

## FCC - TEST REPORT

Report Number : **60.790.19.037.01R01** Date of Issue : November 19, 2019

Model : **AOLD-2056A**

Product Type : **Weather Station**

Applicant : **AOK ELECTRONIC LIMITED**

Address : Tianxin Industrial District, Dahou Village, Xiegang Town,  
Dongguan City, Guangdong Province, China

Production Facility : **AOLD ELECTRONIC LIMITED**

Address : Tianxin Industrial District, Dahou Village, Xiegang Town,  
Dongguan City, Guangdong Province, China

Test Result :  **Positive**  **Negative**

Total pages  
including  
Appendices : 18

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## 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	Version9.15.00	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	0.6×10 <sup>-7</sup>



## 5 Summary of Test Results

Emission Tests				
<b>FCC Part 15 Subpart C</b>				
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.

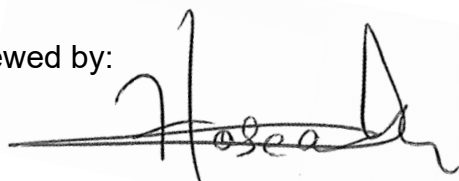
- **Does not** fulfill the general approval requirements.

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

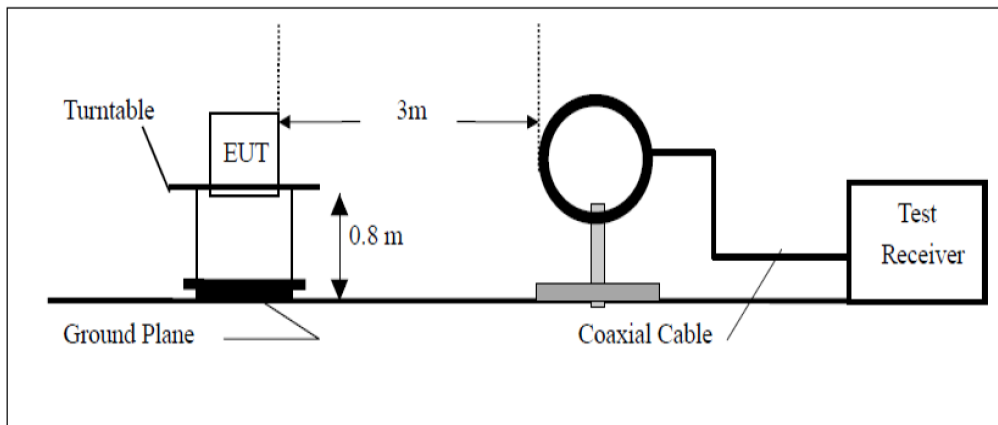
Prepared by:



