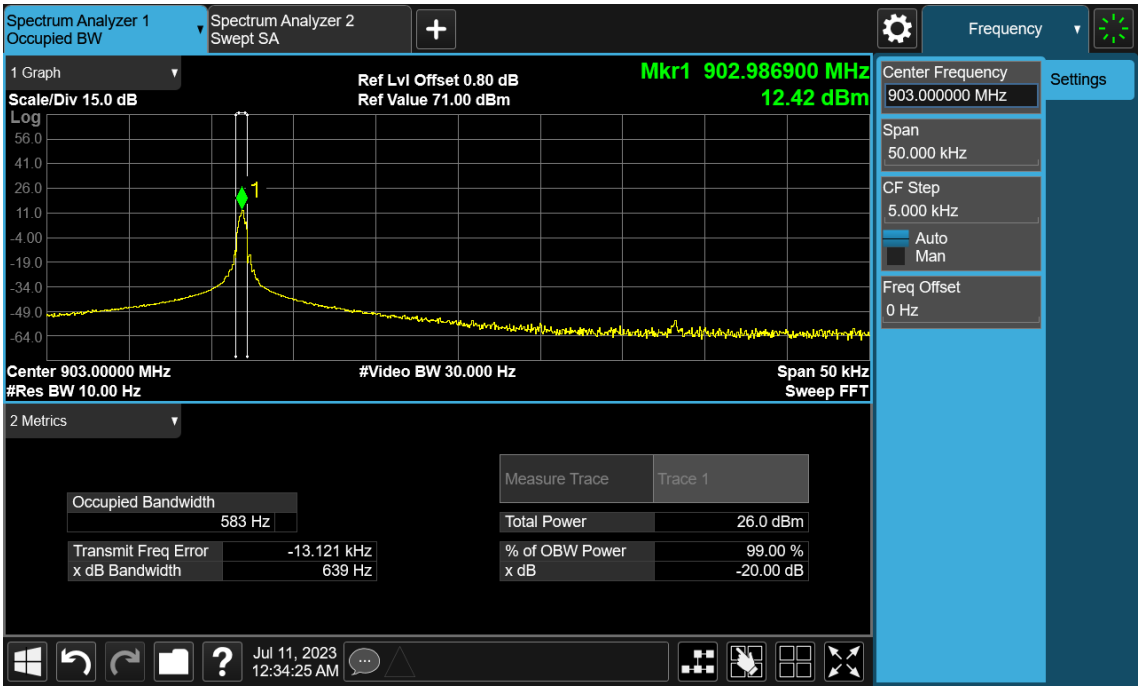
CH71 (914.2MHz)



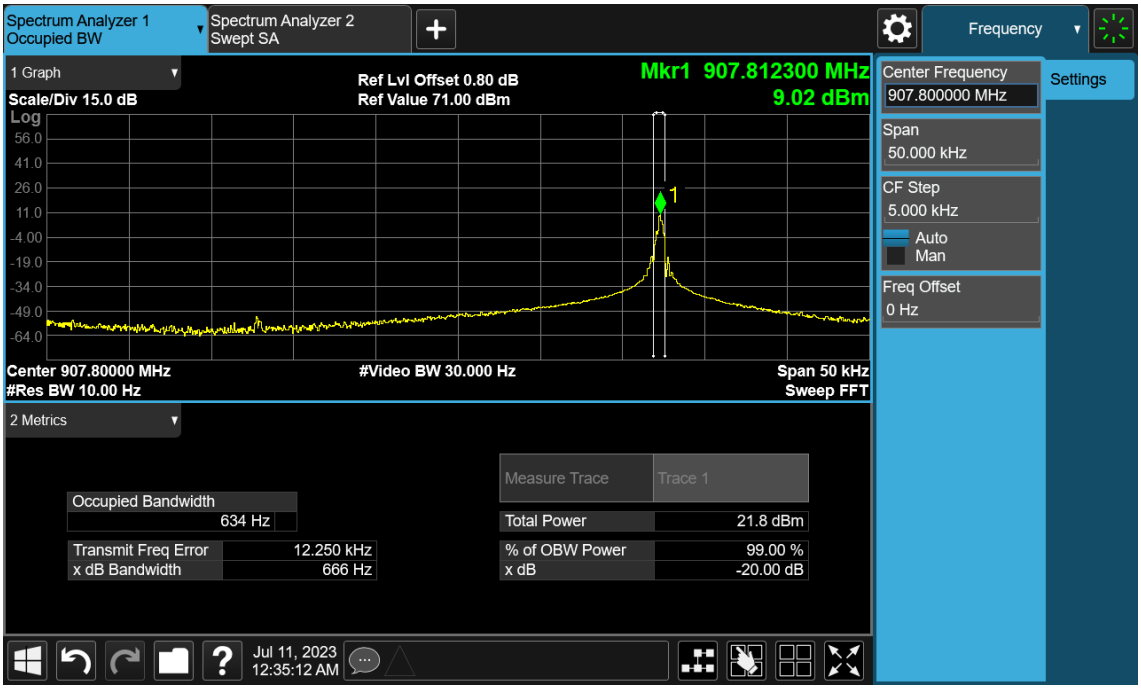
Mode	CH.	Test Freq. (MHz)	20dB Occupied Bandwidth (Hz)	Limit (kHz)	Result
3	64	903	639	≤250	Pass
	67	907.8	666	≤250	Pass
	71	914.2	655	≤250	Pass

20dB Occupied Bandwidth

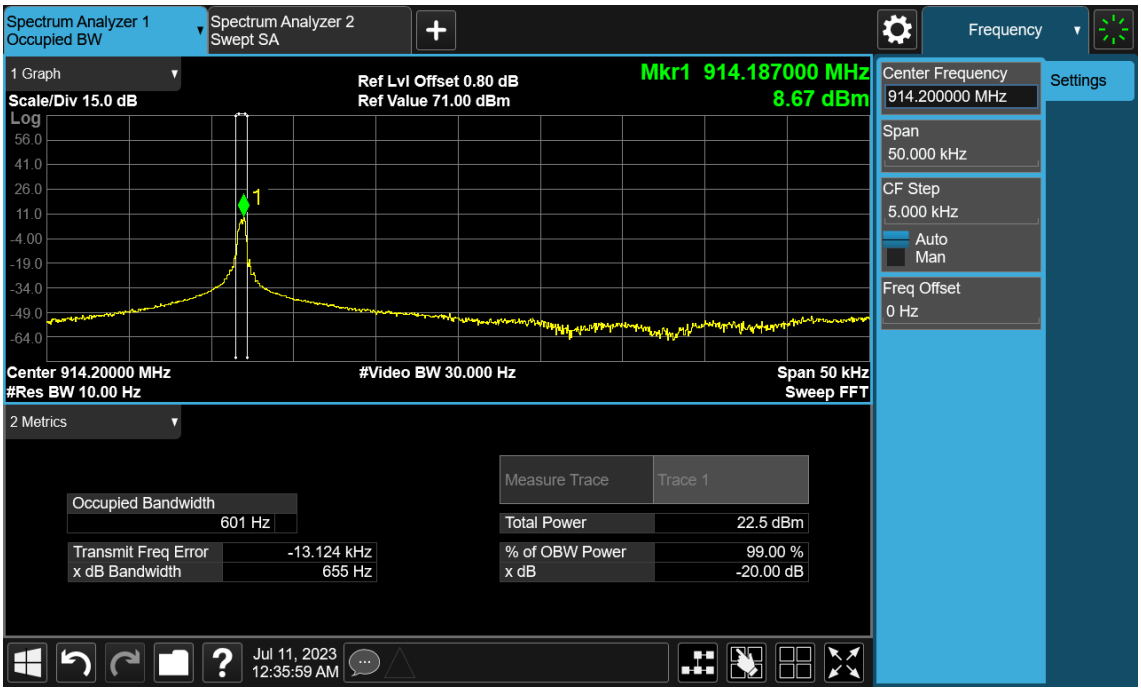
CH64 (903MHz)



