

**FCC - TEST REPORT**Report Number : **60.790.19.037.01R01** Date of Issue : November 19, 2019Model : **AOLD-2056A**Product Type : **Weather Station**Applicant : **AOK ELECTRONIC LIMITED**Address : Tianxin Industrial District, Dahou Village, Xiegang Town,  
Dongguan City, Guangdong Province, ChinaProduction Facility : **AOLD ELECTRONIC LIMITED**Address : Tianxin Industrial District, Dahou Village, Xiegang Town,  
Dongguan City, Guangdong Province, ChinaTest Result : ☒ **Positive** ☐ **Negative**Total pages  
including  
Appendices : 18

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# 1 Table of Contents

1 Table of Contents .....	2
2 Description of Equipment Under Test.....	3
3 Summary of Test Standards .....	4
4 Details about the Test Laboratory .....	5
4.1 Test Equipment Site List .....	6
4.2 Measurement System Uncertainty .....	7
5 Summary of Test Results .....	8
6 General Remarks .....	9
7 Test Setups .....	10
7.1 Radiated test setups 9kHz-30MHz.....	10
7.2 Radiated test setups Below 1GHz .....	10
7.3 Radiated test setups Above 1GHz .....	10
7.4 AC Power Line Conducted Emission test setups .....	11
7.5 Conducted RF test setups.....	11
8 Emission Test Results .....	12
8.1 Spurious Radiated Emission .....	12
8.2 20dB Bandwidth .....	16
8.3 Transmission Time .....	17

## 2 Description of Equipment Under Test

### Description of the Equipment Under Test

Product: Weather Station

Model no.: AOLD-2056A

FCC ID: 2AJOATX2056A

Rating: 3 VDC (2 x 1.5V AA battery)

Frequency: 433.92MHz

Antenna gain: 0 dBi

Number of operated channel: 1

Modulation: ASK

### Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
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### 3 Summary of Test Standards

Test Standards
FCC Part 15 Subpart C 10-1-18 Edition Federal Communications Commission, PART 15 — Radio Frequency Devices, Subpart C — Unintentional Radiators

## 4 Details about the Test Laboratory

### Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch  
Building 12&13 Zhiheng Wisdomland Business Park,  
Nantou Checkpoint Road 2,  
Shenzhen 518052, P.R.China  
FCC Registration Number: 514049

Emission Tests	
Test Item	Test Site
<b>FCC Part 15 Subpart C</b>	
FCC Title 47 Part 15.205, 15.209 & 15.231(e) Radiated Emission	Site1
FCC Title 47 Part 15.207 Conduct Emission	NIL
FCC Title 47 Part 15.231(c) 20dB Bandwidth	Site 1
FCC Title 47 Part 15.231(e) Transmission Time	Site 1

## 4.1 Test Equipment Site List

### Radiated emission Test – Site 1

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2020-6-28
Signal Analyzer	Rohde & Schwarz	FSV40	101031	2020-6-28
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100398	2020-7-7
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2020-7-5
Horn Antenna	Rohde & Schwarz	HF907	102294	2020-6-22
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	12827	2020-7-5
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2020-6-28
Pre-amplifier	Rohde & Schwarz	SCU 40A	100432	2020-6-28
Attenuator	Agilent	8491A	MY39264334	2020-6-28
3m Semi-anechoic chamber	TDK	9X6X6	----	2020-7-7
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

### Conducted Emission Test – Site 1

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2020-6-28
LISN	Rohde & Schwarz	ENV4200	100249	2020-6-28
LISN	Rohde & Schwarz	ENV432	101318	2020-7-19
LISN	Rohde & Schwarz	ENV216	100326	2020-6-28
ISN	Rohde & Schwarz	ENY81	100177	2020-6-28
ISN	Rohde & Schwarz	ENY81-CA6	101664	2020-6-28
High Voltage Probe	Rohde & Schwarz	TK9420(VT9420)	9420-584	2020-6-24
RF Current Probe	Rohde & Schwarz	EZ-17	100816	2020-7-2
Attenuator	Shanghai Huaxiang	TS2-26-3	080928189	2020-6-28
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

