

RF TEST REPORT

For

Lorenz High Definition LLC
Product Name: Motion Sensor
Test Model(s): ZSE18 800LR

Report Reference No. : POCE231116018RL001

FCC ID : 2AZ2V-ZSE18800

Applicant's Name : Lorenz High Definition LLC

Address : 230 Rt 206 STE 401, Flanders, New Jersey United States 07836

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 : November 16, 2023

Date of Test : November 16, 2023 to November 25, 2023

Data of Issue : November 27, 2023

Result : Pass

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Revision History Of Report

Version	Description	REPORT No.	Issue Date
V1.0	Original	POCE231116018RL001	November 27, 2023

NOTE1:

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EU Directives.

**NOTE2:**

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.

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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 15.249	/	Pass
Conducted Emission at AC power line	47 CFR Part 15.249	ANSI C63.10-2013 section 6.2	Pass
Occupied Bandwidth	47 CFR Part 15.249	ANSI C63.10-2013, section 6.9.2	Pass
Field strength of fundamental	47 CFR Part 15.249	ANSI C63.10-2013 section 6.5	Pass
Band edge emissions (Radiated)	47 CFR Part 15.249	ANSI C63.10-2013 section 6.6.4	Pass
Emissions in frequency bands (below 1GHz)	47 CFR Part 15.249	ANSI C63.10-2013 section 6.5	Pass
Emissions in frequency bands (above 1GHz)	47 CFR Part 15.249	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 : Lorenz High Definition LLC
Address : 230 Rt 206 STE 401, Flanders, New Jersey United States 07836

Manufacturer : Lorenz High Definition LLC
Address : 230 Rt 206 STE 401, Flanders, New Jersey United States 07836

2.2 Description of Device (EUT)

Product Name:	Motion Sensor
Sample number:	231116007-1
Model/Type reference:	ZSE18 800LR
Trade Mark:	ZOOZ
Power Supply:	DC3.0V from battery / DC5.0V charging from USB port
Operation Frequency:	908.40--916.00MHz
Number of Channels:	3
Modulation Type:	2FSK for 40 kbit/s and 9.6 kbit/s ; 2GFSK for 100 kbit/s
Antenna Type:	external antenna
Antenna Gain:	-4.12dBi Max
Hardware Version:	V2.0
Software Version:	V1.0

Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency
1	908.40 MHz	2	908.42MHz	3	916.00MHz

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	908.40MHz
Middle channel	908.42MHz
Highest channel	916.00MHz

2.3 Description of Test Modes

No	Title	Description
TM1	908.40MHz	Keep the EUT connect to power and works in 908.40MHz continuously transmitting mode .
TM2	908.42MHz	Keep the EUT connect to power and works in 908.42MHz continuously transmitting mode .
TM3	916.00MHz	Keep the EUT connect to power and works in 916.00MHz continuously transmitting mode .
Description		
☒ Special software is used.		
☐ Through engineering command into the engineering mode.		

engineering command: ***#3646633#**

☐ Other method:

Special software:



2.4 Description of Support Units

Title	Manufacturer	Model No.	Remark
ADAPTER	PHOTON	ATXC-069AC65B	Provide by lab

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

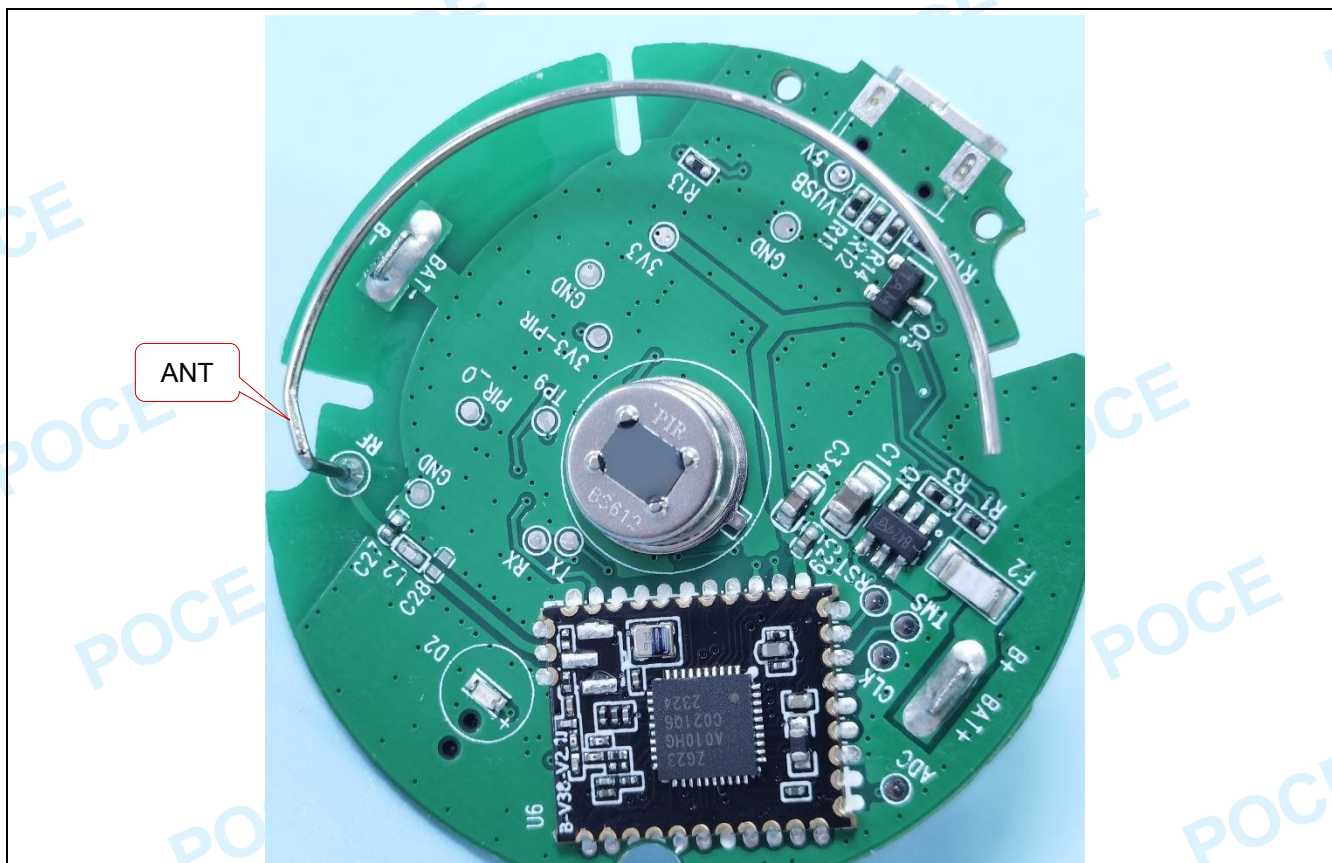
- (1) The test report reference to the report template version v0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) 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.
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3.1.1 Conclusion:



4 Radio Spectrum Matter Test Results (RF)

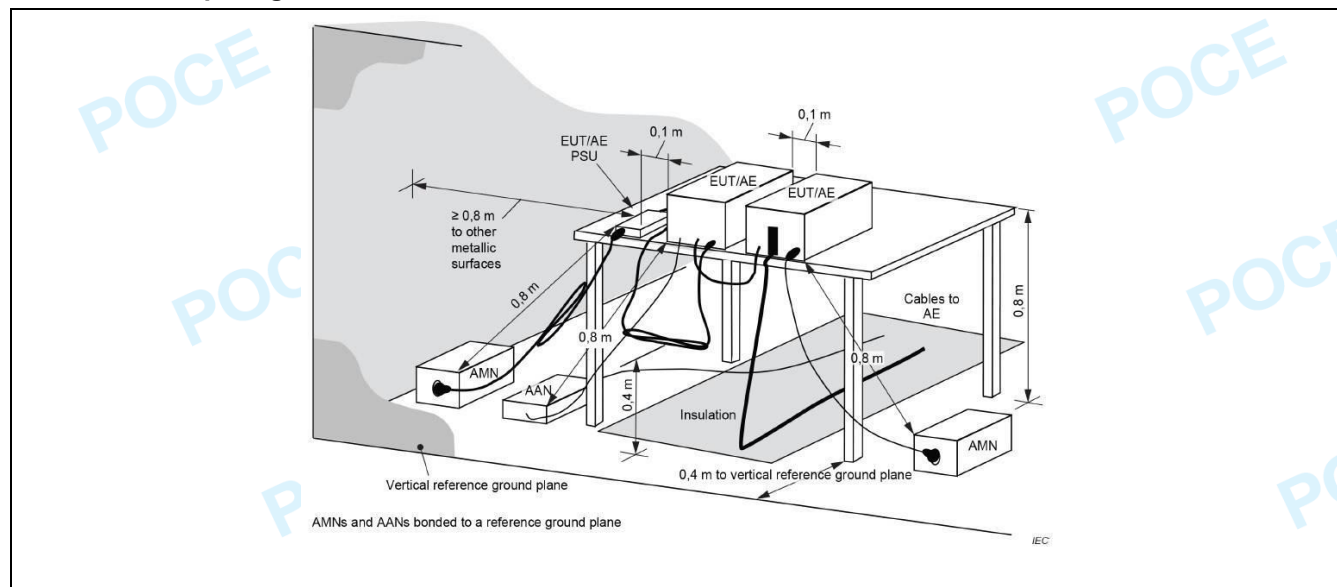
4.1 Conducted Emission at AC power line

Test Requirement:	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:

