

TEST REPORT

Applicant : Shenzhen zhengxin Optoelectronics Technology Co., Ltd

Address : 7/F, Building A9, Xinghuaxiong Science Park, Baihua Community,
Guangming District, Shenzhen, China

Manufacturer : Shenzhen zhengxin Optoelectronics Technology Co., Ltd

Address : 7/F, Building A9, Xinghuaxiong Science Park, Baihua Community,
Guangming District, Shenzhen, China

Product Name : RF Remote control

Model Number : RF-17KEY-8439, RF-17KEY-8439-1, RF-21KEY-8439,
RF-15KEY-8439, RF-19KEY-8439, RF-18KEY-8439,
RF-20KEY-8439, RF-13KEY-8439, RF-18KEY-8439-1

Trademark : N/A

FCC ID : 2BRB7-RF-17KEY

Test Date : Apr 18, 2026 - May 19, 2026

Date of Report : May 28, 2026

Test Result : This device described above has been tested by BKC, and the test results show that the equipment under test (EUT) is in compliance with the Standard requirements. And it is applicable only to the tested sample identified in the report.

Test Procedure Used:

Standards : FCC CFR Title 47 Part 15 Subpart C Section 15.231
C63.10-2020+Cor1-2023

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Reviewer(Supervisor):
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Approved(Manager):
Levi Xiao



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1. General Information

1.1. Description of Device (EUT)

EUT Name	: RF Remote control
Model No.	: RF-17KEY-8439, RF-17KEY-8439-1, RF-21KEY-8439, RF-15KEY-8439, RF-19KEY-8439, RF-18KEY-8439, RF-20KEY-8439, RF-13KEY-8439, RF-18KEY-8439-1
Model Difference	: All models are the same, except for the model name and product appearance.
Power supply	: 3V LITHIUM BATTERY
Operation frequency	: 433.92MHz
Modulation	: ASK
Antenna Type	: PCB antenna, Maximum Gain is 1.8 dBi
Intend use environment	: Residential, commercial and light industrial environment

1.2. Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	433.92	/	/	/	/

1.3. Summary of test result

RF PART		
Test Items	Test Requirement	Result
Conducted Emission	15.207	N/A
Fundamental & Radiated Spurious Emission Measurement	15.209, 15.231b	PASS
Occupy Bandwidth	15.231c	PASS
Dwell time	15.231a	PASS
Antenna Requirement	15.203	PASS
Remark: N/A is an abbreviation for Not Applicable. Measurement Uncertainty is not taken into account for conformity statement		

1.4. Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Hardware Version	Software Version
/	/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/
/	/	/	/

1.5. Test mode

The special RF test software was used to control EUT work in Continuous TX mode, and select test channel, wireless mode.

Test mode	Low channel	Middle channel	High channel
ASK	433.92MHz	/	/
Note:			

1.6. Block Diagram

Conducted Emission

/

Radiated Emission

EUT

Conducted Spurious

EUT

1.7. Test Conditions

Category	Normal Conditions	Extreme Conditions
Temperature range	15-35°C	N/A
Humidity range	20-75%	N/A
Pressure range	86-106kPa	N/A
Power supply	DC 5V or Battery 3VDC	N/A
Note: N/A is an abbreviation for Not Applicable.		

1.8. Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for radio frequency	$\pm 7 \times 10^{-8}$	
Conducted Emissions (150kHz~30MHz)	$\pm 2.54\text{dB}$	
Radiated Emission(9KHz~30MHz)	$\pm 1.6\text{ dB}$	
Radiated Emission(30MHz~1GHz)	Vertical: $\pm 4.14\text{dB}$ Horizontal: $\pm 4.25\text{dB}$	
Radiated Emission(1GHz~6GHz)	$\pm 3.9\text{dB}$	
Radiated Emission(6GHz~18GHz)	$\pm 4.3\text{dB}$	
Radiated Emission(18GHz~40GHz)	$\pm 3.38\text{dB}$	
Uncertainty for conducted RF Power	$\pm 0.20\text{dB}$	
Conducted spurious emissions	$\pm 0.24\text{dB}$	
Uncertainty for temperature	0.6°C	

Uncertainty for humidity	1%	
Bandwidth	$\pm 1.5 \times 10^{-6}$	
Time	$\pm 2\%$	
Duty Cycle	$\pm 2\%$	
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%		

1.9. Test Facility

Site Description		
Name of Firm	:	Shenzhen BKC Testing Co., Ltd.
Site Location	:	Room 103, 1/F, Huaya Building, Huaya Industrial Park, Longhua Community, Longhua District, Shenzhen, Guangdong, China.
FCC Designation Number	:	CN1416
FCC Test Firm Registration Number	:	701543

1.10. Test Equipment

Conducted Test Site

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	102762	Mar. 11. 2026	Mar. 10. 2027
2	EMI Test Receiver	R&S	ESCI	101424	Mar. 11. 2026	Mar. 10. 2027
3	Rf cables	HTEC	HCE 2M-CE	N/A	Mar. 11. 2026	Mar. 10. 2027
4	Coupling/ Decoupling Network	Diamond	CX210	N/A	Mar. 11. 2026	Mar. 10. 2027
5	CE Testing software	EZ	EZ-EMC	/	/	/

Radiated Test Site(Below 1G and Above 1G)

