

# FCC Part 15C Test Report FCC ID: 2BD4V-SLINGER

Report No.: DL-20231111022E

Applicant: SLINGER BAG AMERICAS INC.

Address: 2709 North Rolling Road, Suite 138, Windsor Mill, Maryland 21244-2164, United States

Manufacturer: GIANT ALARM SYSTEM CO., LTD

Address: No.37, Yangguang Road, Optoelectronic Information Park, Daxiamei Town, Nanan, Fujian

362300, China

EUT: Remote control

Trade Mark: SLINGER®

Model Number: JJ-RC-F8A-AD21

Date of Receipt: Nov. 06, 2023

Test Date: Nov. 06, 2023 - Nov. 11, 2023

Date of Report: Nov. 11, 2023

Prepared By: Shenzhen DL Testing Technology Co., Ltd.

Address: 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong

Street, Longgang District, Shenzhen, Guangdong, China

Applicable FCC PART 15 C 15.231 Standards: ANSI C63.10:2013

Test Result: Pass

Report Number: DL-20231111022E

Prepared (Test Engineer): Alisa Song

Reviewer (Supervisor): Jack Bu

Approved (Manager): Jade Yang

This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 1 of 32



Shenzhen DL Testing Technology Co., Ltd.

Report No.: DL-20231111022E

Table of Contents	rage
1. SUMMARY OF TEST RESULTS	4
1.1 MEASUREMENT UNCERTAINTY	4
2. GENERAL INFORMATION	5
2.1 GENERAL DESCRIPTION OF EUT	5
2.2 DESCRIPTION OF TEST MODES	5
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	6
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	6
2.5 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING	6
2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS	7
3 . EMC EMISSION TEST	8
3.1 CONDUCTED EMISSION MEASUREMENT	8
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS	8
3.1.2 TEST PROCEDURE	8
3.1.3 DEVIATION FROM TEST STANDARD	8
3.1.4 TEST SETUP	9
3.1.5 EUT OPERATING CONDITIONS	9
3.1.6 TEST RESULTS	9
3.2 RADIATED EMISSION MEASUREMENT	10
3.2.1 RADIATED EMISSION LIMITS	10
3.2.2 TEST PROCEDURE	11
3.2.3 DEVIATION FROM TEST STANDARD	11
3.2.4 TEST SETUP	12
3.2.5 EUT OPERATING CONDITIONS	13
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)	14
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)	15
3.2.8 TEST RESULTS (1GHZ~25GHZ)	18
4 . BANDWIDTH TEST	19
4.1 APPLIED PROCEDURES / LIMIT	19
4.1.1 TEST PROCEDURE	19
4.1.2 DEVIATION FROM STANDARD	19
4.1.3 TEST SETUP	19
4.1.4 EUT OPERATION CONDITIONS	19
4.1.5 TEST RESULTS	20
5 . CALCULATION OF AVERAGE FACTOR	21
5.1 APPLIED PROCEDURES / LIMIT	21
5.1.1 TEST PROCEDURE	21
5.1.2 TEST SETUP	21
5.1.3 EUT OPERATION CONDITIONS	21

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 2 of 32



Shenzhen DL Testing Technology Co., Ltd. Report No.: DL-20231111022E

Table of Contents	Page
5.1.4 TEST RESULTS	22
6. TRANSMISSION CEASE TIME	23
6.1 APPLIED PROCEDURES / LIMIT	23
6.1.1 TEST PROCEDURE	23
6.1.2 DEVIATION FROM STANDARD	23
6.1.3 TEST SETUP	23
6.1.4 EUT OPERATION CONDITIONS	23
6.1.5 TEST RESULTS	24
7. ANTENNA REQUIREMENT	25
7.1 STANDARD REQUIREMENT	25
7.2 EUT ANTENNA	25
8. TEST SEUUP PHOTO	26
9. EUT PHOTO	27

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 3 of 32



## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.231) , Subpart C				
Standard Section	Test Item	Judgment	Remark	
15.207	Conducted Emission	N/A		
15.209,15.231b	Fundamental &Radiated Spurious Emission Measurement	PASS		
15.231a	Transmission cease time	PASS		
15.215	20dB Bandwidth	PASS		
15.203	Antenna Requirement	PASS		

Report No.: DL-20231111022E

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

Test Lab: Shenzhen DL Testing Technology Co., Ltd.