### 20dB Bandwidth, Transmission Time – Site 1

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2020-6-28

## 4.2 Measurement System Uncertainty

### Measurement System Uncertainty Emissions

System Measurement Uncertainty	
Items	Extended Uncertainty
Uncertainty for Radiated Emission in 3m chamber 9kHz-30MHz	4.46dB
Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.91dB; Vertical: 4.89dB;
Uncertainty for Radiated Emission in 3m chamber 1000MHz-25000MHz	Horizontal: 4.80dB; Vertical: 4.79dB;
Uncertainty for Conducted Emission 150kHz-30MHz	3.21dB
Uncertainty for Conducted RF test	2.13dB
Uncertainty for Frequency RF test	$0.6 \times 10^{-7}$

## 5 Summary of Test Results

Emission Tests				
FCC Part 15 Subpart C				
Test Condition	Pages	Test Result		
		Pass	Fail	N/A
FCC Title 47 Part 15.205, 15.209 & 15.231(e) Radiated Emission	12-15	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FCC Title 47 Part 15.207 Conduct Emission (1)	NIL	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FCC Title 47 Part 15.231(c) 20dB Bandwidth	16	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FCC Title 47 Part 15.231(e) Transmission Time	17-18	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Remark:

1) Conducted Emission testing is not applicable for battery operated device.



## 6 General Remarks

### Remarks

This submittal(s) (test report) is intended for **FCC ID: 2AJOATX2056A**, complies with Section 15.205, 15.207, 15.209, 15.231 of the FCC Part 15, Subpart C rules.

The TX frequency is 433.92MHz.

### SUMMARY:

- All tests according to the regulations cited on page 8 were

☒ - Performed

☐ - **Not** Performed

- The Equipment Under Test

☒ - **Fulfills** the general approval requirements.

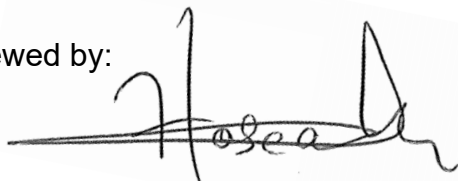
☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: October 24, 2019

Testing Start Date: October 30, 2019

Testing End Date: November 8, 2019

Reviewed by:



Hosea CHAN  
EMC Project Engineer

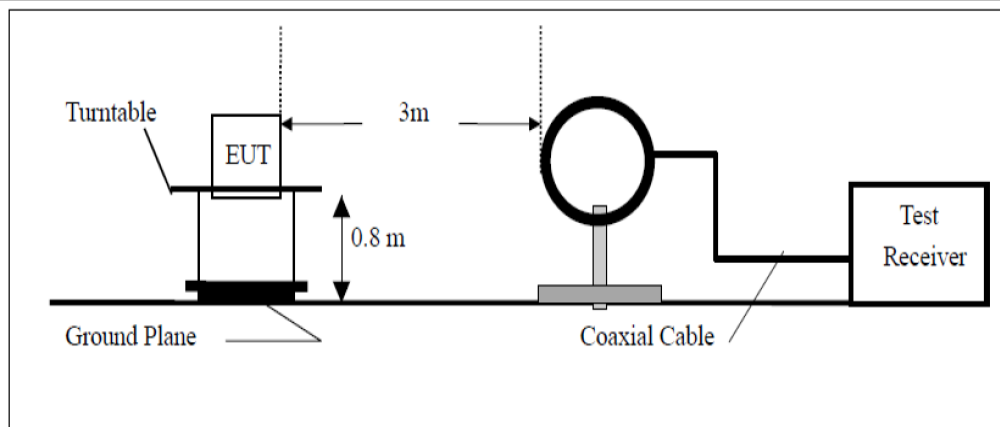
Prepared by:



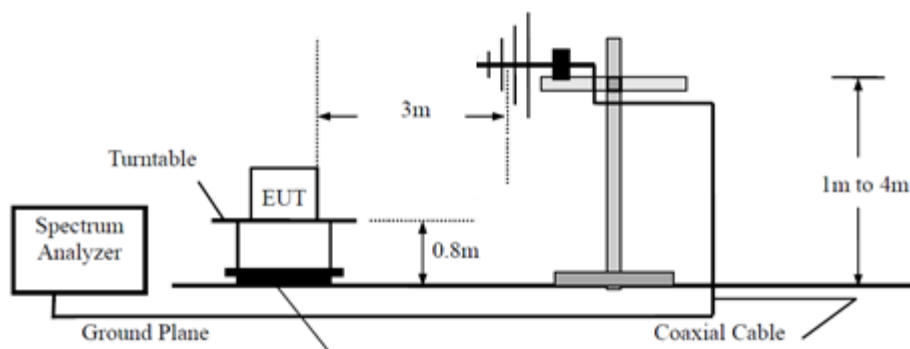
Eric LI  
EMC Senior Project Engineer

## 7 Test Setups

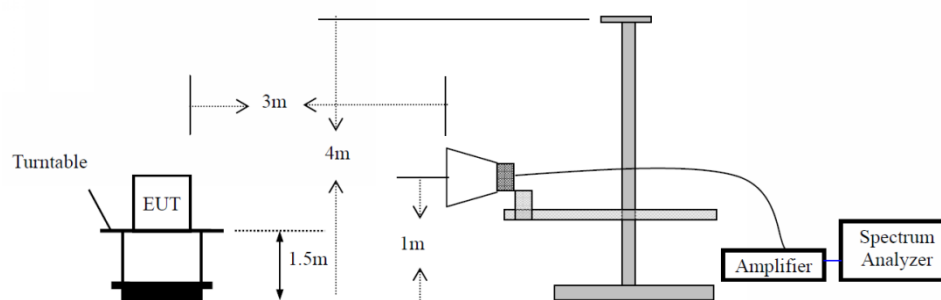
### 7.1 Radiated test setups 9kHz-30MHz



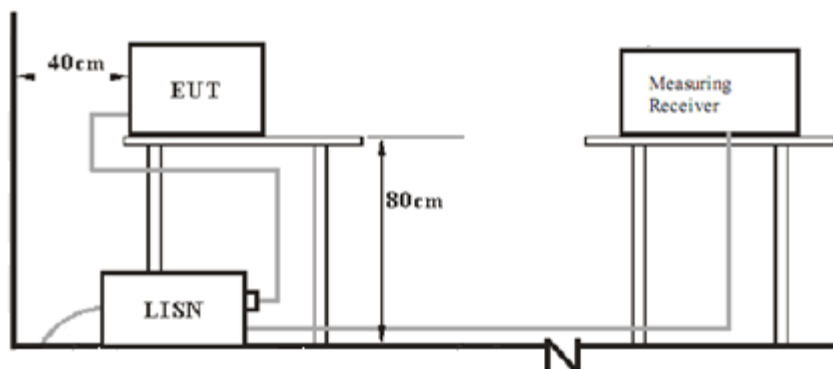
### 7.2 Radiated test setups Below 1GHz



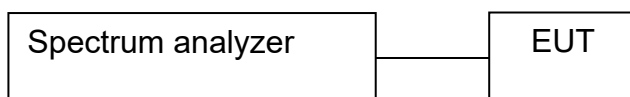
### 7.3 Radiated test setups Above 1GHz



## 7.4 AC Power Line Conducted Emission test setups



## 7.5 Conducted RF test setups



## 8 Emission Test Results

### 8.1 Spurious Radiated Emission

EUT: AOLD-2056A  
 Op Condition: Operated, TX Mode (433.92MHz)  
 Test Specification: FCC15.205, 15.209 & 15.231(e) Antenna: Horizontal  
 Comment: 3 VDC  
 Remark: 9kHz to 5GHz

Test Result	
<input checked="" type="checkbox"/>	Passed
<input type="checkbox"/>	Not Passed

Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector PK/QP/AV	Corr. (dB)
433.92	65.70	92.87	-27.17	Peak	-23.1
867.84	53.86	72.87	-19.01	Peak	-16.6
1301.76	48.24	74.00	-25.76	Peak	-11.7
1735.68	45.32	74.00	-28.68	Peak	-9.7
2169.60	42.38	74.00	-31.62	Peak	-7.3
2603.52	62.62	74.00	-11.38	Peak	-5.9
3037.44	52.57	74.00	-21.43	Peak	-4.1
3471.36	49.68	74.00	-24.32	Peak	-2.6
3905.28	48.30	74.00	-25.70	Peak	-1.3
4339.20	39.04	74.00	-34.96	Peak	0.2

Frequency MHz	PK Result @3m dBμV/m	Duty Cycle Factor dB	AV Result @3m dBμV/m	Limit dBμV/m	Margin dB
433.92	65.70	-11.78	53.92	72.87	-18.95
867.84	53.86	-11.78	42.08	52.87	-10.79
1301.76	48.24	-11.78	36.46	54.00	-17.54
1735.68	45.32	-11.78	33.54	54.00	-20.46
2169.60	42.38	-11.78	30.60	54.00	-23.40
2603.52	62.62	-11.78	50.84	54.00	-3.16
3037.44	52.57	-11.78	40.79	54.00	-13.21
3471.36	49.68	-11.78	37.90	54.00	-16.10
3905.28	48.30	-11.78	36.52	54.00	-17.48
4339.20	39.04	-11.78	27.26	54.00	-26.74