CH67 (907.8MHz)



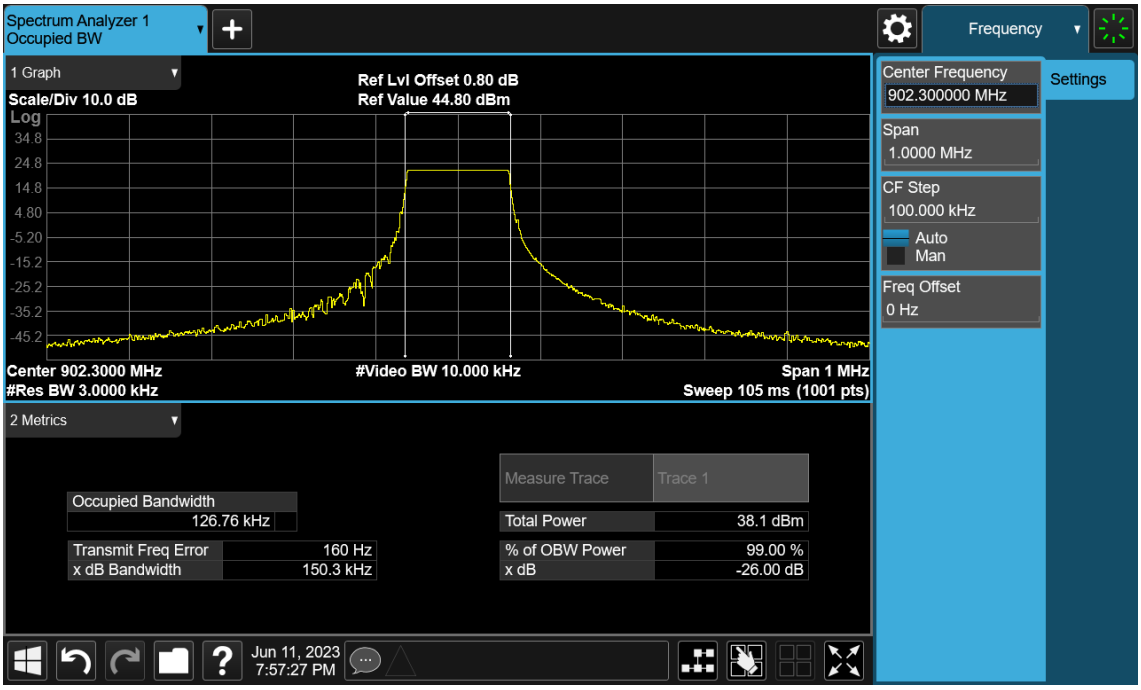
CH71 (914.2MHz)



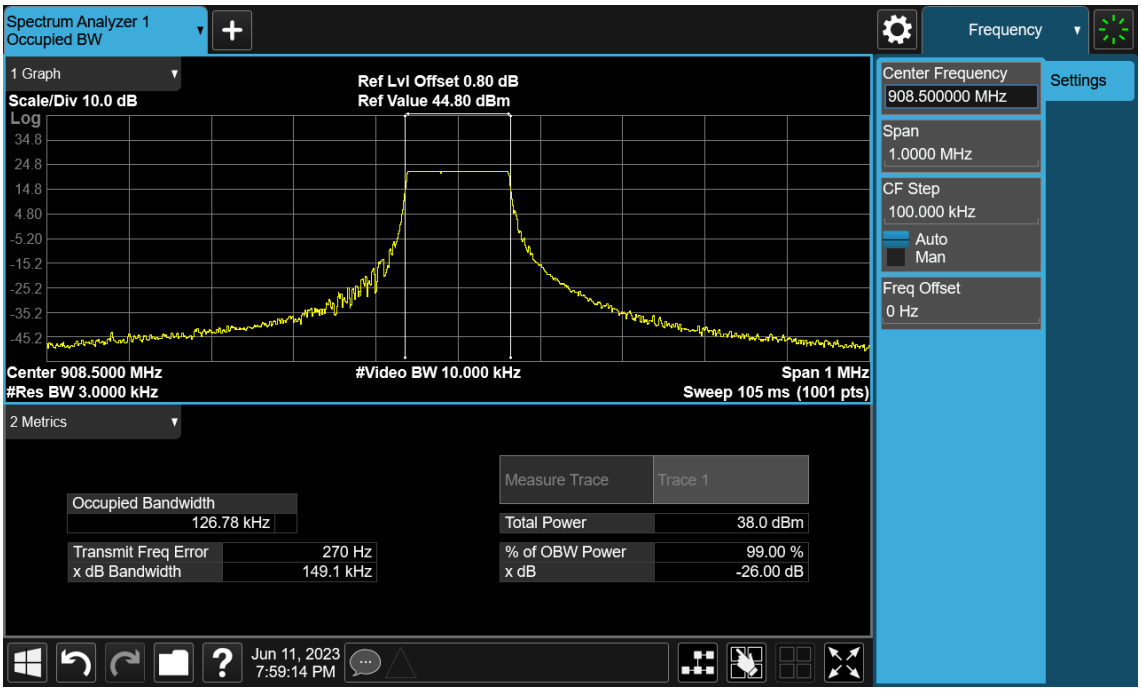
Mode	CH.	Test Freq. (MHz)	99% Occupied Bandwidth (kHz)	Limit	Result
1	00	902.3	126.76	Within frequency range	Pass
	31	908.5	126.78	Within frequency range	Pass
	63	914.9	126.61	Within frequency range	Pass
2	64	903.0	507.01	Within frequency range	Pass
	67	907.8	503.96	Within frequency range	Pass
	71	914.2	505.69	Within frequency range	Pass
3	64	903.0	0.575	Within frequency range	Pass
	67	907.8	0.663	Within frequency range	Pass
	71	914.2	0.596	Within frequency range	Pass