Address: 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong

Street, Longgang District, Shenzhen, Guangdong, China

FCC Test Firm Registration Number: 854456

Designation Number: CN1307 IC Registered No.: 27485

CAB ID.: CN0118

## 1.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $\mathbf{y} \pm \mathbf{U}$ , where expended uncertainty  $\mathbf{U}$  is based on a standard uncertainty multiplied by a coverage factor of  $\mathbf{k}=2$ , providing a level of confidence of approximately  $\mathbf{95}$  %.

No.	Item	Uncertainty
1	Conducted Emission Test	±2.56dB
2	RF power,conducted	±0.42dB
3	Spurious emissions,conducted	±2.76dB
4	All emissions,radiated(<1G)	±3.65dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 4 of 32



# 2. GENERAL INFORMATION

## 2.1 GENERAL DESCRIPTION OF EUT

Product Name:	Remote control
Trademark	SLINGER®
Model No.:	JJ-RC-F8A-AD21
Model Difference	N/A
Operation Frequency:	433.92MHz
Channel numbers:	1 Channels
Modulation technology:	ASK
Antenna Type:	Internal Antenna
Antenna gain:	0.52dBi
Power supply:	DC 6V

Report No.: DL-20231111022E

## Note:

- 1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- 2. The EUT's all information provided by client.

# 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description	
Mode 1	TX Mode	
For Conducted & Radiated Emission		
Final Test Mode	Description	
Mode 1	TX Mode	

## Note:

(1) New battery is used during the test

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 5 of 32

Report No.: DL-20231111022E

# 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test

E-1 EUT

# 2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Model/Type No.	Series No.	Note
E-1	Remote control	JJ-RC-F8A-AD21	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

(1) For detachable type I/O cable should be specified the length in cm in <code>FLength\_</code> column.

# 2.5 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

None.

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 6 of 32

Report No.: DL-20231111022E



# 2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation test, Band-edge test and 20db bandwidth test equipment

	adiation test, Band-edge test and 20db bandwidth test equipment				<b>.</b>	
Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4408B	MY50140780	Nov. 05, 2023	Nov. 04, 2024
2	Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Nov. 05, 2023	Nov. 04, 2024
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Nov. 05, 2023	Nov. 04, 2024
4	Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Nov. 05, 2023	Nov. 04, 2024
5	Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Nov. 05, 2023	Nov. 04, 2024
6	Amplifier (9KHz-6GHz)	Schwarzbeck	BBV9743B	00153	Nov. 05, 2023	Nov. 04, 2024
7	Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Nov. 05, 2023	Nov. 04, 2024
8	Amplifier (18GHz-40GHz)	Quanjuda	DLE-161	97	Nov. 05, 2023	Nov. 04, 2024
9	Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Nov. 05, 2023	Nov. 04, 2024
10	RF cables1 (9kHz-1GHz)	ChengYu	966	004	Nov. 05, 2023	Nov. 04, 2024
11	RF cables2 (1GHz-40GHz)	ChengYu	966	003	Nov. 05, 2023	Nov. 04, 2024
12	Antenna connector	Florida RF Labs	N/A	RF 01#	Nov. 05, 2023	Nov. 04, 2024
13	Power probe	KEYSIGHT	U2021XA	MY55210018	Nov. 05, 2023	Nov. 04, 2024
14	Signal Analyzer 9kHz-26.5GHz	Agilent	N9020A	MY55370280	Nov. 05, 2023	Nov. 04, 2024
15	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	Nov. 05, 2023	Nov. 04, 2024
16	D.C. Power Supply	LongWei	PS-305D	010964729	Nov. 05, 2023	Nov. 04, 2024