Average value = Peak value + Duty cycle factor

## Spurious Radiated Emission

EUT: AOLD-2056A  
 Op Condition: Operated, TX Mode (433.92MHz)  
 Test Specification: FCC15.205, 15.209 & 15.231(e) Antenna: Vertical  
 Comment: 3 VDC  
 Remark: 9kHz to 5GHz

### Test Result

☒ Passed  
☐ Not Passed

Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector PK/QP/AV	Corr. (dB)
433.92	76.46	92.87	-16.41	Peak	-23.1
867.84	60.27	72.87	-12.60	Peak	-16.6
1301.76	59.00	74.00	-15.00	Peak	-11.7
1735.68	48.43	74.00	-25.57	Peak	-9.7
2169.60	45.23	74.00	-28.77	Peak	-7.3
2603.52	61.26	74.00	-12.74	Peak	-5.9
3037.44	50.69	74.00	-23.31	Peak	-4.1
3471.36	55.58	74.00	-18.42	Peak	-2.6
3905.28	52.27	74.00	-21.73	Peak	-1.3
4339.20	43.26	74.00	-30.74	Peak	0.2
4773.12	41.85	74.00	-32.15	Peak	2.4

Frequency MHz	PK Result @3m dBμV/m	Duty Cycle Factor dB	AV Result @3m dBμV/m	Limit dBμV/m	Margin dB
433.92	76.46	-11.78	64.68	72.87	-8.19
867.84	60.27	-11.78	48.49	52.87	-4.38
1301.76	59.00	-11.78	47.22	54.00	-6.78
1735.68	48.43	-11.78	36.65	54.00	-17.35
2169.60	45.23	-11.78	33.45	54.00	-20.55
2603.52	61.26	-11.78	49.48	54.00	-4.52
3037.44	50.69	-11.78	38.91	54.00	-15.09
3471.36	55.58	-11.78	43.80	54.00	-10.20
3905.28	52.27	-11.78	40.49	54.00	-13.51
4339.20	43.26	-11.78	31.48	54.00	-22.52
4773.12	41.85	-11.78	30.07	54.00	-23.93

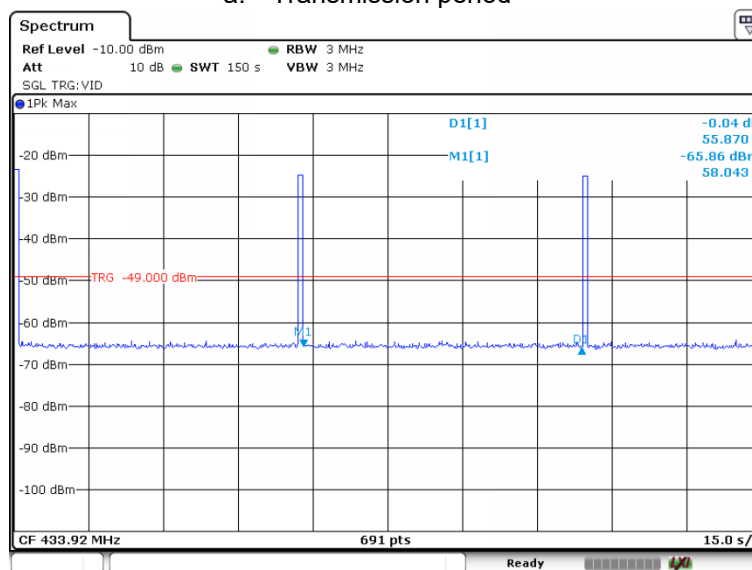
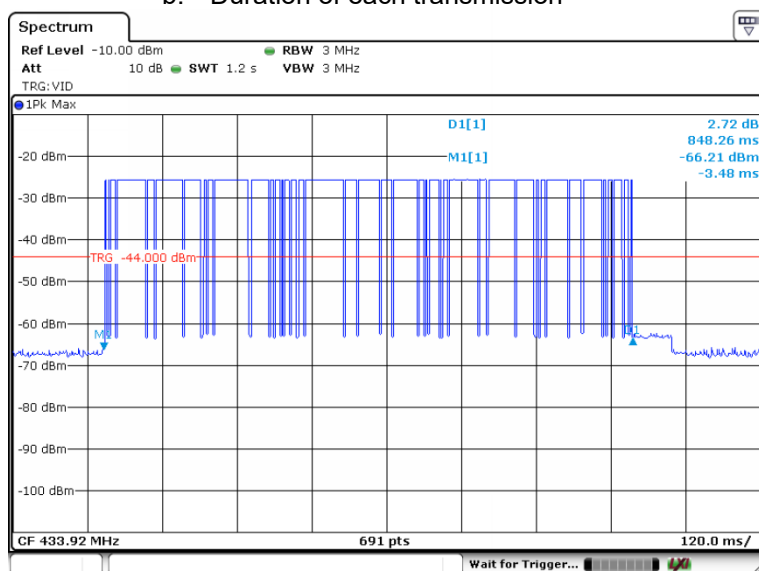
Average value = Peak value + Duty cycle factor

