

Report No.: TW2208358E File reference No.: 2022-09-01

Applicant: DawnSun Electronic Technology Co., Ltd. Zhongshan

Product: Remote Control – Transmitter

Model No.: FA0188

Trademark: N/A

Test Standards: FCC Part 15 Subpart C, Paragraph 15.231

Test result:

It is herewith confirmed and found to comply with the

requirements set up by ANSI C63.4&FCC Part 15 Subpart C, Paragraph 15.231 for the evaluation of electromagnetic

compatibility

Approved By

Terry Tang

Manager

Dated: September 01, 2022

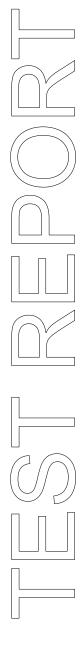
Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

# SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com



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# **Special Statement:**

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

### **CNAS-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of testing Laboratories.

# FCC-Registration No.: 744189

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

# Industry Canada (IC) —Registration No.:5205A

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

#### **A2LA** (Certification Number:5013.01)

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

CAB identifier: CN0033

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# **Test Report Conclusion**

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#### 1.0 General Details

#### 1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TESTING LABORATORIES.

Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le

Village, Nanshan District, Shenzhen, China

Telephone: +86 755 83448688 Fax: +86 755 83442996

Site on File with the Federal Communications Commission – United Sates

Registration Number: 744189 For 3m Anechoic Chamber

#### 1.2 Applicant Details

Applicant: DawnSun Electronic Technology Co., Ltd. Zhongshan

Address: 8# Nanyi Street, Xinggong Road, Longxing Industrial District, Shaxi Town, Zhongshan,

Guangdong, China 528471

Telephone: (86)0760-87336328 Fax: 0760-87332108

#### 1.3 Description of EUT

Product: Remote Control – Transmitter

Manufacturer: DawnSun Electronic Technology Co., Ltd. Zhongshan

Address: 8# Nanyi Street, Xinggong Road, Longxing Industrial District, Shaxi Town,

Zhongshan, Guangdong, China 528471

Trademark: N/A

Model Number: FA0188

Additional Model Name N/A

Additional Trade Name N/A

Hardware Version: 188-V1

Software Version: 37D4

Serial No.: FA0188

Rating: DC3.0V (2pcs CR2032 button batteries in parallel)

Operation Frequency: 315MHz
Modulation Type: OOK
Emission Designation: 24K2A1D

Antenna Designation PCB Antenna with Gain 0dBi

### 1.4 Submitted Sample

2 Samples

The report refers only to the sample tested and does not apply to the bulk.

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#### 1.5 Test Duration

2022-08-23 to 2022-09-01

#### 1.6 Test Uncertainty

Conducted Emissions Uncertainty = 3.6dB

Radiated Emissions below 1GHz Uncertainty =4.7dB

Radiated Emissions above 1GHz Uncertainty =6.0dB

Conducted Power Uncertainty =6.0dB

Occupied Channel Bandwidth Uncertainty = 5%

Note: The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

1.7 Test Engineer

The sample tested by

Print Name: Andy Xing

Andy -xing

2.0 Test Equipment						
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date	
ESPI Test Receiver	R&S	ESPI 3	100379	2022-07-15	2023-07-14	
Loop Antenna	EMCO	6507	00078608	2022-07-18	2025-07-17	
Spectrum	R&S	FSIQ26	100292	2022-07-15	2023-07-14	
EMI Test Receiver	R&S	ESCS 30	834115/006	2022-07-15	2023-07-14	
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2022-07-18	2025-07-17	
Horn Antenna	R&S	BBHA 9120D	9120D-631	2022-07-18	2024-07-17	
Bilog Antenna	Bilog Antenna Schwarebeck VULB9163		9163/340	2022-07-18	2025-07-17	
9*6*6 Anechoic	1		N/A	2022-07-26	2025-07-25	
EMI Test Receiver	RS	ESVB	826156/011	2022-07-15	2023-07-14	
Spectrum	HP/Agilent	E4407B	MY50441392	2022-07-15	2023-07-14	
Spectrum	RS	FSP	1164.4391.38	2022-07-15	2023-07-14	
RF Cable	Zhengdi	ZT26-NJ-NJ-8		2022-07-15	2023-07-14	
KI Cable	Zhengui	M/FA		2022-07-13	2023-07-14	
RF Cable	Zhengdi	7m		2022-07-15	2023-07-14	
Pre-Amplifier	Schwarebeck	BBV9743	#218	2022-07-15	2023-07-14	
Pre-Amplifier	HP/Agilent 8449B		3008A00160	2022-07-15	2023-07-14	
LISN	SCHAFFNER	NNB42	00012	2022-08-18	2023-07-17	

