

# CTC Laboratories, Inc.

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T	ES	T F	RE	PO	RT

Report No. ...... CTC20211448E01

FCC ID-----: 2ARVQ-AS039NRC

Applicant----: **AUTOSLIDE PTY LTD** 

Address·····: Unit 3/413, Wetherill Park, 2164 NSW, Australia

Manufacturer·····: **AUTOSLIDE PTY LTD** 

Address····· Unit 3/413, Wetherill Park, 2164 NSW, Australia

Product Name ...... AUTOSLIDE REMOTE CONTROL

Trade Mark······: AUTOSLIDE

Model/Type reference·······: AS039NRC

Listed Model(s) · · · · · N/A

Standard-----: FCC CFR Title 47 Part 15 Subpart C Section 15.231(a)

Date of receipt of test sample...: Aug. 30. 2021

Date of testing...... Aug. 31. 2021 to Sep. 08. 2021

Date of issue...... Sep. 08. 2021

Result..... PASS

Compiled by:

(Printed name+signature) Terry Su

Terry Su Miller Ma

Supervised by:

(Printed name+signature) Miller Ma

Approved by:

(Printed name+signature) Walter Chen

Testing Laboratory Name...... CTC Laboratories, Inc.

Shenzhen, Guangdong, China

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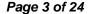
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# 1. TEST SUMMARY

# 1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.231(a): Periodic operation in the band 40.66–40.70 MHz and above 70MHz.

RSS-210 Issue 10: Licence-Exempt Radio Apparatus: Category I Equipment.

RSS-Gen: General Requirements for Compliance of Radio Apparatus.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

# 1.2. Report version

Revised No.	Date of issue	Description
01	Sep. 08. 2021	Original

# 1.3. Test Description

FCC Part 15 Subpart C 15.231(a)/ RSS-210 Issue 10						
Test Item	Stan	dard Section	Result	Test Engineer		
rest item	FCC	IC	Result			
Antenna Requirement	15.203	1	Pass	Terry Su		
Conducted Emission	15.207	RSS-Gen 7.2	N/A	N/A		
Radiated Emissions	15.205	RSS-Gen 7.3	Pass	Terry Su		
Field Strength of the Fundamental	15.231(e)	1	Pass	Terry Su		
20dB Bandwidth	15.231(c)	1	Pass	Terry Su		
Continue Transmission Time	15.231(a)	RSS-210 Annex D. a	Pass	Terry Su		

Note: "N/A" Not applicable.

The measurement uncertainty is not included in the test result.

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# 1.4. Test Facility

### Address of the test laboratory

CTC Laboratories, Inc.

Add: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

## Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L5365

CTC Laboratories, Inc. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation. Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) f or the Competence of Testing and Calibration Laboratories.

#### A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

## Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Indus try Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

#### FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. EMC Laboratory has been registered and fully described in a report filed with the (F CC) Federal Communications Commission. The acceptance letter from the FCC is maintained inour files. Registration 951311, Aug 26, 2017.

# 1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the CTC Laboratories, Inc. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Below is the best measurement capability for CTC Laboratories, Inc.





**Test Items Notes Measurement Uncertainty** Transmitter power conducted 0.42 dB (1) Transmitter power Radiated 2.14 dB (1) Conducted spurious emissions 9kHz~40GHz 1.60 dB (1) Radiated spurious emissions 9kHz~40GHz 2.20 dB (1) Conducted Emissions 9kHz~30MHz 3.20 dB (1) Radiated Emissions 30~1000MHz 4.70 dB (1) Radiated Emissions 1~18GHz 5.00 dB (1) Radiated Emissions 18~40GHz 5.54 dB (1) Occupied Bandwidth (1)

**Note (1):** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

# 1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101kPa





2. GENERAL INFORMATION

# 2.1. Client Information

Applicant:	AUTOSLIDE PTY LTD
Address:	Unit 3/413, Wetherill Park, 2164 NSW, Australia
Manufacturer:	AUTOSLIDE PTY LTD
Address:	Unit 3/413, Wetherill Park, 2164 NSW, Australia