**Spurious Radiated Emission**

EUT: AOLD-2056A  
Op Condition: Operated, TX Mode (433.92MHz)  
Test Specification: FCC15.205, 15.209 & 15.231(e)  
Comment: 3 VDC  
Remark: Duct Cycle Factor Calculation

**Test Result**

☒ Passed  
☐ Not Passed

**Duct Cycle Factor Calculation****a. Transmission period****b. Duration of each transmission**

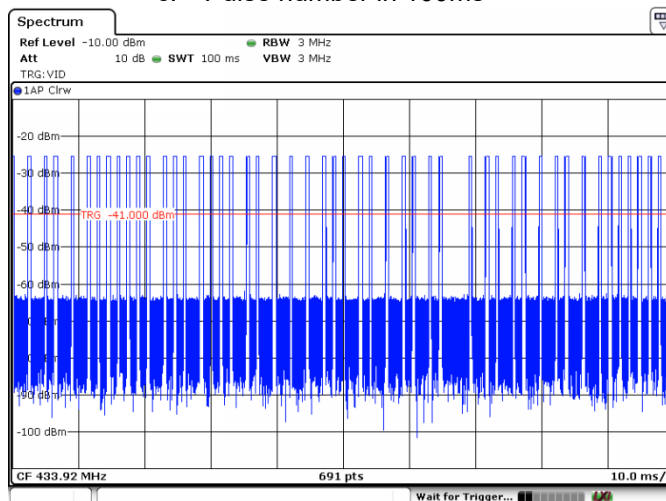
## Spurious Radiated Emission

EUT: AOLD-2056A  
 Op Condition: Operated, TX Mode (433.92MHz)  
 Test Specification: FCC15.205, 15.209 & 15.231(e)  
 Comment: 3 VDC  
 Remark: Duct Cycle Factor Calculation

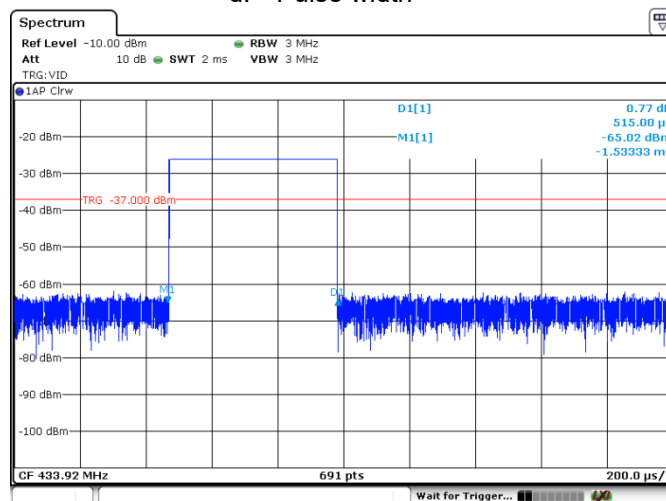
Test Result

☒ Passed☐ Not Passed

c. Pulse number in 100ms



d. Pulse width



### Calculation:

$T_p = 100\text{ms}$  (Max. allowed  $T_p$  for calculation)

Number of pulse in  $T_p = 50$ ,

Pulse width =  $0.515\text{ms}$

$T_{on} = \text{Pulse width} \times \text{Number of pulses in } T_p$   
 $= 25.75\text{ ms}$