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Antenna	Schwarzbeck	VULB 9168	01321	Mar. 20. 2025	Mar. 19. 2028
2	EMI Test Receiver	R&S	ESRP	101478	Mar. 11. 2026	Mar. 10. 2027
3	Preamplifier	HP	8447D	2727A05345	Mar. 11. 2026	Mar. 10. 2027
4	Double Ridged Broadband	SCHWARZBECK	BBHA 9120D	02621	Mar. 10. 2025	Mar. 19. 2028
5	Preamplifier	Schwarzbeck	BBV 9718D	00041	Mar. 11. 2026	Mar. 10. 2027
6	Rf cables	HUBER+SUHNER	8M-RE	N/A	Mar. 11. 2026	Mar. 10. 2027
7	Rf cables	HUBER+SUHNER	1.5M-RE	N/A	Mar. 11. 2026	Mar. 10. 2027
8	Rf cables	HUBER+SUHNER	1.5M-AP-RE	N/A	Mar. 09. 2026	Mar. 10. 2027
9	Spectrum	Agilent	N9020A	MY50510311	Mar. 11. 2026	Mar. 10. 2027
10	Spectrum analyzer	R&S	FSP40	200061	Mar. 11. 2026	Mar. 10. 2027

11	Double Ridged Broadband Horn Antenna	COM-POWER	AH-1840	10100009	Mar. 11. 2026	Mar. 10. 2027
12	RE Testing software	EZ	EZ-EMC	/	/	/

RF Test Site

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum	Agilent	N9020A	MY50510311	Mar. 11. 2026	Mar. 10. 2027
2	Vector source	Agilent	N5182A	MY47420223	Mar. 11. 2026	Mar. 10. 2027
3	All instrument	Rohde & Schwarz	CMW 500	101131	Mar. 11. 2026	Mar. 10. 2027
4	control unit	MW	MW100-RFCB	MW200411BK-34	Mar. 11. 2026	Mar. 10. 2027
5	Spectrum analyzer	R&S	FSP40	200061	Mar. 11. 2026	Mar. 10. 2027
6	RF Testing software	MW	MTS 8310	/	/	/

Test software

Software name	RF Testing software
Software version	2.0.0.0
Software name	RE Testing software
Software version	EMEC-03A2 RE+
Software name	CE Testing software
Software version	EMEC-3A1+

2. Conducted emission at the mains terminals test

2.1.Limit

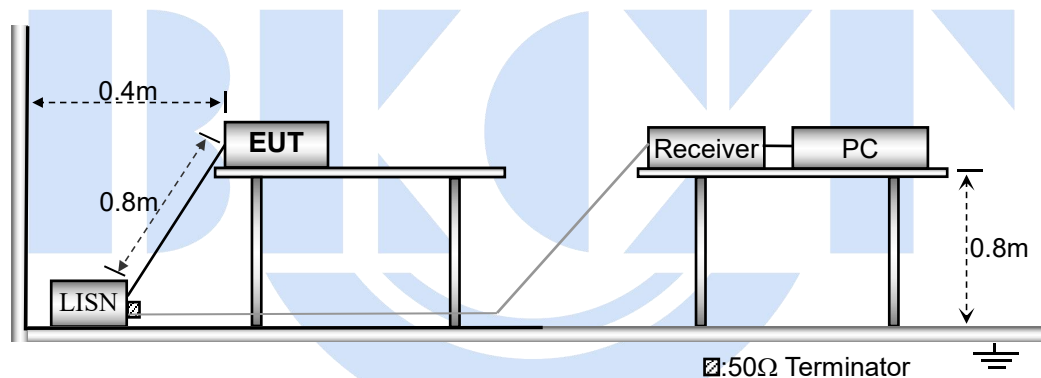
Test Requirement:	FCC Part15 C Section 15.207
Test Method:	C63.10-2020+Cor1-2023
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

2.2.Test Setup



2.3.Test Procedure

1. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
2. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
3. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
4. LISN at least 80 cm from nearest part of EUT chassis.
5. For the actual test configuration, please refer to the related Item-EUT Test Photos.

2.4.Test Result

Not applicable for DC product.

3. Radiated Spurious Emissions

3.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.209
Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02;
C63.10-2020+Cor1-2023
Test Result: PASS
Measurement Distance: 3m

Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

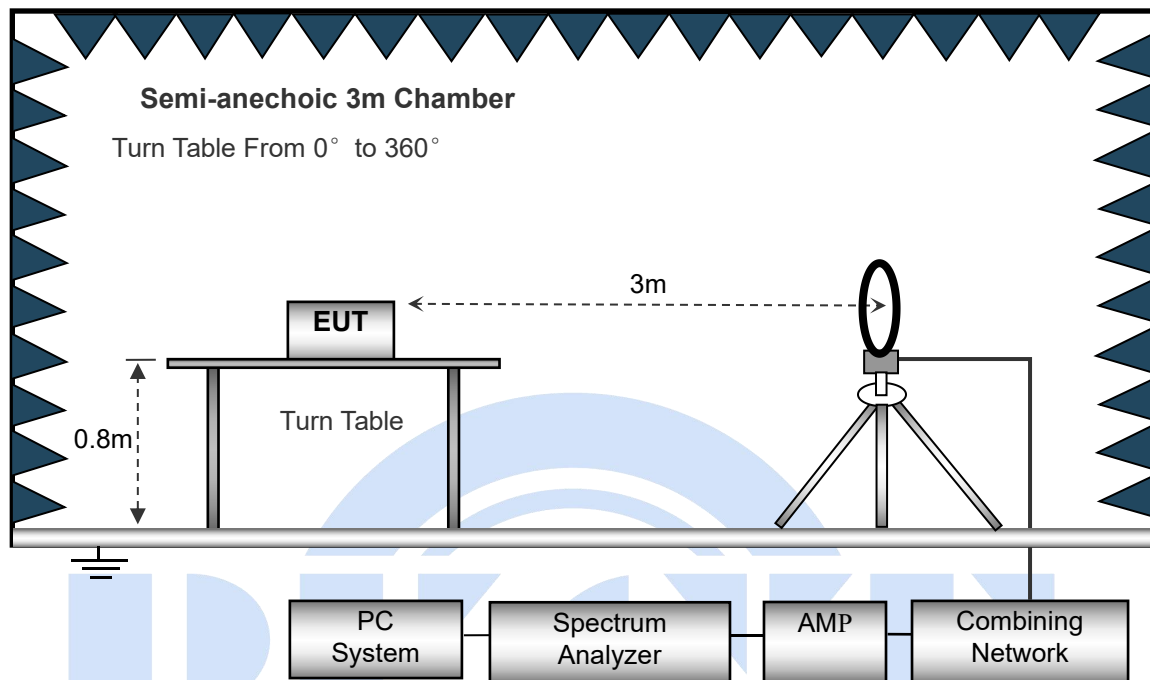
Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log(2400/F(\text{kHz})) + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log(24000/F(\text{kHz})) + 40$
1.705 ~ 30	30	30	$100 * 30$	$20\log(30) + 40$
30 ~ 88	100	3	100	$20\log(100)$
88 ~ 216	150	3	150	$20\log(150)$
216 ~ 960	200	3	200	$20\log(200)$
Above 960	500	3	500	$20\log(500)$

