

RF TEST REPORT

For

Network Corporation

Product Name: Lora-DTU

Test Model(s): LRM-03S-D

Report Reference No. : POCE231026001EC001

FCC ID : 2BDRCLRM-03S-D

Applicant's Name : Network Corporation

Address : 8-33, Chigasaki-chuo, Tsuzuki-ku, Yokohama, 224-0032 Japan

Testing Laboratory : Shenzhen POCE Technology Co., Ltd.

Address : 101-102 Building H5 & 1/F., Building H, Hongfa Science & Technology Park, Tangtou, Shiyan, Bao'an District, Shenzhen, Guangdong, China

Test Specification Standard : 47 CFR Part 15.249 & ANSI C63.10-2013

Date of Receipt : October 26, 2023

Date of Test : October 26, 2023 to November 8, 2023

Data of Issue : November 8, 2023

Result : Pass

Note: This report shall not be reproduced except in full, without the written approval of Shenzhen POCE Technology Co., Ltd. This document may be altered or revised by Shenzhen POCE Technology Co., Ltd. personnel only, and shall be noted in the revision section of the document. The test results in the report only apply to the tested sample.

Revision History Of Report

Version	Description	REPORT No.	Issue Date
V1.0	Original	POCE231026001EC001	November 8, 2023

NOTE1:

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

Compiled by:

Keren Huang

Keren Huang/ Test Engineer

Supervised by:

Stone Yin

Stone Yin / Project Engineer

Approved by:

Tom Chen

Tom Chen / Manager

CONTENTS

1	TEST SUMMARY	4
1.1	TEST STANDARDS	4
1.2	SUMMARY OF TEST RESULT	4
2	GENERAL INFORMATION	5
2.1	CLIENT INFORMATION	5
2.2	DESCRIPTION OF DEVICE (EUT)	5
2.3	DESCRIPTION OF TEST MODES	5
2.4	DESCRIPTION OF SUPPORT UNITS	6
2.5	EQUIPMENTS USED DURING THE TEST	7
2.6	STATEMENT OF THE MEASUREMENT UNCERTAINTY	8
2.7	AUTHORIZATIONS	8
2.8	ANNOUNCEMENT	8
3	EVALUATION RESULTS (EVALUATION)	9
3.1	ANTENNA REQUIREMENT	9
3.1.1	Conclusion:	9
4	RADIO SPECTRUM MATTER TEST RESULTS (RF)	10
4.1	CONDUCTED EMISSION AT AC POWER LINE	10
4.1.1	E.U.T. Operation:	10
4.1.2	Test Setup Diagram:	10
4.1.3	Test Data:	11
4.2	OCCUPIED BANDWIDTH	13
4.2.1	E.U.T. Operation:	13
4.2.2	Test Setup Diagram:	14
4.2.3	Test Data:	14
4.3	FIELD STRENGTH OF FUNDAMENTAL	20
4.3.1	E.U.T. Operation:	20
4.3.2	Test Setup Diagram:	20
4.3.3	Test Data:	21
4.4	BAND EDGE EMISSIONS (RADIATED)	22
4.4.1	E.U.T. Operation:	22
4.4.2	Test Setup Diagram:	22
4.4.3	Test Data:	23
4.5	EMISSIONS IN FREQUENCY BANDS (BELOW 1GHz)	26
4.5.1	E.U.T. Operation:	26
4.5.2	Test Setup Diagram:	27
4.5.3	Test Data:	27
4.6	EMISSIONS IN FREQUENCY BANDS (ABOVE 1GHz)	31
4.6.1	E.U.T. Operation:	31
4.6.2	Test Setup Diagram:	32
4.6.3	Test Data:	33
5	TEST SETUP PHOTOS	36
6	PHOTOS OF THE EUT	38

1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

47 CFR Part 15.249: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz

1.2 Summary of Test Result

Item	Standard	Method	Result
Antenna requirement	47 CFR Part 15.203	/	Pass
Occupied Bandwidth	47 CFR 15.215(c)	ANSI C63.10-2013, section 6.9.2	Pass
Field strength of fundamental	47 CFR 15.249(a)	ANSI C63.10-2013 section 6.5	Pass
Band edge emissions (Radiated)	47 CFR 15.249(d)	ANSI C63.10-2013 section 6.6.4	Pass
Emissions in frequency bands (below 1GHz)	47 CFR 15.249(a) 47 CFR 15.249(d) 47 CFR 15.249(e)	ANSI C63.10-2013 section 6.5	Pass
Emissions in frequency bands (above 1GHz)	47 CFR 15.249(a) 47 CFR 15.249(d) 47 CFR 15.249(e)	ANSI C63.10-2013 section 6.6	Pass

Note: 1.N/A -this device(EUT) is not applicable to this testing item

2. RF-conducted test results including cable loss.

2 GENERAL INFORMATION

2.1 Client Information

Applicant's Name : Network Corporation
Address : 8-33, Chigasaki-chuo, Tsuzuki-ku, Yokohama, 224-0032 Japan
Manufacturer : Dalian Jiupeng Electronic System Engineering Co.,Ltd
Address : 1603, Liangjiu international Building 5, Heyi Street, Xigang Dist., Dalian

2.2 Description of Device (EUT)

Product Name:	Lora-DTU
Sample number:	231024003-2
Model/Type reference:	LRM-03S-D
Trade Mark:	
Power Supply:	DC8-28V
Operation Frequency:	903MHz -- 927MHz
Number of Channels:	25
Modulation Type:	Long Range(LoRa)
Antenna Type:	External antenna (reversed polarity unique antenna port)
Antenna Gain:	4.54dBi
Hardware Version:	20230908LoraDB-02
Software Version:	V1.2

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	903 MHz	8	910MHz	15	917MHz	22	924MHz
2	904 MHz	9	911MHz	16	918MHz	23	925MHz
3	905MHz	10	912MHz	17	919MHz	24	926MHz
4	906MHz	11	913MHz	18	920MHz	25	927MHz
5	907MHz	12	914MHz	19	921MHz	/	/
6	908MHz	13	915MHz	20	922MHz	/	/
7	909MHz	14	916MHz	21	923MHz	/	/

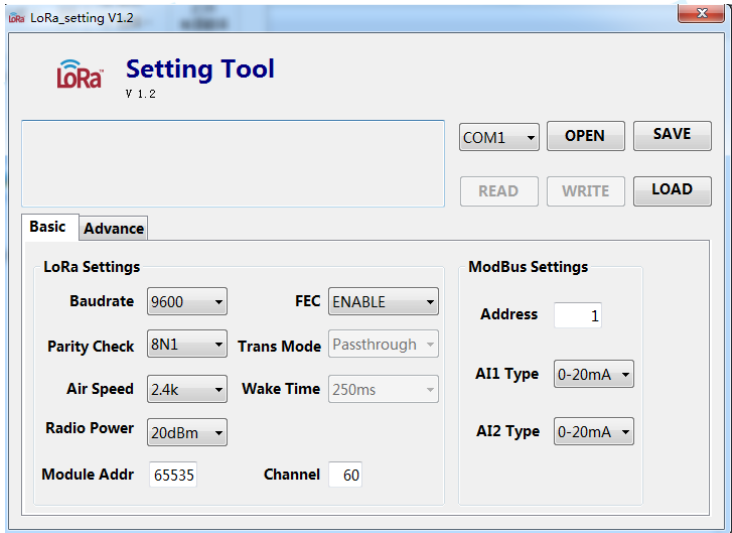
Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	Frequency (MHz)
Lowest channel	903MHz
Middle channel	915MHz
Highest channel	927MHz

2.3 Description of Test Modes

No	Title	Description
TM1	TX- Long Range(0.3kbps)	Keep the EUT in continuously transmitting mode with Long Range-0.3kbps modulation type.
TM2	TX- Long Range(2.4kbps)	Keep the EUT in continuously transmitting mode with Long

		Range-2.4kbps modulation type.
TM3	TX- Long Range(19.2kbps)	Keep the EUT in continuously transmitting mode with Long Range-19.2kbps modulation type.
Description		
☒ Special software is used. ☐ Through engineering command into the engineering mode. engineering command: ***#3646633#** ☐ Other method:		
Special software: 		
Duty cycle	/	

Note: LORA has different signal rates, such as 0.3/1.2/2.4/4.8/9.6/19.2 kbps. In the test, the lowest rate was selected, with an intermediate rate of 2.4 kbps and a maximum rate of 19.2 kbps.

2.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Description	Manufacturer	Model No.	Remark	Certification
1	ADAPTER	SHENZHEN FUJIA APPLIANCE CO.,LTD	MODEL: FJ-SW1501500N INPUT:100-240 50/60Hz 0.4A Max OUTPUT:15V 1.5A	Provide by lab	SDOC
2	PC	HP	HP14-ep0354TU	Provide by lab	SDOC

2.5 Equipments Used During The Test

Conducted Emission at AC power line					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal. Due Date
Shielding room	CY	8*4*3	20160102	2023/1/26	2025/1/25
Pulse Limiter	Schwarzbeck	VTSD 9561	561-G071	2023/2/27	2024/2/26
Cable	Schwarzbeck	/	/	2023/2/27	2024/2/26
Test Receiver	Rohde & Schwarz	ESPI	1164.6607K03-102109-MH	2023/6/13	2024/6/12
L.I.S.N	R&S	ESH3-Z5	831.5518.52	2022/12/29	2023/12/28
L.I.S.N	Schwarzbeck	NSLK 8126	NSLK 8126	2023/8/8	2024/8/7
50ΩCoaxial Switch	Anritsu	MP59B	M20531	/	/
EMI Testsoftware	Farad	EZ -EMC	V1.1.42	/	/

Emissions in restricted frequency bands and RF					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Test Receiver	R&S	ESCI	102109	2023/6/13	2024/6/12
Spectrum Analyzer	R&S	FSP30	1321.3008K40-101729-jR	2023/6/14	2024/6/13
966 Chamber	CY	9*6*6	20160101	2023/1/26	2025/1/25
Bore-sighting Antenna rack	PBB	1308503	16033	/	/
Loop antenna	ZHINAN	ZN30900C	ZN30900C	2021/7/5	2024/7/4
Broadband Antenna	Sunol Sciences	JB6 Antenna	A090414	2023/5-21	2025/5-20
Horn Antenna	Sunol Sciences	DRH-118	A091114	2023/5/13	2025/5/12
Horn antenna	COM-POWER	AH-1840(40G)	10100008	2023/4/5	2025/4/4
Power APM(LF)	Schwarzbeck	BBV9743	9743-151	2023/6/13	2024/6/12
Power APM(HF)	Schwarzbeck	BBV9718	9718-282	2023/6/13	2024/6/12
Cable(LF)#2	Schwarzbeck	/	/	2023/2/27	2024/2/26
Cable(LF)#1	Schwarzbeck	/	/	2023/2/27	2024/2/26
Cable(HF)#2	Schwarzbeck	AK9515E	96250	2023/2/28	2024/2/27
Cable(HF)#1	Schwarzbeck	SYV-50-3-1	/	2023/2/27	2024/2/26
Power divider	MIDEWEST	PWD-2533	SMA-79	2023/5/11	2026/5/10
signal generator	Keysight	N5181A	MY48180415	2022/12/10	2023/12/9
signal generator	Keysight	N5182A	MY50143455	2022/12/29	2023/12/28
Spectrum Analyzer	Keysight	N9020A	MY53420323	2022/12/29	2023/12/28
RF Sensor Unit	TACHOY	TR1029-2	000001	/	/
RF Control Unit	TACHOY	TR1029-1	000001	/	/
Position Controller	MF	MF-7802	/	/	/
EMI Testsoftware	Farad	EZ -EMC	V1.1.42	/	/
RF TestSoftware	TACHOY	RTS-01	V2.0.0.0	/	/

2.6 Statement Of The Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Disturbance (0.15~30MHz)	$\pm 3.41\text{dB}$
Occupied Bandwidth	$\pm 3.63\%$
RF conducted power	$\pm 0.733\text{dB}$
RF power density	$\pm 0.234\%$
Conducted Spurious emissions	$\pm 1.98\text{dB}$
Radiated Emission (Above 1GHz)	$\pm 5.46\text{dB}$
Radiated Emission (Below 1GHz)	$\pm 5.79\text{dB}$
Note: (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.	

2.7 Authorizations

Company Name:	Shenzhen POCE Technology Co., Ltd.
Address:	101-102 Building H5 & 1/F., Building H, Hongfa Science & Technology Park, Tangtou, Shiyan, Bao'an District, Shenzhen, Guangdong, China
Phone Number:	+86-13267178997
Fax Number:	86-755-29113252

Identification of the Responsible Testing Location

Company Name:	Shenzhen POCE Technology Co., Ltd.
Address:	101-102 Building H5 & 1/F., Building H, Hongfa Science & Technology Park, Tangtou, Shiyan, Bao'an District, Shenzhen, Guangdong, China
Phone Number:	+86-13267178997
Fax Number:	86-755-29113252
FCC Registration Number:	0032847402
Designation Number:	CN1342
Test Firm Registration No.:	778666
A2LA Certificate Number:	6270.01

2.8 Announcement

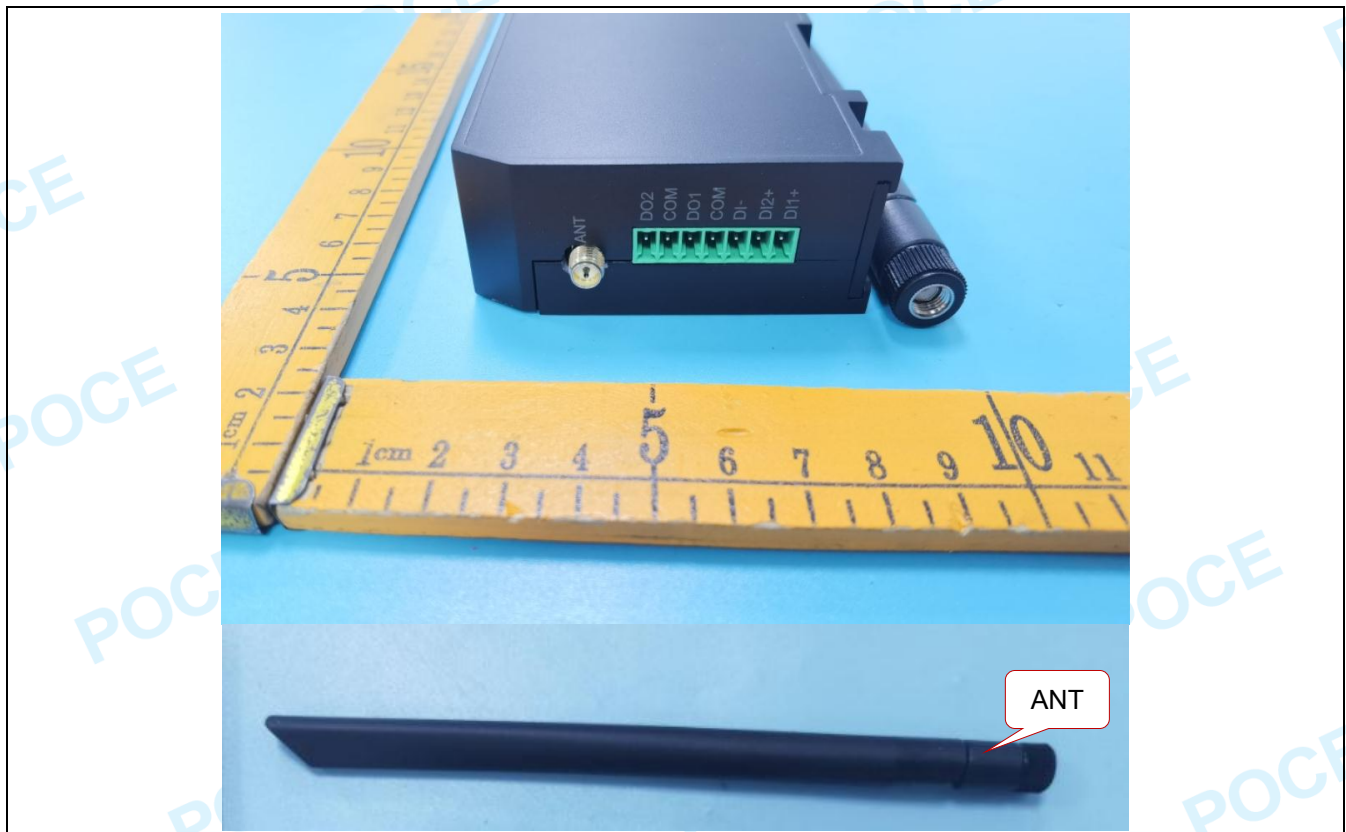
- (1) The test report reference to the report template version v0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) This document may not be altered or revised in any way unless done so by POCE and all revisions are duly noted in the revisions section.
- (5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (6) We hereby declare that the laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant. the laboratory is not responsible for the accuracy of the information provided by the client. When the information provided by the customer may affect the effectiveness of the results, the responsibility lies with the customer, and the laboratory does not assume any responsibility.