99% Occupied Bandwidth

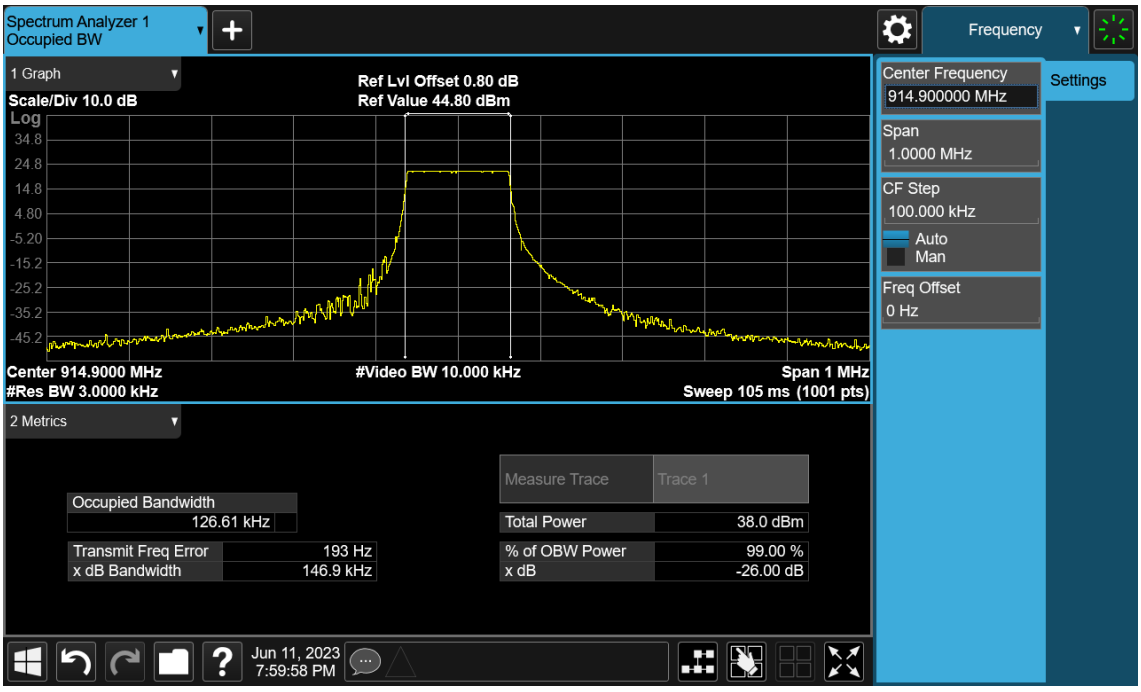
Mode 1 CH00 (902.3MHz)



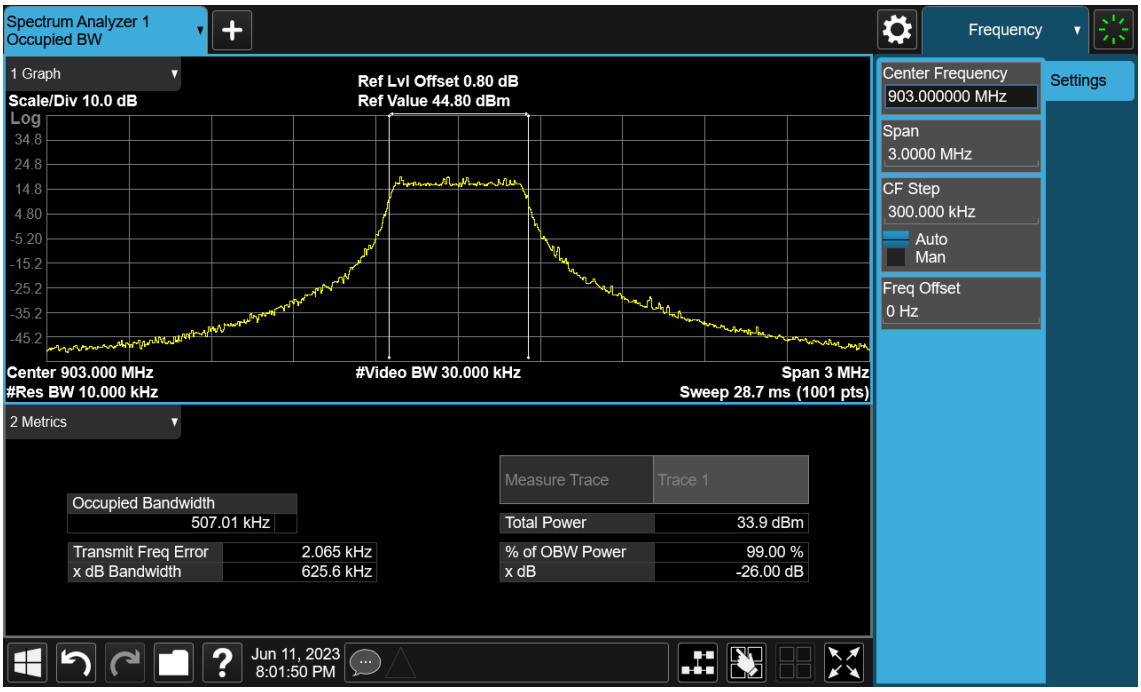
Mode 1 CH31 (908.5MHz)



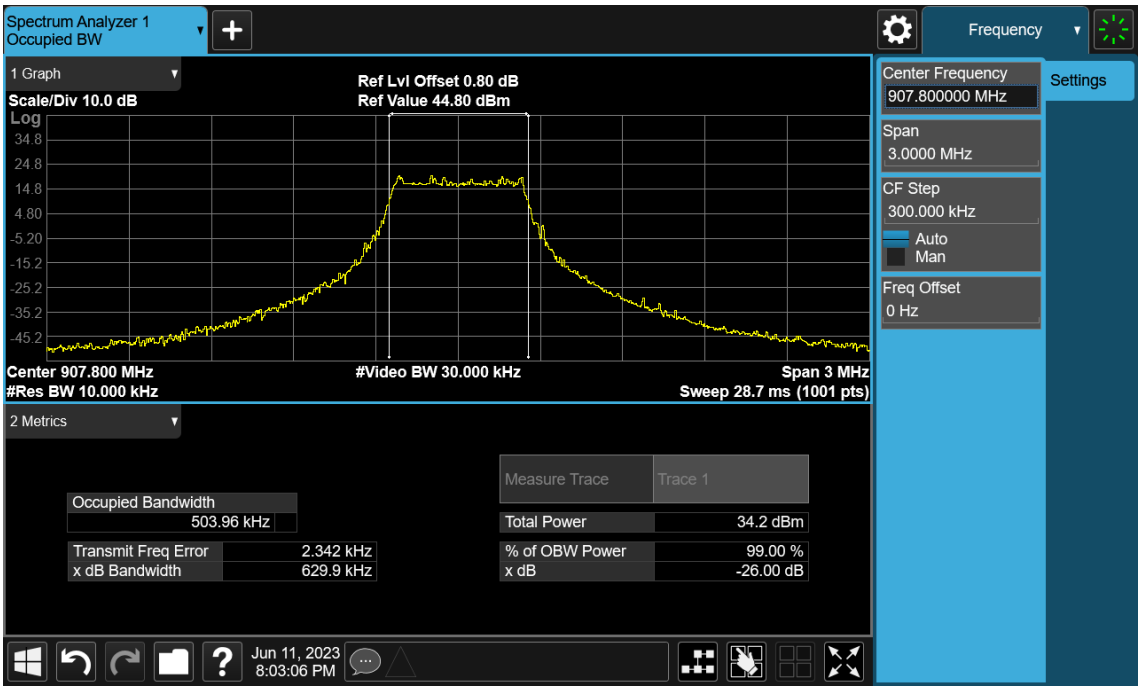
Mode 1 CH63 (914.9MHz)