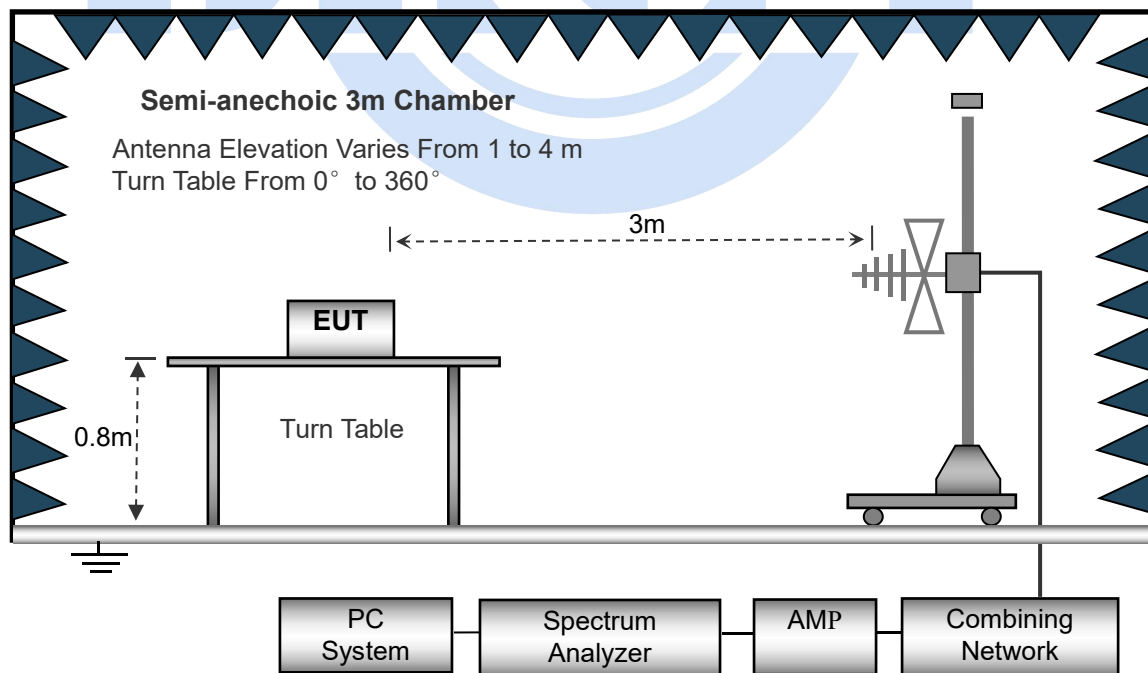
3.2. Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the C63.10-2020+Cor1-2023.