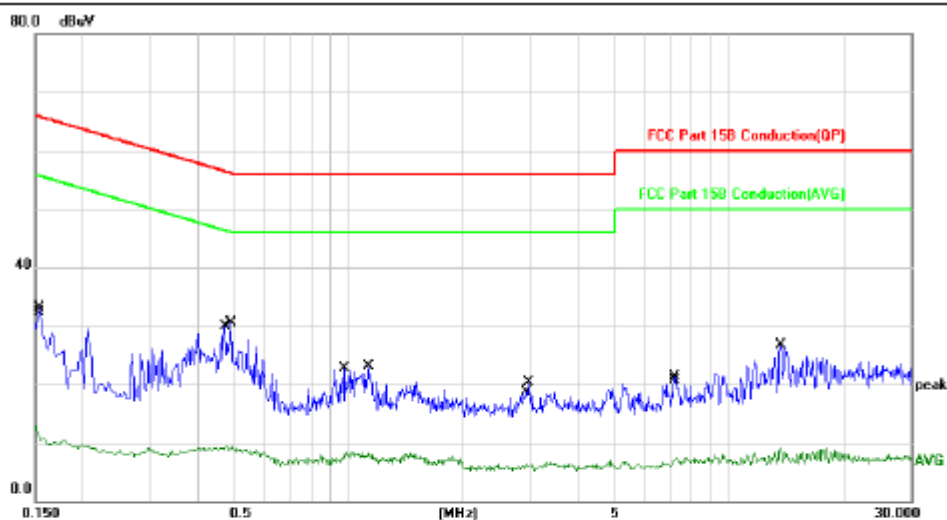
Operating Environment:					
Temperature:	22.2 °C	Humidity:	48.4 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM1(worse case)				

4.1.2 Test Setup Diagram:



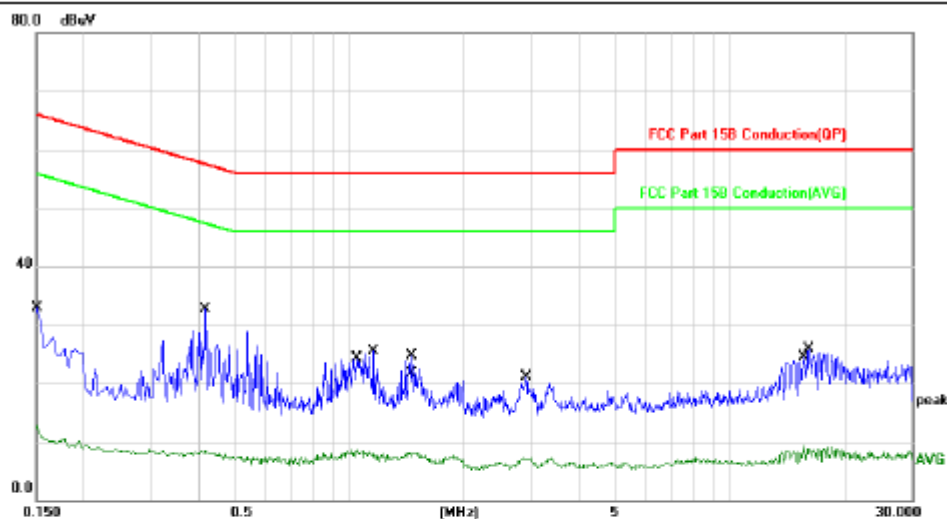
4.1.3 Test Data:

TM3 / Line: Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	2.91	9.95	12.86	55.99	-43.13	AVG	
2		0.1539	23.16	9.95	33.11	65.78	-32.67	QP	
3		0.4780	-0.61	9.88	9.27	46.37	-37.10	AVG	
4	*	0.4900	20.53	9.88	30.41	56.17	-25.76	QP	
5		0.9820	-1.31	9.80	8.49	46.00	-37.51	AVG	
6		1.1260	13.21	9.80	23.01	56.00	-32.99	QP	
7		2.9180	-3.45	9.78	6.33	46.00	-39.67	AVG	
8		2.9660	10.49	9.78	20.27	56.00	-35.73	QP	
9		7.1940	11.73	9.52	21.25	60.00	-38.75	QP	
10		7.2940	-1.99	9.53	7.54	50.00	-42.46	AVG	
11		13.5860	0.51	8.62	9.13	50.00	-40.87	AVG	
12		13.6420	18.04	8.61	26.65	60.00	-33.35	QP	

TM3 / Line: Neutral



No. Mk.	Freq. MHz	Reading Level dBμV	Correct Factor dB	Measure- ment dBμV	Limit dBμV	Over dB	Detector	Comment
1	0.1500	22.93	9.95	32.88	65.99	-33.11	QP	
2	0.1500	2.82	9.95	12.77	55.99	-43.22	AVG	
3 *	0.4180	22.74	9.89	32.63	57.49	-24.86	QP	
4	0.4180	-1.47	9.89	8.42	47.49	-39.07	AVG	
5	1.0540	-1.18	9.79	8.61	46.00	-37.39	AVG	
6	1.1580	15.75	9.80	25.55	56.00	-30.45	QP	
7	1.4620	14.93	9.78	24.71	56.00	-31.29	QP	
8	1.4780	-1.64	9.78	8.14	46.00	-37.86	AVG	
9	2.8820	-2.47	9.79	7.32	46.00	-38.68	AVG	
10	2.9100	11.27	9.78	21.05	56.00	-34.95	QP	
11	15.5900	0.94	8.27	9.21	50.00	-40.79	AVG	
12	16.0940	17.73	8.18	25.91	60.00	-34.09	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.

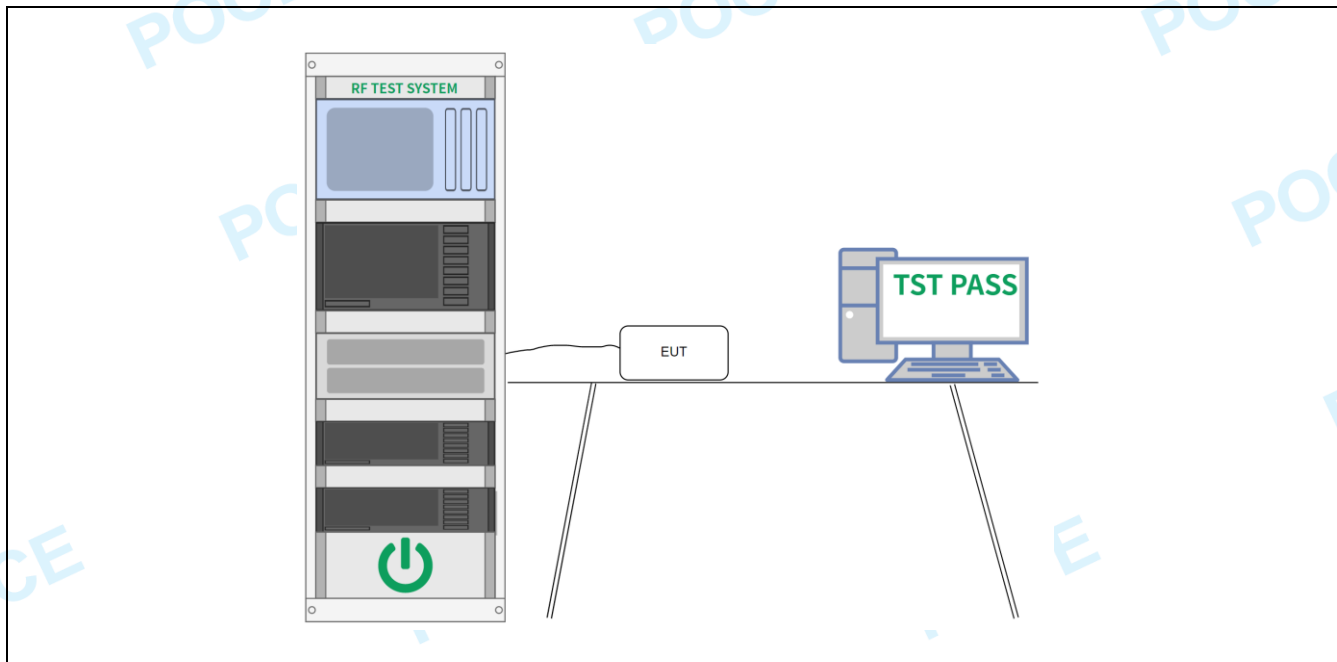
4.2 Occupied Bandwidth

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 $[(\text{reference value}) - xx]$. 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:	22.2 °C	Humidity:	48.4 %	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:

Please Refer to Appendix for Details.

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:	22.2 °C	Humidity:	48.4 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM1, TM2, TM3				

4.3.2 Test Data:

Frequency (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Over (dBuV/m)	Detector	Polarization (H/V)
908.40	92.68	94	-1.32	QP	H
908.40	91.33	94	-2.67	QP	V
908.42	92.14	94	-1.86	QP	H
908.42	91.67	94	-2.33	QP	V
916.00	91.28	94	-2.72	QP	H
916.00	90.33	94	-3.67	QP	V

Remark:

For fundamental frequency RBW ≥ 20 dB BW , VBW $\geq 3 \times$ RBW

Over = Emission Level - Limit

Level=Test receiver reading + correction factor

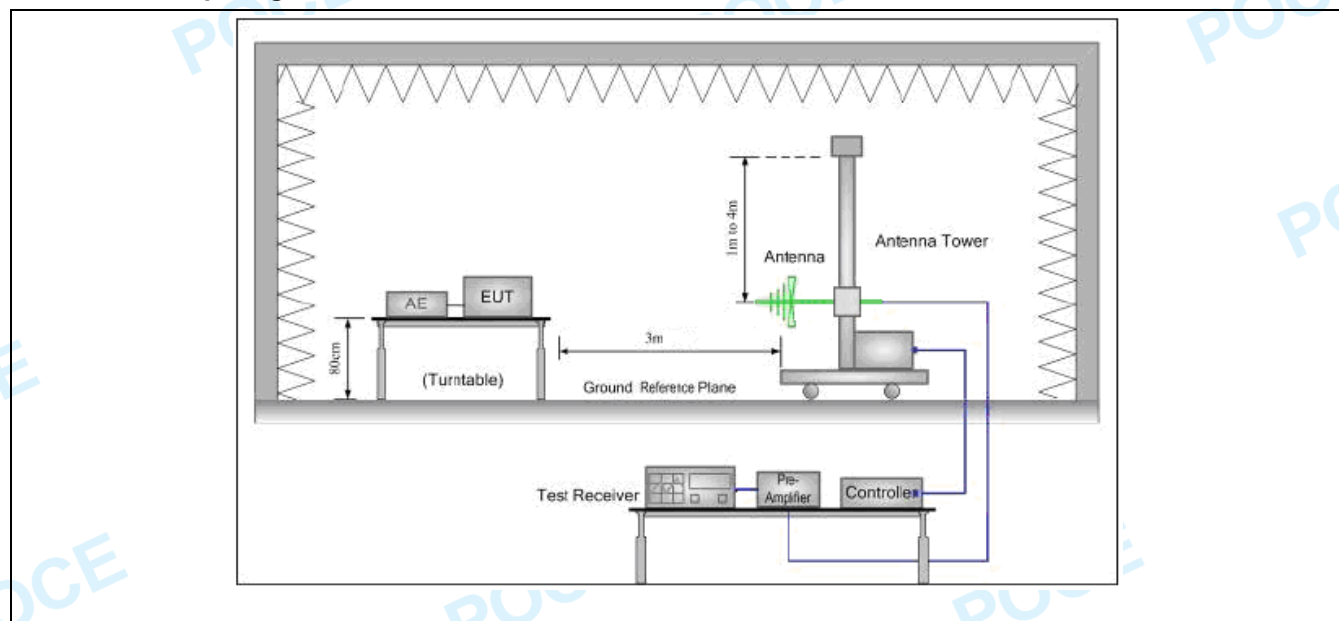
4.4 Band edge emissions (Radiated)