3 Evaluation Results (Evaluation)

3.1 Antenna requirement

Test Requirement:	Refer to 47 CFR Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.
-------------------	---

3.1.1 Conclusion:



4 Radio Spectrum Matter Test Results (RF)

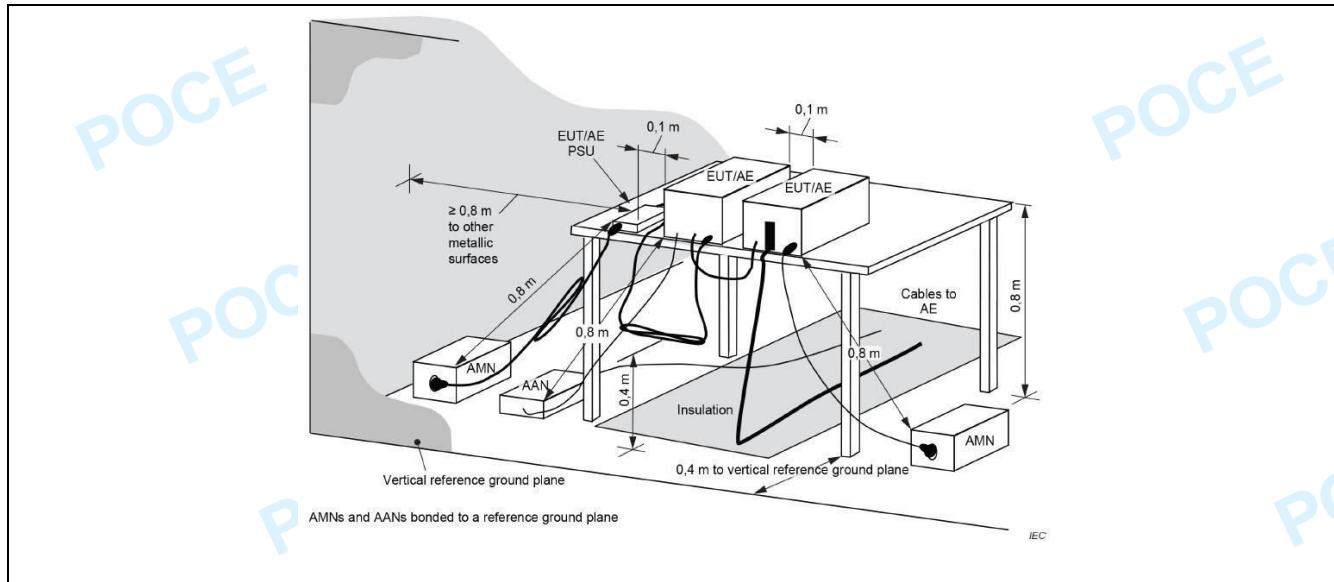
4.1 Conducted Emission at AC power line

Test Requirement:	Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).		
Test Limit:	Frequency of emission (MHz)	Conducted limit (dB μ V)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
	*Decreases with the logarithm of the frequency.		
Test Method:	ANSI C63.10-2013 section 6.2		
Procedure:	Refer to ANSI C63.10-2013 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices		

4.1.1 E.U.T. Operation:

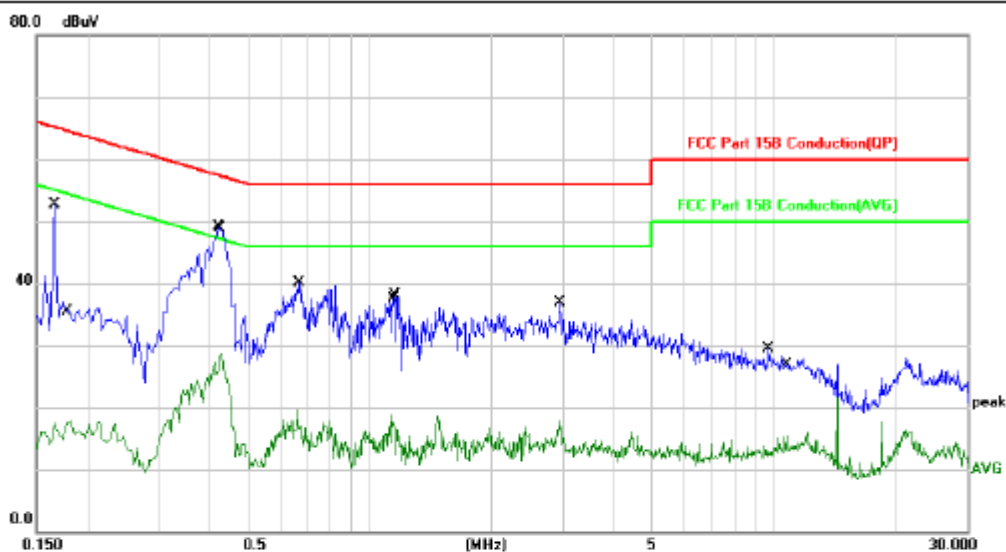
Operating Environment:					
Temperature:	23.5 °C	Humidity:	56 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM1				
Final test mode:	TM1				

4.1.2 Test Setup Diagram:



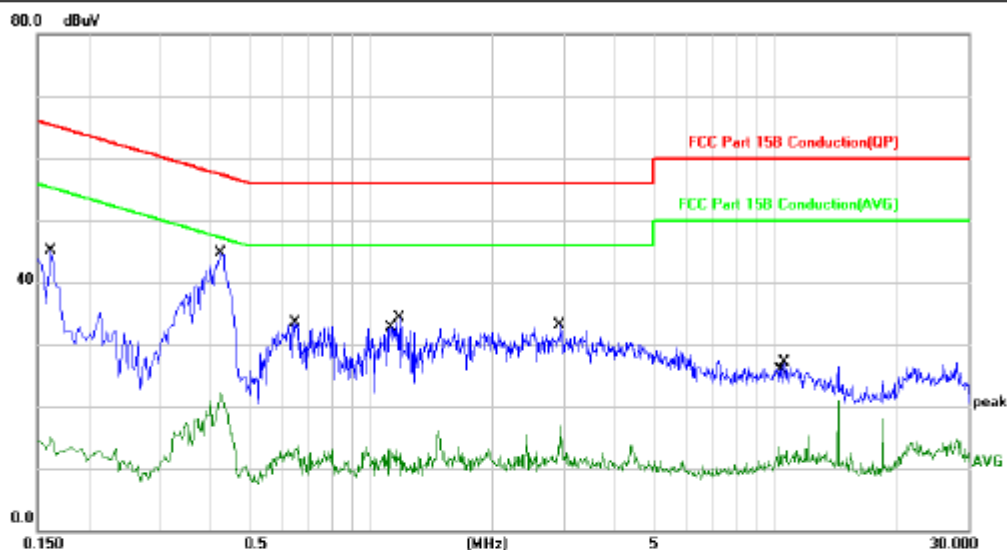
4.1.3 Test Data:

TM1 / Line: Line / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1660	42.64	10.03	52.67	65.15	-12.48	QP	
2		0.1819	7.83	10.03	17.86	54.39	-36.53	AVG	
3	*	0.4220	39.06	9.99	49.05	57.41	-8.36	QP	
4		0.4300	18.72	9.99	28.71	47.25	-18.54	AVG	
5		0.6620	9.71	9.97	19.68	46.00	-26.32	AVG	
6		0.6700	30.23	9.96	40.19	56.00	-15.81	QP	
7		1.1300	9.08	9.91	18.99	46.00	-27.01	AVG	
8		1.1580	28.21	9.92	38.13	56.00	-17.87	QP	
9		2.9380	7.85	10.03	17.88	46.00	-28.12	AVG	
10		2.9580	26.87	10.03	36.90	56.00	-19.10	QP	
11		9.6820	19.10	10.41	29.51	60.00	-30.49	QP	
12		10.7780	4.99	10.44	15.43	50.00	-34.57	AVG	

TM1 / Line: Neutral / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1620	35.06	10.03	45.09	65.36	-20.27	QP	
2		0.1620	4.98	10.03	15.01	55.36	-40.35	AVG	
3	*	0.4260	34.71	9.99	44.70	57.33	-12.63	QP	
4		0.4260	12.25	9.99	22.24	47.33	-25.09	AVG	
5		0.6540	23.59	9.97	33.56	56.00	-22.44	QP	
6		0.6580	3.80	9.97	13.77	46.00	-32.23	AVG	
7		1.1100	3.27	9.90	13.17	46.00	-32.83	AVG	
8		1.1740	24.30	9.92	34.22	56.00	-21.78	QP	
9		2.9380	23.09	10.03	33.12	56.00	-22.88	QP	
10		2.9380	6.96	10.03	16.99	46.00	-29.01	AVG	
11		10.2380	3.10	10.43	13.53	50.00	-36.47	AVG	
12		10.5420	16.59	10.44	27.03	60.00	-32.97	QP	

NOTE:

- 1.An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3.Measurement Level = Reading level + Correct Factor, Over=Limit- Measurement
4. The test results only show the worst mode or worst channel.

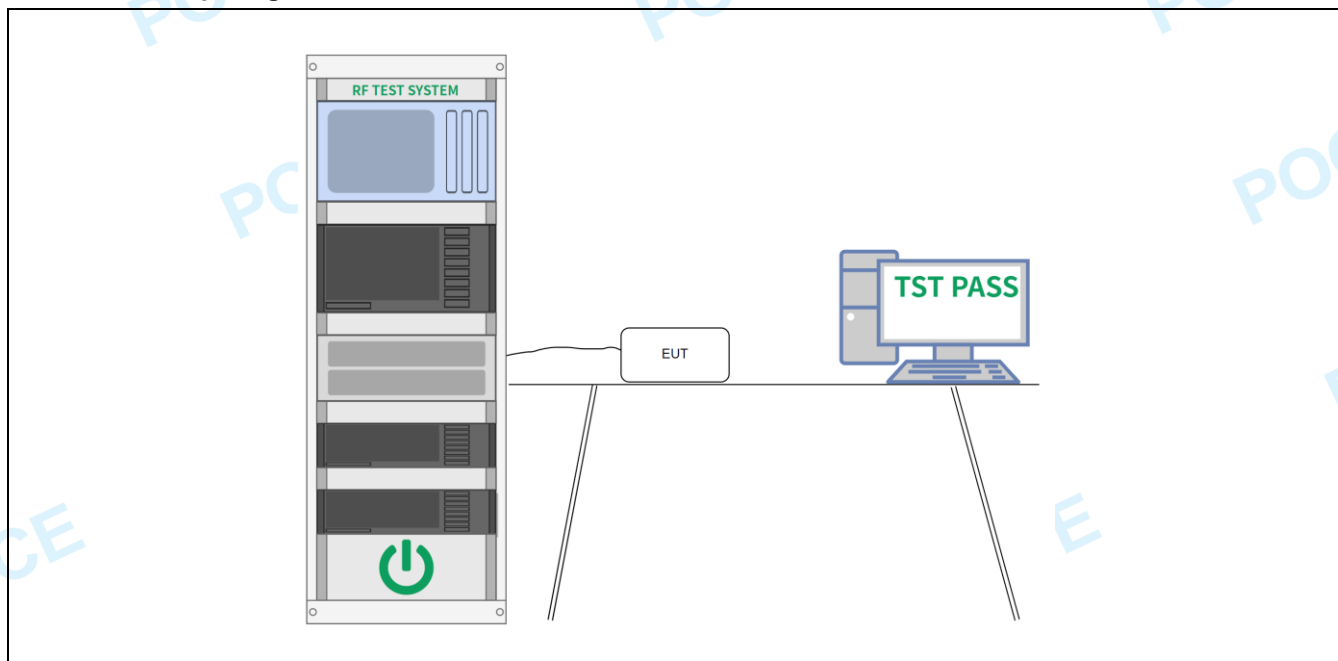
4.2 Occupied Bandwidth

Test Requirement:	47 CFR 15.215(c)
Test Limit:	Refer to 47 CFR 15.215(c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.
Test Method:	ANSI C63.10-2013, section 6.9.2
Procedure:	a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW. b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement. c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (OBW/RBW)]$ below the reference level. Specific guidance is given in 4.1.5.2. d) Steps a) through c) might require iteration to adjust within the specified tolerances. e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “-xx dB down” requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value. f) Set detection mode to peak and trace mode to max hold. g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value). h) Determine the “-xx dB down amplitude” using $[(\text{reference value}) - \text{xx}]$. Alternatively, this calculation may be made by using the marker-delta function of the instrument. i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j). j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-xx dB down amplitude” determined in step h). If a marker is below this “-xx dB down amplitude” value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the “-xx dB down amplitude” determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth. k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

4.2.1 E.U.T. Operation:

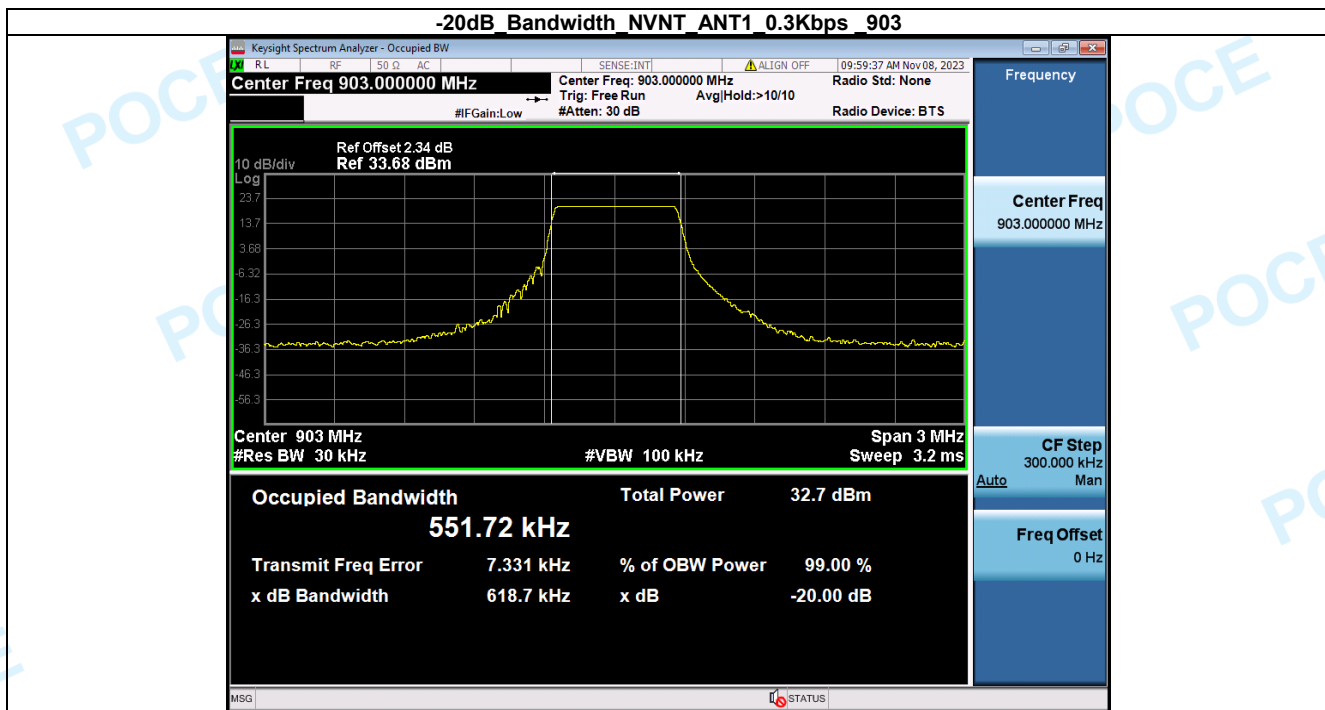
Operating Environment:					
Temperature:	23.7 °C	Humidity:	53.7 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM1, TM2, TM3				

4.2.2 Test Setup Diagram:

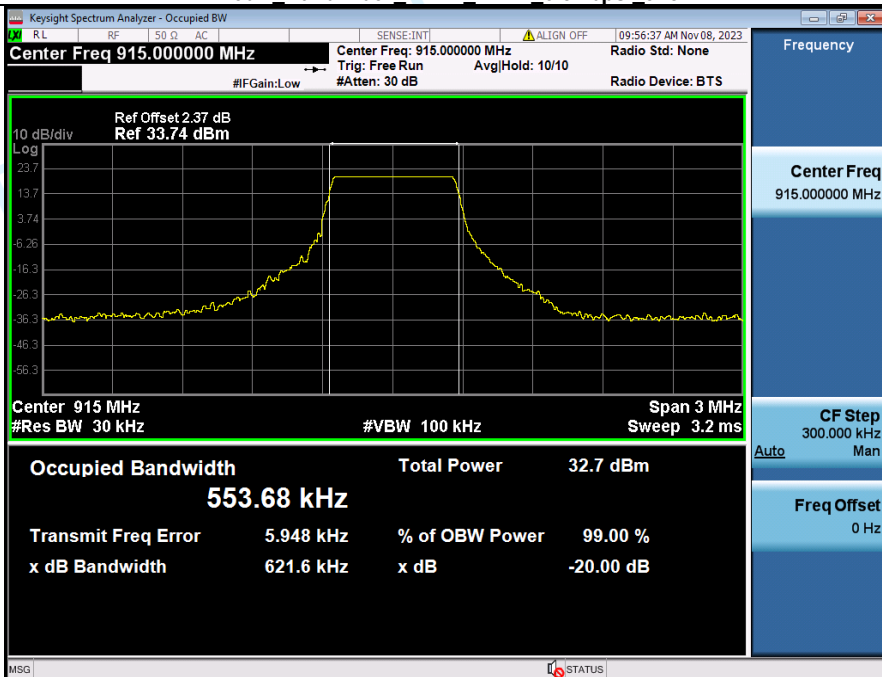


4.2.3 Test Data:

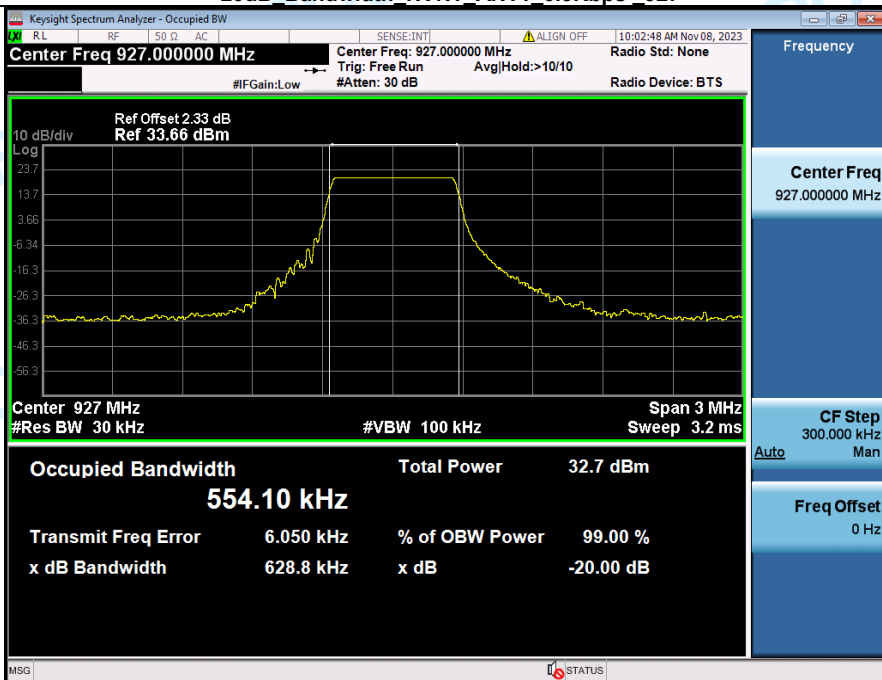
Condition	Antenna	Modulation	Rate	Frequency (MHz)	-20dB BW(MHz)
NVNT	ANT1	Lora	0.3Kbps	903.00	0.619
NVNT	ANT1	Lora	0.3Kbps	915.00	0.622
NVNT	ANT1	Lora	0.3Kbps	927.00	0.629