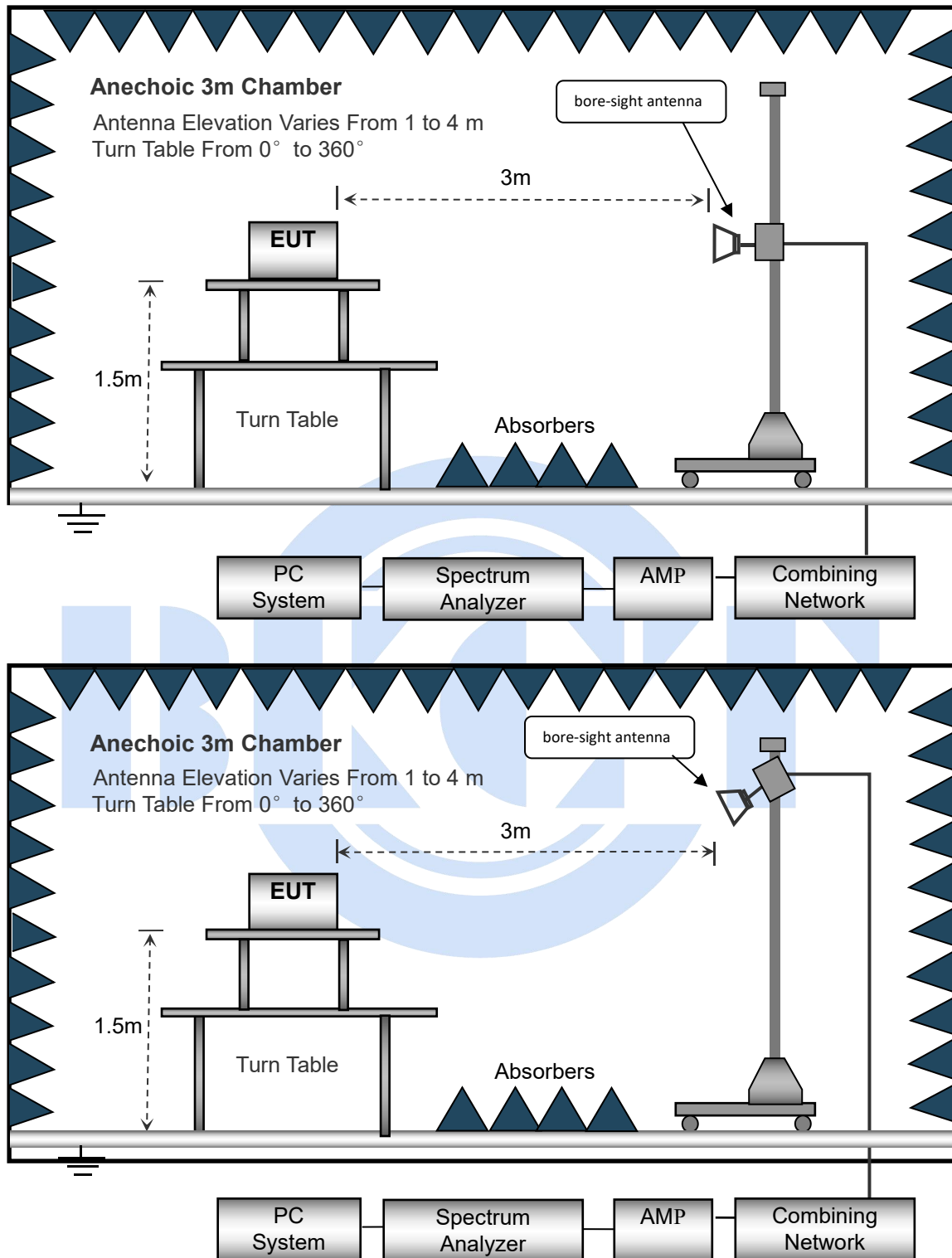
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



3.3. Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in Z axis,so the worst data were shown as follow.
8. A 2.4GHz high - pass filter is used during radiated emissions above 1GHz measurement.



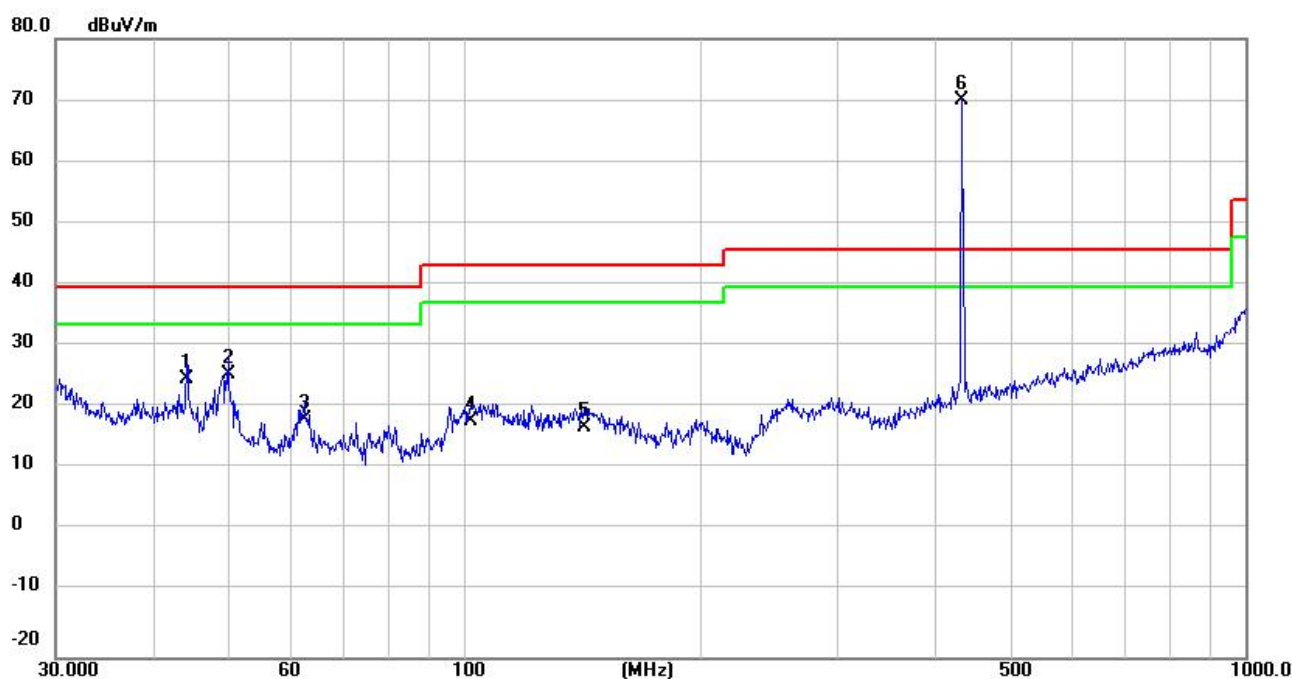
3.4. Test Result

Test Frequency: 9KHz~30MHz

The measurements were more than 20 dB below the limit and not reported.