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. <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. In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.		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
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 6.6.4																									
Procedure:	ANSI C63.10-2013 section 6.6.4																									

4.4.1 E.U.T. Operation:

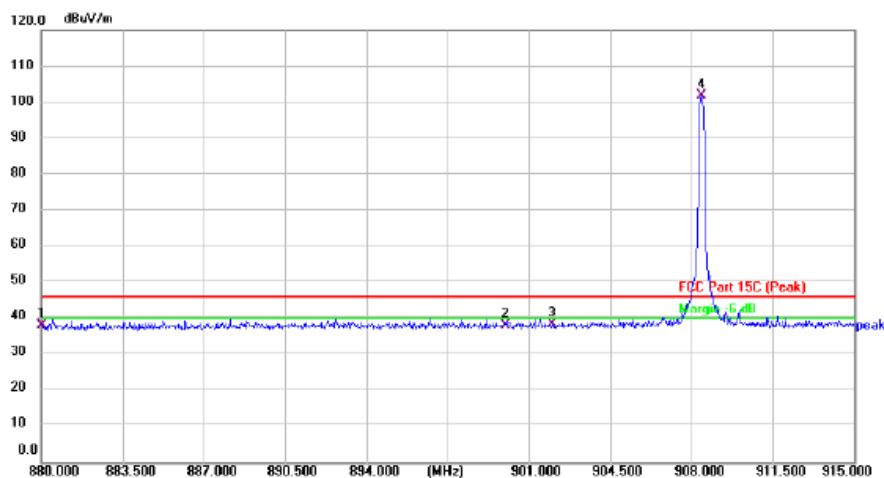
Operating Environment:					
Temperature:	22.2 °C	Humidity:	48.4 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM1, TM3				
Final test mode:	TM1, TM3				

4.4.2 Test Setup Diagram:



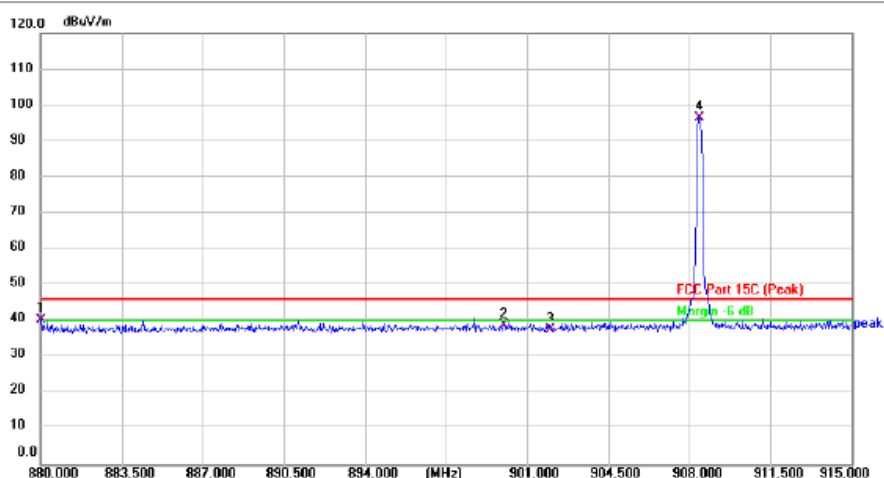
4.4.3 Test Data:

TM1 / Polarization: Horizontal / Band: 908.40M



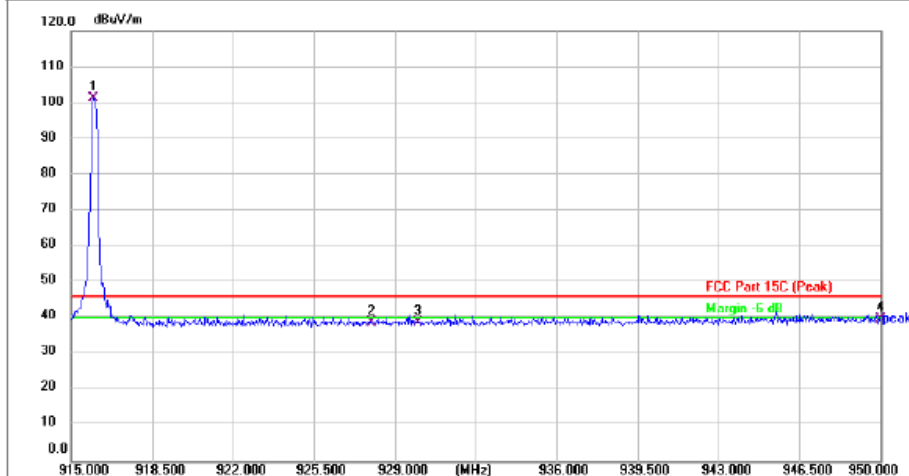
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	880.0000	30.71	7.40	38.11	46.00	-7.89	QP			P	
2	900.0000	30.47	7.76	38.23	46.00	-7.77	QP			P	
3	902.0000	30.74	7.82	38.56	46.00	-7.44	QP			P	
4 *	908.4200	93.89	7.98	101.87	46.00	55.87	QP				Fundamental

TM1 / Polarization: Vertical / Band: 908.40M



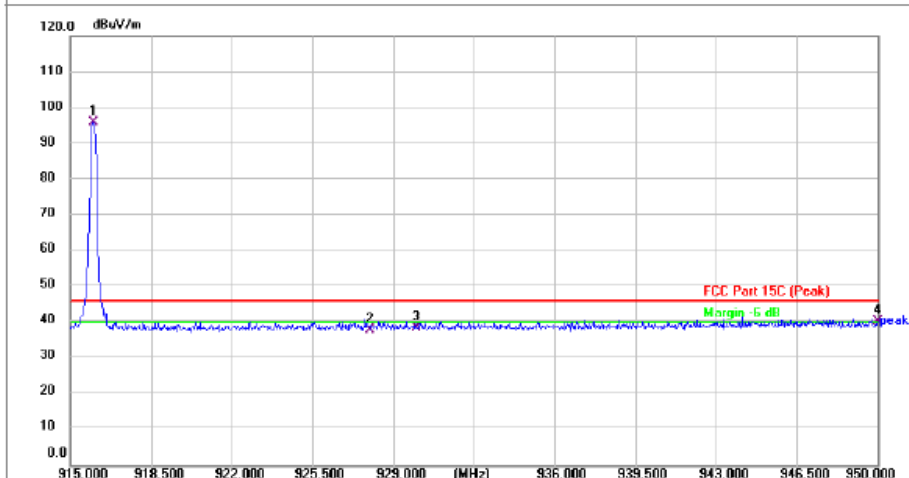
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 !	880.0000	33.21	7.15	40.36	46.00	-5.64	QP			P	
2	900.0000	31.08	7.76	38.84	46.00	-7.16	QP			P	
3	902.0000	29.74	7.81	37.55	46.00	-8.45	QP			P	
4 *	908.4200	88.60	7.98	96.58	46.00	50.58	QP				Fundamental

TM3 / Polarization: Horizontal / Band: 916.00M



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 *	915.9450	93.17	8.19	101.36	46.00	55.36	QP				Fundamental
2	928.0000	30.47	8.51	38.98	46.00	-7.02	QP			P	
3	930.0000	30.24	8.56	38.80	46.00	-7.20	QP			P	
4	950.0000	30.63	9.11	39.74	46.00	-6.26	QP			P	

TM3 / Polarization: Vertical / Band: 916.00M



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 *	916.0150	87.71	8.17	95.88	46.00	49.88	QP				Fundamental
2	928.0000	29.56	8.49	38.05	46.00	-7.95	QP			P	
3	930.0000	30.15	8.53	38.68	46.00	-7.32	QP			P	
4 !	950.0000	31.34	9.06	40.40	46.00	-5.60	QP			P	

Remark:

Margin = Measurement Level - Limit

Measurement Level=Test receiver reading + correction factor

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

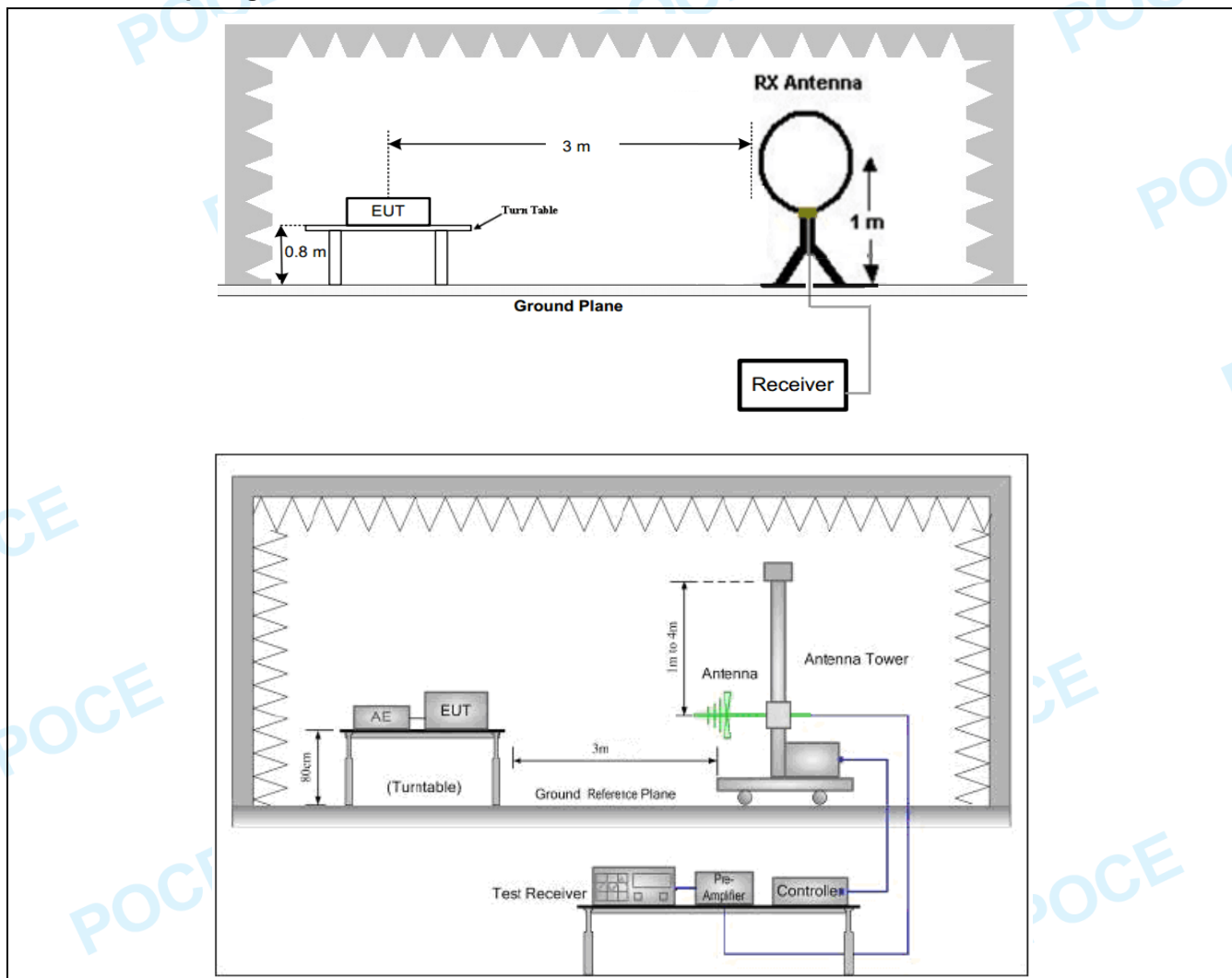
4.5 Emissions in frequency bands (below 1GHz)

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 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. In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. 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 6.5																																								
Procedure:	ANSI C63.10-2013 section 6.5																																								

4.5.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.2 °C	Humidity:	48.4 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM1(worse case)				

4.5.2 Test Setup Diagram:



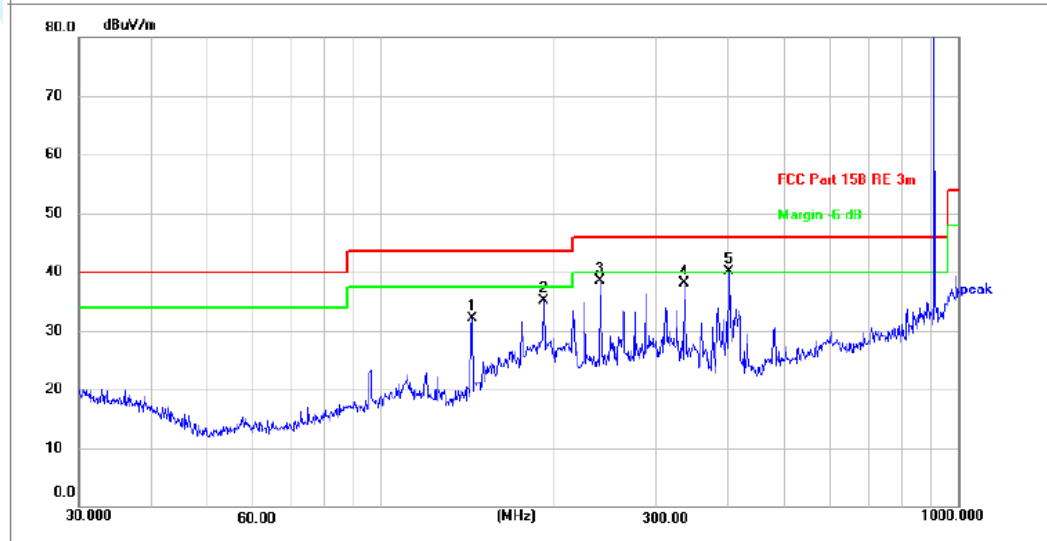
4.5.3 Test Data:

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.

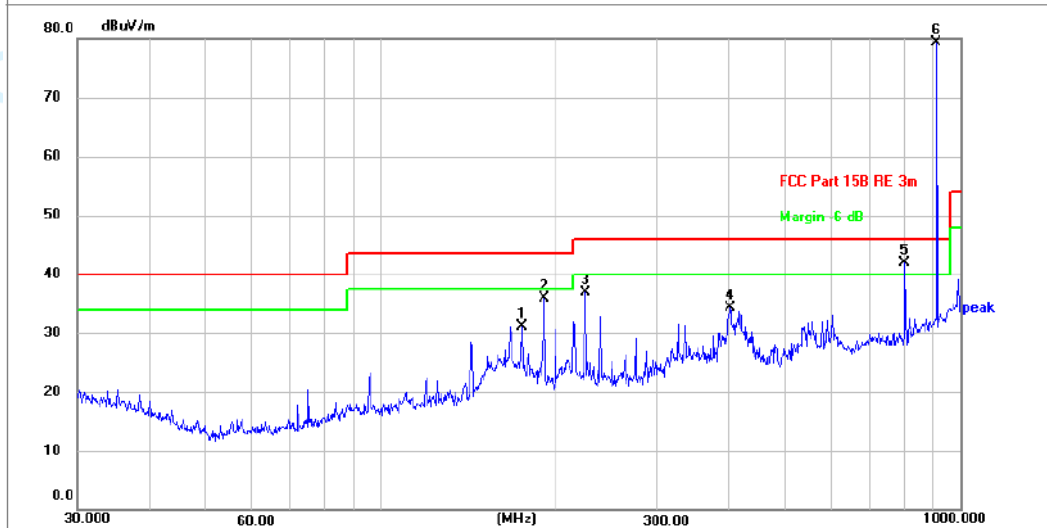
Between 30MHz – 1000MHz

TM1 / Polarization: Horizontal / Band: 908.4M



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	143.8295	36.05	-3.98	32.07	43.50	-11.43	QP	100		P	
2	191.7450	38.13	-3.01	35.12	43.50	-8.38	QP	100		P	
3	239.9874	40.83	-2.29	38.54	46.00	-7.46	QP	100		P	
4	334.8589	36.68	1.44	38.12	46.00	-7.88	QP	100		P	
5 !	400.4319	38.76	1.37	40.13	46.00	-5.87	QP	100		P	
6 *	909.6667	79.15	8.01	87.16	94.00	-6.84	QP	100		P	Fundamental

TM1 / Polarization: Vertical / Band: 908.4M



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	175.0368	34.41	-3.22	31.19	43.50	-12.31	QP	100		P	
2	191.7450	38.82	-3.01	35.81	43.50	-7.69	QP	100		P	
3	225.3080	39.44	-2.53	36.91	46.00	-9.09	QP	100		P	
4	400.4319	32.96	1.37	34.33	46.00	-11.67	QP	100		P	
5 !	801.7863	37.25	4.75	42.00	46.00	-4.00	QP	100		P	
6 *	909.6667	71.32	8.00	79.32	94.00	-14.68	QP	100		P	Fundamental

Remark: Over= Measurement Level - Limit

Measurement Level=Test receiver reading + correction factor

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

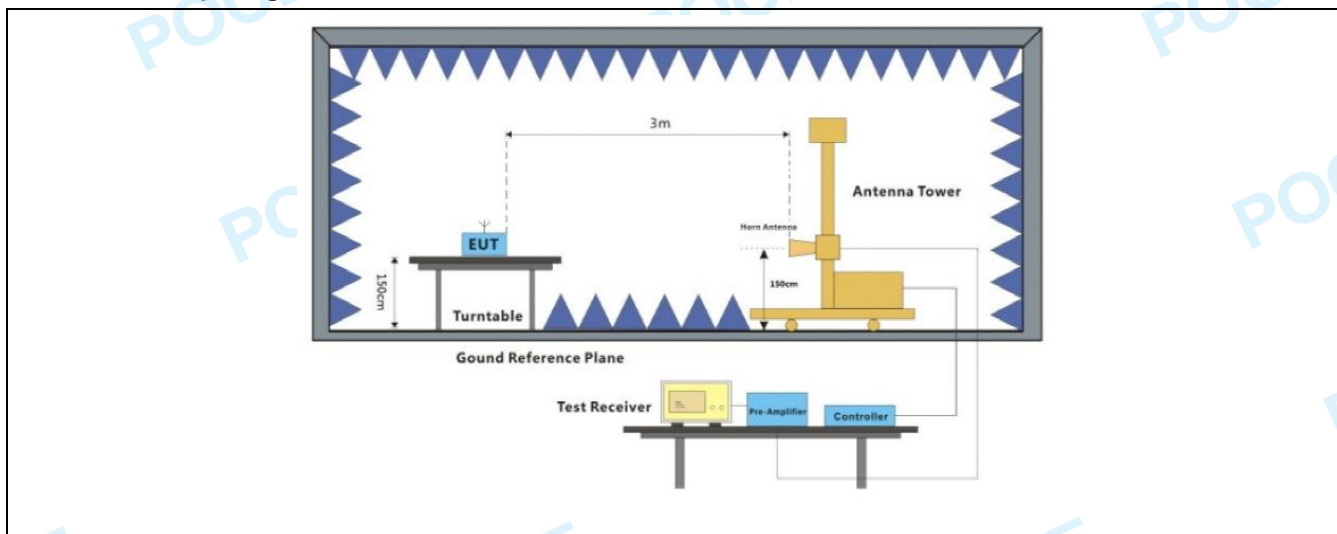
4.6 Emissions in frequency bands (above 1GHz)

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><tr><th>Fundamental frequency</th><th>Field strength of fundamental (millivolts/meter)</th><th>Field strength of harmonics (microvolts/meter)</th></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><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></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. In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. 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:

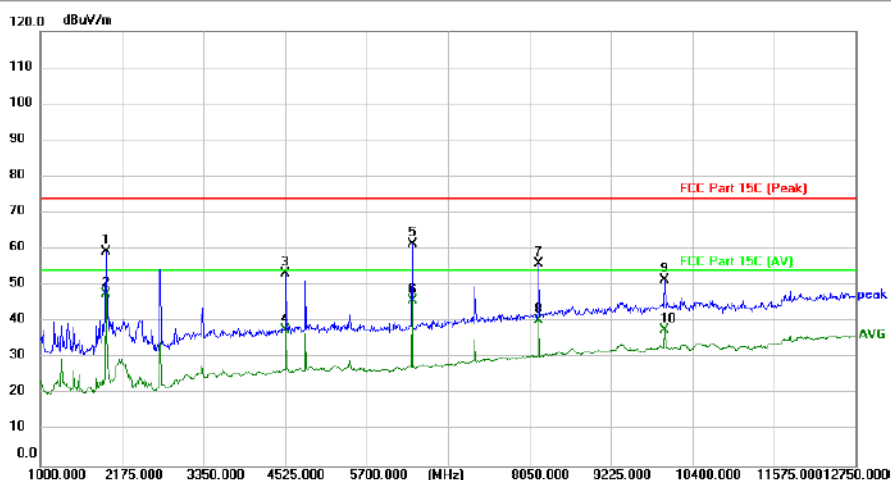
Operating Environment:					
Temperature:	22.2 °C	Humidity:	48.4 %	Atmospheric Pressure:	102 kPa
Pre test mode:		TM1, TM2, TM3			
Final test mode:		TM1, TM2, TM3			

4.6.2 Test Setup Diagram:



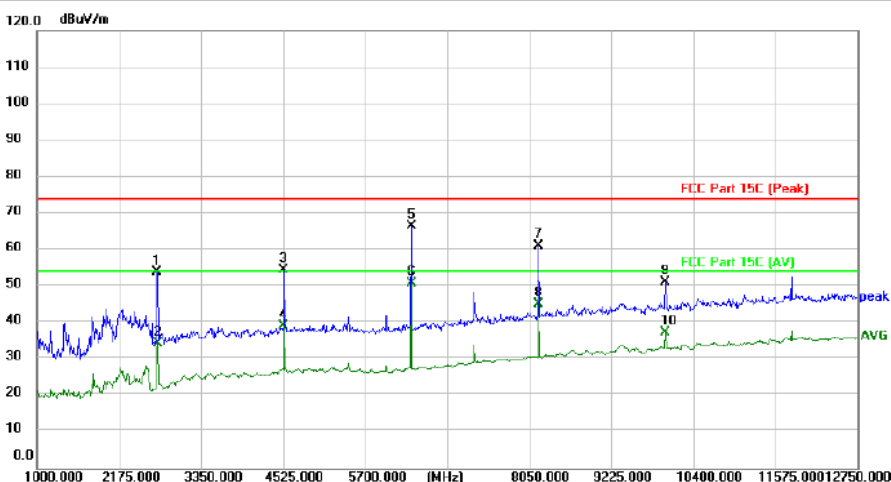
4.6.3 Test Data:

TM1 / Polarization: Horizontal / Band: 908.40M



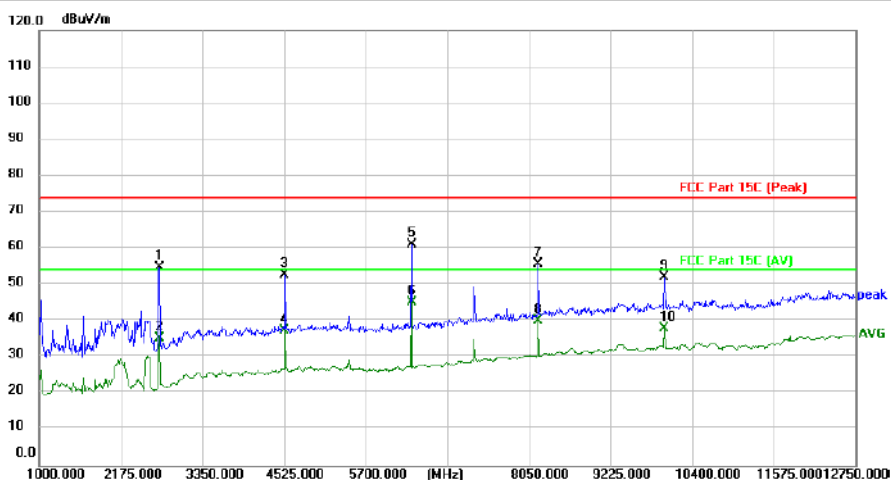
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1940.000	67.29	-7.93	59.36	74.00	-14.64	peak	149		P	
2 *	1940.000	55.37	-7.93	47.44	54.00	-6.56	AVG	149		P	
3	4536.750	55.18	-1.82	53.36	74.00	-20.64	peak	149		P	
4	4536.750	39.53	-1.82	37.71	54.00	-16.29	AVG	149		P	
5	6358.000	59.21	2.08	61.29	74.00	-12.71	peak	149		P	
6	6358.000	43.64	2.08	45.72	54.00	-8.28	AVG	149		P	
7	8179.250	49.33	6.65	55.98	74.00	-18.02	peak	149		P	
8	8179.250	33.75	6.65	40.40	54.00	-13.60	AVG	149		P	
9	10000.500	43.30	8.09	51.39	74.00	-22.61	peak	149		P	
10	10000.500	29.65	8.09	37.74	54.00	-16.26	AVG	149		P	

TM1 / Polarization: Vertical / Band: 908.40M



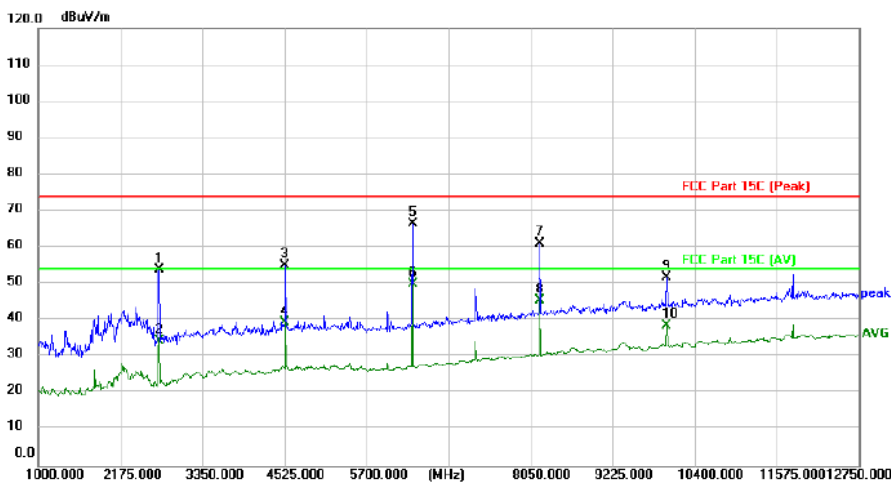
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2715.500	60.63	-6.63	54.00	74.00	-20.00	peak	149		P	
2	2727.250	40.98	-6.59	34.39	54.00	-19.61	AVG	149		P	
3	4536.750	55.56	-1.18	54.38	74.00	-19.62	peak	149		P	
4	4536.750	40.30	-1.18	39.12	54.00	-14.88	AVG	149		P	
5	6358.000	64.61	1.92	66.53	74.00	-7.47	peak	149		P	
6 *	6358.000	48.84	1.92	50.76	54.00	-3.24	AVG	149		P	
7	8179.250	54.74	6.27	61.01	74.00	-12.99	peak	149		P	
8	8179.250	38.80	6.27	45.07	54.00	-8.93	AVG	149		P	
9	10000.500	42.97	8.29	51.26	74.00	-22.74	peak	149		P	
10	10000.500	29.12	8.29	37.41	54.00	-16.59	AVG	149		P	

TM2 / Polarization: Horizontal / Band: 908.42M



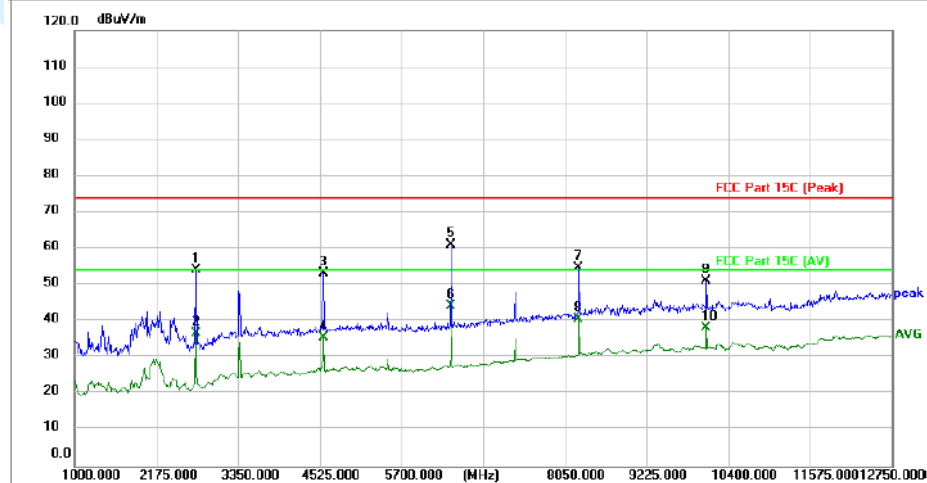
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2727.250	60.78	-6.06	54.72	74.00	-19.28	peak	149		P	
2	2727.250	41.38	-6.06	35.32	54.00	-18.68	AVG	149		P	
3	4536.750	54.42	-1.82	52.60	74.00	-21.40	peak	149		P	
4	4536.750	39.14	-1.82	37.32	54.00	-16.68	AVG	149		P	
5	6358.000	58.98	2.08	61.06	74.00	-12.94	peak	149		P	
6 *	6358.000	43.18	2.08	45.26	54.00	-8.74	AVG	149		P	
7	8179.250	49.05	6.65	55.70	74.00	-18.30	peak	149		P	
8	8179.250	33.54	6.65	40.19	54.00	-13.81	AVG	149		P	
9	10000.500	43.82	8.09	51.91	74.00	-22.09	peak	149		P	
10	10000.500	29.89	8.09	37.98	54.00	-16.02	AVG	149		P	