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#### 2.2 Automation Test Software

#### For Conducted Emission Test

Name	Version	
EZ-EMC	Ver.EMC-CON 3A1.1	

#### For Radiated Emissions

Name	Version
EMI Test Software BL410-EV18.91	V18.905
EMI Test Software BL410-EV18.806 High Frequency	V18.06

#### 3.0 Technical Details

# 3.1 Summary of test results

#### The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.203	Antenna	PASS	Compliant
	requirements		
FCC Part 15, Paragraph 15.207	Conducted	N/A	N/A
	Emission Test		
FCC Part 15, Paragraph 15.209	General Requirement	PASS	Compliant
FCC Part 15, Paragraph 15.231 (b)	Radiated Emission Test	PASS	Compliant
FCC Part 15, Paragraph 15.231 (c)	20dB	PASS	Compliant
	Bandwidth		
	Testing		
FCC Part 15, Paragraph 15.231 (a1)	Deactivate	PASS	Compliant
	Testing		

#### 3.2 Test Standards

FCC Part 15 Subpart C, Paragraph 15.231, ANSI C63.4:2014 and ANSI C63.10:2013

# 4.0 EUT Modification

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES

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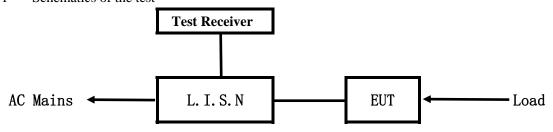
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#### 5. Power Line Conducted Emission Test

#### 5.1 Schematics of the test

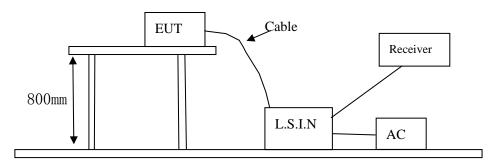


**EUT: Equipment Under Test** 

# 5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2014. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2014.

#### Block diagram of Test setup



#### 5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2014. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

#### A. EUT

Device	Manufacturer	Model	FCC ID
Remote Control – DawnSun Electronic Technology		FA0188, FA0188-D	A25-FA0188
Transmitter	Co., Ltd.Zhongshan		

# B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

# C. Peripherals

			ı	
Device	Manufacturer	Model	FCC ID/DOC	Cable
N/A				

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5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2014.

- A Setup the EUT and simulators as shown on follow
- B Enable AF signal and confirm EUT active to normal condition
- 5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency	Limits (d	lB μ V)
(MHz)	Quasi-peak Level	Average Level
$0.15 \sim 0.50$	66.0~56.0*	56.0~46.0*
$0.50 \sim 5.00$	56.0	46.0
5.00 ~ 30.00	60.0	50.0

Notes:

- 1. \*Decreasing linearly with logarithm of frequency.
- 2. The tighter limit shall apply at the transition frequencies

#### 5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz. (The average detector is necessary when the Quasi-peak emission level beyond the average Limit.)

Note: Due to CR2032 button Battery operation, this test item not applicable.

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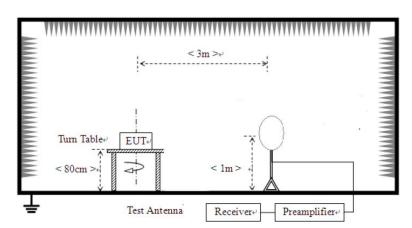
#### 6 Radiated Emission Test

6.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at TIMEWAY EMC Laboratory. This site is on file with the FCC laboratory division, Registration No.744189
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 30 MHz to 5 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization : Vertical polarization and Horizontal polarization.