# 2.2. General Description of EUT

Product Name:	AUTOSLIDE REMOTE CONTROL
Marketing Name:	AUTOSLIDE
Model/Type reference:	AS039NRC
Listed Model(s):	N/A
Power supply:	12Vdc from alkaline battery
Hardware version:	N/A
Software version:	N/A
RF parameter	
Modulation:	ООК
Operation frequency:	433.92MHz
Channel number:	1
Antenna type:	PCB Antenna
Antenna gain:	0dBi

# 2.3. EUT Operation state

The EUT has been tested under typical operating condition. The Applicant provides software to control the EUT for staying in continuous transmitting mode for testing.



# 2.4. Measurement Instruments List

Tonso	Tonscend JS0806-2 Test system						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until		
1	Spectrum Analyzer	Rohde & Schwarz	FUV40-N	101331	Mar. 15, 2022		
2	Spectrum Analyzer	KEYSIGHT	N9020A	100231	Dec. 25, 2021		
3	MXG Vector Signal Generator	Agilent	N5182A	MY47420864	Dec. 25, 2021		
4	Signal Generator	Agilent	E8257D	MY46521908	Dec. 25, 2021		
5	Power Sensor	Agilent	U2021XA	MY5365004	Mar. 15, 2022		
6	Power Sensor	Agilent	U2021XA	MY5365006	Mar. 15, 2022		
7	High and low temperature box	ESPEC	MT3035	N/A	Mar. 24, 2022		
8	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 25, 2021		
9	300328 v2.2.2 test system	TONSCEND	v2.6	1	1		

Radiated emission(3m chamber 2)						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until	
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-1013	Jan.12, 2022	
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 24, 2021	
3	Spectrum Analyzer	R&S	FSU26	100105	Dec. 25, 2021	
4	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 15, 2022	
5	Pre-Amplifier	SONOMA	310	186194	Dec. 25, 2021	
6	Low Noise Pre-Amplifier	EMCI	EMC051835	980075	Dec. 25, 2021	
7	Test Receiver	R&S	ESCI7	100967	Dec. 25, 2021	

Radiated	Radiated emission(3m chamber 3)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until	
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-759	Nov.09, 2021	
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 24, 2021	
3	Test Receiver	Keysight	N9038A	MY56400071	Dec. 25, 2021	
4	Broadband Premplifier	SCHWARZBECK	BBV9743B	259	Dec. 25, 2021	
5	Mirowave Broadband Amplifier	SCHWARZBECK	BBV9718C	111	Dec. 25, 2021	

Conduc	Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until		
1	LISN	R&S	ENV216	101112	Dec. 25, 2021		
2	LISN	R&S	ENV216	101113	Dec. 25, 2021		
3	EMI Test Receiver	R&S	ESCI	100658	Dec. 25, 2021		

Note:1. The Cal. Interval was one year.

2. The cable loss has calculated in test result which connection between each test instruments.



# 3. TEST ITEM AND RESULTS

## 3.1. Conducted Emission

#### Limit

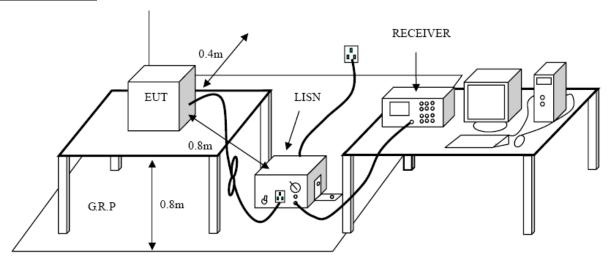
FCC CFR Title 47 Part 15 Subpart C Section 15.207/ RSS-Gen 7.2:

Fraguency range (MHz)	Limit (dBuV)			
Frequency range (MHz)	Quasi-peak	Average		
0.15-0.5	66 to 56*	56 to 46*		
0.5-5	56	46		
5-30	60	50		

#### Notes:

- (1) \*Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

## **Test Configuration**



### **Test Procedure**

- 1. The EUT was setup according to ANSI C63.10:2013 requirements.
- 2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
- 3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
- 4. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
- 5. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
- 6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
- 7. During the above scans, the emissions were maximized by cable manipulation.