TM2 / Polarization: Vertical / Band: 908.42M



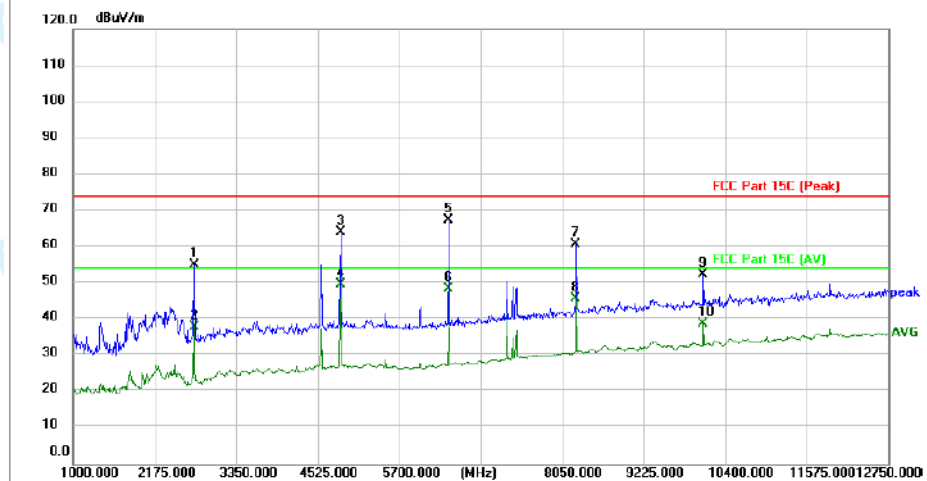
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2727.250	60.52	-6.59	53.93	74.00	-20.07	peak	149		P	
2	2727.250	40.99	-6.59	34.40	54.00	-19.60	AVG	149		P	
3	4536.750	56.14	-1.18	54.96	74.00	-19.04	peak	149		P	
4	4536.750	40.50	-1.18	39.32	54.00	-14.68	AVG	149		P	
5	6358.000	64.65	1.92	66.57	74.00	-7.43	peak	149		P	
6 *	6358.000	48.14	1.92	50.06	54.00	-3.94	AVG	149		P	
7	8179.250	54.70	6.27	60.97	74.00	-13.03	peak	149		P	
8	8179.250	39.28	6.27	45.55	54.00	-8.45	AVG	149		P	
9	10000.500	43.44	8.29	51.73	74.00	-22.27	peak	149		P	
10	10000.500	30.28	8.29	38.57	54.00	-15.43	AVG	149		P	

TM3 / Polarization: Horizontal / Band: 916M



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	2739.000	60.06	-6.04	54.02	74.00	-19.98	peak	149		P	
2	2739.000	42.92	-6.04	36.88	54.00	-17.12	AVG	149		P	
3	4583.750	54.77	-1.65	53.12	74.00	-20.88	peak	149		P	
4	4583.750	37.32	-1.65	35.67	54.00	-18.33	AVG	149		P	
5	6416.750	58.95	2.20	61.15	74.00	-12.85	peak	149		P	
6 *	6416.750	42.06	2.20	44.26	54.00	-9.74	AVG	149		P	
7	8249.750	47.97	6.76	54.73	74.00	-19.27	peak	149		P	
8	8249.750	33.82	6.76	40.58	54.00	-13.42	AVG	149		P	
9	10082.750	43.04	8.24	51.28	74.00	-22.72	peak	149		P	
10	10082.750	29.97	8.24	38.21	54.00	-15.79	AVG	149		P	

TM3 / Polarization: Vertical / Band: 916M



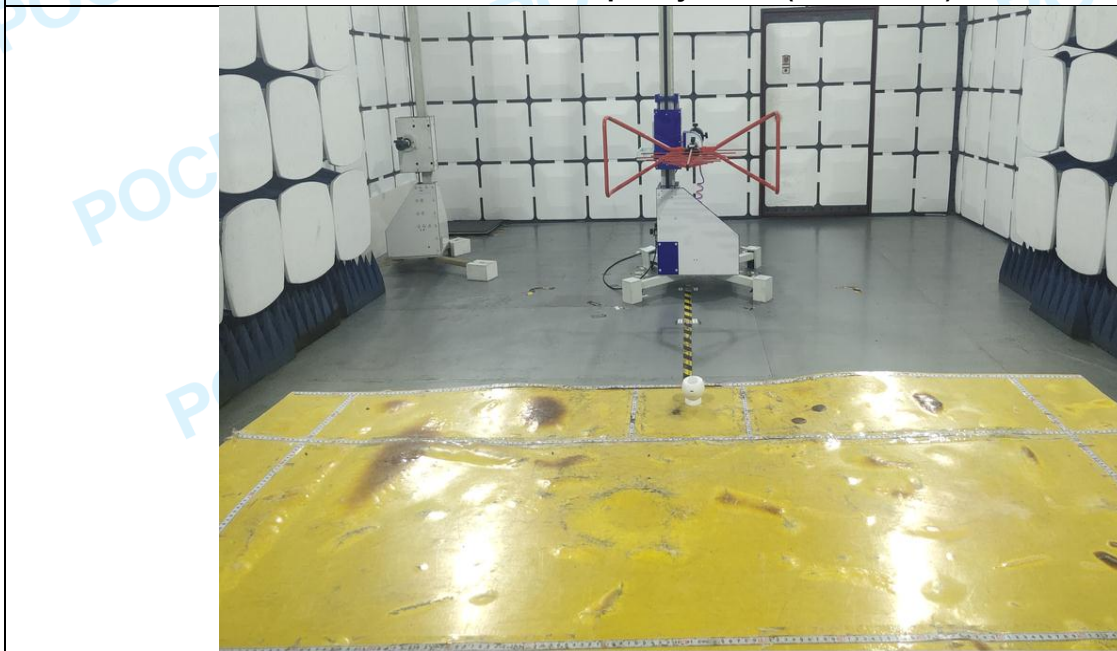
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2739.000	61.72	-6.54	55.18	74.00	-18.82	peak	149		P	
2	2739.000	44.63	-6.54	38.09	54.00	-15.91	AVG	149		P	
3	4854.000	64.14	-0.12	64.02	74.00	-9.98	peak	149		P	
4 *	4854.000	49.65	-0.12	49.53	54.00	-4.47	AVG	149		P	
5	6416.750	65.18	2.07	67.25	74.00	-6.75	peak	149		P	
6	6416.750	46.41	2.07	48.48	54.00	-5.52	AVG	149		P	
7	8249.750	54.31	6.38	60.69	74.00	-13.31	peak	149		P	
8	8249.750	39.50	6.38	45.88	54.00	-8.12	AVG	149		P	
9	10082.750	43.87	8.34	52.21	74.00	-21.79	peak	149		P	
10	10082.750	30.48	8.34	38.82	54.00	-15.18	AVG	149		P	

5 TEST SETUP PHOTOS

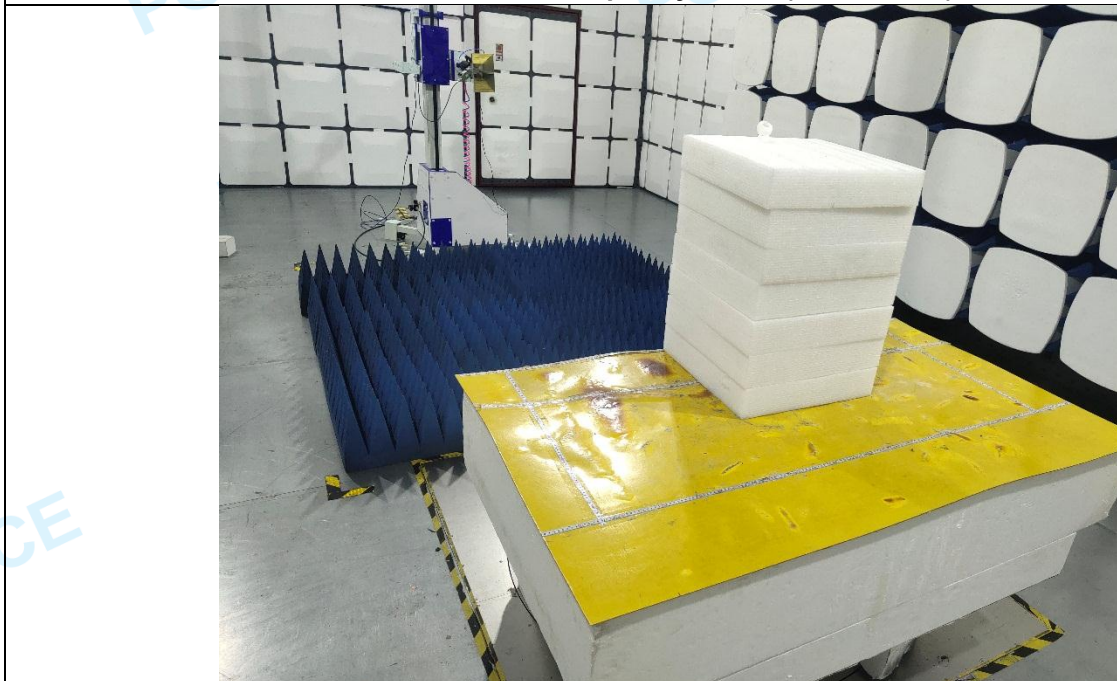
Conducted Emission at AC power line



Emissions in frequency bands (below 1GHz)



Emissions in frequency bands (above 1GHz)