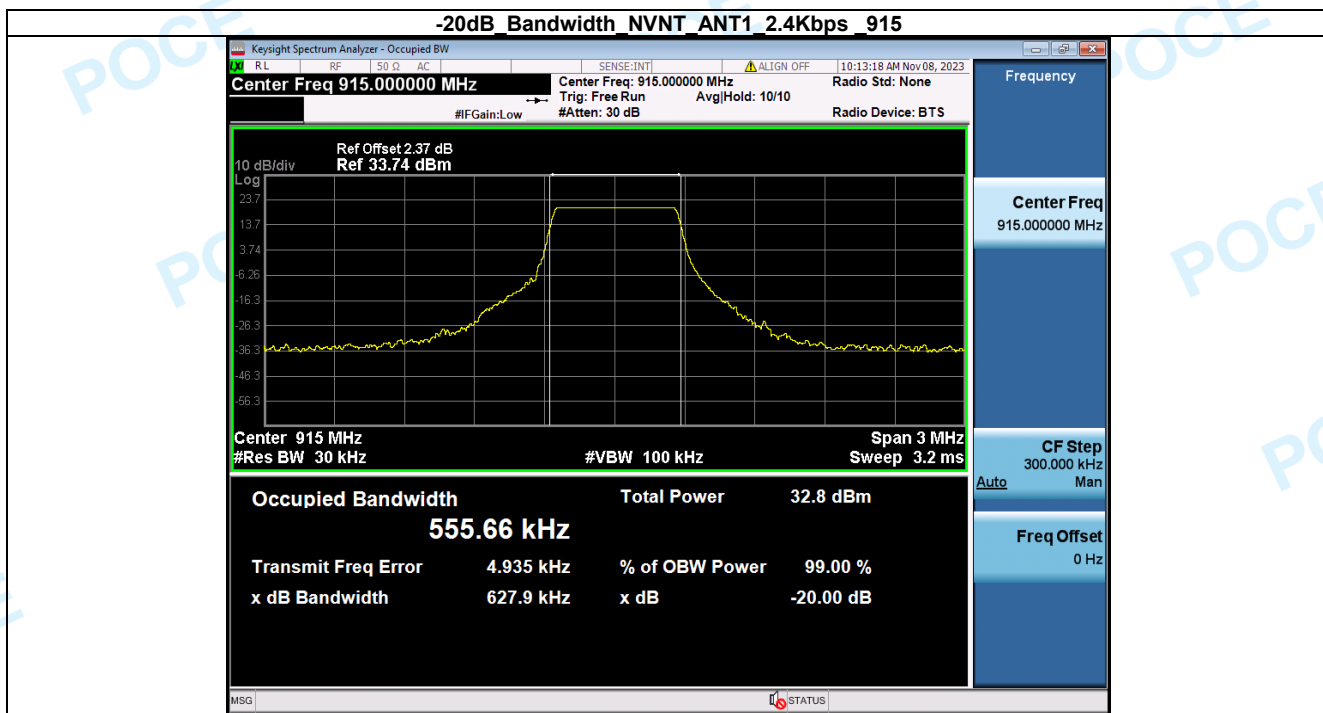
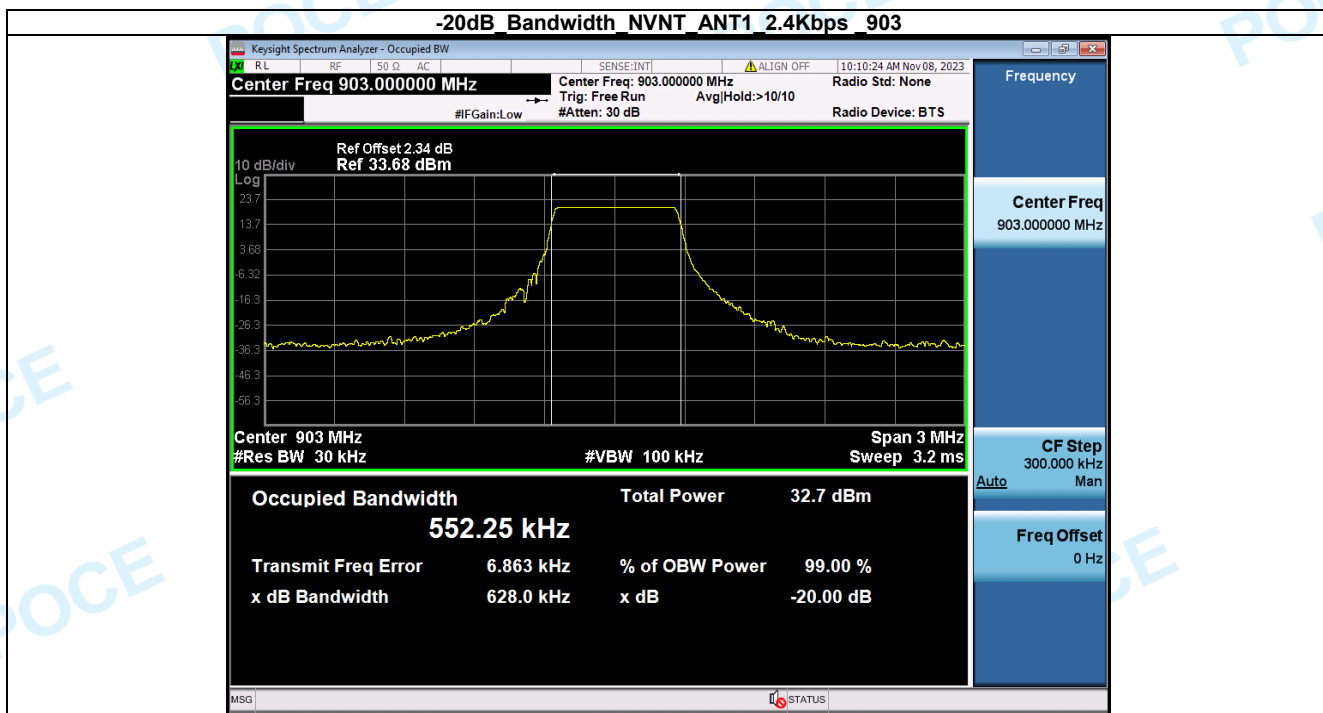
-20dB Bandwidth NVNT ANT1 0.3Kbps 915

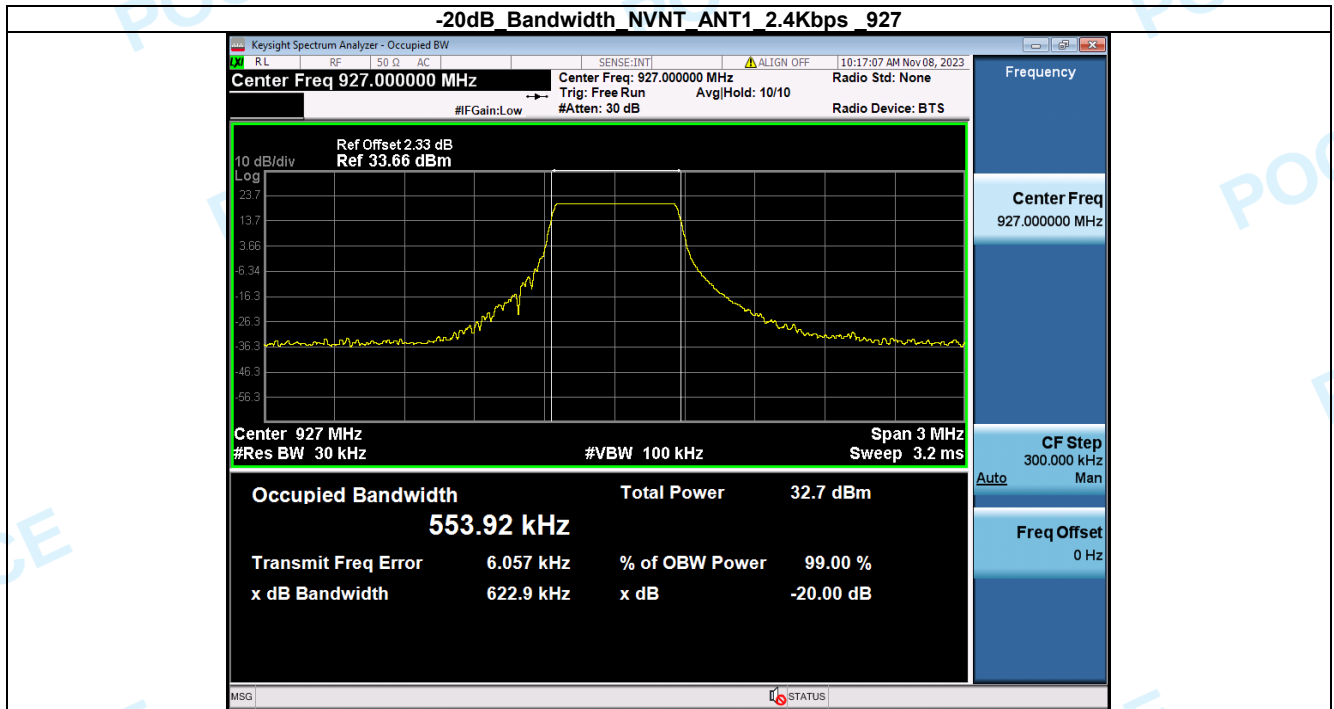


-20dB Bandwidth NVNT ANT1 0.3Kbps 927

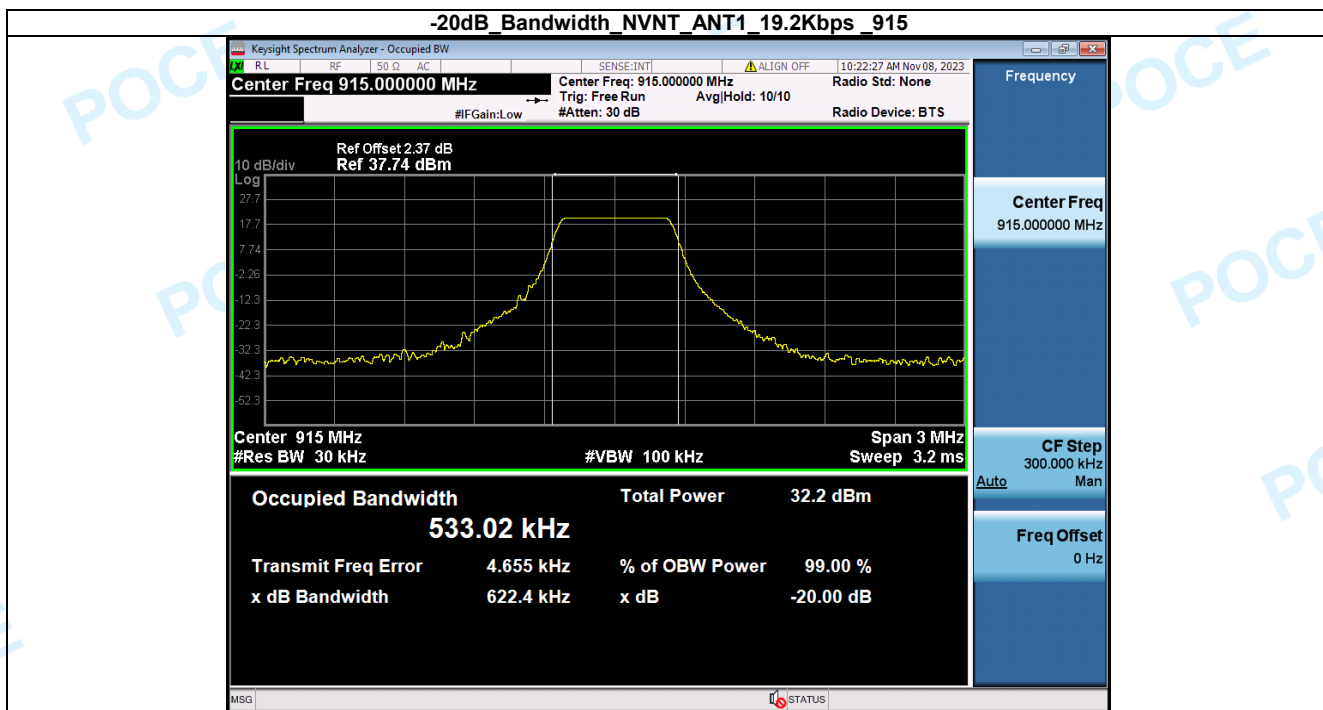
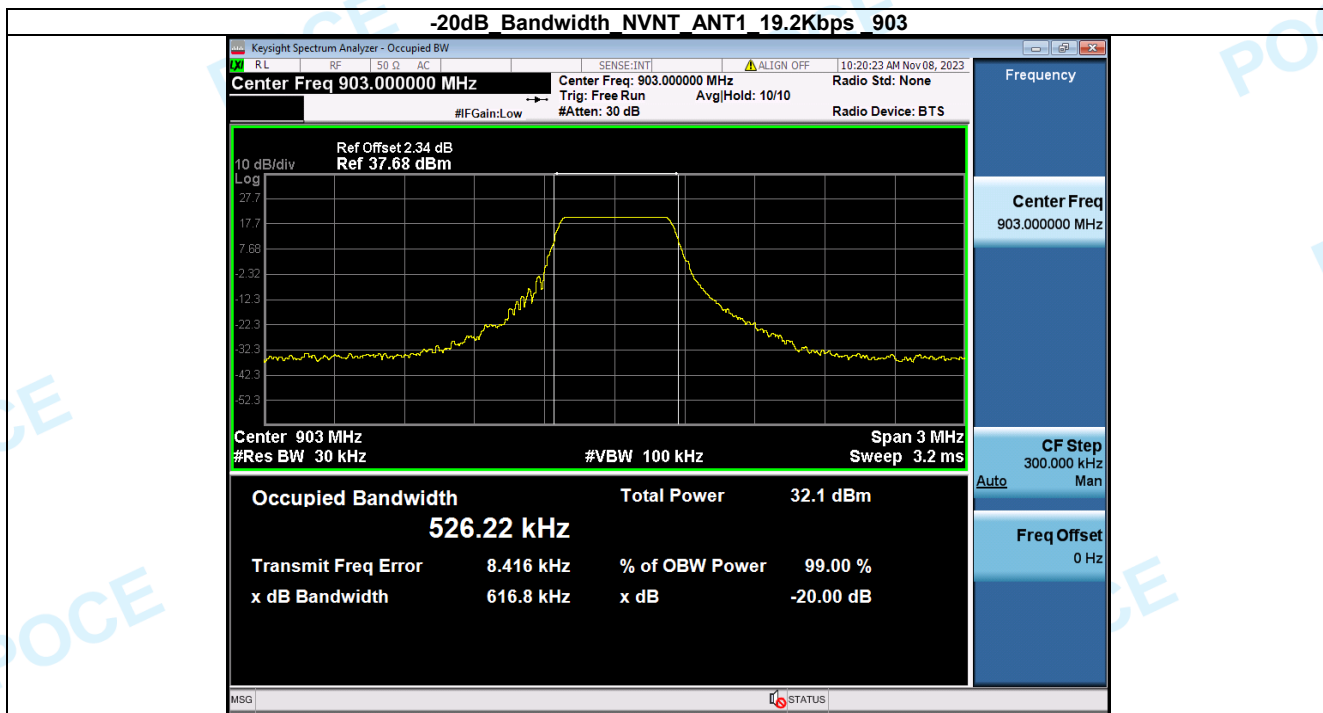