**Test Mode:** 

Please refer to the clause 2.3.

**Test Results** 

Not applicable.

CTC Laboratories, Inc.



# 3.2. Radiated Emission

## **Limit**

FCC CFR Title 47 Part 15 Subpart C Section 15.231(b)/ RSS-Gen 7.3.

The field strength of emissions from intentional radiators operated average value under this section shall

not exceed the following

Fundamental frequency		Field strength of fundamental (millivolts/meter)	Unwanted emissions (millivolts/meter)	
	260 - 470 MHz	3,750 to 12,500 **	375 to 1,250 **	

<sup>\*\*</sup> linear interpolation with frequency, f, in MHz:

F is **433.92**MHz

Field strength of fundamental: Limit at 3 meters = 41.67\*F - 7083.34 Field strength of harmonics: Limit at 3 meters = 4.167\*F - 708.334

So the field strength of emission limits have been calculated in below table.

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolt/meter) at 3m		
433.92MHz	100.82 (Peak)		
433.92MHz	80.82 (Average)		

### Radiated Emission Limits (9 kHz~1000 MHz)

Frequency (MHz)	Field Strength (microvolt/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		

### Radiated Emission Limit (Above 1000MHz)

Frequency	Distance Meters(at 3m)			
(MHz)	Peak	Average		
Above 1000	74	54		

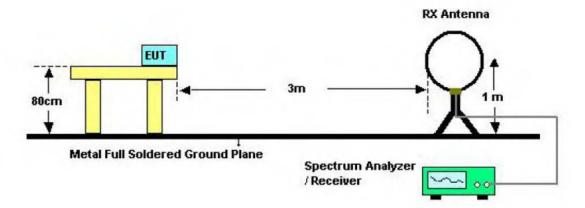
### Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

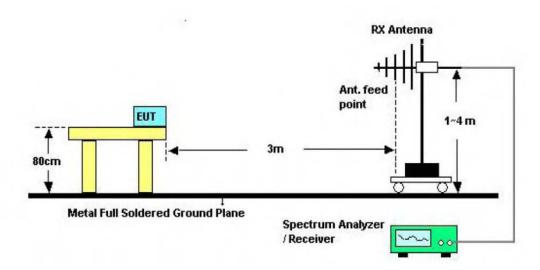




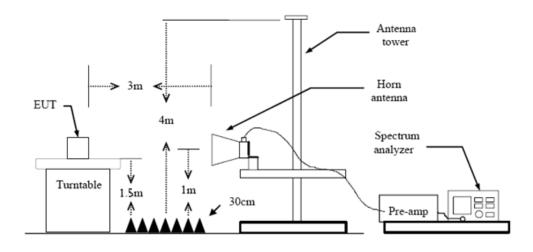
# **Test Configuration**



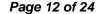
Below 30MHz Test Setup



Below 1000MHz Test Setup



Above 1GHz Test Setup





#### **Test Procedure**

- 1. The EUT was setup and tested according to ANSI C63.10:2013
- The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level
- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
- 4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
- 5. Set to the maximum power setting and enable the EUT transmit continuously.
- 6. Use the following spectrum analyzer settings
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Below 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;

If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

(3) From 1 GHz to 10<sup>th</sup> harmonic:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW=3MHz RMS detector for Average value.