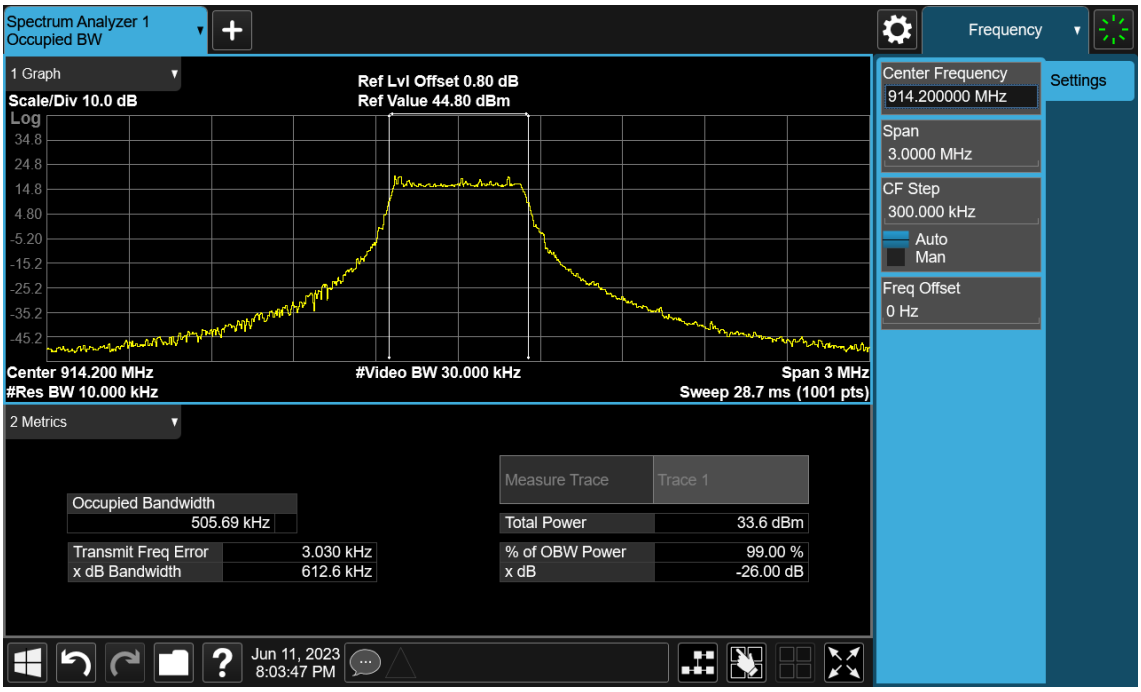
Mode 2 CH64 (903.0MHz)



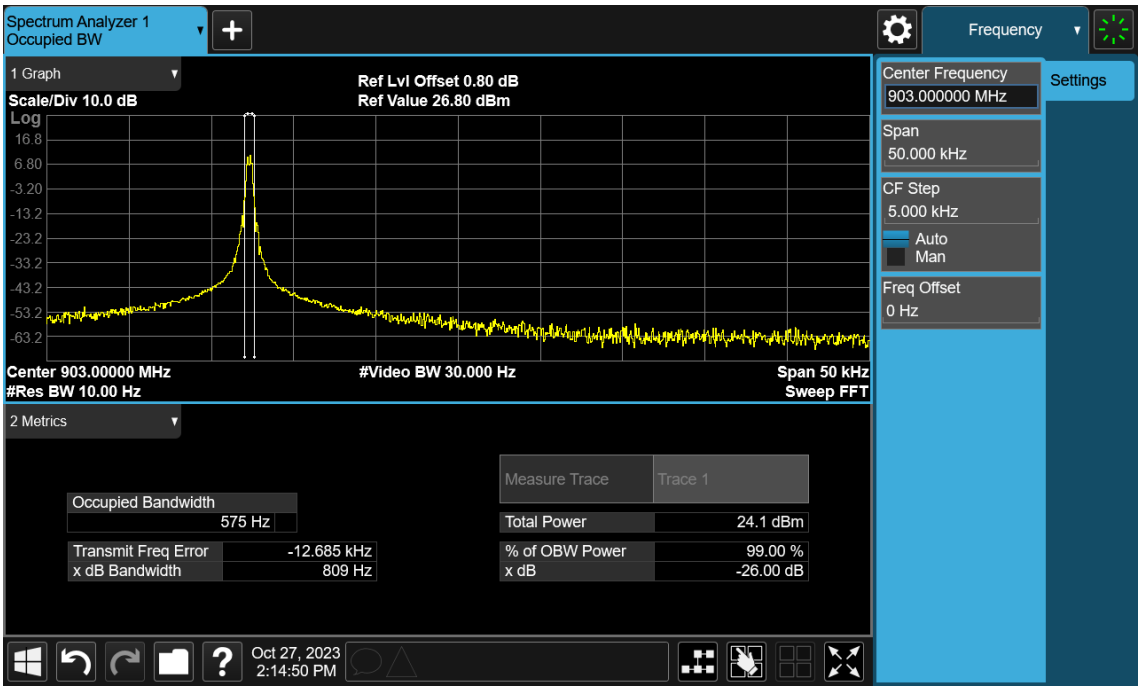
Mode 2 CH67 (907.8MHz)



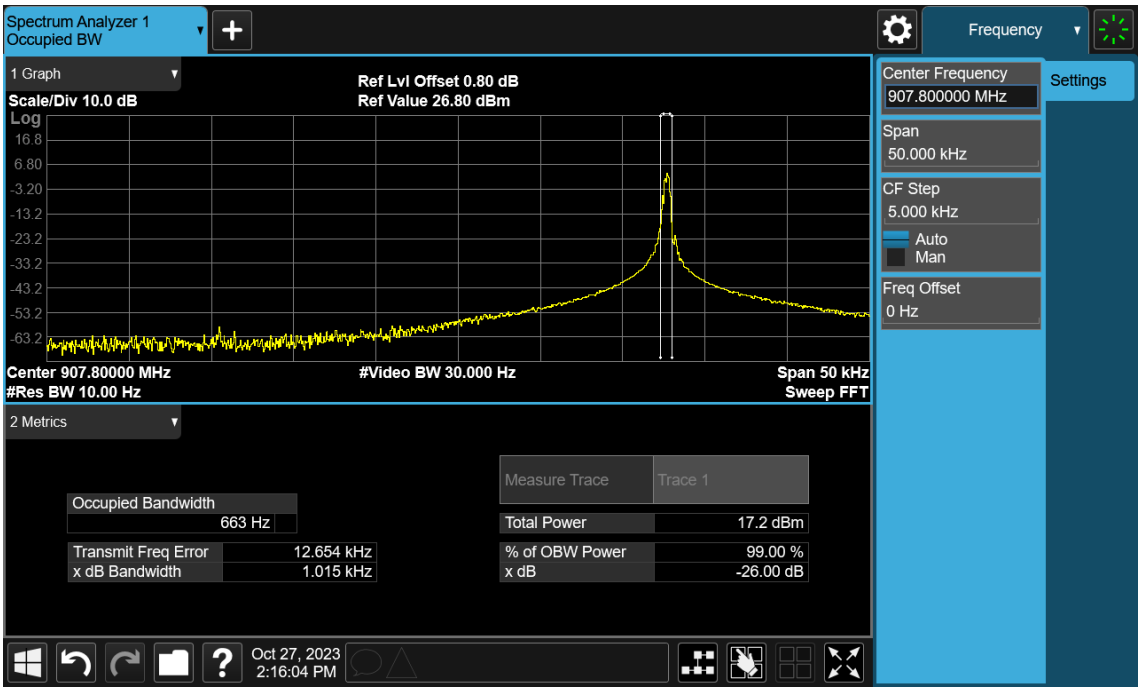
Mode 2 CH71 (914.2MHz)