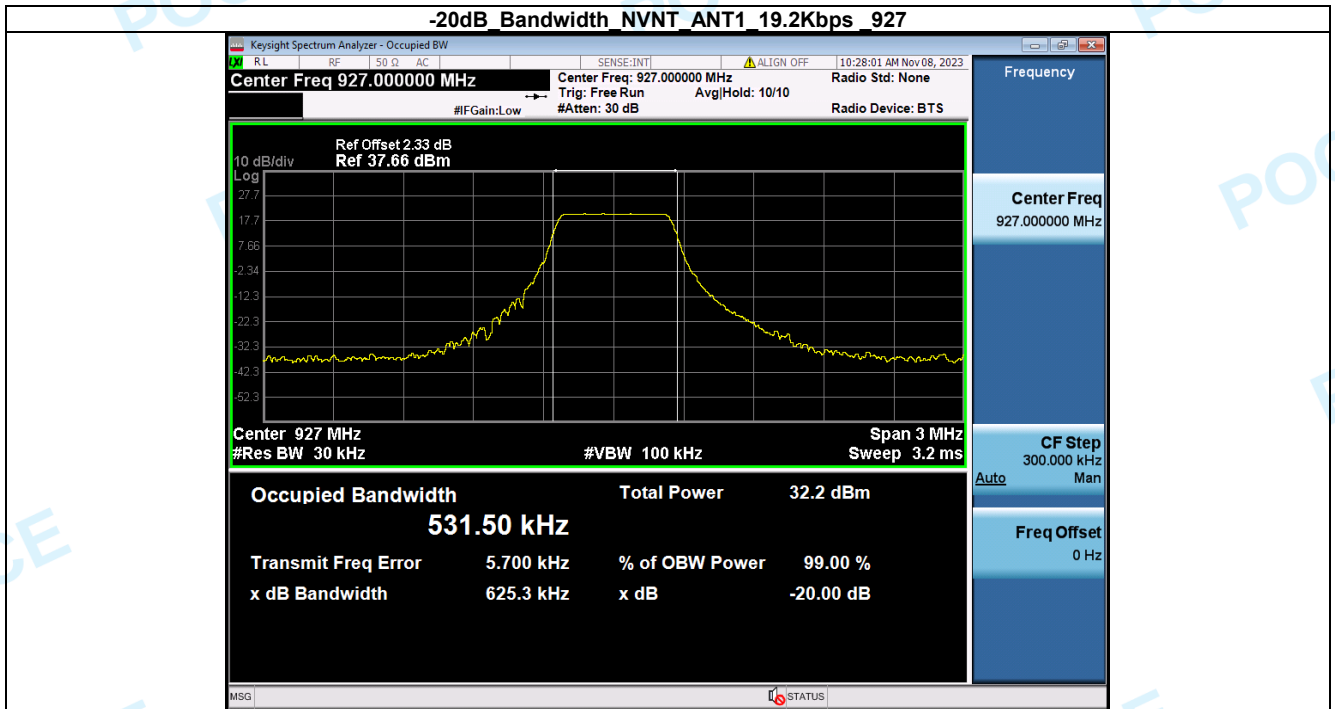
Condition	Antenna	Modulation	Rate	Frequency (MHz)	-20dB BW(MHz)
NVNT	ANT1	Lora	2.4Kbps	903.00	0.628
NVNT	ANT1	Lora	2.4Kbps	915.00	0.628
NVNT	ANT1	Lora	2.4Kbps	927.00	0.623





Condition	Antenna	Modulation	Rate	Frequency (MHz)	-20dB BW(MHz)
NVNT	ANT1	Lora	19.2Kbps	903.00	0.617
NVNT	ANT1	Lora	19.2Kbps	915.00	0.622
NVNT	ANT1	Lora	19.2Kbps	927.00	0.625





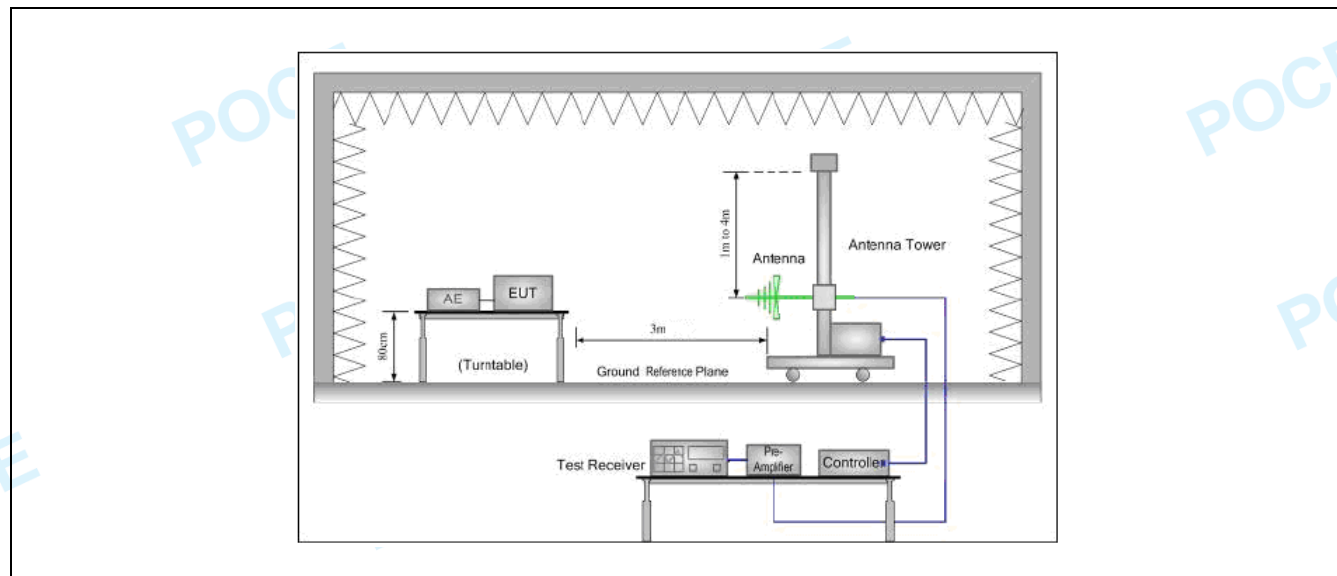
4.3 Field strength of fundamental

Test Requirement:	Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:		
	Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
	902-928 MHz	50	500
	2400-2483.5 MHz	50	500
	5725-5875 MHz	50	500
	24.0-24.25 GHz	250	2500
Test Limit:	Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:		
	Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
	902-928 MHz	50	500
	2400-2483.5 MHz	50	500
	5725-5875 MHz	50	500
	24.0-24.25 GHz	250	2500
Test Method:	ANSI C63.10-2013 section 6.5		
Procedure:	ANSI C63.10-2013 section 6.5		

4.3.1 E.U.T. Operation:

Operating Environment:			
Temperature:	23.7 °C	Humidity:	53.7 %
Pre test mode:	TM1, TM2, TM3		
Final test mode:	TM1, TM2, TM3		

4.3.2 Test Setup Diagram:



4.3.3 Test Data:

Frequency (MHz)	Rate	Emission Level (dBuV/m)	Limits (dBuV/m)	Over (dBuV/m)	Detector (PK/AV)	Polarization (H/V)
903	0.3Kbps	110.01	114	-3.99	PK	H
903	0.3Kbps	92.40	94	-1.60	QP	H
903	0.3Kbps	109.80	114	-4.2	PK	V
903	0.3Kbps	91.76	94	-2.24	QP	V
915	0.3Kbps	109.10	114	-4.9	PK	H
915	0.3Kbps	92.30	94	-1.7	QP	H
915	0.3Kbps	109.97	114	-4.03	PK	V
915	0.3Kbps	91.51	94	-2.49	QP	V
927	0.3Kbps	108.49	114	-5.51	PK	H
927	0.3Kbps	88.19	94	-5.81	QP	H
927	0.3Kbps	109.05	114	-4.95	PK	V
927	0.3Kbps	89.96	94	-4.04	QP	V

Frequency (MHz)	Rate	Emission Level (dBuV/m)	Limits (dBuV/m)	Over (dBuV/m)	Detector (PK/AV)	Polarization (H/V)
903	2.4Kbps	109.10	114	-4.90	PK	H
903	2.4Kbps	88.49	94	-5.51	QP	H
903	2.4Kbps	109.12	114	-4.88	PK	V
903	2.4Kbps	90.10	94	-3.90	QP	V
915	2.4Kbps	109.21	114	-4.79	PK	H
915	2.4Kbps	90.05	94	-3.95	QP	H
915	2.4Kbps	110.04	114	-3.96	PK	V
915	2.4Kbps	89.27	94	-4.73	QP	V
927	2.4Kbps	108.81	114	-5.19	PK	H
927	2.4Kbps	89.34	94	-4.66	QP	H
927	2.4Kbps	109.27	114	-4.73	PK	V
927	2.4Kbps	88.67	94	-5.33	QP	V

Frequency (MHz)	Rate	Emission Level (dBuV/m)	Limits (dBuV/m)	Over (dBuV/m)	Detector (PK/AV)	Polarization (H/V)
903	19.2Kbps	110.49	114	-3.51	PK	H
903	19.2Kbps	88.17	94	-5.83	QP	H
903	19.2Kbps	108.53	114	-5.47	PK	V
903	19.2Kbps	88.68	94	-5.32	QP	V
915	19.2Kbps	108.96	114	-5.04	PK	H
915	19.2Kbps	89.87	94	-4.13	QP	H
915	19.2Kbps	107.67	114	-6.33	PK	V
915	19.2Kbps	88.97	94	-5.03	QP	V
927	19.2Kbps	109.17	114	-4.83	PK	H
927	19.2Kbps	88.19	94	-5.81	QP	H
927	19.2Kbps	108.51	114	-5.49	PK	V
927	19.2Kbps	89.29	94	-4.71	QP	V

Remark: For fundamental frequency RBW >=20dB BW , VBW >=3xRBW

Over = Emission Level - Limit

Level=Test receiver reading + correction factor

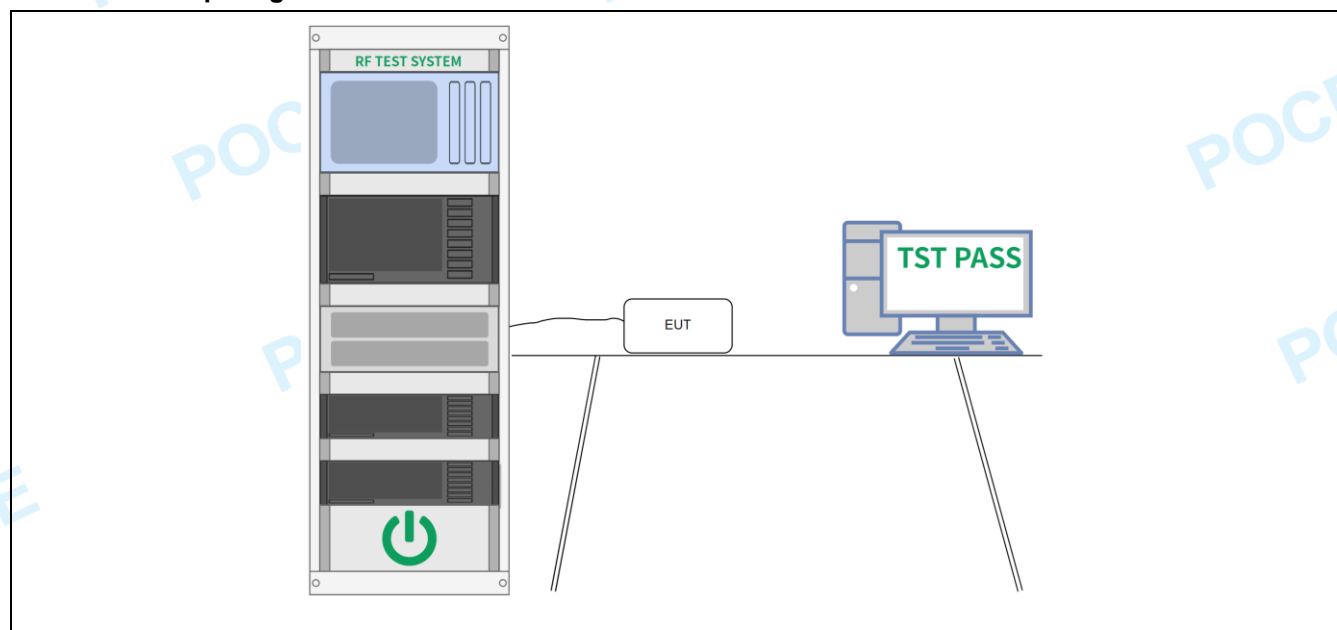
4.4 Band edge emissions (Radiated)

Test Requirement:	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.		
Test Limit:	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.		
	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
	0.009-0.490	2400/F(kHz)	300
	0.490-1.705	24000/F(kHz)	30
	1.705-30.0	30	30
	30-88	100 **	3
	88-216	150 **	3
	216-960	200 **	3
	Above 960	500	3
	** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.		
Test Method:	ANSI C63.10-2013 section 6.6.4		
Procedure:	ANSI C63.10-2013 section 6.6.4		

4.4.1 E.U.T. Operation:

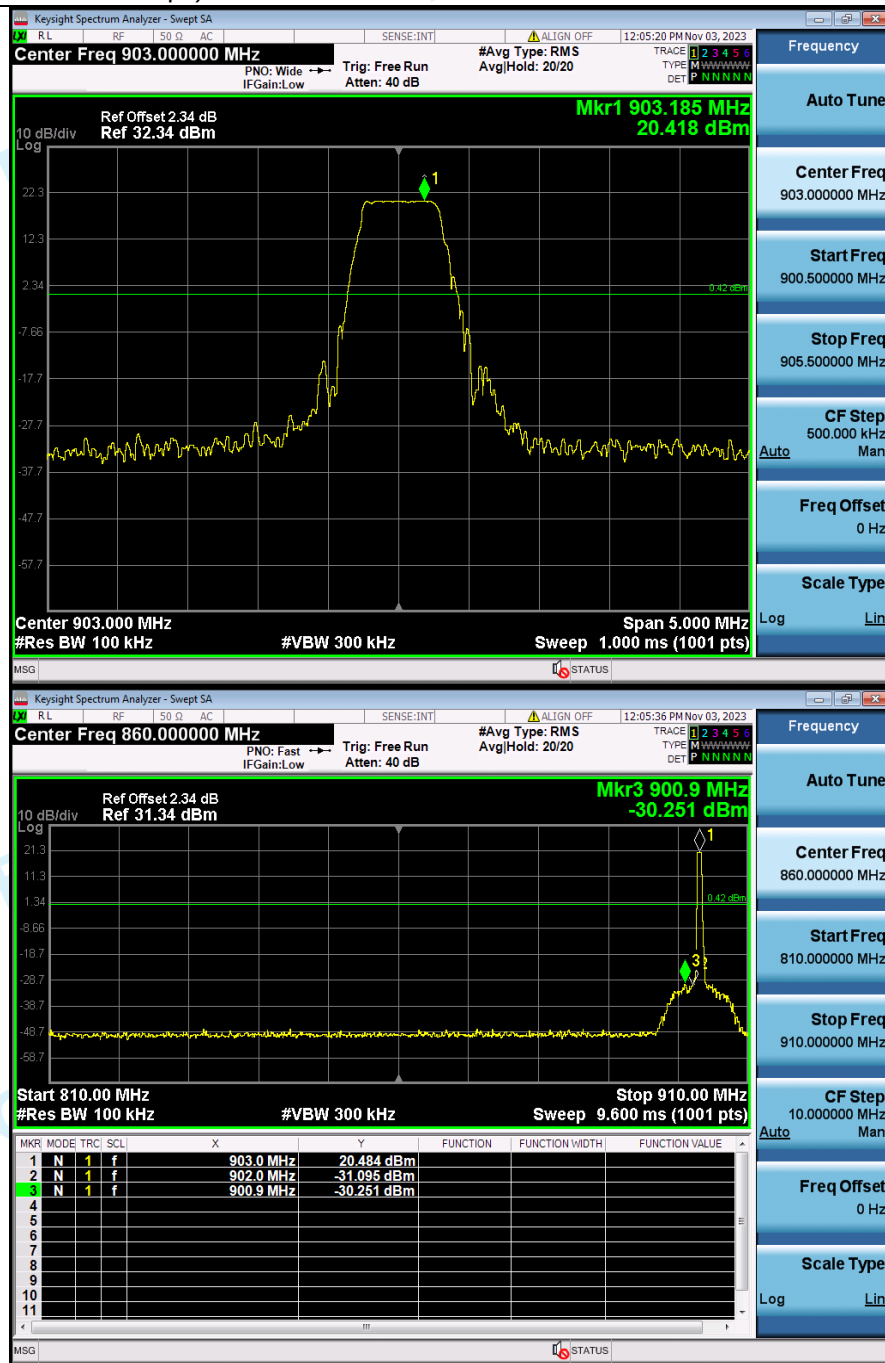
Operating Environment:					
Temperature:	23.7 °C	Humidity:	53.7 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM3 (worse case)				