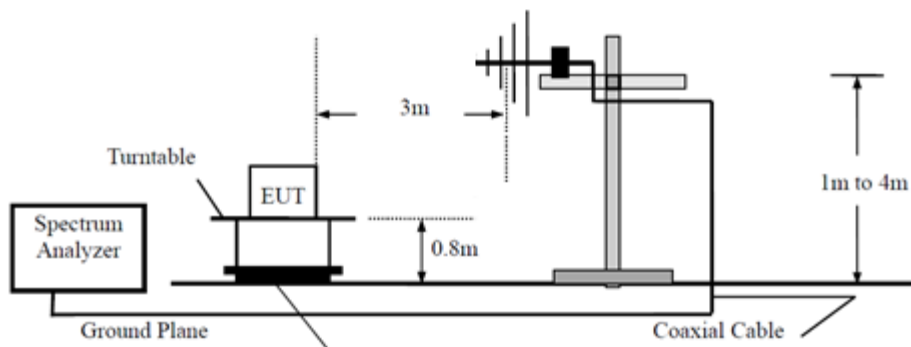
Eric LI  
EMC Senior Project Engineer

## 7 Test Setups

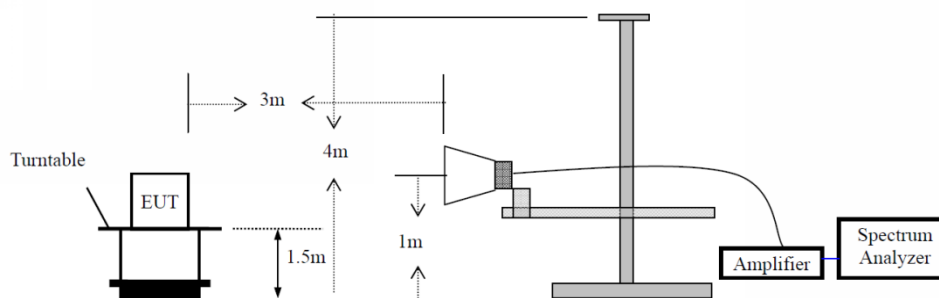
### 7.1 Radiated test setups 9kHz-30MHz



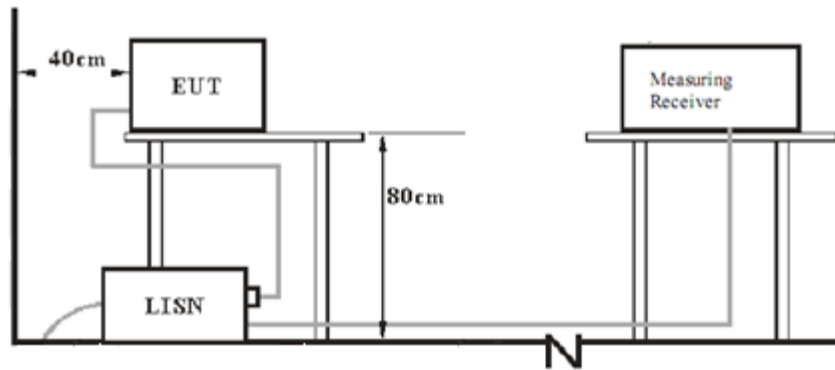
### 7.2 Radiated test setups Below 1GHz



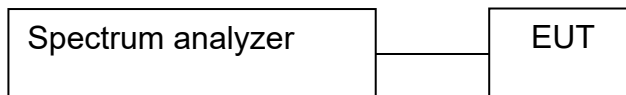
### 7.3 Radiated test setups Above 1GHz



## 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 dB $\mu$ V/m	Limit dB $\mu$ V/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 dB $\mu$ V/m	Duty Cycle Factor dB	AV Result @3m dB $\mu$ V/m	Limit dB $\mu$ V/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	
<input checked="" type="checkbox"/>	Passed
<input type="checkbox"/>	Not Passed

Frequency MHz	Result dB $\mu$ V/m	Limit dB $\mu$ V/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 dB $\mu$ V/m	Duty Cycle Factor dB	AV Result @3m dB $\mu$ V/m	Limit dB $\mu$ V/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