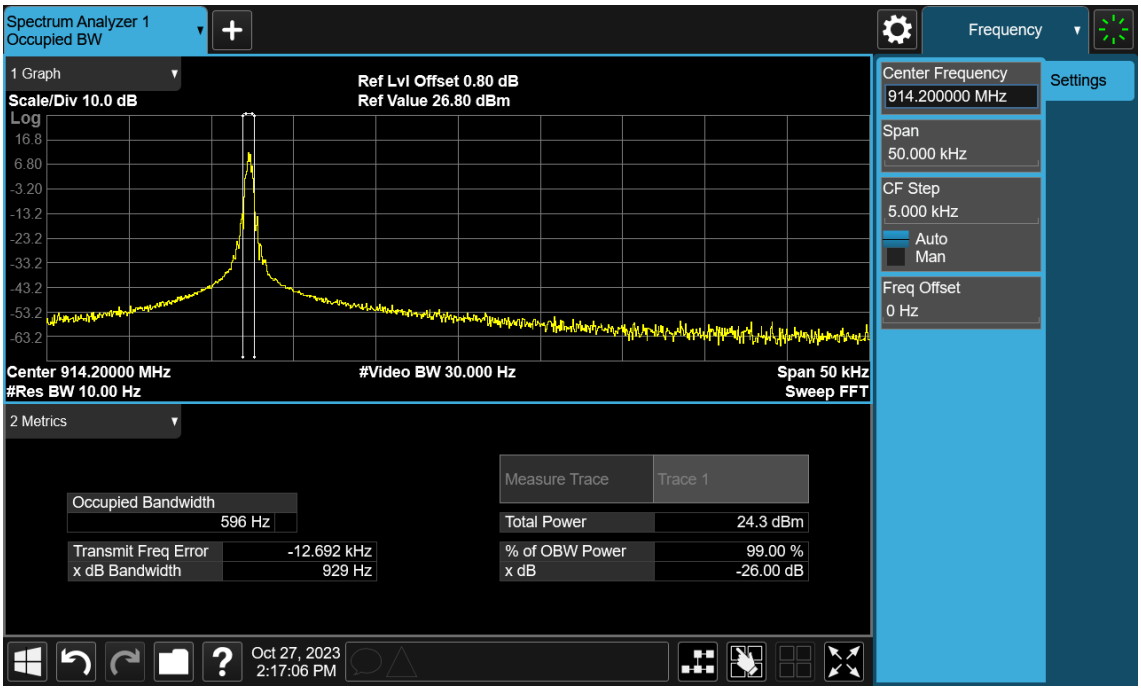
Mode 3 CH64 (903.0MHz)



Mode 3 CH67 (907.8MHz)



Mode 3 CH67 (914.2MHz)



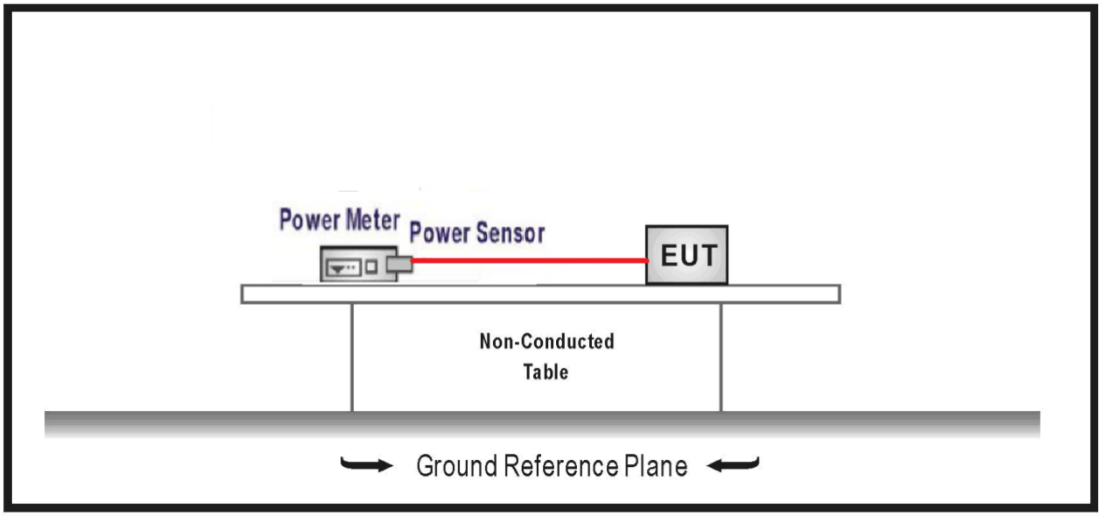
4.6 Fundamental emission output power — VERDICT: PASS

4.6.1 Limit

Standard			FCC Part 15 Subpart C Paragraph 15.247 (b)(3)
☒	GTX ＜6dBi		Pout≤30dBm
☐	GTX ＞6dBi		
	☐	Non-Fix point-point	Pout≤30-(GTX -6)
	☐	Fix point-point	Pout≤30-[(GTX-6)]/3
	☐	Point-to-multipoint	Pout≤30-(GTX-6)
	☐	Overlap Beams	Pout≤30-[(GTX-6)]/3
	☐	Aggregate power transmitted simultaneously on all beams	Pout≤30-[(GTX-6)]/3
	☐	single directional beam	Pout≤30-[(GTX-6)]/3+8dB
☒	For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels		

Note 1 : GTX directional gain of transmitting antennas.
Note 2 : Pout is maximum peak conducted output power .

4.6.2 Test Setup



4.6.3 Test Procedure							
	References Rule					Chapter	Description
☒	ANSI C63.10					11.9	Fundamental emission output power
	☐	ANSI C63.10				11.9.1	Maximum peak conducted output power
		☐	ANSI C63.10			11.9.1.1	RBW ⩾ DTS bandwidth
		☐	ANSI C63.10			11.9.1.2	Integrated band power method
		☐	ANSI C63.10			11.9.1.3	PKPM1 Peak power meter method
	☒	ANSI C63.10				11.9.2	Maximum conducted (average) output power
		☒	ANSI C63.10			11.9.2.2	Measurement using a spectrum analyzer (SA)
			☐	ANSI C63.10		11.9.2.2.2	Method AVGSA-1(Duty cycle⩾98%)
			☐	ANSI C63.10		11.9.2.2.3	Method AVGSA-1A(Duty cycle⩾98%)
			☒	ANSI C63.10		11.9.2.2.4	Method AVGSA-2(Duty cycle⩽98%)
			☐	ANSI C63.10		11.9.2.2.5	Method AVGSA-2A(Duty cycle⩽98%)
			☐	ANSI C63.10		11.9.2.2.4	Method AVGSA-3
			☐	ANSI C63.10		11.9.2.2.5	Method AVGSA-3A
		☒	ANSI C63.10			11.9.2.3	Measurement using a power meter (PM)
			☒	ANSI C63.10		11.9.2.3.1	Method AVGPM
			☐	ANSI C63.10		11.9.2.3.2	Method AVGPM-G
☒	ANSI C63.10					7.8.5	Output power test procedure for frequency-hopping spread-spectrum (FHSS) devices