4.4.2 Test Setup Diagram:

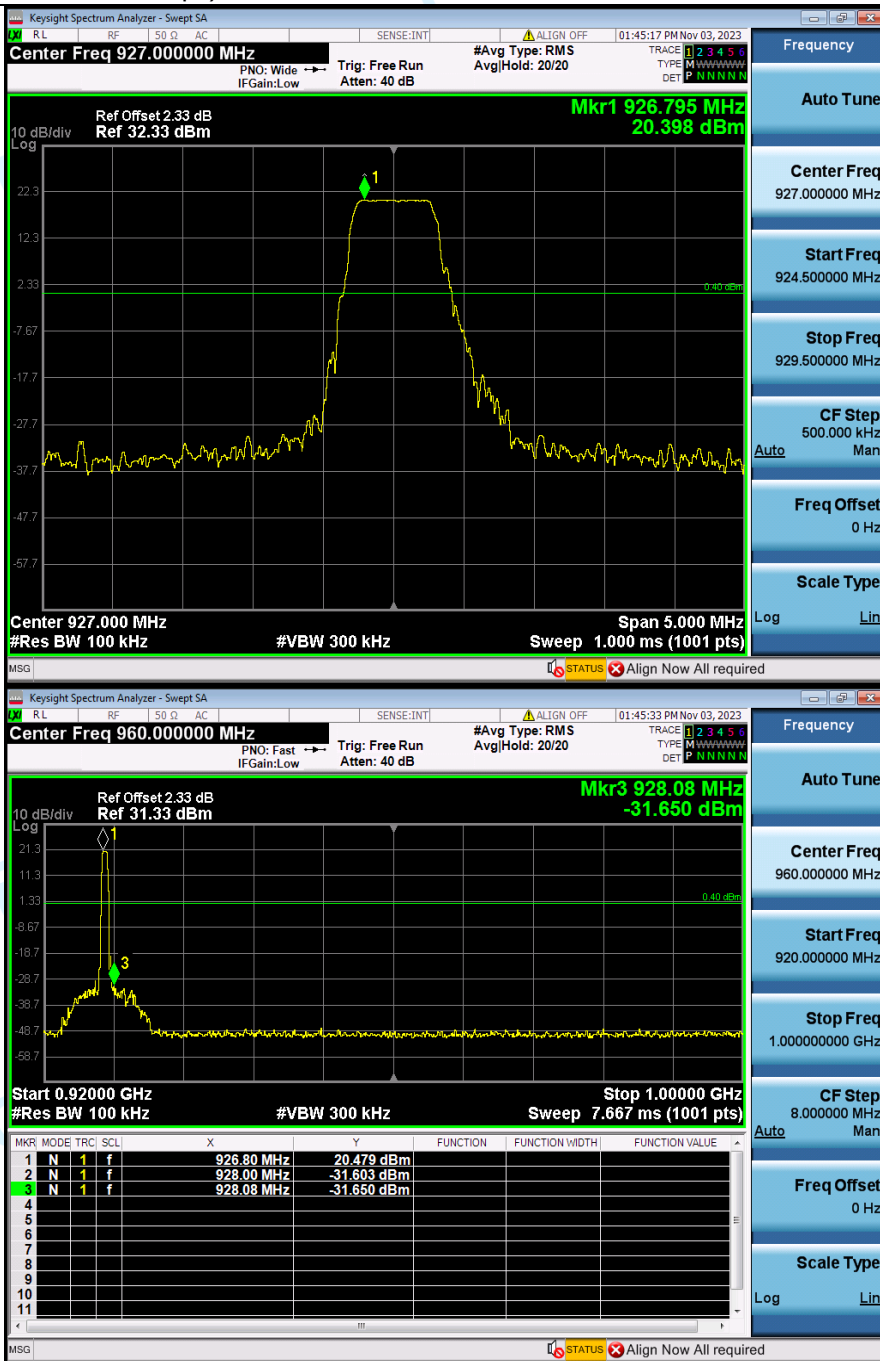


4.4.3 Test Data:

TM3 / CH: L (Data rate: 19.2Kbps)



TM3 / CH: H (Date rate: 19.2Kbps)



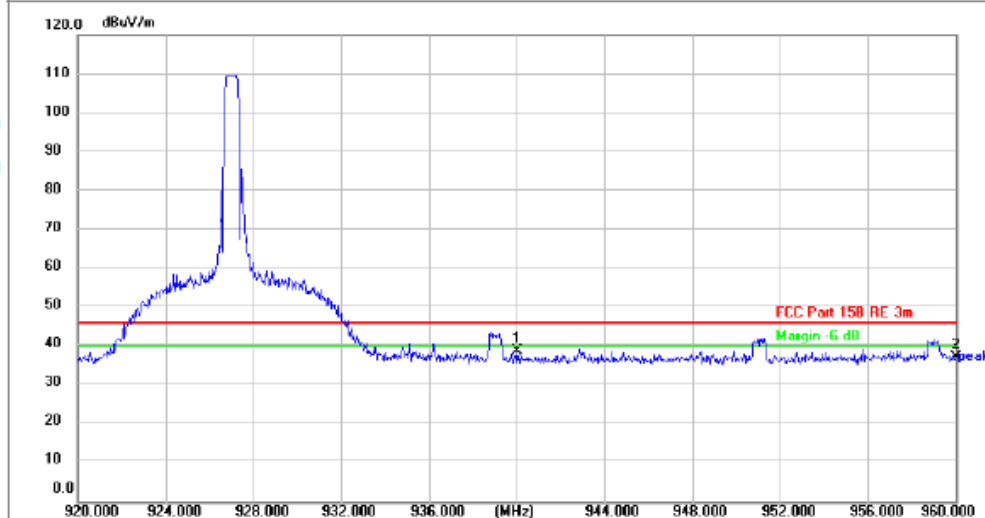
Restriction band

TM3 / Polarization: Horizontal / CH: H (Date rate: 19.2Kbps)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	940.0000	27.40	8.84	36.24	46.00	-9.76	peak			P	
2	960.0000	26.48	9.37	35.85	46.00	-10.15	peak			P	

TM3 / Polarization: Vertical/ CH: H (Date rate: 19.2Kbps)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	940.0000	30.10	8.80	38.90	46.00	-7.10	peak	100		P	
2	960.0000	28.12	9.33	37.45	46.00	-8.55	peak	100		P	

Remark: Margin = Measurement Level - Limit

Measurement Level=Test receiver reading + correction factor

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

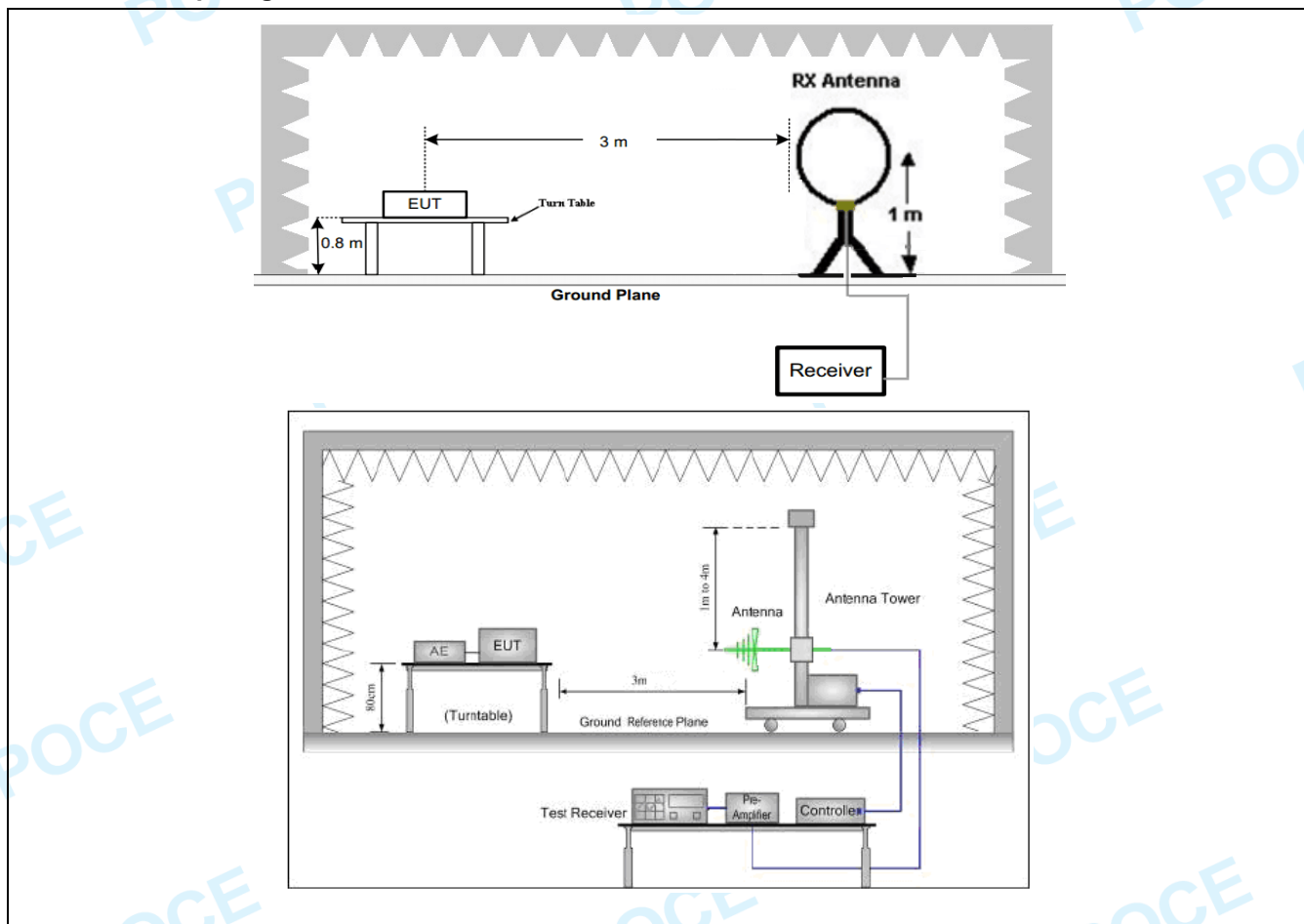
4.5 Emissions in frequency bands (below 1GHz)

Test Requirement:	47 CFR 15.249(a) 47 CFR 15.249(d) 47 CFR 15.249(e)																																									
Test Limit:	Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following: <table><tr><td>Fundamental frequency</td><td>Field strength of fundamental (millivolts/meter)</td><td>Field strength of harmonics (microvolts/meter)</td></tr><tr><td>902-928 MHz</td><td>50</td><td>500</td></tr><tr><td>2400-2483.5 MHz</td><td>50</td><td>500</td></tr><tr><td>5725-5875 MHz</td><td>50</td><td>500</td></tr><tr><td>24.0-24.25 GHz</td><td>250</td><td>2500</td></tr></table> Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation. <table><tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr><tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr><tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr><tr><td>1.705-30.0</td><td>30</td><td>30</td></tr><tr><td>30-88</td><td>100 **</td><td>3</td></tr><tr><td>88-216</td><td>150 **</td><td>3</td></tr><tr><td>216-960</td><td>200 **</td><td>3</td></tr><tr><td>Above 960</td><td>500</td><td>3</td></tr></table> ** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.			Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)	902-928 MHz	50	500	2400-2483.5 MHz	50	500	5725-5875 MHz	50	500	24.0-24.25 GHz	250	2500	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	0.009-0.490	2400/F(kHz)	300	0.490-1.705	24000/F(kHz)	30	1.705-30.0	30	30	30-88	100 **	3	88-216	150 **	3	216-960	200 **	3	Above 960	500	3
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)																																								
902-928 MHz	50	500																																								
2400-2483.5 MHz	50	500																																								
5725-5875 MHz	50	500																																								
24.0-24.25 GHz	250	2500																																								
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)																																								
0.009-0.490	2400/F(kHz)	300																																								
0.490-1.705	24000/F(kHz)	30																																								
1.705-30.0	30	30																																								
30-88	100 **	3																																								
88-216	150 **	3																																								
216-960	200 **	3																																								
Above 960	500	3																																								
Test Method:	ANSI C63.10-2013 section 6.5																																									
Procedure:	ANSI C63.10-2013 section 6.5																																									

4.5.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.7 °C	Humidity:	53.7 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM3 (worse case)				

4.5.2 Test Setup Diagram:



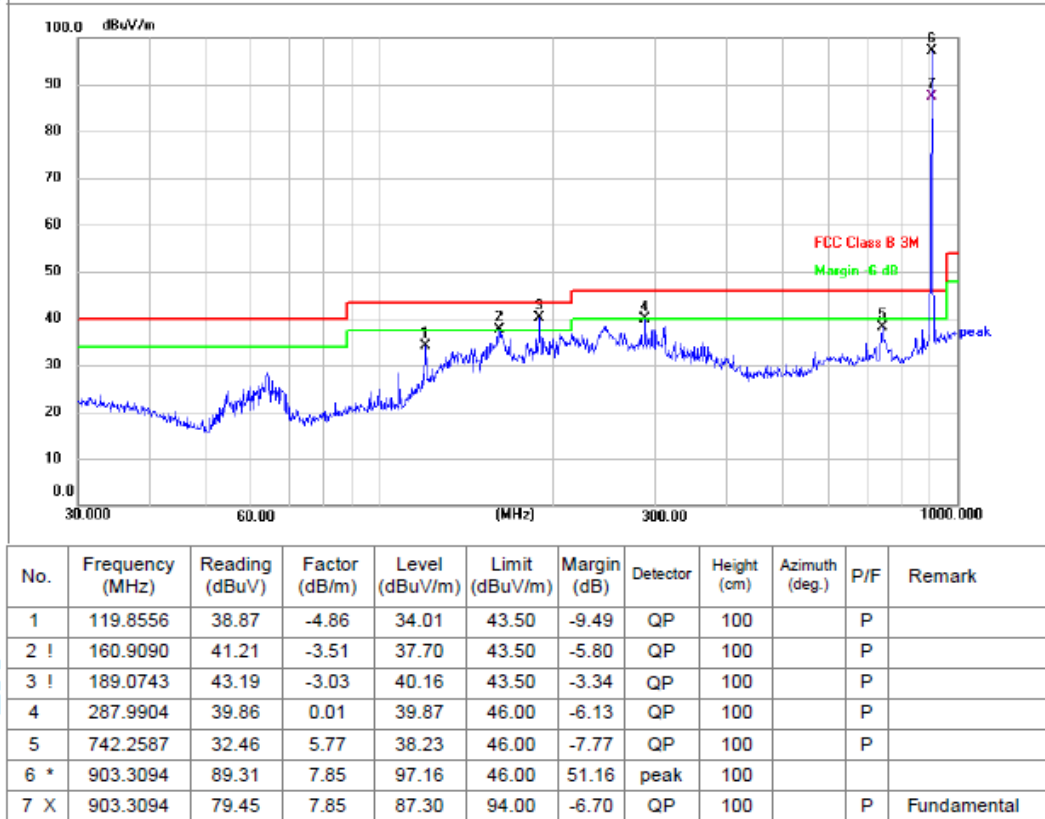
4.5.3 Test Data:

Between 9KHz – 30MHz

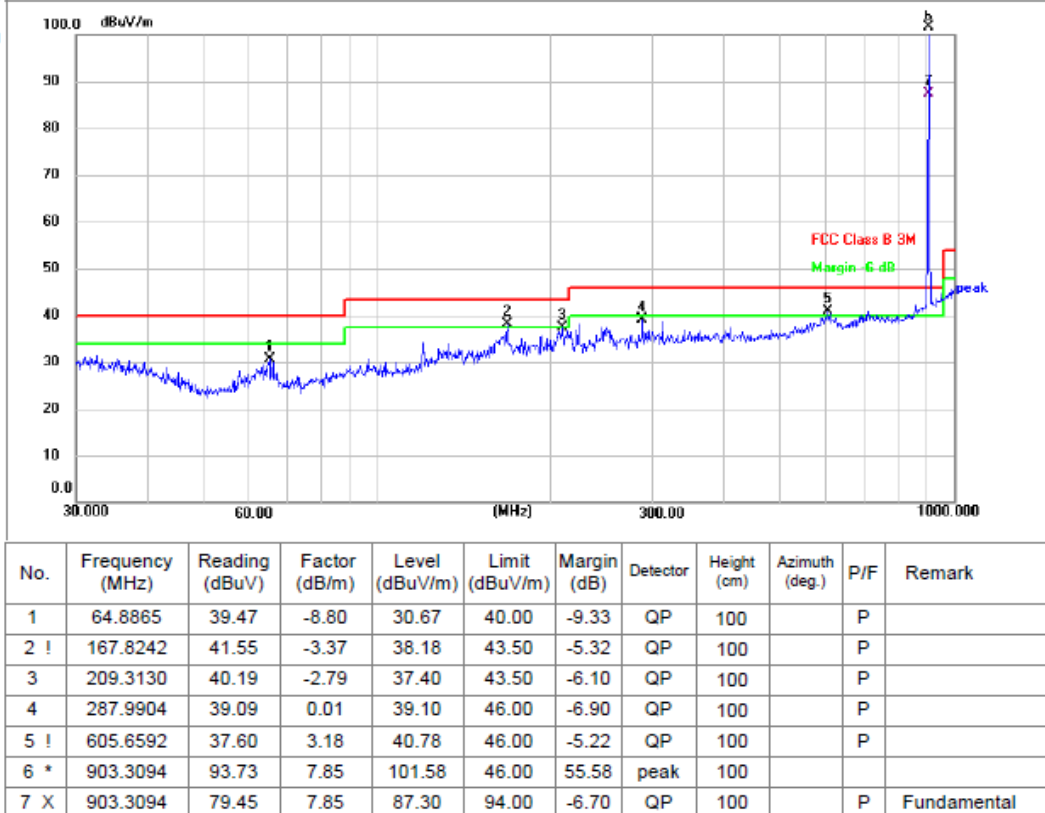
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

Between 30MHz – 1000MHz (Data rate: 19.2Kbps)