#### **Test Mode**

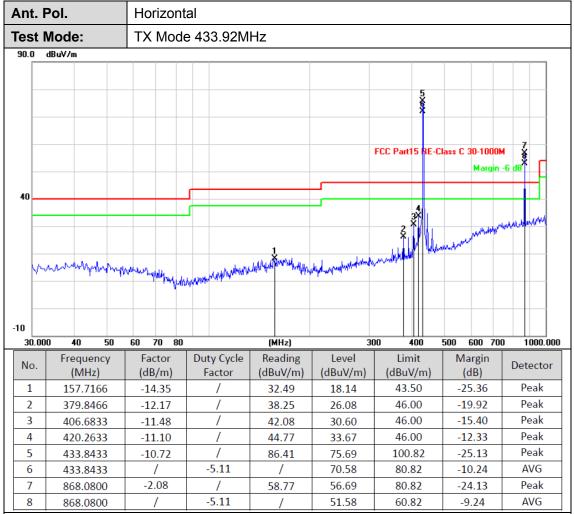
Please refer to the clause 2.3.

#### **Test Result**

### 9 KHz~30 MHz

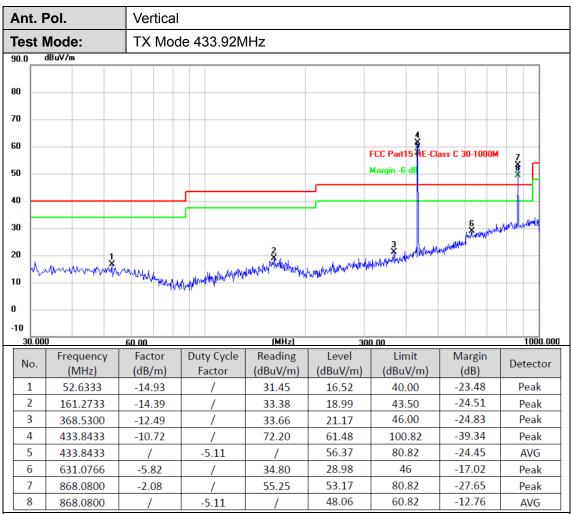
From 9 KHz to 30 MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



- 1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- 2.Margin value = Level -Limit value
- 3.AVG=Peak+Duty Cycle Factor(-5.11)





- 1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- 2.Margin value = Level -Limit value
- 3.AVG=Peak+Duty Cycle Factor(-5.11)



Ant. Pol.		Horizont	al							
Test Mode:		TX Mode 433.92MHz								
Remark:			No report for the emission which more than 10 dB below the prescribed limit.							
90.0	90.0 dBuV/m									
80					FCC	Part15 RE-Class	B Above 1G PK			
70										
60			_							
50	ž	3	5 7 6 8	9 <b>1</b> 0	¥2	Part15 RE-Class				
40		×				Lunging Allerton April	and appropriate the second	markenskalder		
30	Who affer when the second second	appropriately the market of	hayutillitabayarunan yotallari	water made of with	infinite sold of the ideas.					
20										
10										
0										
-10 11	000.000 1500.00	2000.00 250	00.00 3000.0	O (MHz)	4000.00	4500.00 500	0.00 5500.	00 6000.00		
	Frequency	Factor	Duty Cycle	Reading	Level	Limit	Margin			
N	o. (MHz)	(dB/m)	Factor	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector		
1	1 1736.667	-7.71	/	58.74	51.03	74.00	-22.97	Peak		
2	2 1736.667	/	-5.11	/	45.92	54.00	-8.08	AVG		
3	3 2170.000	-5.21	/	55.43	50.22	74.00	-23.78	Peak		
4	1 2170.000	/	-5.11	/	45.11	54.00	-8.89	AVG		
5	2603.333	-3.33	/	56.95	53.62	74.00	-20.38	Peak		
(	5 2603.333	/	-5.11	/	48.51	54.00	-5.49	AVG		
7	7 3036.667	-2.24	/	54.81	52.57	74.00	-21.43	Peak		
8	3036.667	/	-5.11	/	47.46	54.00	-6.54	AVG		
I -	3471.667	-1.52	/	54.15	52.63	74.00	-21.37	Peak		
1		/	-5.11	/	47.52	54.00	-6.48	AVG		
1		-0.17	/	51.50	51.33	74.00	-22.67	Peak		
1	2 3905.000	/	-5.11	/	46.22	54.00	-7.78	AVG		