**Conduction Test equipment** 

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	843 Shielded Room	ChengYu	843 Room	843	Sep. 20, 2022	Sep. 19, 2025
2	EMI Receiver	R&S	ESR	101421	Nov. 05, 2023	Nov. 04, 2024
3	LISN	R&S	ENV216	102417	Nov. 05, 2023	Nov. 04, 2024
4	843 Cable 1#	ChengYu	CE Cable	001	Nov. 05, 2023	Nov. 04, 2024

# Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ_EMC	EMC-CON 3A1.1
2	EMC radiation test system	FALA	EZ_EMC	FA-03A2
3	RF test system	MAIWEI	MTS8310	2.0.0.0
4	RF communication test system	MAIWEI	MTS8200	2.0.0.0

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 7 of 32



## 3. EMC EMISSION TEST

## 3.1 CONDUCTED EMISSION MEASUREMENT

## 3.1.1 POWER LINE CONDUCTED EMISSION Limits

## (Frequency Range 150KHz-30MHz)

Report No.: DL-20231111022E

FREQUENCY (MHz)	Limit (dB	Standard	
FREQUENCT (MIDZ)	Quasi-peak	Average	Stariuaru
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

#### Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

# 3.1.2 TEST PROCEDURE

- a. 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.
- b. 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.
- c. 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.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

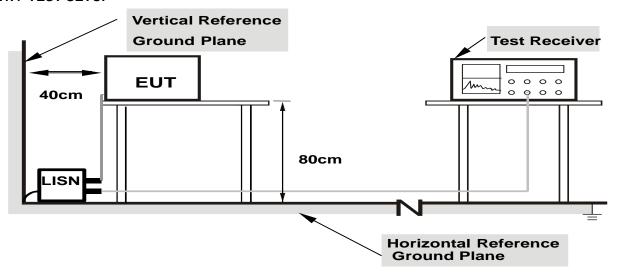
## 3.1.3 DEVIATION FROM TEST STANDARD

No deviation

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 8 of 32



## 3.1.4 TEST SETUP



Report No.: DL-20231111022E

Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

## 3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

## 3.1.6 TEST RESULTS

The EUT is powered by battery, no requirements for this item.

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 9 of 32



## 3.2 RADIATED EMISSION MEASUREMENT

# 3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Report No.: DL-20231111022E

Frequency (MHz)	Field Strength (micorvolts/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

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

comply with the renowing.						
Fundamental	Field Strength of Fundamental	Field Strength of Harmonics				
Frequency	(millivolts/meter)	(microvolts/meter)				
40.66-40.70 MHz	2250	225				
70-130 MHz	1250	125				
130-174 MHz	1250-3750**	1250-375**				
174-260 MHz	3750	375				
260-470 MHz	3750-12500**	3750-1250**				
Above 470 MHz	12500	1250				

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz,  $\mu$ V/m at 3 meters = 56.81818(F) - 6136.3636; for the band 260-470 MHz,  $\mu$ V/m at 3 meters = 41.6667(F) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

## LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)		
	PEAK	AVERAGE	
Above 1000	74	54	

## Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 10 of 32



Shenzhen DL Testing Technology Co., Ltd.