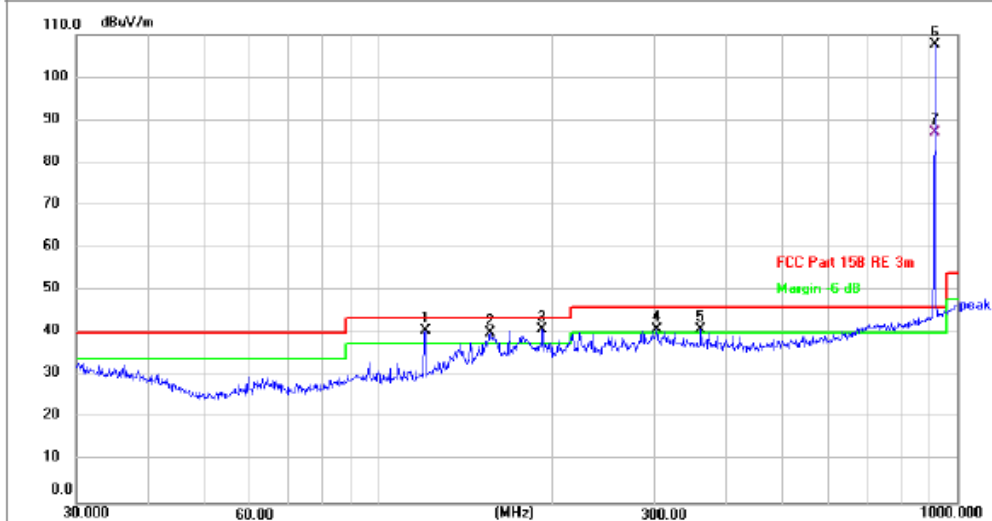
TM3 / Polarization: Horizontal / CH: L



TM3 / Polarization: Vertical / CH: L

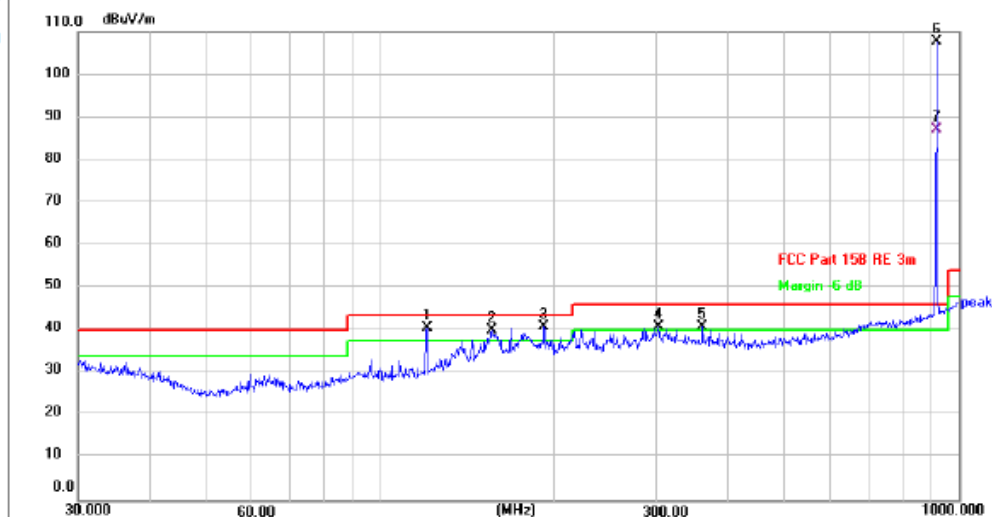


TM3 / Polarization: Horizontal / CH: M



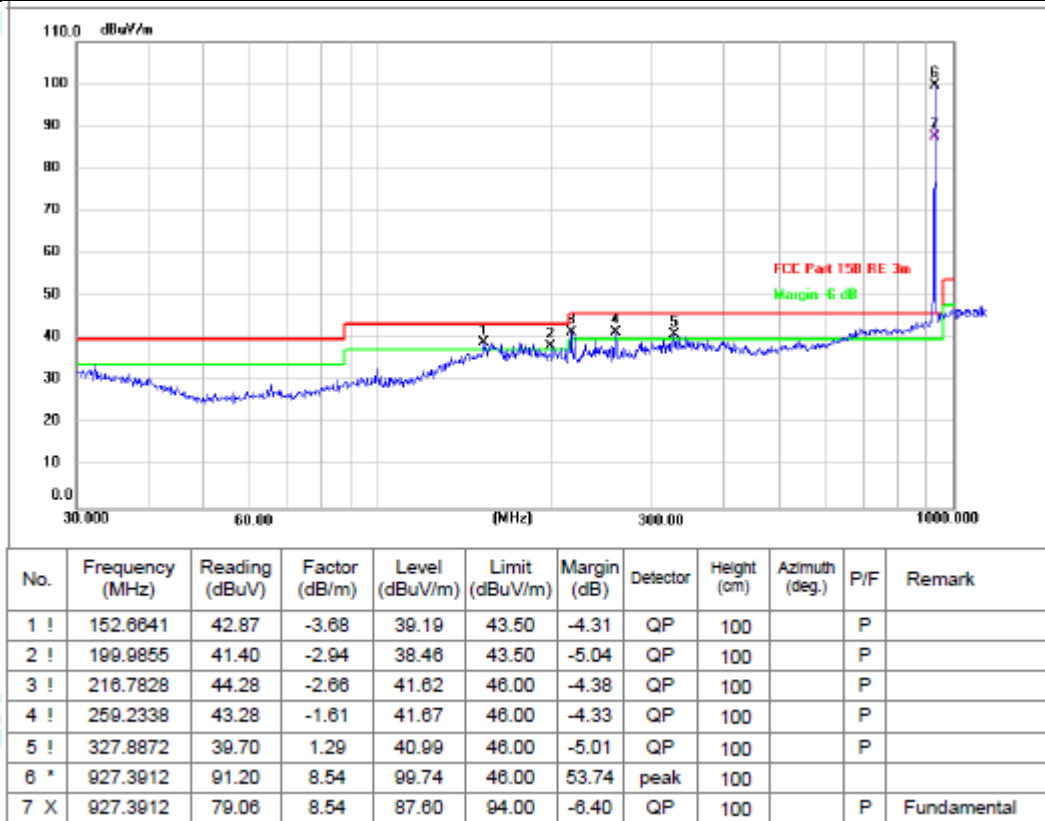
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 !	120.2766	45.28	-4.85	40.43	43.50	-3.07	QP	100		P	
2 !	155.9101	43.59	-3.62	39.97	43.50	-3.53	QP	100		P	
3 !	191.7450	43.79	-3.01	40.78	43.50	-2.72	QP	100		P	
4 !	302.4811	40.08	0.74	40.82	46.00	-5.18	QP	100		P	
5 !	360.4476	39.20	1.68	40.88	46.00	-5.12	QP	100		P	
6 *	916.0687	99.55	8.19	107.74	46.00	61.74	peak	100			
7 X	916.0687	78.81	8.19	87.00	94.00	-7.00	QP	100		P	Fundamental

TM3 / Polarization: Vertical / CH: M

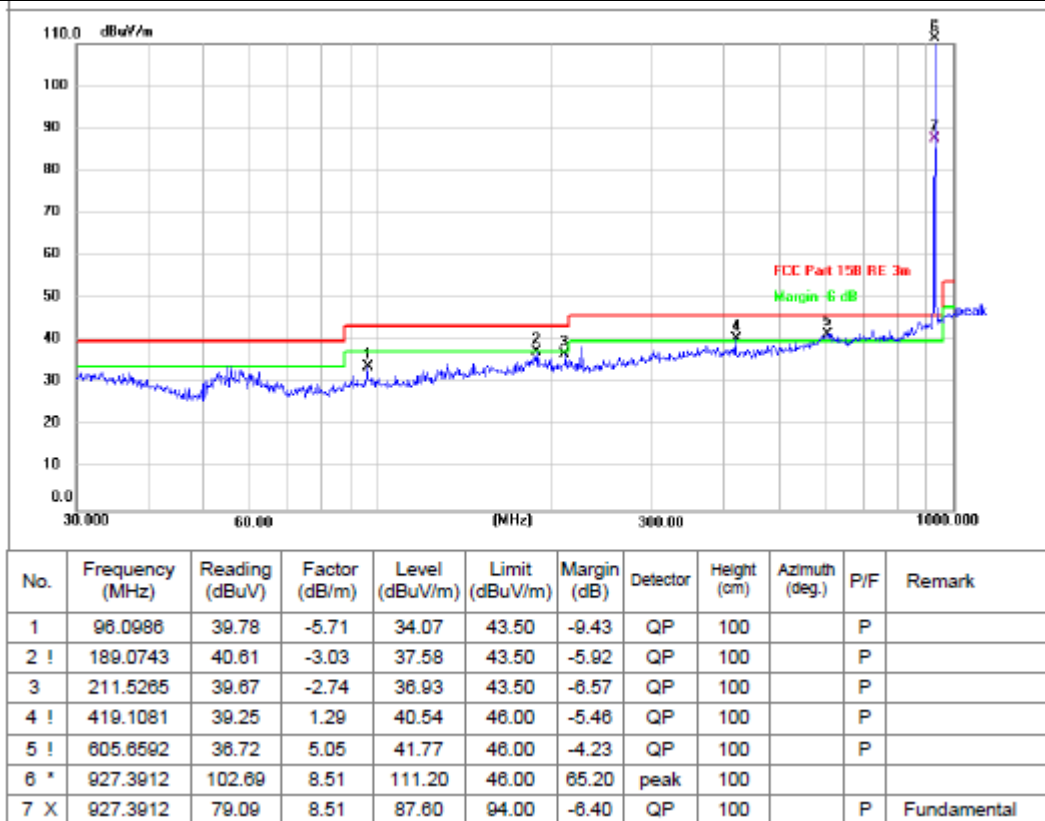


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 !	120.2766	45.28	-4.85	40.43	43.50	-3.07	QP	100		P	
2 !	155.9101	43.59	-3.62	39.97	43.50	-3.53	QP	100		P	
3 !	191.7450	43.79	-3.01	40.78	43.50	-2.72	QP	100		P	
4 !	302.4811	40.08	0.74	40.82	46.00	-5.18	QP	100		P	
5 !	360.4476	39.20	1.68	40.88	46.00	-5.12	QP	100		P	
6 *	916.0687	99.55	8.19	107.74	46.00	61.74	peak	100			
7 X	916.0687	78.81	8.19	87.00	94.00	-7.00	QP	100		P	Fundamental

TM3 / Polarization: Horizontal / CH:H



TM3 / Polarization: Vertical / CH: H



Remark: Over= Measurement Level - Limit

Measurement Level=Test receiver reading + correction factor

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

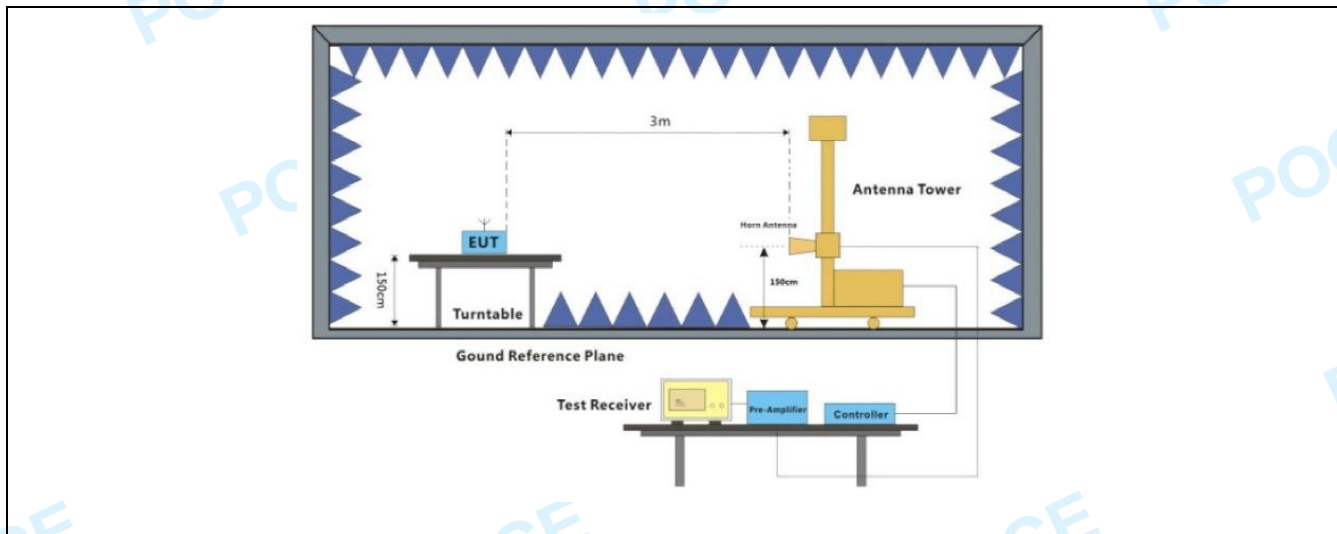
4.6 Emissions in frequency bands (above 1GHz)

Test Requirement:	47 CFR 15.249(a) 47 CFR 15.249(d) 47 CFR 15.249(e)																																								
Test Limit:	Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following: <table border="1"> <thead> <tr> <th>Fundamental frequency</th><th>Field strength of fundamental (millivolts/meter)</th><th>Field strength of harmonics (microvolts/meter)</th></tr> </thead> <tbody> <tr> <td>902-928 MHz</td><td>50</td><td>500</td></tr> <tr> <td>2400-2483.5 MHz</td><td>50</td><td>500</td></tr> <tr> <td>5725-5875 MHz</td><td>50</td><td>500</td></tr> <tr> <td>24.0-24.25 GHz</td><td>250</td><td>2500</td></tr> </tbody> </table> Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation. <table border="1"> <thead> <tr> <th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr> </thead> <tbody> <tr> <td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr> <tr> <td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr> <tr> <td>1.705-30.0</td><td>30</td><td>30</td></tr> <tr> <td>30-88</td><td>100 **</td><td>3</td></tr> <tr> <td>88-216</td><td>150 **</td><td>3</td></tr> <tr> <td>216-960</td><td>200 **</td><td>3</td></tr> <tr> <td>Above 960</td><td>500</td><td>3</td></tr> </tbody> </table> ** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241. As shown in § 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.		Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)	902-928 MHz	50	500	2400-2483.5 MHz	50	500	5725-5875 MHz	50	500	24.0-24.25 GHz	250	2500	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	0.009-0.490	2400/F(kHz)	300	0.490-1.705	24000/F(kHz)	30	1.705-30.0	30	30	30-88	100 **	3	88-216	150 **	3	216-960	200 **	3	Above 960	500	3
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)																																							
902-928 MHz	50	500																																							
2400-2483.5 MHz	50	500																																							
5725-5875 MHz	50	500																																							
24.0-24.25 GHz	250	2500																																							
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)																																							
0.009-0.490	2400/F(kHz)	300																																							
0.490-1.705	24000/F(kHz)	30																																							
1.705-30.0	30	30																																							
30-88	100 **	3																																							
88-216	150 **	3																																							
216-960	200 **	3																																							
Above 960	500	3																																							
Test Method:	ANSI C63.10-2013 section 6.6																																								
Procedure:	ANSI C63.10-2013 section 6.6																																								

4.6.1 E.U.T. Operation:

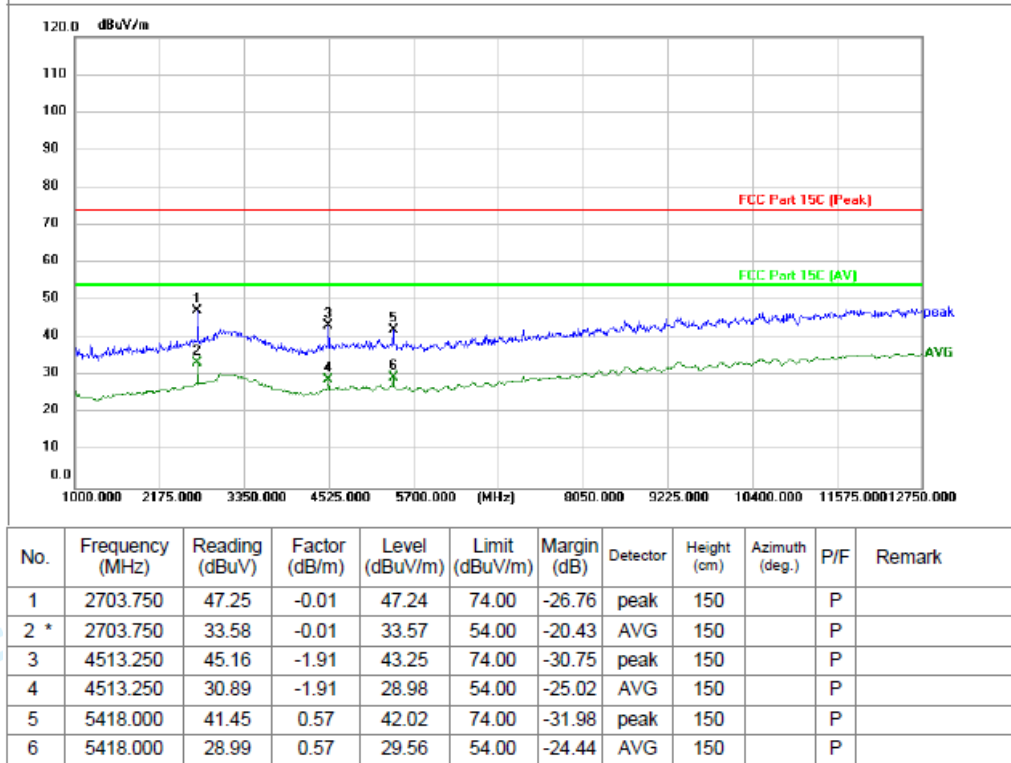
Operating Environment:					
Temperature:	23.7 °C	Humidity:	53.7 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM3 (worse case)				