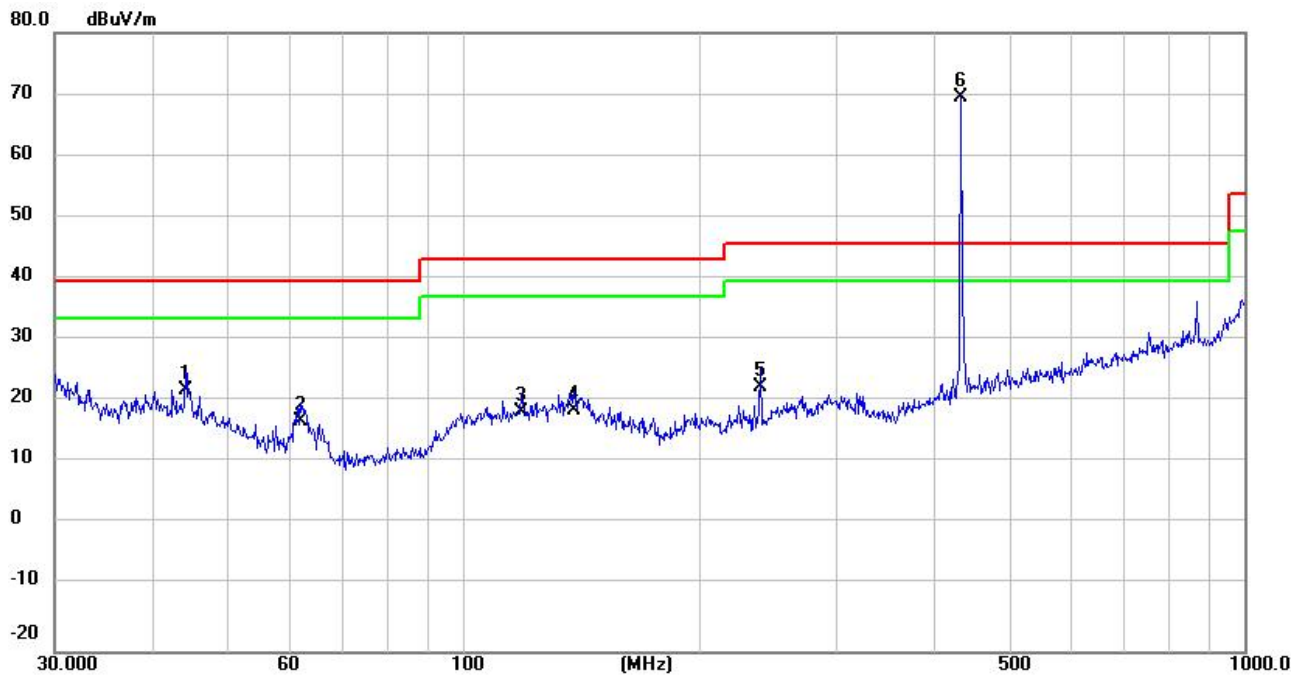
Test Frequency : 30MHz ~ 1GHz

Radiation Emission Test Data			
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Horizontal
Test Voltage :	3VDC	Test Mode	TX Mode



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark			
1	44.1200	28.79	-3.64	25.15	40.00	-14.85	QP			
2	49.8813	31.63	-5.78	25.85	40.00	-14.15	QP			
3	62.4313	28.46	-9.96	18.50	40.00	-21.50	QP			
4	102.0013	22.86	-4.66	18.20	43.50	-25.30	QP			
5	142.3242	20.07	-2.78	17.29	43.50	-26.21	QP			
6	434.0650	69.92	0.04	69.96	80.8	-10.84	peak			

Radiation Emission Test Data			
Temperature:	25.1°C	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Vertical
Test Voltage :	3VDC	Test Mode	TX Mode



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark			
1	44.1200	26.10	-3.64	22.46	40.00	-17.54	QP			
2	61.9949	27.33	-9.93	17.40	40.00	-22.60	QP			
3	118.6012	22.12	-3.32	18.80	43.50	-24.70	QP			
4	138.8734	21.61	-2.65	18.96	43.50	-24.54	QP			
5	239.9873	27.53	-4.73	22.80	46.00	-23.20	QP			
6	434.0649	69.65	0.04	69.69	80.8	-11.11	peak			

For average Emission

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit AV	Margin	Polarization
433.9200	69.69	-9.82	59.87	80.8	-20.93	Horizontal

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit AV	Margin	Polarization
433.9200	69.96	-9.82	60.14	80.8	-20.66	Vertical

Notes: 1. Average emission Level = Peak Level + Duty cycle factor

2. Duty cycle level please see clause 5.

Radiated Spurious Emission (1GHz to 10th harmonics)

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit		Margin dB		Polarization
				PK	AV	PK	AV	
1301.25	41.20	-9.82	31.38	74.00	54.00	-32.80	-22.62	Vertical
1735.12	41.23	-9.82	29.41	80.80	60.80	-39.57	-31.39	Vertical
2169.47	42.12	-9.82	31.57	80.80	60.80	-38.68	-29.23	Vertical
2603.52	45.80	-9.82	30.62	80.80	60.80	-35.00	-30.18	Vertical
3037.45	44.30	-9.82	30.26	80.80	60.80	-36.50	-30.54	Vertical
3471.36	42.55	-9.82	31.92	80.80	60.80	-38.25	-28.88	Vertical
1301.57	42.02	-9.82	34.85	74.00	54.00	-31.98	-19.15	Horizontal
1735.63	44.99	-9.82	35.01	80.80	60.80	-35.81	-25.79	Horizontal
2169.25	43.16	-9.82	35.94	80.80	60.80	-37.64	-24.86	Horizontal
2603.45	41.27	-9.82	31.50	80.80	60.80	-39.53	-29.30	Horizontal
3037.39	41.53	-9.82	36.78	80.80	60.80	-39.27	-24.02	Horizontal
3471.38	46.19	-9.82	34.96	80.80	60.80	-34.61	-25.84	Horizontal

Notes: 1.Average emission Level = Peak Level + Duty cycle factor

2.Duty cycle level please see clause 6.