Receiver setup:

Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Hz Quasi-peak 200Hz		600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100KHz	00KHz 300KHz Quas	
Above 1GHz	Peak	1MHz	3MHz	Peak
Above 1GHz	Peak	1MHz	10Hz	Average

Report No.: DL-20231111022E

#### 3.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre (Above 18GHz the distance is 1 meter and table is 1.5 metre).
- h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

# 3.2.3 DEVIATION FROM TEST STANDARD

No deviation

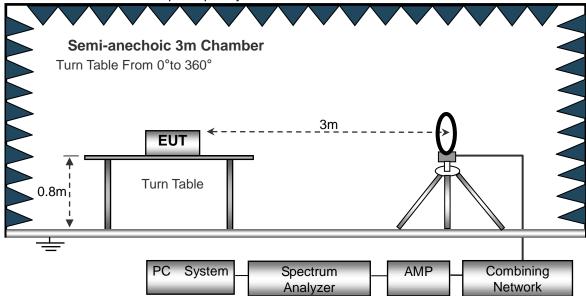
Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 11 of 32

Report No.: DL-20231111022E

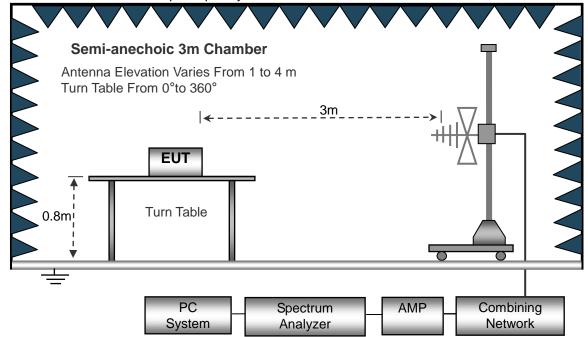


# 3.2.4 TEST SETUP

(A) Radiated Emission Test-Up Frequency Below 30MHz



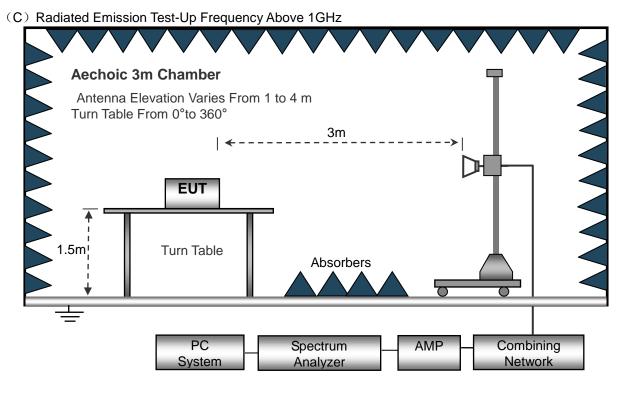
(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 12 of 32



echnology Co., Ltd. Report No.: DL-20231111022E



## 3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 13 of 32

# 3.2.6 TEST RESULTS (BETWEEN 9KHZ - 30 MHZ)

Temperature:	20℃	Relative Humidtity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 6V
Test Mode:	Mode 1	Polarization :	

Report No.: DL-20231111022E

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
				PASS
				PASS

# NOTE:

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

Distance extrapolation factor =40 log (specific distance/test distance)(dB); Limit line = specific limits(dBuv) + distance extrapolation factor.

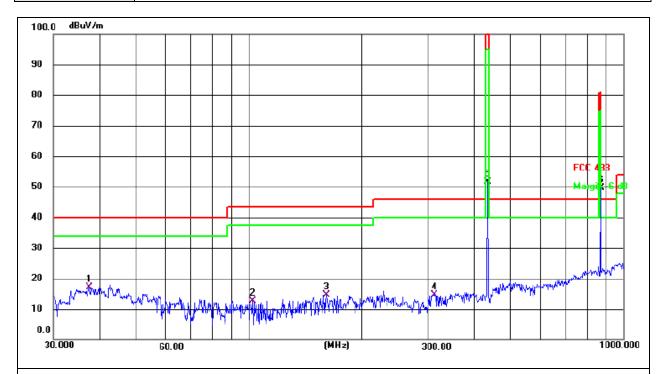
Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 14 of 32



# 3.2.7 TEST RESULTS (BETWEEN 30MHZ - 1GHZ)

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage:	DC 6V		
Test Mode :	Mode 1		