4.6.2 Test Setup Diagram:

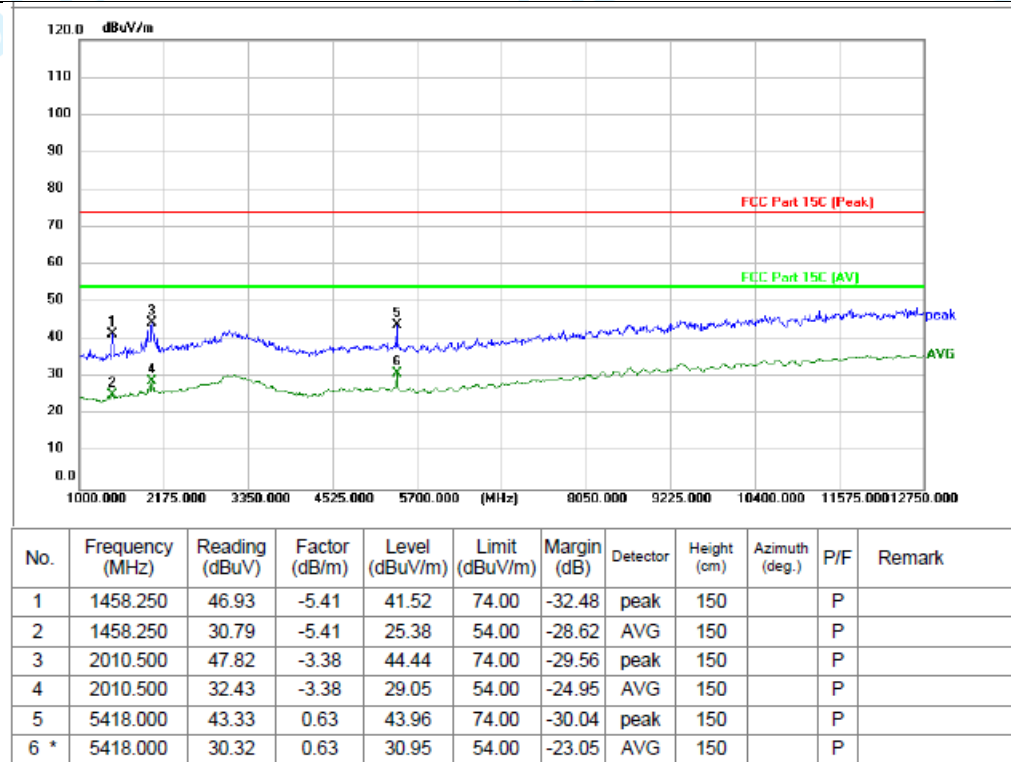


4.6.3 Test Data:

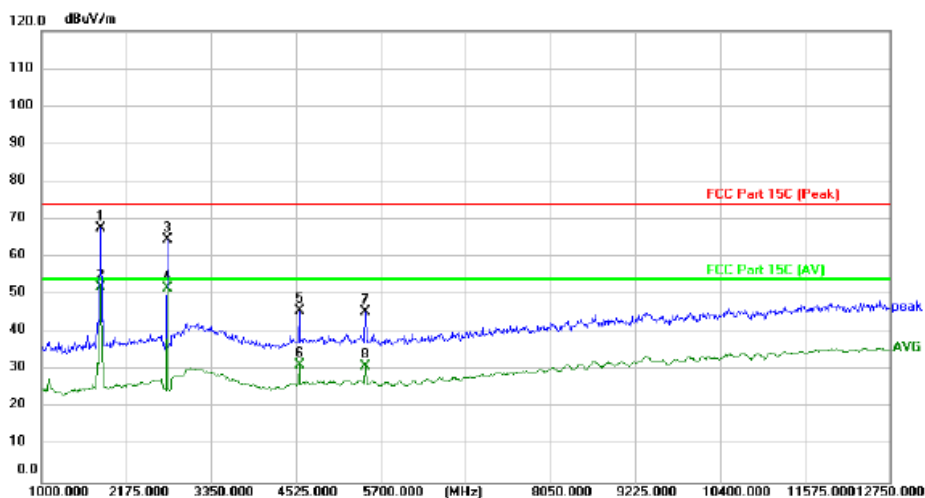
TM3 / Polarization: Horizontal / CH: L (Date rate: 19.2Kbps)



TM3 / Polarization: Vertical / CH: L (Date rate: 19.2Kbps)

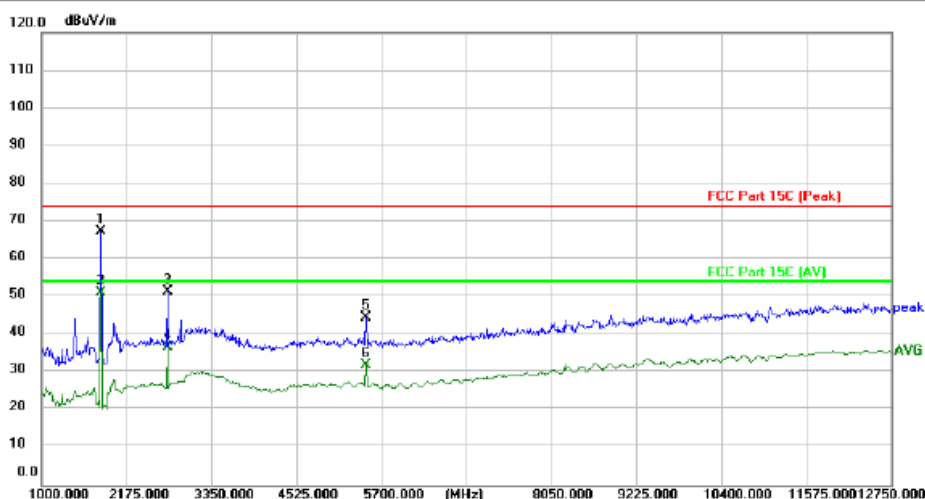


TM3 / Polarization: Horizontal / CH: M (Date rate: 19.2Kbps)



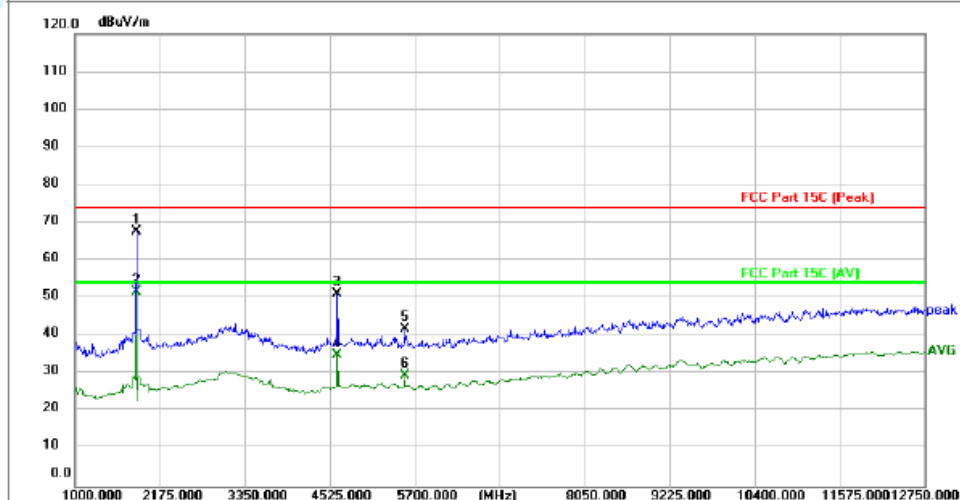
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1822.500	69.94	-2.27	67.67	74.00	-6.33	peak			P	
2 *	1822.500	54.27	-2.27	52.00	54.00	-2.00	AVG			P	
3	2739.000	64.71	0.07	64.78	74.00	-9.22	peak			P	
4	2739.000	51.77	0.07	51.84	54.00	-2.16	AVG			P	
5	4572.000	47.33	-1.70	45.63	74.00	-28.37	peak			P	
6	4572.000	33.14	-1.70	31.44	54.00	-22.56	AVG			P	
7	5488.500	44.70	0.70	45.40	74.00	-28.60	peak	150		P	
8	5488.500	30.36	0.70	31.06	54.00	-22.94	AVG	150		P	

TM3 / Polarization: Vertical / CH: M (Date rate: 19.2Kbps)



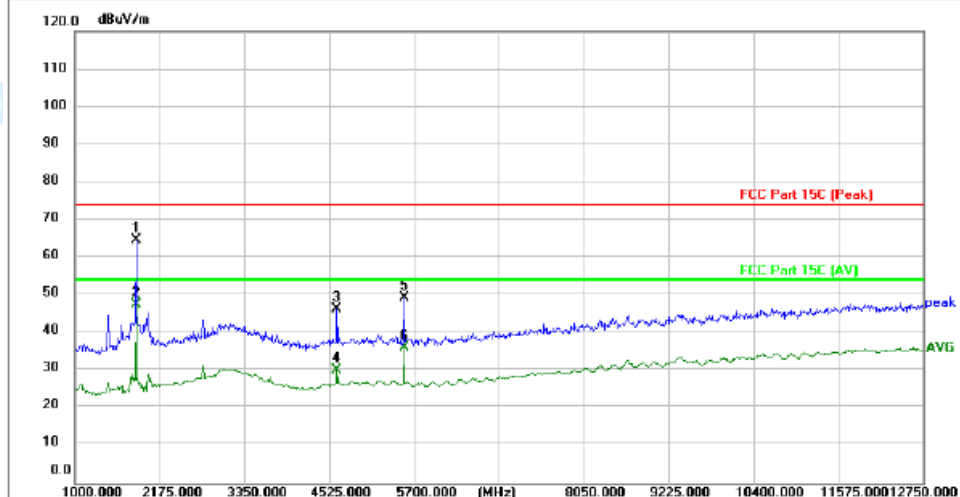
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1822.500	71.29	-4.08	67.21	74.00	-6.79	peak			P	
2 *	1822.500	55.24	-4.08	51.16	54.00	-2.84	AVG			P	
3	2739.000	52.01	-0.43	51.58	74.00	-22.42	peak			P	
4	2739.000	37.17	-0.43	36.74	54.00	-17.26	AVG			P	
5	5488.500	43.95	0.67	44.62	74.00	-29.38	peak			P	
6	5488.500	31.32	0.67	31.99	54.00	-22.01	AVG			P	

TM3 / Polarization: Horizontal / CH: H (Date rate: 19.2Kbps)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1846.000	69.88	-2.19	67.69	74.00	-6.31	peak			P	
2 *	1846.000	53.84	-2.19	51.65	54.00	-2.35	AVG			P	
3	4630.750	52.74	-1.49	51.25	74.00	-22.75	peak			P	
4	4630.750	36.44	-1.49	34.95	54.00	-19.05	AVG			P	
5	5559.000	41.20	0.79	41.99	74.00	-32.01	peak	150		P	
6	5559.000	28.82	0.79	29.61	54.00	-24.39	AVG	150		P	

TM3 / Polarization: Vertical / CH: H (Date rate: 19.2Kbps)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1846.000	68.65	-3.98	64.67	74.00	-9.33	peak			P	
2 *	1846.000	51.61	-3.98	47.63	54.00	-6.37	AVG			P	
3	4630.750	47.09	-0.86	46.23	74.00	-27.77	peak			P	
4	4630.750	31.10	-0.86	30.24	54.00	-23.76	AVG	150		P	
5	5559.000	48.58	0.71	49.29	74.00	-24.71	peak	150		P	
6	5559.000	35.54	0.71	36.25	54.00	-17.75	AVG	150		P	

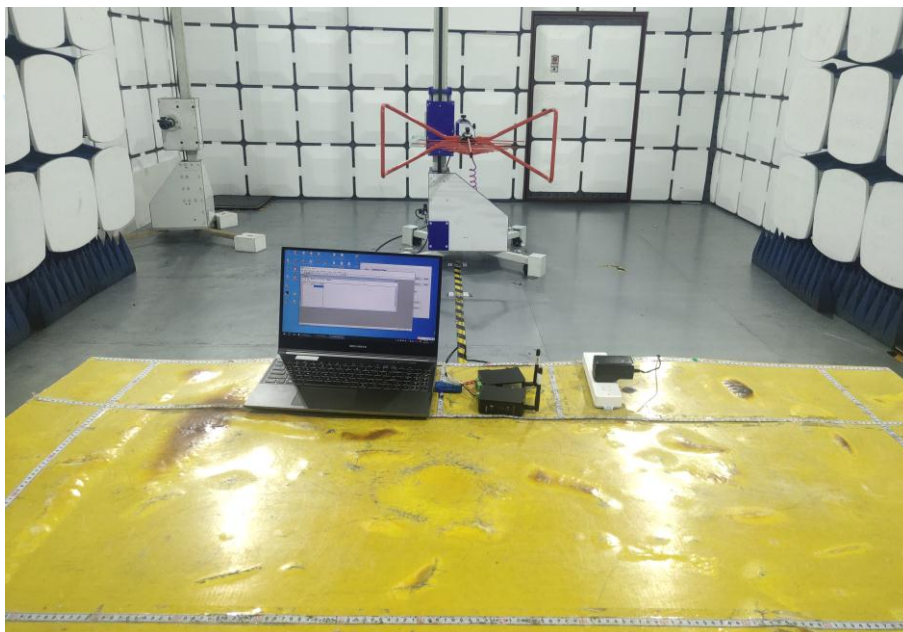
Remark: Margin = Limit – Level

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

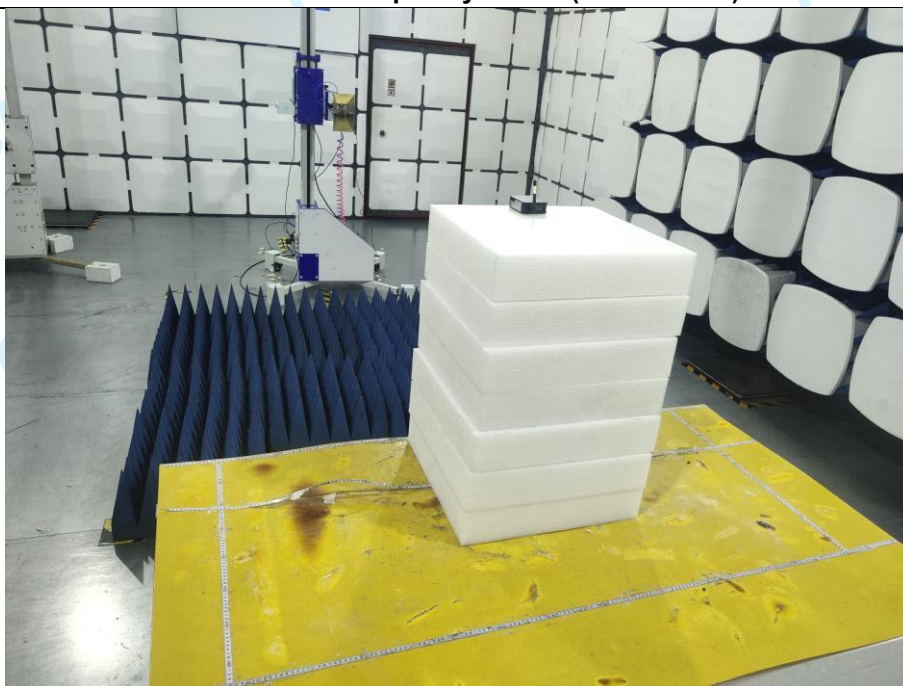
Level=Test receiver reading + correction factor

5 TEST SETUP PHOTOS

Emissions in frequency bands (below 1GHz)



Emissions in frequency bands (above 1GHz)