4.6.4 Test Data

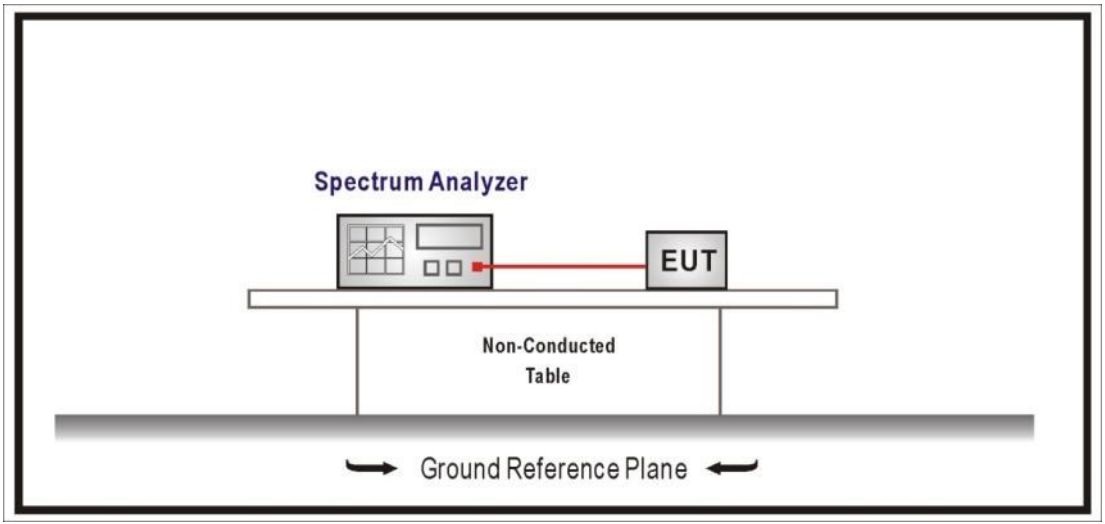
Mode	Channel	Test Frequency (MHz)	Output Power (dBm)	E.I.R.P (dBm)	Conducted Limit (dBm)	E.I.R.P Limit (dBm)	Result
1	00	902.3	20.75	21.05	30.00	36.00	Pass
	31	908.5	20.77	21.07	30.00	36.00	Pass
	63	914.9	20.71	21.01	30.00	36.00	Pass
2	64	903.0	20.56	20.86	30.00	36.00	Pass
	67	907.8	20.67	20.97	30.00	36.00	Pass
	71	914.2	20.52	20.82	30.00	36.00	Pass
3	64	903.0	20.69	20.99	30.00	36.00	Pass
	67	907.8	20.81	21.11	30.00	36.00	Pass
	71	914.2	20.70	21.00	30.00	36.00	Pass

Note:
1. E.I.R.P.= Output Power + Antenna Gain
2. Please refer to clause 1.2 for antenna gain.

4.7 Power Density	VERDICT: PASS

4.7.1 Limit:	
Standard	FCC Part 15 Subpart C Paragraph 15.247 (e)
Power Spectral Density≤8dBm/3kHz	

4.7.2 Test Setup



4.7.3 Test Procedure

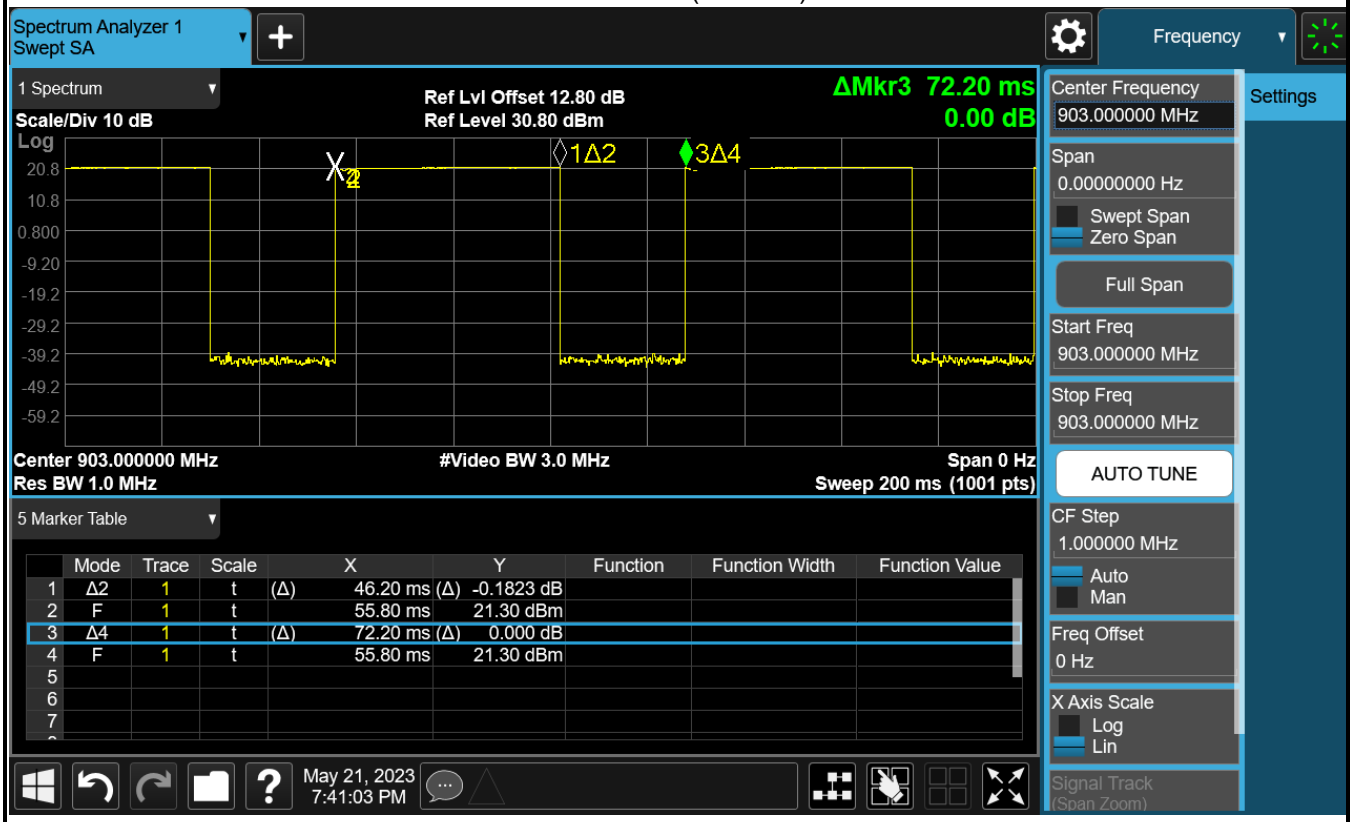
	References Rule		Chapter	Description
☒	ANSI C63.10		11.10	Maximum power spectral density level in the fundamental emission
	☐	ANSI C63.10	11.10.2	Method PKPSD (peak PSD)
	☐	ANSI C63.10	11.10.3	Method AVGPSD-1(Duty cycle≥98%)
	☐	ANSI C63.10	11.10.4	Method AVGPSD-1A(Duty cycle≥98%)
	☒	ANSI C63.10	11.10.5	Method AVGPSD-2(Duty cycle<98%)
	☐	ANSI C63.10	11.10.6	Method AVGPSD-2A(Duty cycle<98%)
	☐	ANSI C63.10	11.10.7	Method AVGPSD-3
	☐	ANSI C63.10	11.10.8	Method AVGPSD-3A