Report No.: DL-20231111022E



No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	37.4164	31.50	-14.41	17.09	40.00	-22.91	QP
2		102.3596	29.26	-16.55	12.71	43.50	-30.79	QP
3		160.9088	31.77	-17.14	14.63	43.50	-28.87	QP
4		313.2760	25.90	-11.20	14.70	46.00	-31.30	QP
5		434.0649	60.57	-9.01	51.56	100.80	-49.24	peak
6		869.1300	50.56	-1.04	49.52	80.80	-31.28	peak

## Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Level - Limit;

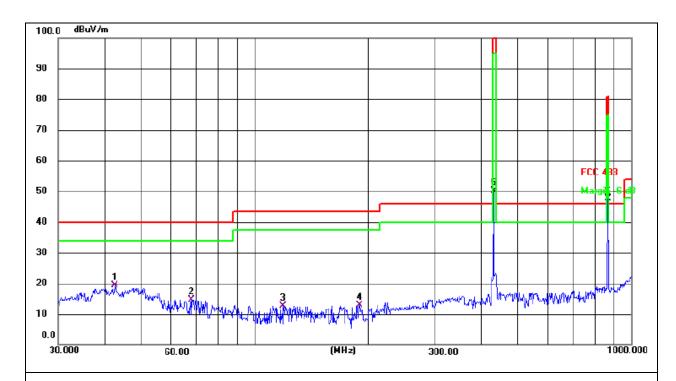
Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 15 of 32



# Shenzhen DL Testing Technology Co., Ltd.

Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
Test Voltage:	DC 6V		
Test Mode :	Mode 1		

Report No.: DL-20231111022E



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	42.4508	33.18	-13.68	19.50	40.00	-20.50	QP
2		68.1512	29.61	-14.89	14.72	40.00	-25.28	QP
3		119.0177	29.13	-16.50	12.63	43.50	-30.87	QP
4		189.7384	28.14	-15.33	12.81	43.50	-30.69	QP
5	4	431.0314	59.21	-9.09	50.12	100.80	-50.68	peak
6		866.0878	48.81	-1.10	47.71	80.80	-33.09	peak

# Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Level - Limit;

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 16 of 32



# For average Emission

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	AverageLevel dBuV/m	Polarization	Limit AV	Margin
434.0649	51.56	-13.98	37.58	Horizontal	80.8	-43.22
869.1300	49.52	-13.98	35.54	Horizontal	60.6	-25.06

Notes: 1. Average emission Level = Peak Level + Duty cycle factor 2.Duty cycle level please see clause 5.

Freque MHz	-	Peak Level dBuV/m	Duty cycle factor	AverageLevel dBuV/m	Polarization	Limit AV	Margin
431.03	314	50.12	-13.98	36.14	Vertical	80.8	-44.66
866.08	378	47.71	-13.98	33.73	Vertical	60.6	-26.87

Notes: 1. Average emission Level = Peak Level + Duty cycle factor 2.Duty cycle level please see clause 5.