Duty cycle factor =  $20 \times \log(T_{on}/T_p) = -11.78\text{dB}$

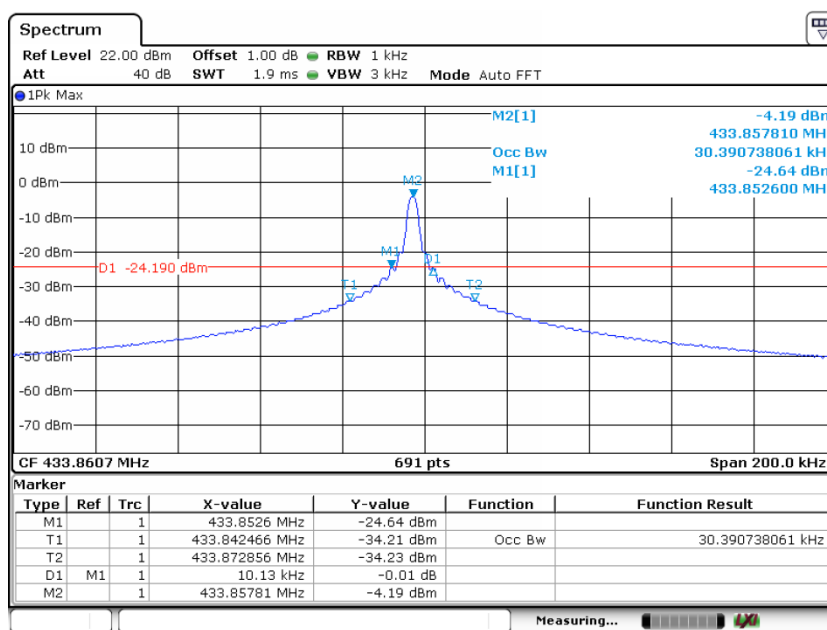
## 8.2 20dB Bandwidth

EUT: AOLD-2056A  
 Op Condition: Operated, TX Mode (433.92MHz)  
 Test Specification: FCC15.231(c) 20dB Bandwidth  
 Comment: 3 VDC

Test Result

☒ Passed

☐ Not Passed



Date: 7.NOV.2019 17:15:00

Bandwidth	Measured Value	Limit
20dB bandwidth	10.13 kHz	<= 1084.8 kHz
Limit=0.25%*Center Frequency=0.25%*433.92MHz=1084.8kHz		



### 8.3 Transmission Time

EUT: AOLD-2056A  
Op Condition: Operated, TX Mode (433.92MHz)  
Test Specification: FCC15.231(e)  
Comment: 3 VDC

Test Result

☒ Passed☐ Not Passed

Frequency	Duration of each transmission	Limit	Silent period	Limit
433.92MHz	848.26ms	< 1s	55.87s	≥ 25.4478s

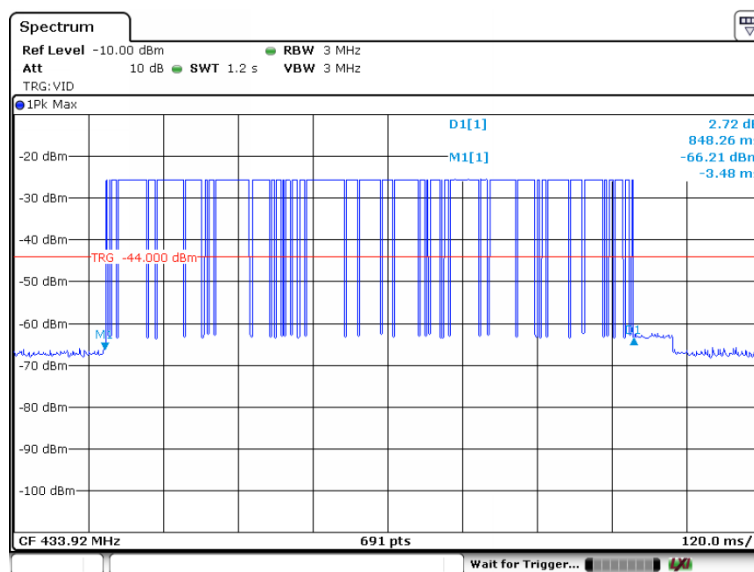
Silent period should be at least 30 times the duration of the transmission but in no case less than 10 seconds

**Transmission Time**

EUT: AOLD-2056A  
Op Condition: Operated, TX Mode (433.92MHz)  
Test Specification: FCC15.231(e)  
Comment: 3 VDC

**Test Result**

☒ Passed  
☐ Not Passed

**Duration of each transmission****Transmission period**