4.7.4 Test Data

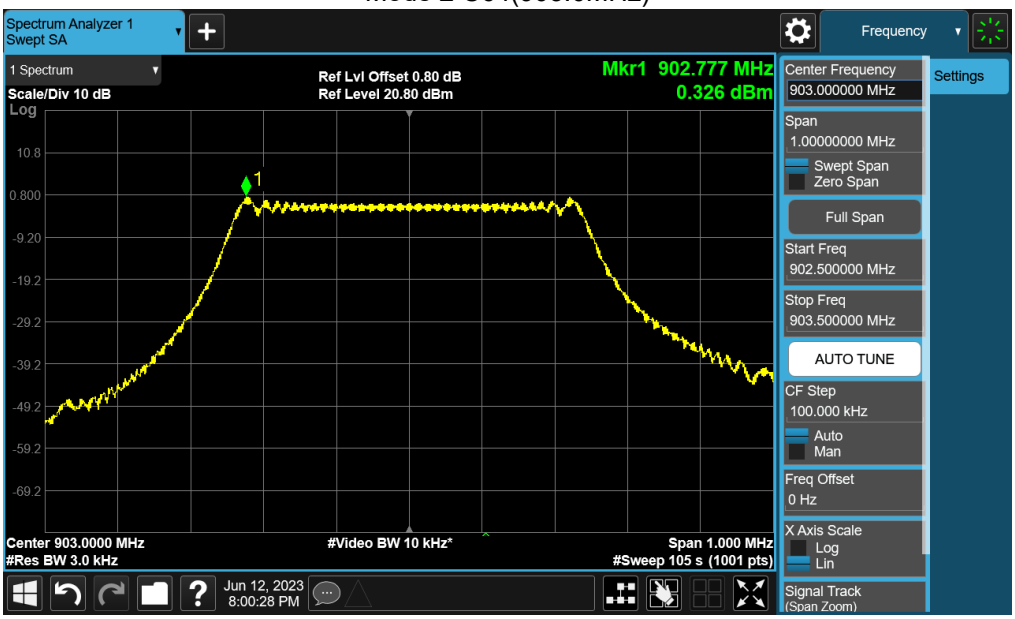
Mode	Channel	Test Frequency (MHz)	Reading level (dBm/3kHz)	Measurement PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2	64	903.0	0.326	2.266	⩽8	Pass
	67	907.8	0.113	2.053	⩽8	Pass
	71	914.2	-0.028	1.912	⩽8	Pass

Note 1: Measurement PSD = Reading level + Duty factor

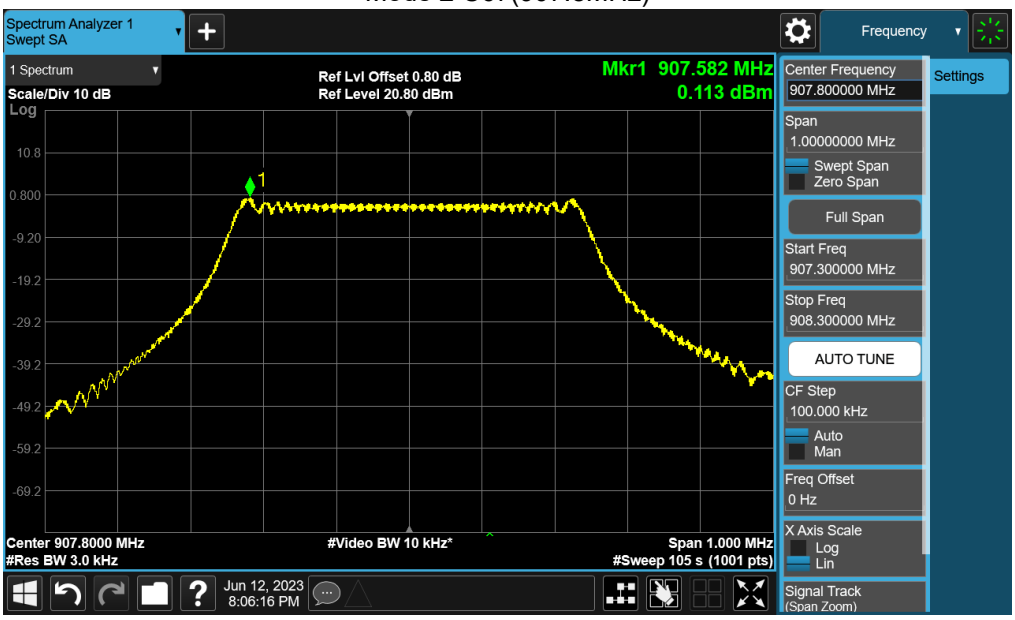
Mode 2 C64(903MHz)



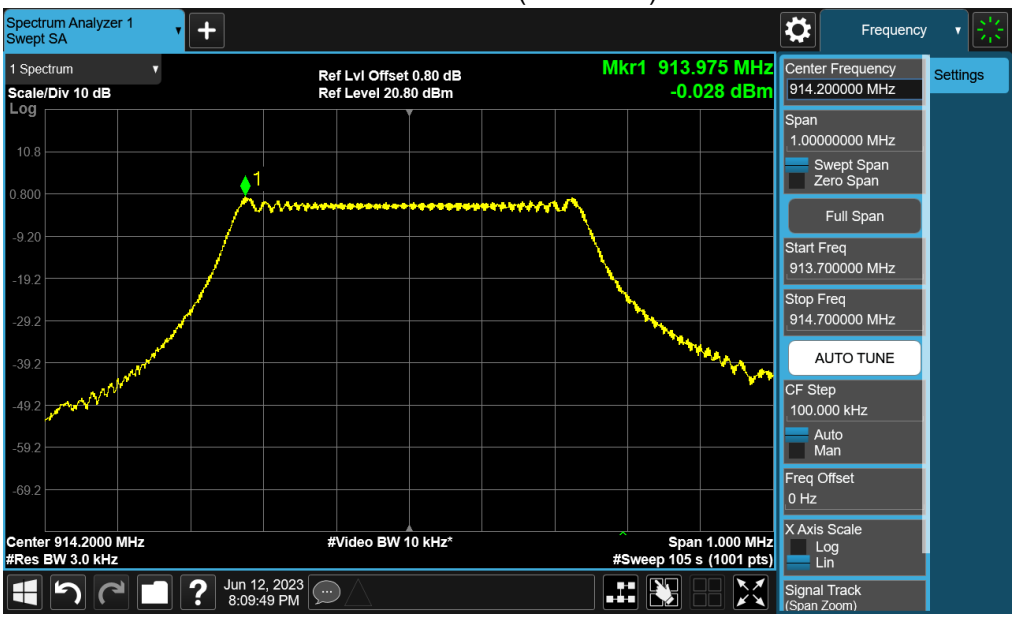
Mode 2 C64(903.0MHz)



Mode 2 C67(907.8MHz)



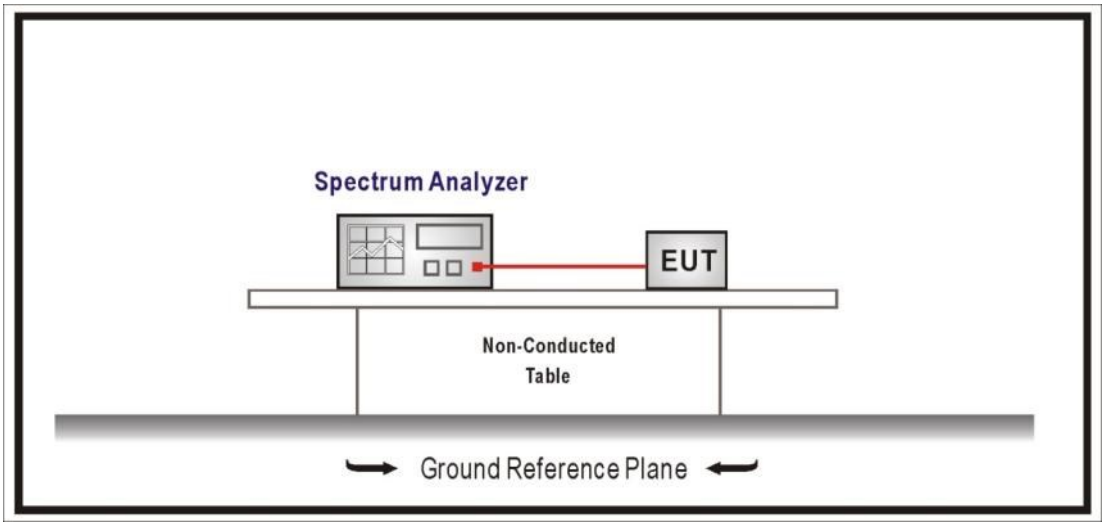
Mode 2 C671(914.2MHz)



4.8 Carrier Frequency Separation	VERDICT: PASS

4.8.1 Limit:	
Standard	FCC Part 15 Subpart C Paragraph 15.247(a)(1)
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.	