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 17 of 32



# 3.2.8 TEST RESULTS (1GHZ TO 10 TH HARMONICS)

Polar (H/V)	Frequency	Peak Reading Level	Correct Factor	Peak Level	Duty cycle factor	Average Level	Limits PK	Limits AV	Margin PK	Margin AV
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dB)	(dB)		
			ор	eration	frequenc	y:433.92				
V	1301.76	55.57	-21.97	33.6	-13.98	19.62	74	54	-40.40	-34.38
V	1735.68	64.14	-21.97	42.17	-13.98	28.19	80.8	60.8	-38.63	-32.61
V	2169.6	63.69	-17.41	46.28	-13.98	32.3	80.8	60.8	-34.52	-28.50
V	2603.52	64.55	-17.41	47.14	-13.98	33.16	80.8	60.8	-33.66	-27.64
V	3037.44	46.52	-2.63	43.89	-13.98	29.91	80.8	60.8	-36.91	-30.89
V	3471.36	47.08	-2.63	44.45	-13.98	30.47	80.8	60.8	-36.35	-30.33
Н	1301.76	56.26	-21.97	34.29	-13.98	20.31	74	54	-39.71	-33.69
Н	1735.68	63.55	-21.97	41.58	-13.98	27.6	80.8	60.8	-39.22	-33.20
Н	2169.6	65.69	-17.41	48.28	-13.98	34.3	80.8	60.8	-32.52	-26.50
Н	2603.52	63.28	-17.41	45.87	-13.98	31.89	80.8	60.8	-34.93	-28.91
Н	3037.44	46.58	-2.63	43.95	-13.98	29.97	80.8	60.8	-36.85	-30.83
Н	3471.36	45.67	-2.63	43.04	-13.98	29.06	80.8	60.8	-37.76	-31.74

Report No.: DL-20231111022E

#### Remark:

- 1. PK Emission Level = Peak Reading Level + Correct Factor
- 2. Correct Factor= Antenna Factor + Cable Loss Pre-amplifier, Margin= Emission Level Limit
- 2. If peak below the average limit, the average emission was no test.
- 3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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

- 2. Duty cycle level please see clause 5.
- 3. Pulse Desensitization Correction Factor

Pulse Width (PW) = 76.44ms 2/PW = 2/76.44ms = 0.03kHz RBW (100 kHz) > 2/PW (0.03kHz)

Therefore PDCF is not needed

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 18 of 32



## 4. BANDWIDTH TEST

## 4.1 APPLIED PROCEDURES / LIMIT

AT LIED I ROCEDORES / EIMIT					
FCC Part15 (15.249), Subpart C					
Section	Description				
	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				
15.231C	operating above 900 MHz, the emission spurious shall be no wider than 0.5% of the				
15.2310	center frequency. Bandwidth is determined at the points 20 dB down from the				
	modulated carrier.				
	B.W (20dBc) Limit = 0.25% * f(MHz) = 0.25% * 433.92MHz = 1.0848MHz				

Report No.: DL-20231111022E

#### 4.1.1 TEST PROCEDURE

- 1. Set RBW = 30 kHz.
- 2. Set VBW = 100 kHz.
- 3. Detector = Peak.
- 4. Trace mode = max hold.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.
- 7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

## 4.1.2 DEVIATION FROM STANDARD

No deviation.

## 4.1.3 TEST SETUP



# 4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

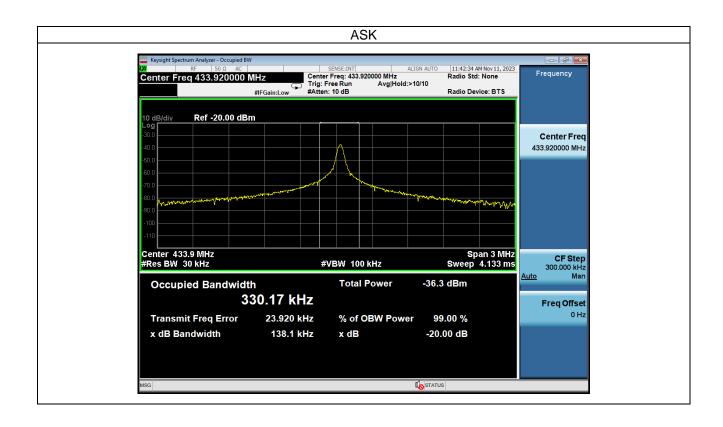
Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 19 of 32



# 4.1.5 TEST RESULTS

	Frequency (MHz)	20dB Bandwidth (MHz)	Result
ı	433.92	0.1381	Pass

Report No.: DL-20231111022E



Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 20 of 32



## 5. CALCULATION OF AVERAGE FACTOR

#### 5.1 APPLIED PROCEDURES / LIMIT

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.