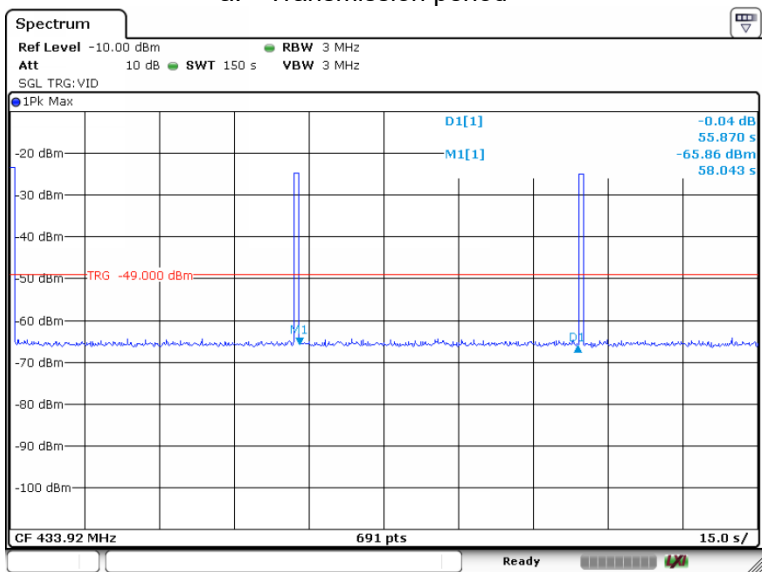
## Spurious Radiated Emission

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

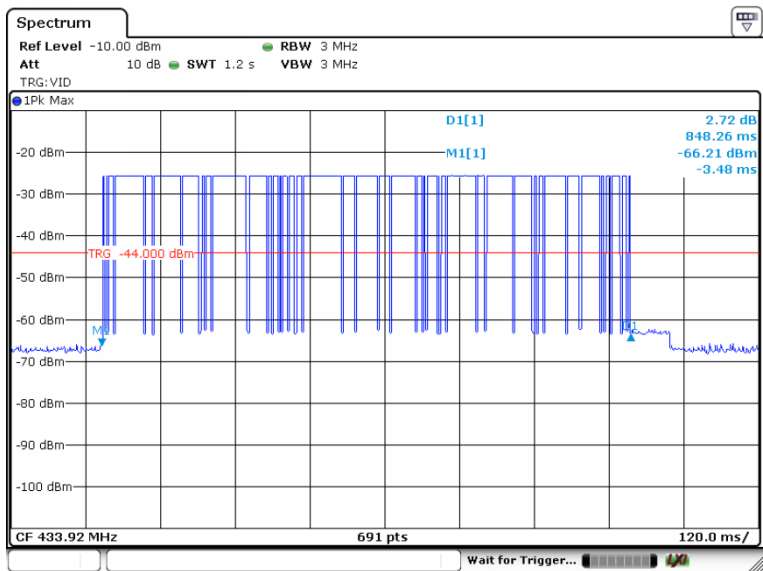
Test Result	
<input checked="" type="checkbox"/>	Passed
<input type="checkbox"/>	Not Passed

### Duct Cycle Factor Calculation

a. Transmission period



b. Duration of each transmission

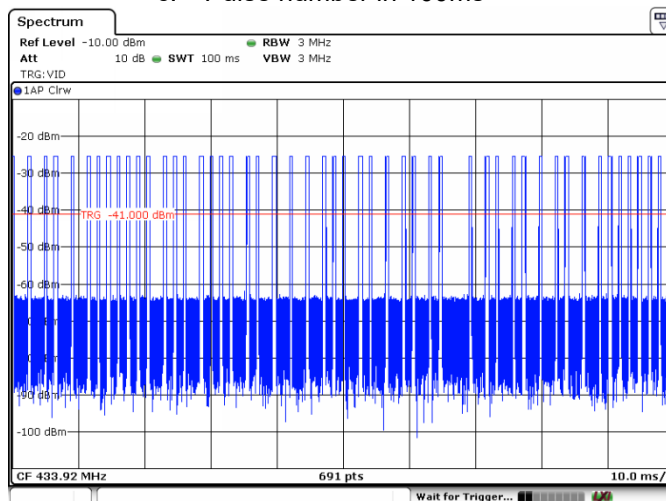


## Spurious Radiated Emission

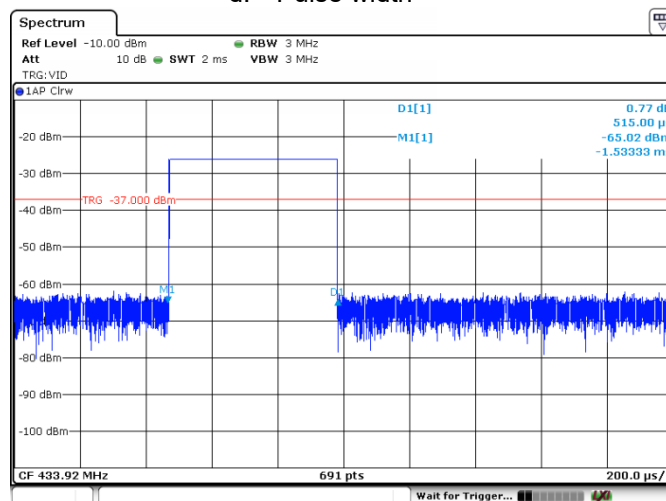
EUT: AOLD-2056A  
 Op Condition: Operated, TX Mode (433.92MHz)  
 Test Specification: FCC15.205, 15.209 & 15.231(e)  
 Comment: 3 VDC  
 Remark: Duct Cycle Factor Calculation