6 PHOTOS OF THE EUT

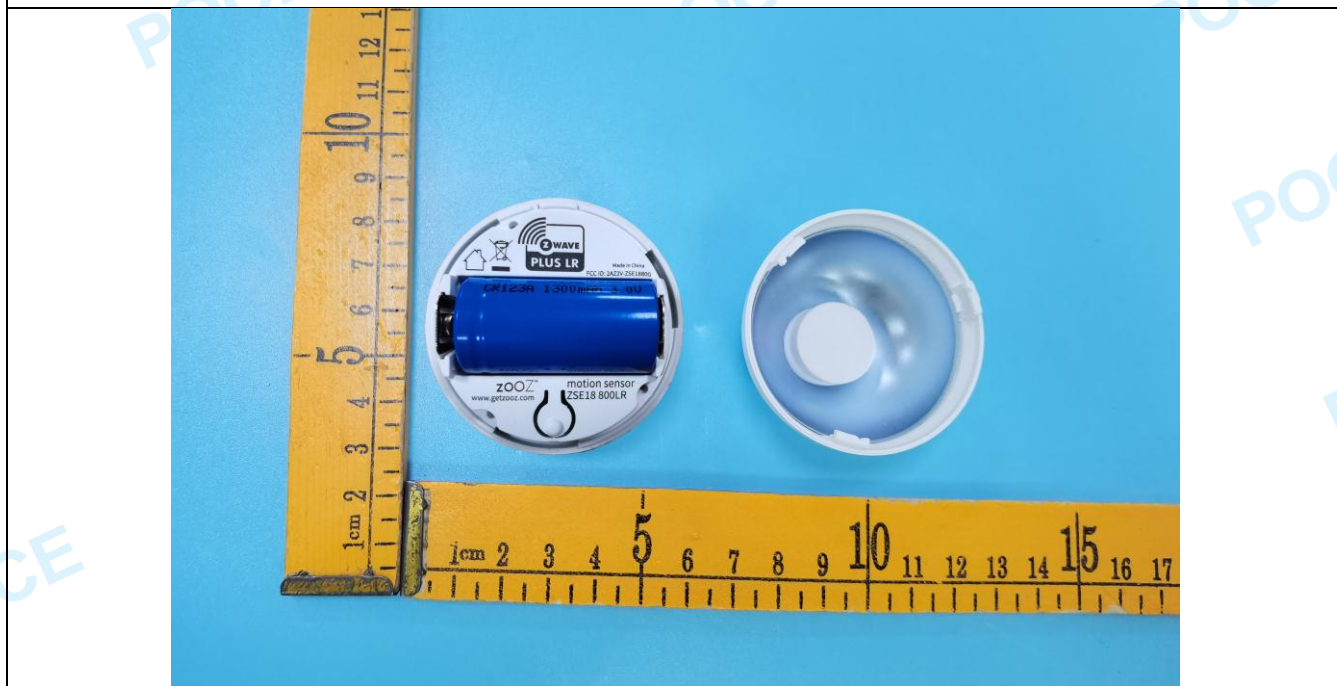
External

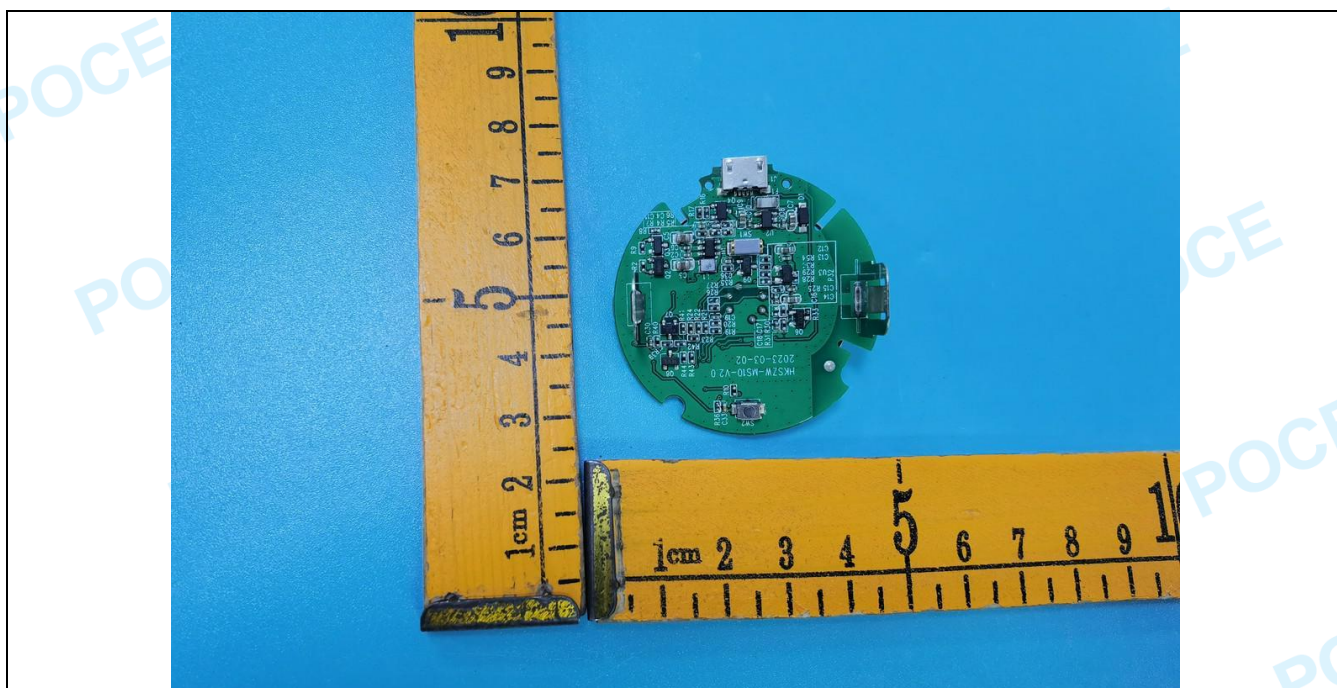


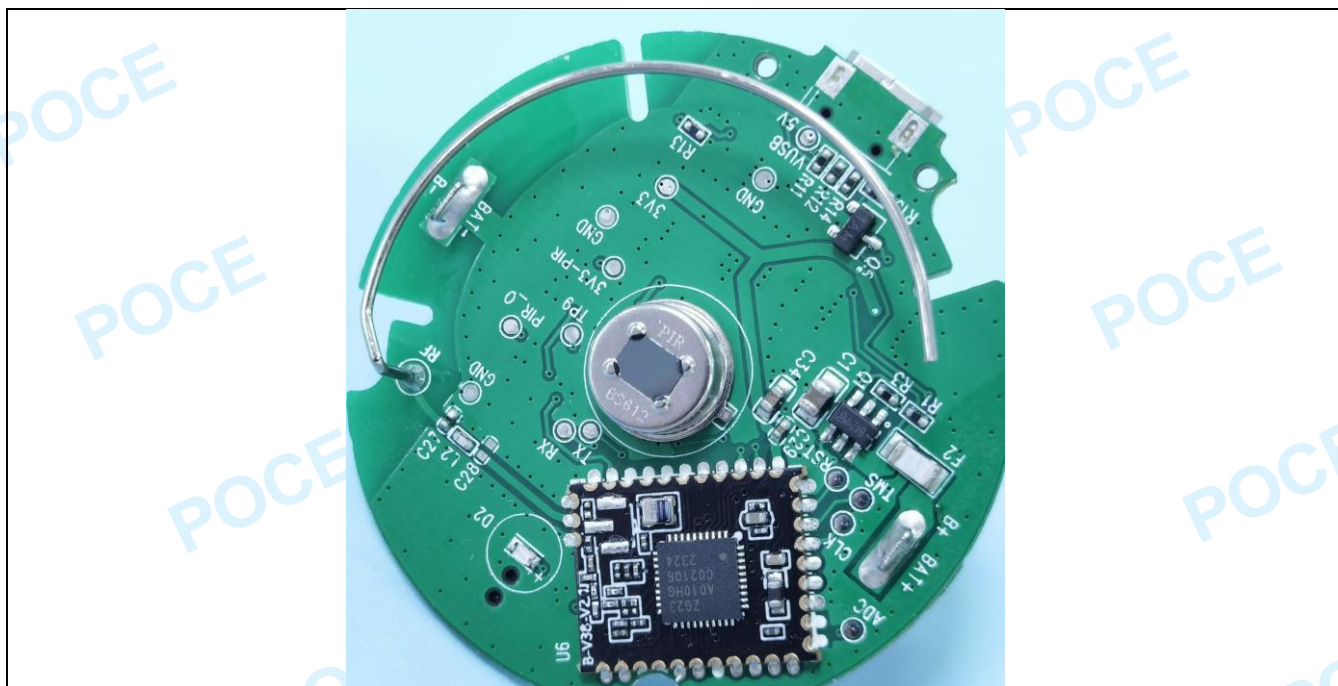
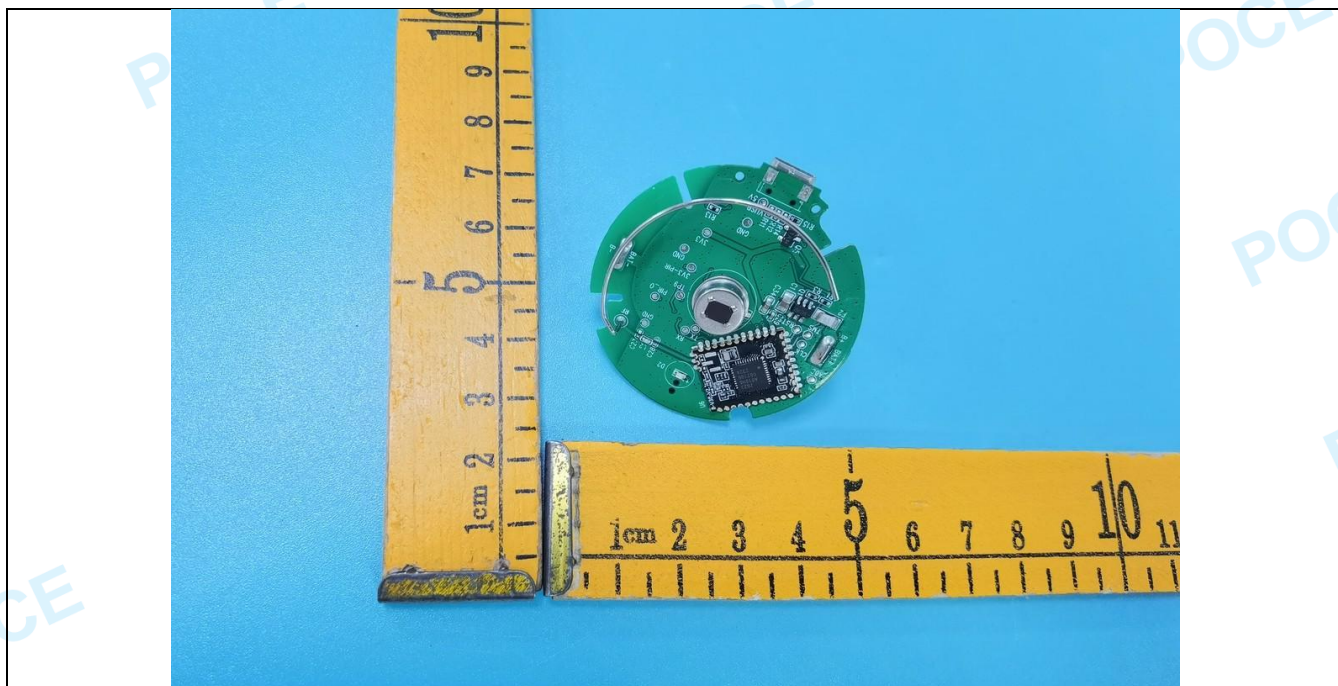