4. Bandwidth Test

4.1.Limit

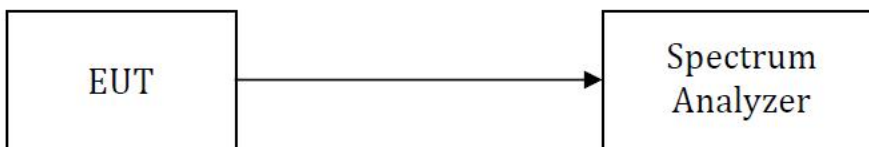
Test Requirement: FCC CFR47 Part 15 Section 15.231(c)
Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02;
C63.10-2020+Cor1-2023
Test Result: PASS

Limit:

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating between 70 MHz to 900 MHz. Those devices operating above 900 MHz, the emission spurious shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

B.W (20dBc) Limit = $0.25\% * f(\text{MHz}) = 0.25\% * 433.92\text{MHz} = 1.0848\text{MHz}$

4.2.Test Setup

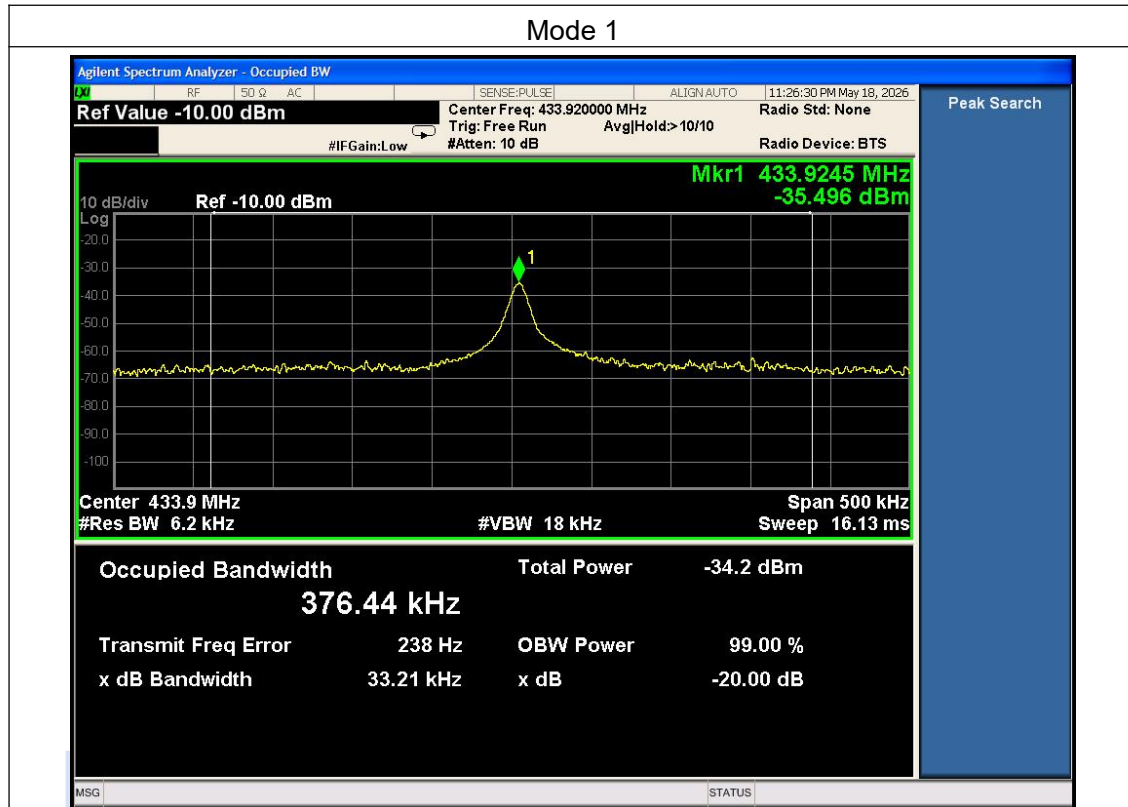


4.3.Test Procedure

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	1-5%OBW
VB	≥RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.Test Result

Frequency	20dB Bandwidth (KHz)	Limit (MHz)	Result
433.92MHz	33.21	1.0848	PASS



5. Calculation of Average Factor

5.1.Calculation

The output field strengths of specification in accordance with the FCC rules specify measurements with an average detector. During the test, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

The duty cycle is measured in 100 ms or the repetition cycle period, whichever is a shorter time frame. The duty cycle is measured by placing the spectrum analyzer to set zero span at 1MHz resolution bandwidth.