Report No.: DL-20231111022E

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 100kHz resolution bandwidth.

#### **5.1.1 TEST PROCEDURE**

- 1. Set RBW = 100 kHz.
- 2. Set VBW = 300 kHz.
- 3. Detector = Peak.
- 4. Sweep = auto couple.
- 5. Allow the trace to stabilize.

## 5.1.2 TEST SETUP

EUT	SPECTRUM		
	ANALYZER		

## **5.1.3 EUT OPERATION CONDITIONS**

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 21 of 32



# **5.1.4 TEST RESULTS**

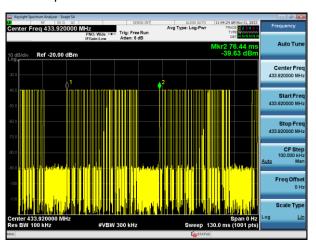
Duty Cycle= Effective time one cycle/ Total time one cycle

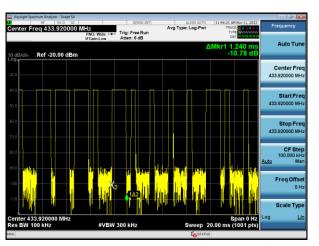
Averaging factor in dB =20log (duty cycle)

Duty Cycle = (1.240ms\*9+0.480ms\*16)/76.44

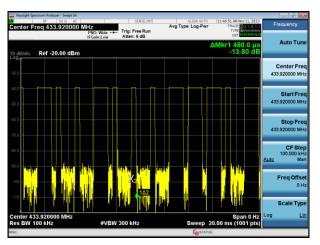
Therefore, the averaging factor is found by 20log0.2=-13.98dB

Test plot as follows:





Report No.: DL-20231111022E



Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 22 of 32



# 6. TRANSMISSION CEASE TIME

## **6.1 APPLIED PROCEDURES / LIMIT**

FCC Part15 (15.249) , Subpart C				
Section Description				
15.231a	A manually operated transmitter shall employ a switch that will automatically			
	deactivate the transmitter within not more than 5 seconds of being released.			

Report No.: DL-20231111022E

## **6.1.1 TEST PROCEDURE**

- 1. Set RBW = 100 kHz.
- 2. Set VBW = 300 kHz.
- 3. Detector = Peak.
- 4. Trace mode = max hold.
- 5. Allow the trace to stabilize.

# **6.1.2 DEVIATION FROM STANDARD**

No deviation.

# 6.1.3 TEST SETUP

EUT	SPECTRUM	
	ANALYZER	

# **6.1.4 EUT OPERATION CONDITIONS**

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

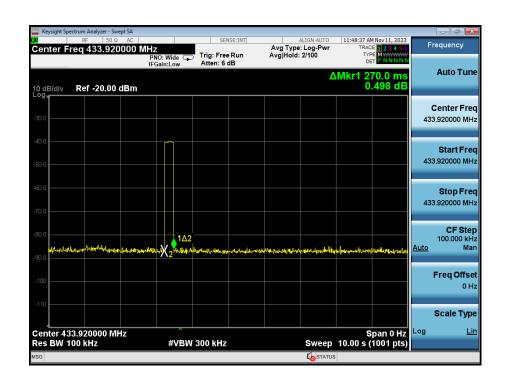
Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 23 of 32



# 6.1.5 TEST RESULTS

	Transmission cease time (second)	Limit (second)	Result	
Normal	0.270	<5s	Pass	

Report No.: DL-20231111022E



Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 24 of 32

Shenzhen DL Testing Technology Co., Ltd.

# 7. ANTENNA REQUIREMENT

# 7.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

Report No.: DL-20231111022E

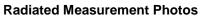
# 7.2 EUT ANTENNA

The EUT antenna is internal antenna, It comply with the standard requirement.