Internal



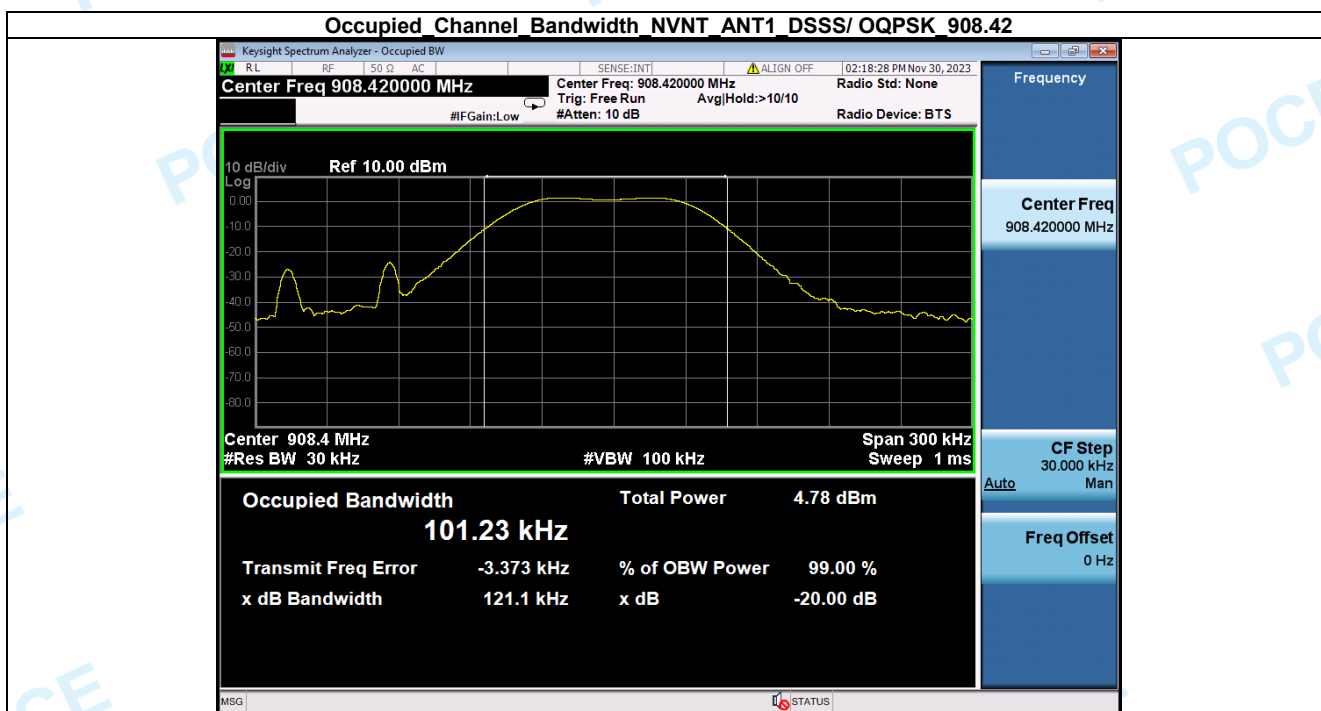
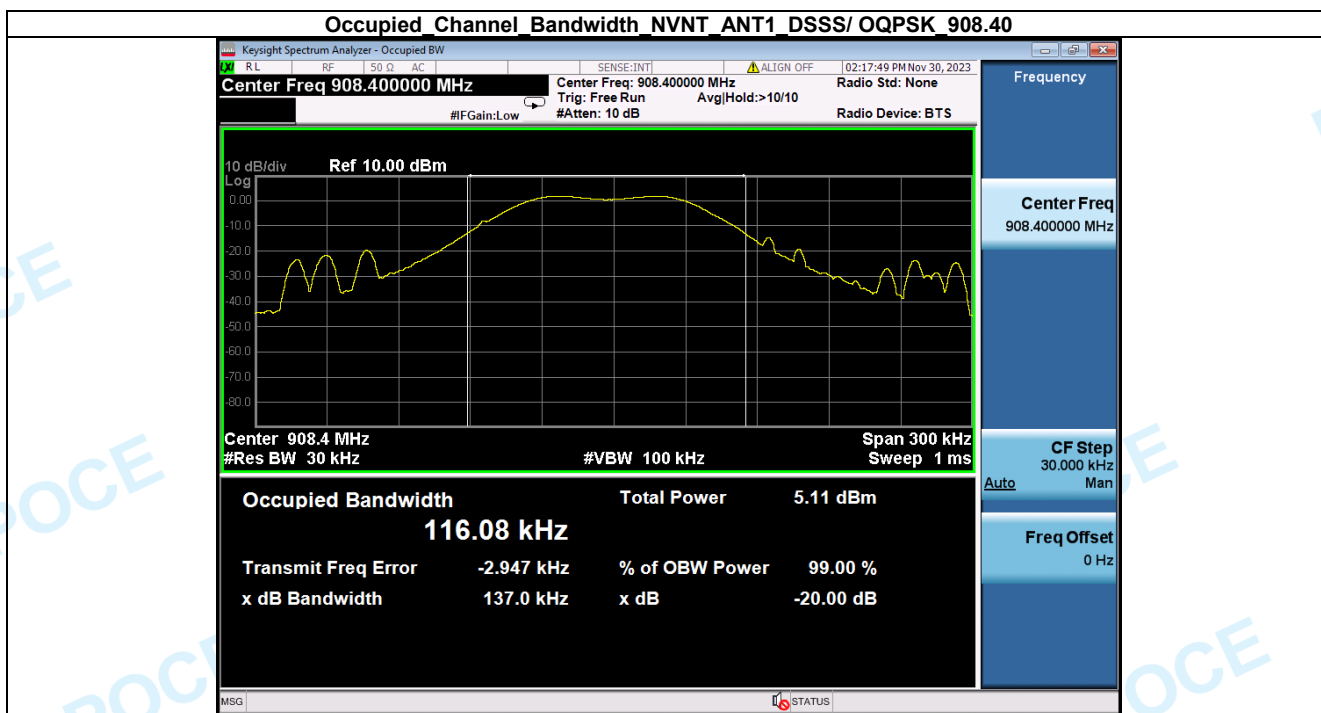


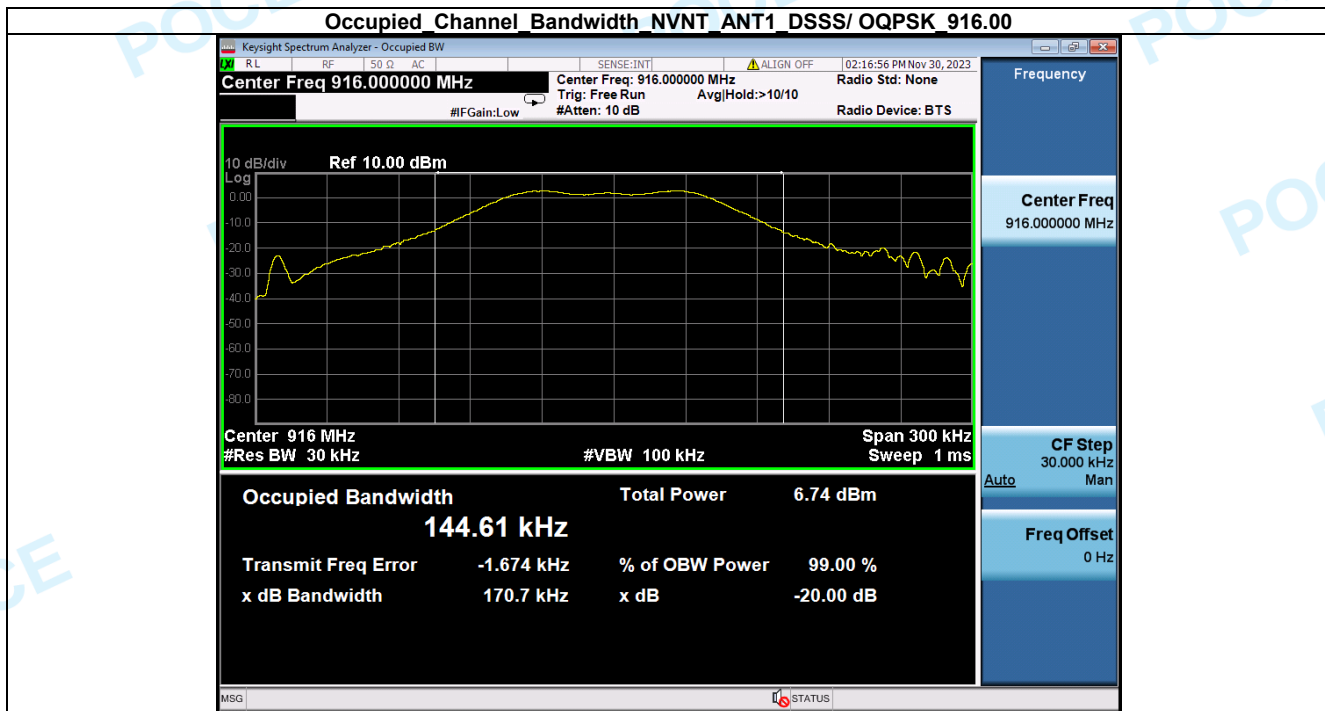


Appendix

1. Occupied Bandwidth

Condition	Antenna	Modulation	Frequency (MHz)	-20dB BW(MHz)	if larger than CFS
NVNT	ANT1	FSK	908.40	0.137	No
NVNT	ANT1	FSK	908.42	0.121	No
NVNT	ANT1	FSK	916.00	0.171	No





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