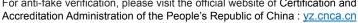
- 1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- 2.Margin value = Level- Limit value
- 3.AVG=Peak+Duty Cycle Factor(-5.11)



Ant. Pol. Vertical **Test Mode:** TX Mode 433.92MHz Remark: No report for the emission which more than 10 dB below the prescribed limit. dBuV/m 80 FCC Part15 RE-Class B Above 1G PK 70 60 FCC Part15 RE-Class B Above 1G AV 50 40 30 20 10 0 -10

No.	Frequency (MHz)	Factor (dB/m)	Duty Cycle Factor	Reading (dBuV/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2603.333	-3.33	/	52.56	49.23	74.00	-24.77	Peak
2	2603.333	/	-5.11	/	44.12	54.00	-9.88	AVG
3	3038.333	-2.24	/	50.99	48.75	74.00	-25.25	Peak
4	3038.333	/	-5.11	/	43.64	54.00	-10.36	AVG
5	3471.667	-1.52	/	50.28	48.76	74.00	-25.24	Peak
6	3471.667	/	-5.11	/	43.65	54.00	-10.35	AVG
7	3905.000	-0.17	/	50.58	50.41	74.00	-23.59	Peak
8	3905.000	/	-5.11	/	45.30	54.00	-8.7	AVG

- 1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- 2.Margin value = Level- Limit value
- 3.AVG=Peak+Duty Cycle Factor(-5.11)



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## 3.3. 20 dB Bandwidth

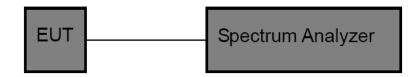
### **Limit**

FCC CFR Title 47 Part 15 Subpart C Section 15.231(c)/ RSS-210 A.1.3.

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

433.92MHz\*0.25%=1.085MHz

#### **Test Configuration**



## **Test Procedure**

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- 2. Spectrum Setting:
  - (1) Set RBW =  $1\% \sim 5\%$  OCB.
  - (2) Set the video bandwidth (VBW) ≥ 3 RBW.
  - (3) Detector = Peak.
  - (4) Trace mode = Max hold.
  - (5) Sweep = Auto couple.

#### **Test Mode**

Please refer to the clause 2.3.

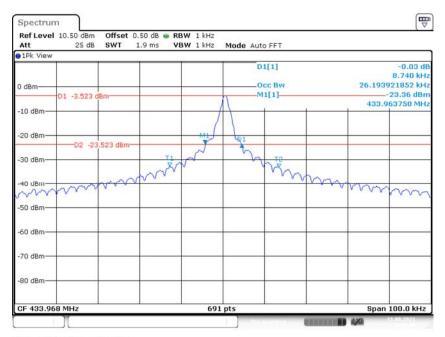
# **Test Results**







Channel Frequency(MHz)20dB Bandwidth(kHz)Limit (MHz)Result433.928.741.085PASS



Date: 31.AUG.2021 10:27:47

Accreditation Administration of the People's Republic of China: <a href="mailto:yz.cnca.cn">yz.cnca.cn</a>

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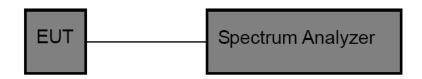
# 3.4. Continue Transmission Time

#### Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.231(a).

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

#### **Test Configuration**



## **Test Procedure**

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- Use the following spectrum analyzer settings:
   Frequency=Center carrier frequency
   RBW=100KHz, VBW=300KHz, Span= 0,
   Sweep time= 5 second, Detector function = peak, Trace = single
- 4. Measure and record the results in the test report.

#### **Test Mode**

Please refer to the clause 2.3.