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

c. Pulse number in 100ms



d. Pulse width



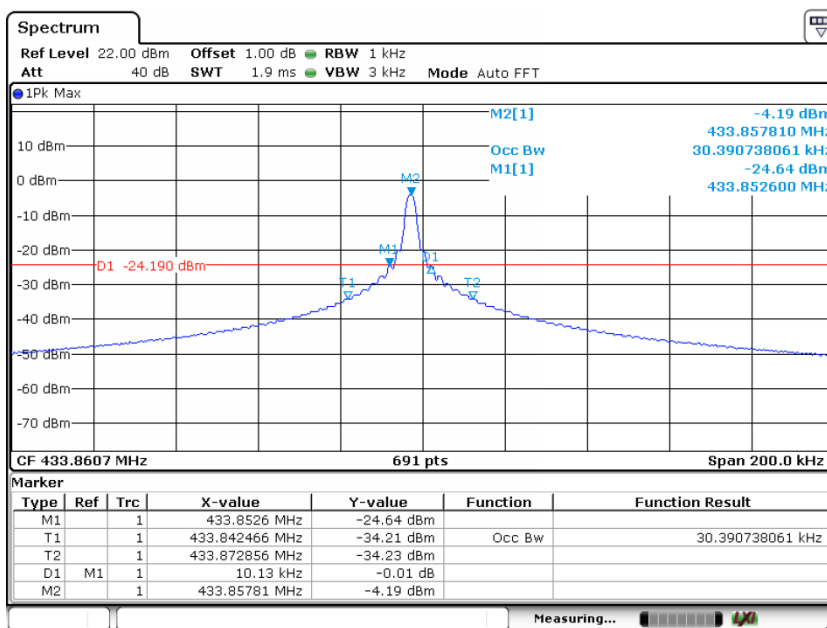
**Calculation:**

$T_p = 100\text{ms}$  (Max. allowed  $T_p$  for calculation)  
 Number of pulse in  $T_p = 50$ ,  
 Pulse width =  $0.515\text{ms}$   
 $T_{on} = \text{Pulse width} * \text{Number of pulses in } T_p$   
 $= 25.75\text{ ms}$   
 Duty cycle factor =  $20 * \log(T_{on}/T_p) = -11.78\text{dB}$

## 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	
<input checked="" type="checkbox"/>	Passed
<input type="checkbox"/>	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		





China

### 8.3 Transmission Time

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

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

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

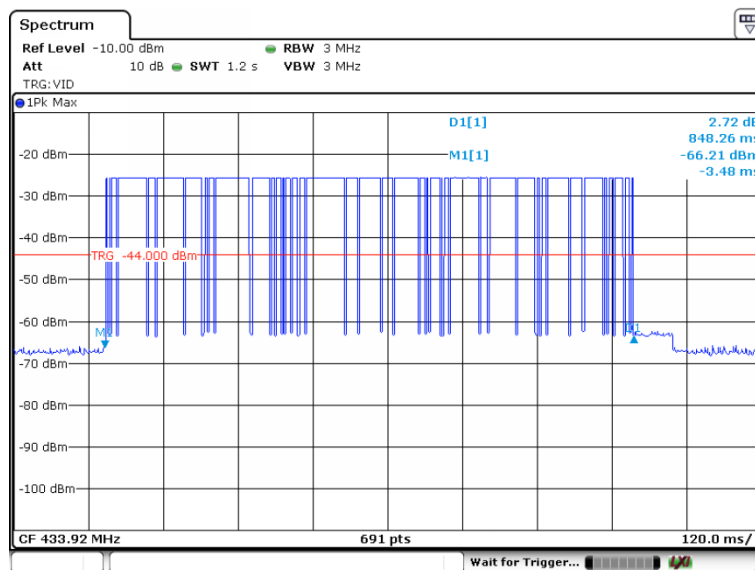
Silent period should be at least 30 times the duration of the transmission but in no case less than 10 seconds

## Transmission Time

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

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

Duration of each transmission



Transmission period