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 25 of 32

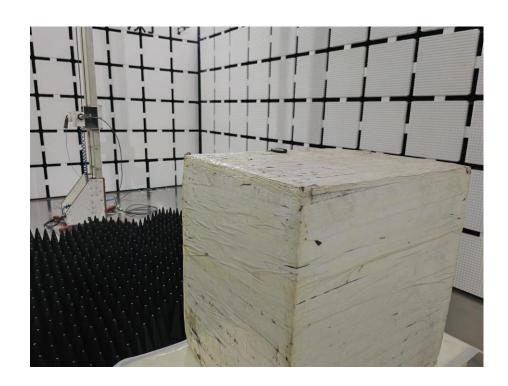


# **8. TEST SEUUP PHOTO**



Report No.: DL-20231111022E





Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 26 of 32



# 9. EUT PHOTO



Report No.: DL-20231111022E



Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 27 of 32

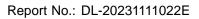




Report No.: DL-20231111022E



Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 28 of 32

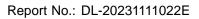






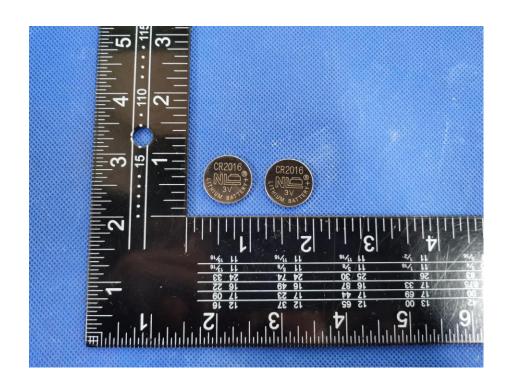


Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 29 of 32

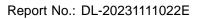




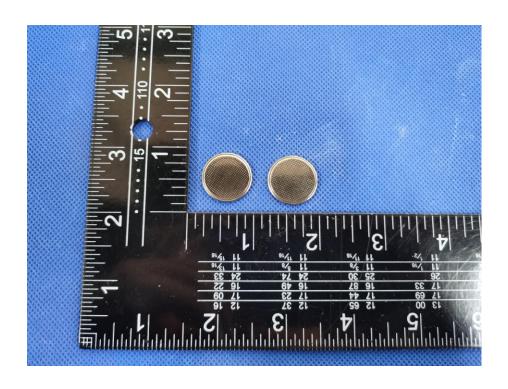




Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 30 of 32

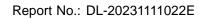




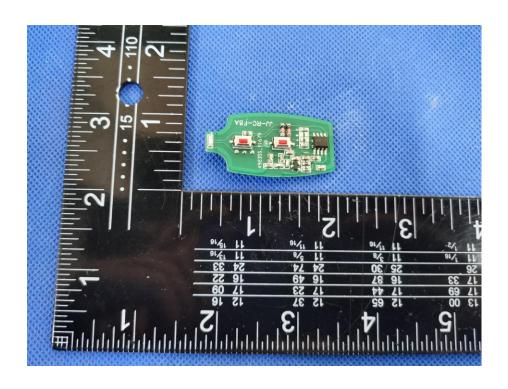


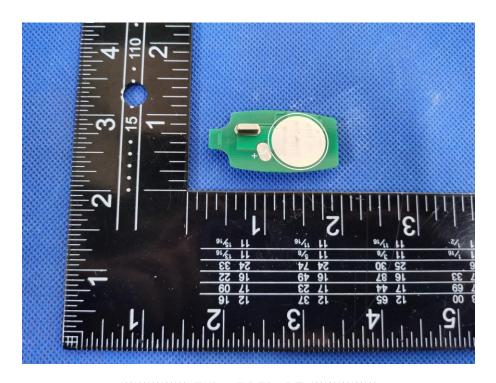


Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 31 of 32









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

Test Report Tel: 400-688-3552 Web:www.dl-cert.com Email: service@dl-cert.com Page 32 of 32