Averaging factor in dB = $20\log(\text{duty cycle})$

The duration of one cycle = 51ms

The duty cycle is simply the on-time divided the duration of one cycle

Duty Cycle = $(1.22\text{ms} \times 7 + 0.44\text{ms} \times 18) / 51$

= 16.46ms / 51ms

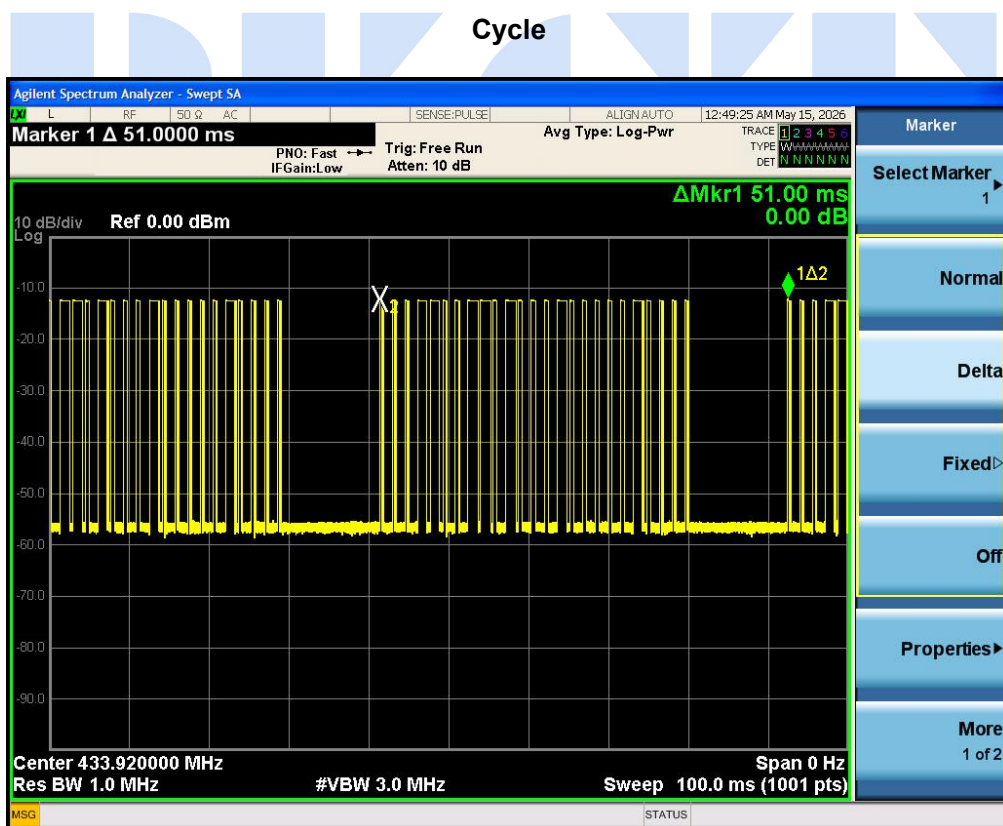
= 0.323

Therefore, the averaging factor is found by $20\log 0.323 = -9.82\text{dB}$

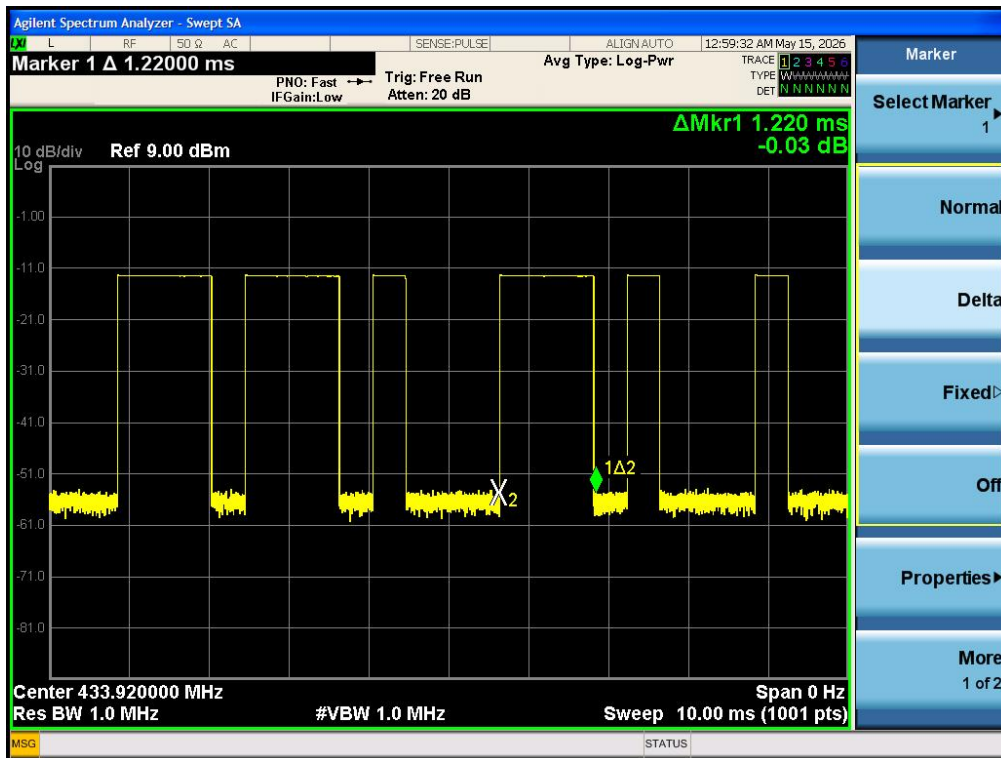
Test plot as follows:

Note: During the 100ms, the amount of pulse and on-time of pulse are the same for every pulse train.