# **Test Result**

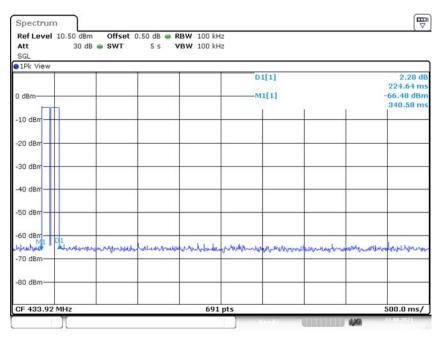


CTC Laboratories, Inc.





Frequency (MHz) Transmission time (s) Limit (s) Result
433.92 0.22464 <5.00 Pass



Date: 31.AUG.2021 15:59:33

Accreditation Administration of the People's Republic of China: <a href="mailto:yz.cnca.cn">yz.cnca.cn</a>

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# 3.5. Duty Cycle

#### Limit

The duration of each transmission shall not be more than 1 second and the rest time between transfers shall be at least 30 times the duration of propagation, but in any case less than 10 seconds.

### **Test Configuration**



## **Test Procedure**

- The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- Use the following spectrum analyzer settings: Frequency=Center carrier frequency RBW=1MHz, VBW>= RBW, Span= 0, Detector function = peak, Trace = single
- Measure and record the results in the test report.

## **Test Mode**

Please refer to the clause 2.3.

#### **Test Result**

Please refer the following pages:

Plot 1: Because the transmit period of the EUT already exceed 100ms, So 100ms was used for calculated, The large pulses total 36, The small pulses total 30.

**Plot 2:** One large pulse in a time period of 0.8657ms.

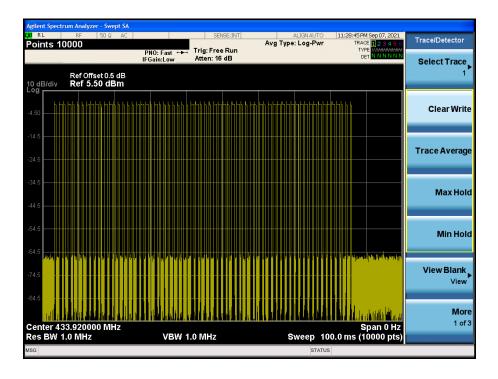
**Plot 3:** One small pulse in a time period of 0.4429ms.

Duty Cycle=ON/100ms=(36\*0.8657+30\*0.4429)/ 100=44.4522/ 100=55.5% 20 log(Duty Cycle)=-5.11

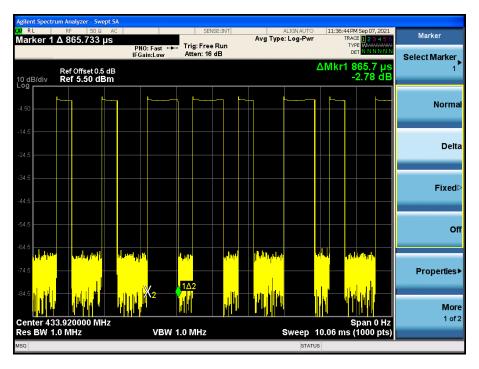




#### Plot 1

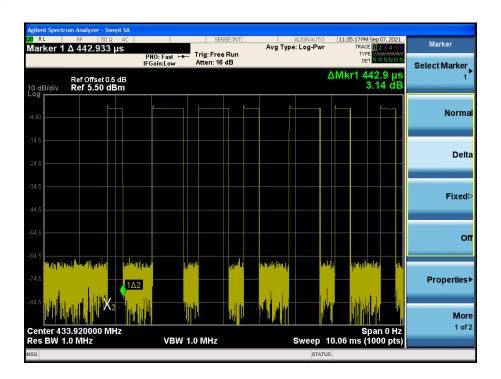


#### Plot 2





Plot 3







# 3.6. Antenna requirement

## Requirement

# FCC CFR Title 47 Part 15 Subpart C Section 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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

## FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

### **Test Result**

The directional gain of the antenna less than 6dBi, please refer to the EUT internal photographs antenna photo.