4.8.2 Test Setup



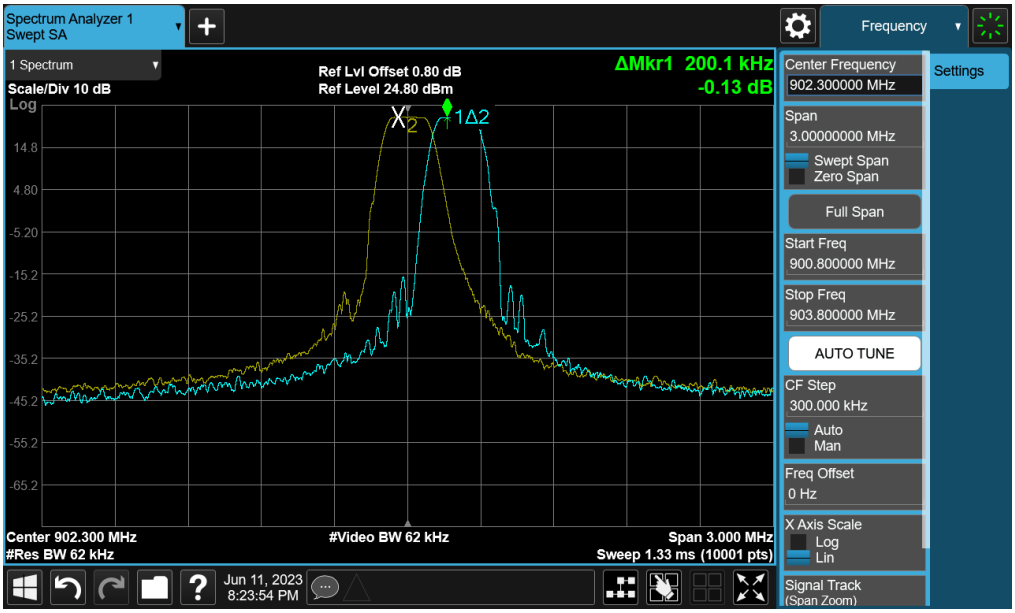
4.8.3 Test Procedure

	References Rule	Chapter	Description
☒	ANSI C63.10	7.8.2	Carrier frequency separation

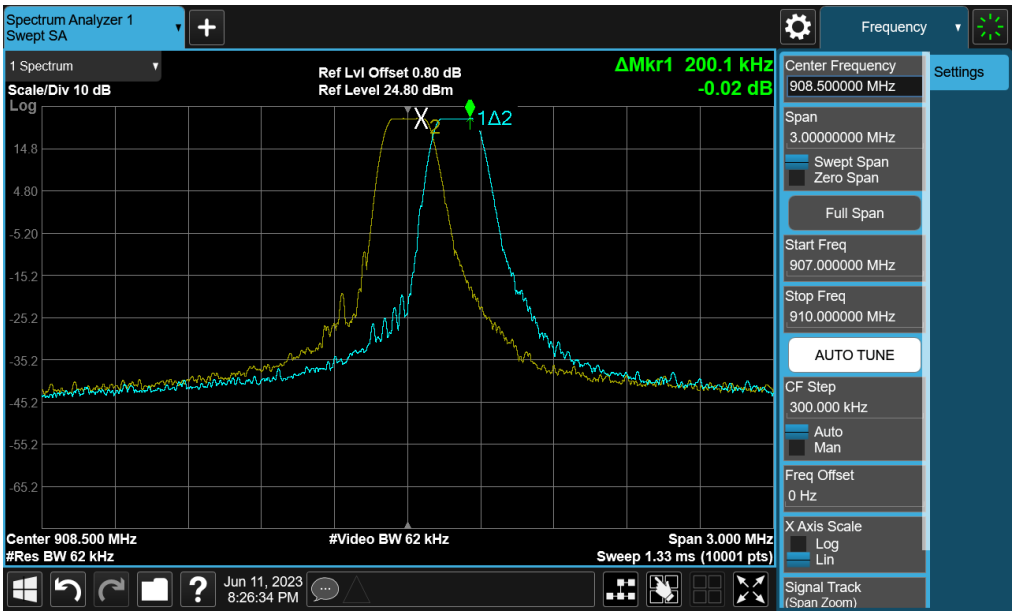
4.8.4 Test Data

Mode	Channel	Test Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
1	00	902.3	200.1	⩾142.5	Pass
	31	908.5	200.1	⩾141.1	Pass
	63	914.9	200.1	⩾139.6	Pass

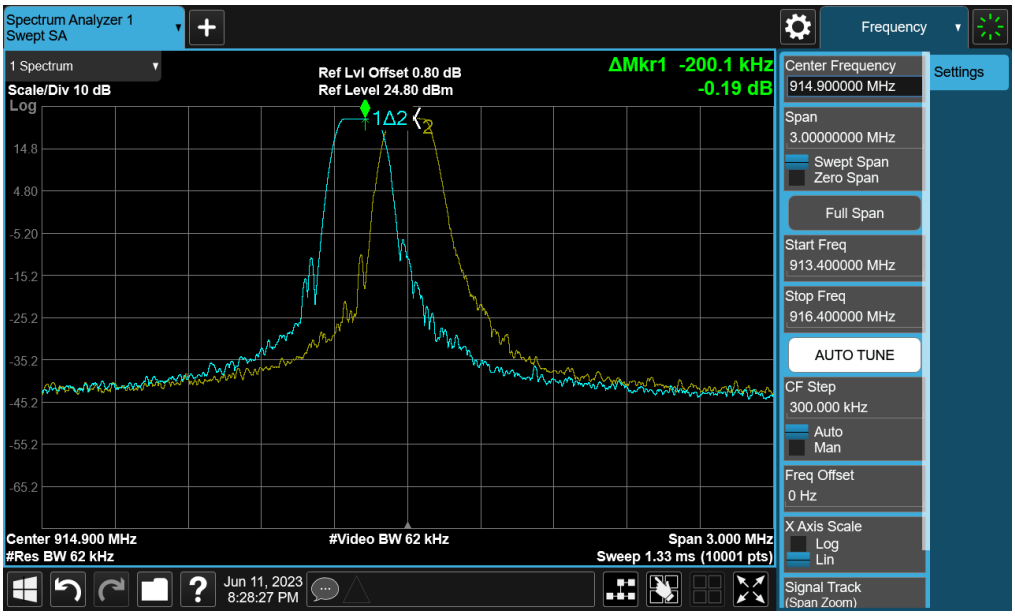
Channel0 902.3MHz



Channel31 908.5MHz



Channel63 914.9MHz



Mode	Channel	Test Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
3	64	903.0	25.552	⩾25	Pass
	67	907.8	25.637	⩾25	Pass
	71	914.2	25.337	⩾25	Pass

Channel 64 903MHz