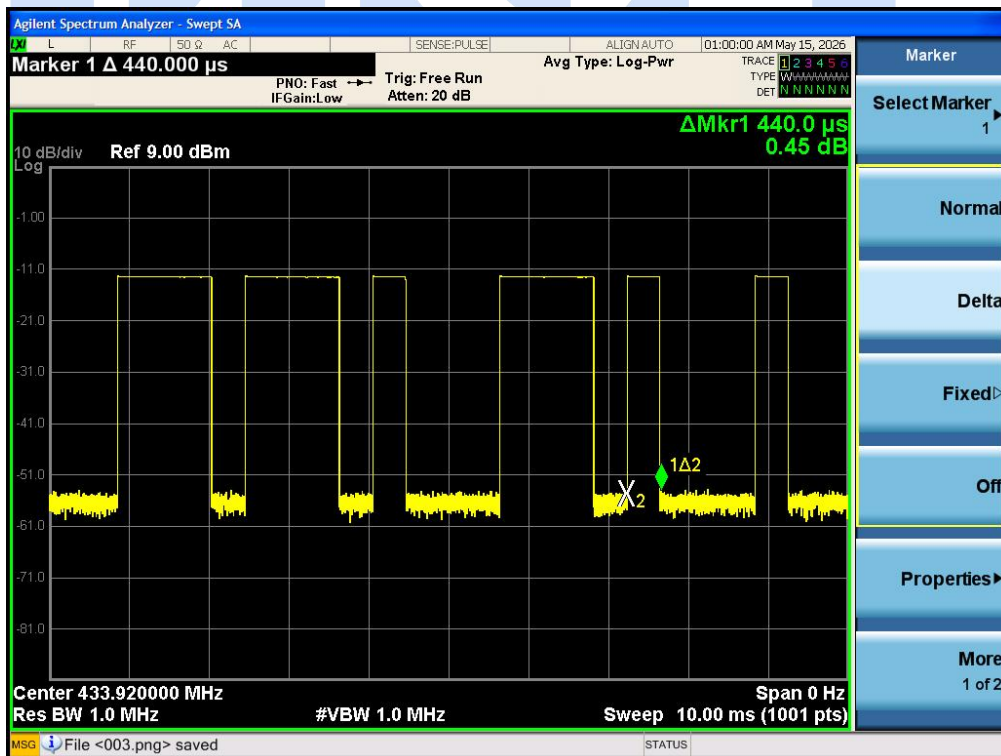
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage :	3VDC
Test Mode :	TX Mode		



On-time 1



On-time 2



6. Dwell time

6.1. Applicable Standard

According to FCC 15.231(a) and RSS-210 A1.1 requirement:

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

6.2. Test Setup



6.3. Test Procedure

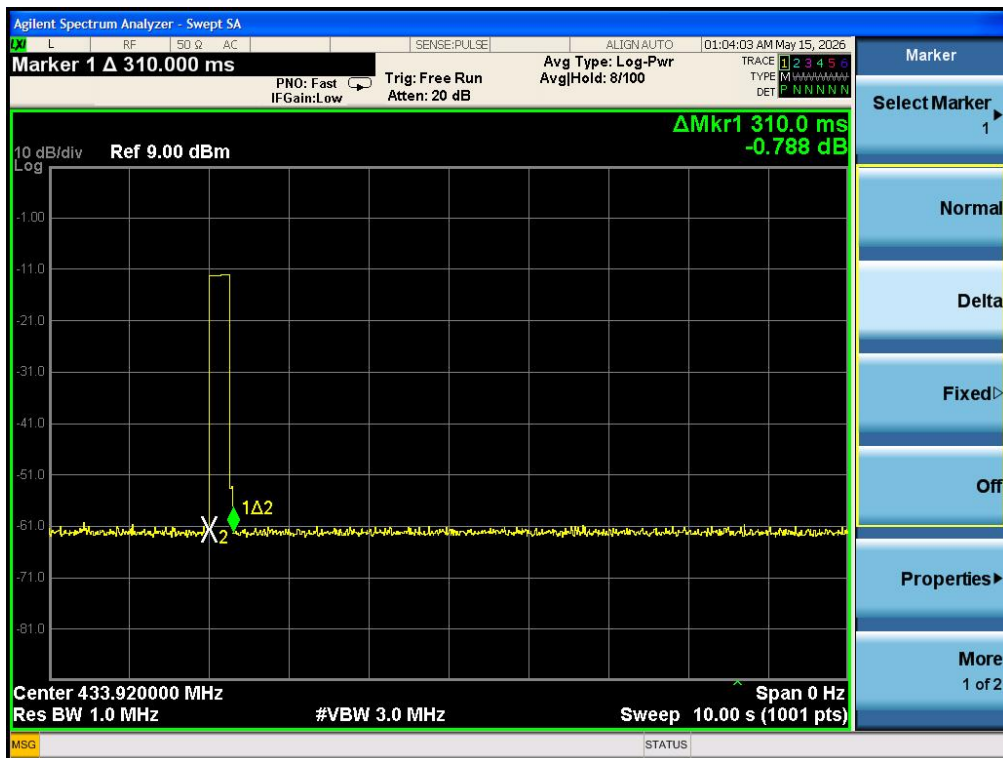
Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

1. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
2. Set RBW to 1MHz and VBW of spectrum analyzer to 3MHz with a convenient frequency span including 100 KHz bandwidth from band edge.
3. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
4. Repeat above procedures until all measured frequencies were complete.

6.4. Test Result

Dwell time (second)	Limit (second)	Result
0.31	<5	Pass

Test plot as follows:



7. Antenna Requirement

According to the FCC Part 15 Paragraph 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. This product is equipped with a PCB antenna, which can meet the requirements of this section.

8. Test Photographs

Please see the attachment for Test Photographs.

9. Photos of the EUT

Please refer to the external and internal photos in the attachment.



***** END OF REPORT *****