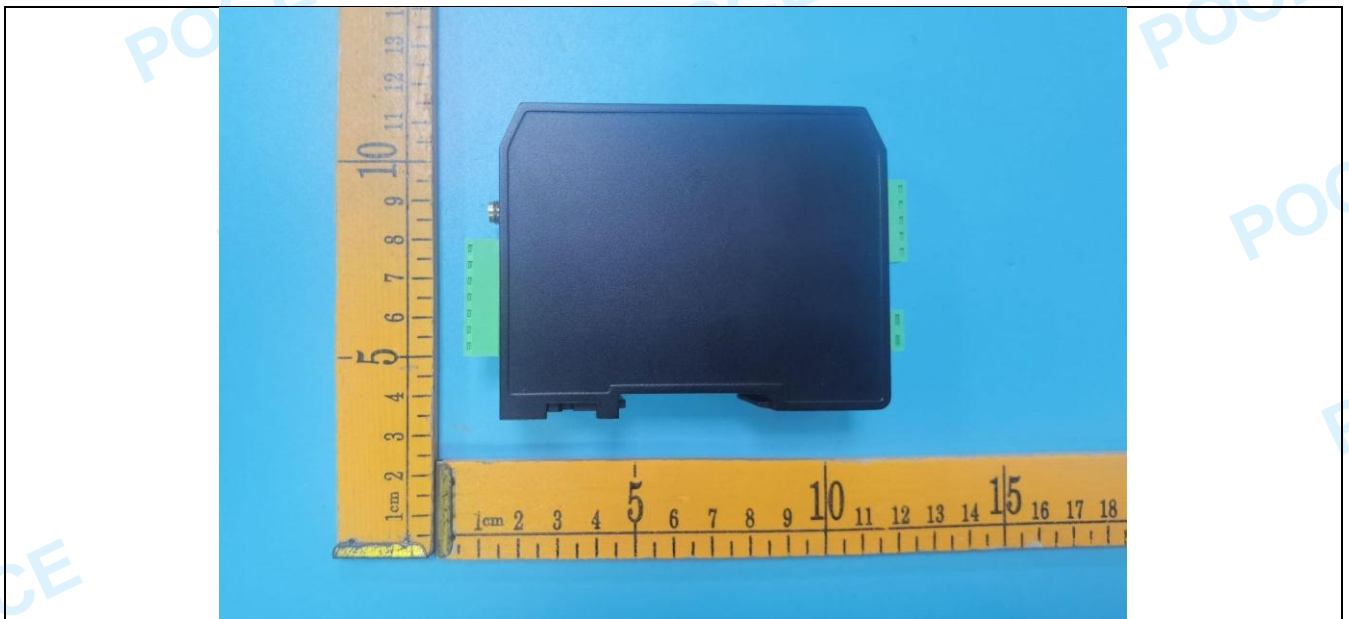
Conducted Emission

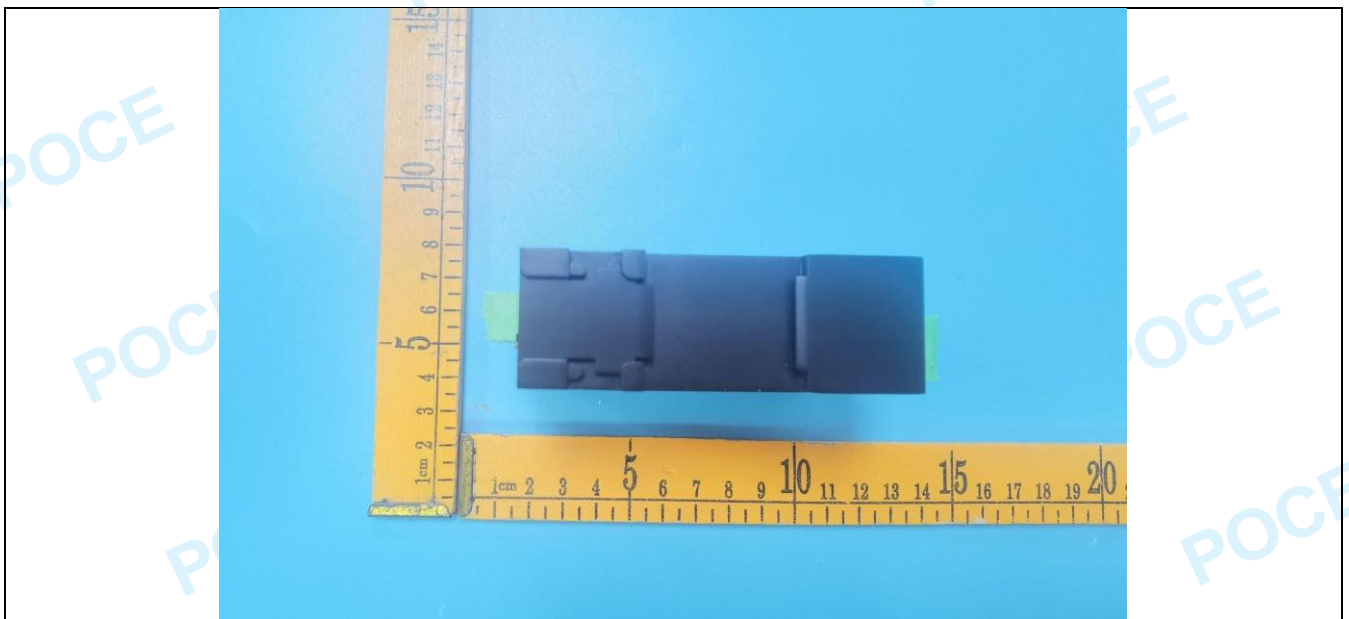


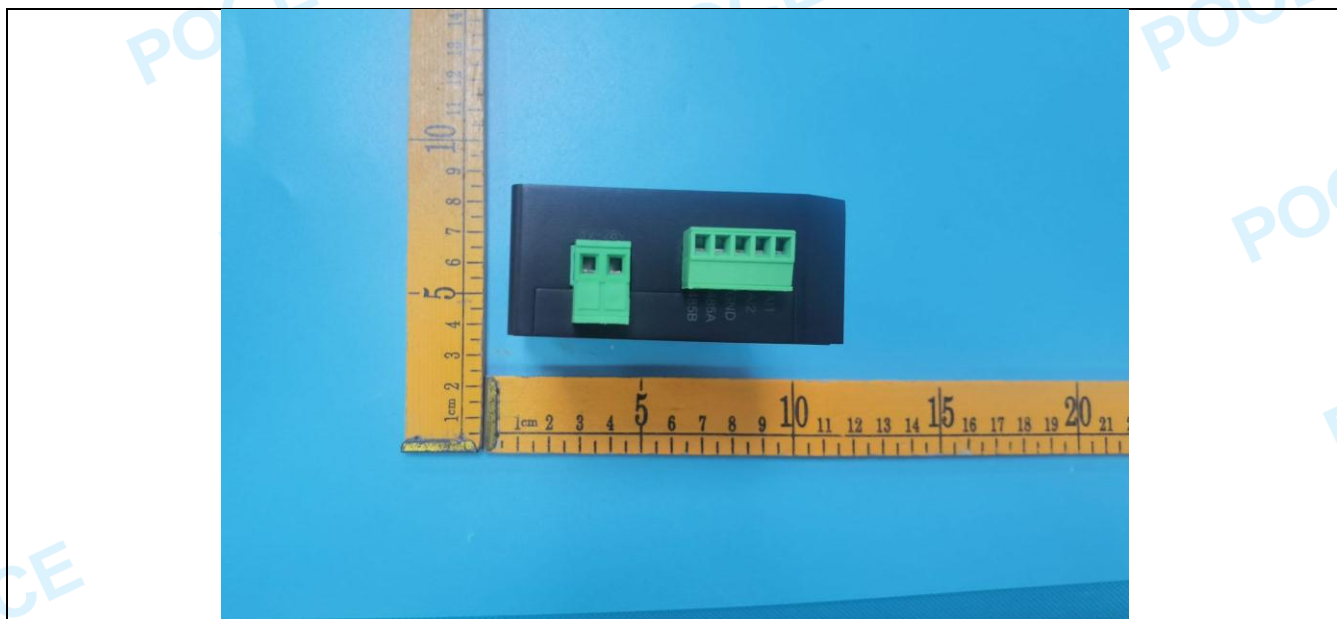
6 PHOTOS OF THE EUT

External

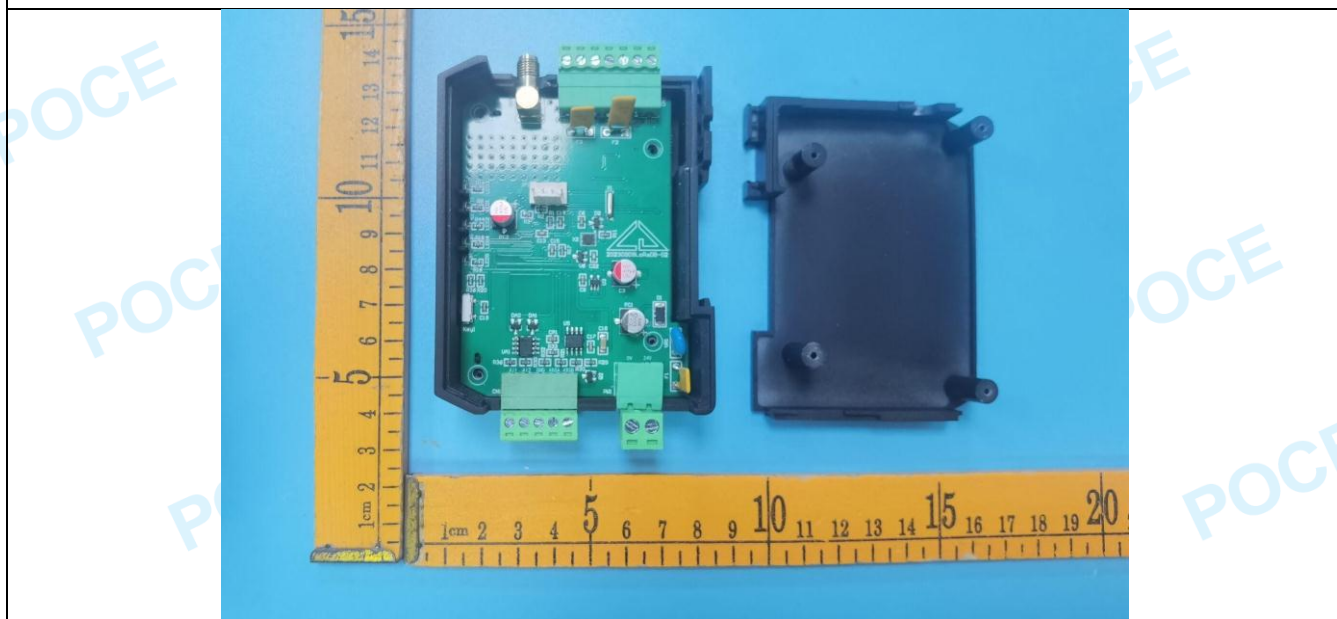


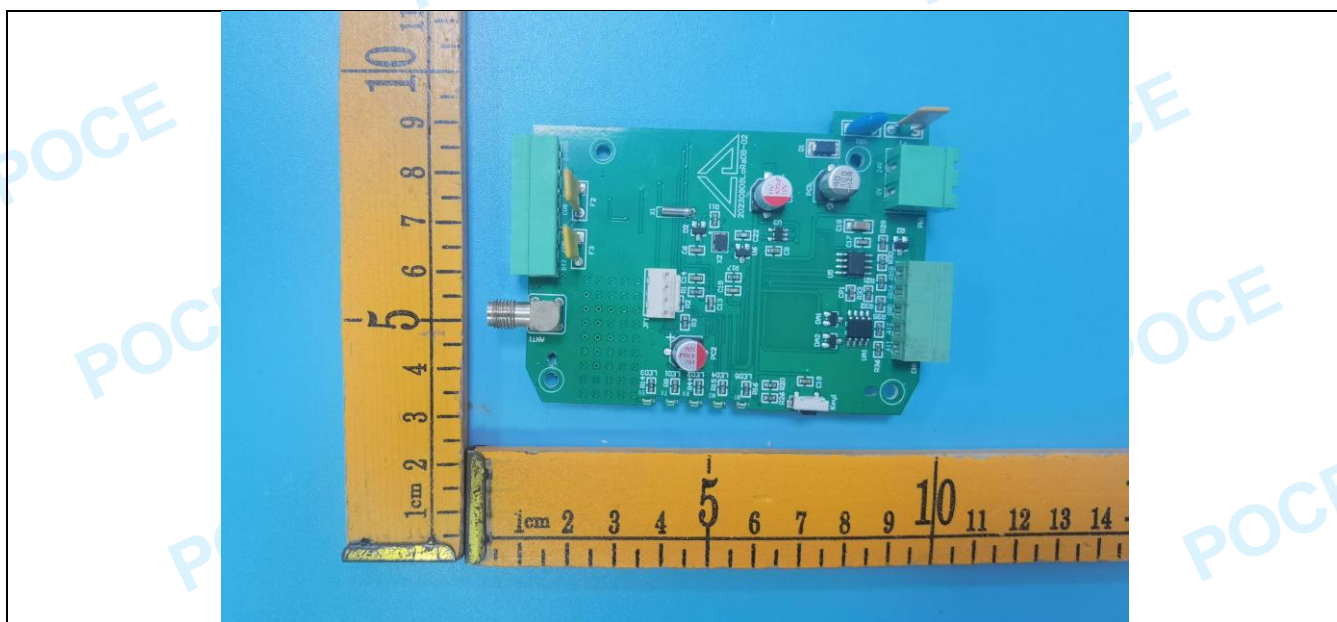
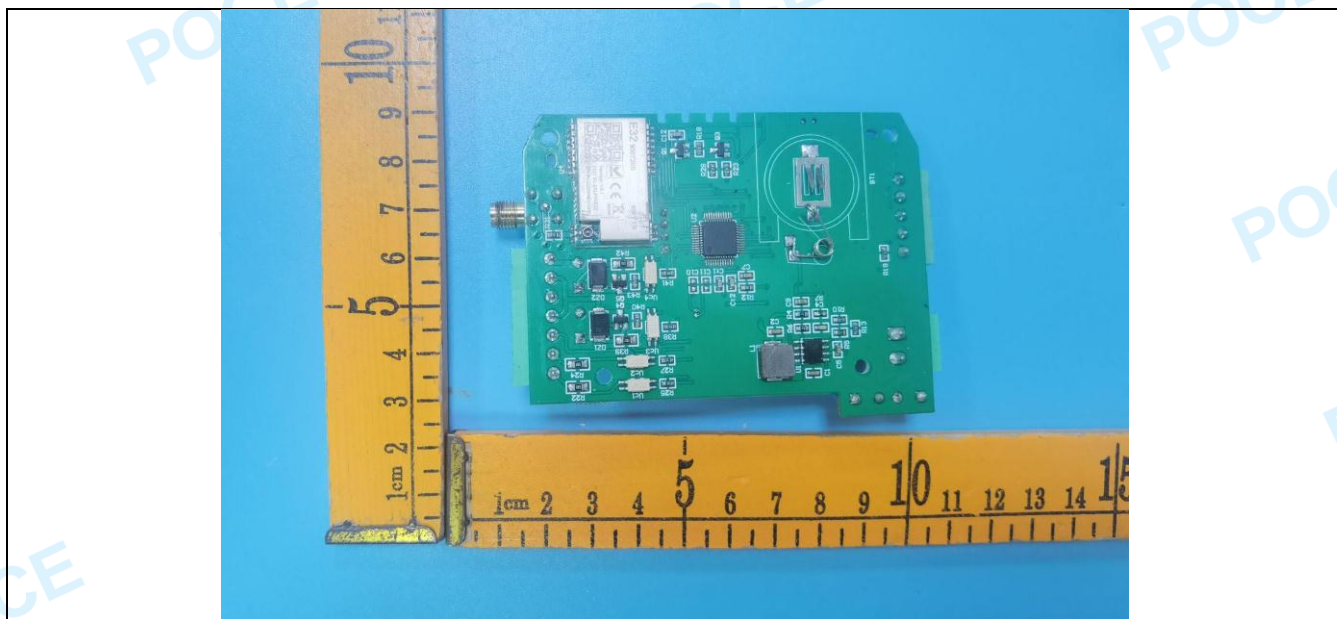


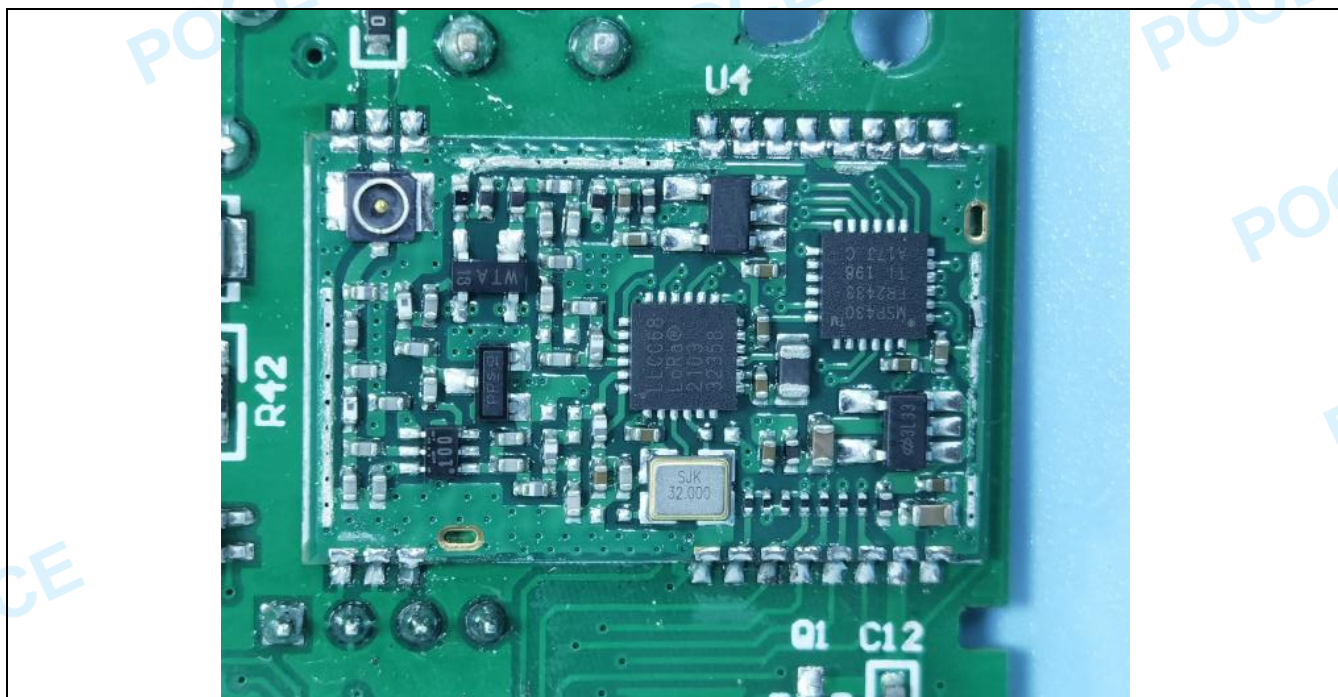




Internal







***** End of Report *****