#### **Block diagram of Test setup**

For radiated emissions from 9kHz to 30MHz



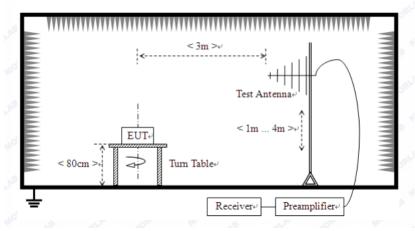
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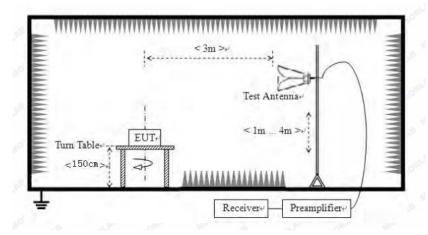
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For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



# 6.2 Configuration of The EUT Same as section 5.3 of this report

# 6.3 EUT Operating Condition Same as section 5.4 of this report.

# 6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

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#### A FCC Part 15 Subpart C Paragraph 15.231(a) Limit

Fundamental Frequency (MHz)	Field Strength of		Field Strength of Spurious		
	Fundamental		Fundamental Emission		ission
	uV/m dBuV/m u		uV/m	dBuV/m	
40.66-40.70	2250	67.04	225	47.04	
70-130	1250	61.94	125	41.94	
130-174	1250-3750	61.94-71.48	125-375	41.94-51.48	
174-260	3750	71.48	375	51.48	
260-470	3750-12500	71.48-81.94	375-1250	51.48-61.94	
Above 470	12500	81.94	1250	61.94	

Note:

- 1. RF Field Strength  $(dBuV) = 20 \log RF \text{ Voltage } (uV)$
- 2.Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- 3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.
- 4.Linear interpolations for frequency ranges 130-174MHz and 260-470MHz
- 5.the above field strength limits are specified at a distance of 3-meters and the tighter limits apply at the band edges
- 6. New batteries were installed in the equipment under test for radiated emission testing.
- 7. This is a handhold device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

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### B. Frequencies in restricted band are compiled to limit on Paragraph 15.209.

Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

- 1. RF Voltage  $(dBuV) = 20 \log RF Voltage (uV)$
- 2. In the Above Table, the tighter limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
- 4. All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30-1000MHz.As to 1G-5G, the final emission level got using PK detector. And Average = peak(dBuV/m) |duty cycle|(dB)

#### 6.5 Test result

#### A Fundamental and Harmonics Radiated emission data

Product:	Remote Control – Transmi	tter	Test Mode	e:	Keep Transr	nitting
Test Item:	Fundamental Radiated Emi-	remperature: 25°C				
Test Voltage:	DC3.0V		Humidity:		56%	
Test Result:	Pass					
Frequency	Emission PK/AV	Hor	riz /	Lim	its PK/AV	Margin
(MHz)	(dBuV/m)	Ve	ert	(d	BuV/m)	(dB)
315	82.06 (PK)/ 72.81 (AV)	I	H	95.	62/75.62	-13.56(PK)/-2.81(AV)
315	78.50 (PK)/ 69.25 (AV)	7	V	95.	62/75.62	-17.12(PK)/-6.37(AV)
630	55.17 (PK)/ 45.92 (AV)	I	H	75.	62/55.62	-20.45(PK)/-9.70(AV)
630	53.03 (PK)/ 43.78 (AV)	7	V	75.	62/55.62	-22.59(PK)/-11.84(AV)
945	45.17 (PK)/ 35.92 (AV)	ŀ	Н	75.	62/55.62	-30.45(PK)/-19.70(AV)
945	46.24 (PK)/ 36.99 (AV)	7	V	75.	62/55.62	-29.38(PK)/-18.63(AV)
1260	44.23 (PK)/ 34.98 (AV)	I	H	75.	62/55.62	-31.39(PK)/-20.64(AV)
1260	44.94 (PK)/ 35.69 (AV)	7	V	75.	62/55.62	-30.68(PK)/-19.93(AV)
1575	47.45 (PK)/ 38.20 (AV)	I	I		74/54	-26.55(PK)/-15.80(AV)
1575	41.35 (PK)/ 32.10 (AV)	7	V		74/54	-32.65(PK)/-21.90(AV)
1890	44.80 (PK)/ 35.55 (AV)	I	I	75.	62/55.62	-30.82(PK)/-20.07(AV)
1890	40.03 (PK)/ 30.78 (AV)	7	V	75.	62/55.62	-35.59(PK)/-24.84(AV)
2205	44.69(PK)/ 35.44 (AV)	I	H		74/54	-29.31(PK)/-18.56(AV)
2205	38.36(PK)/ 26.19 (AV)	7	V		74/54	-35.64(PK)/-27.81(AV)
2520	43.82(PK)/ 34.57 (AV)	I	H	75.	62/55.62	-31.8(PK)/-21.05(AV)

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2520	42.85(PK)/ 33.60 (AV)	V	75.62/55.62	-32.77(PK)/-22.02(AV)
2835		H/V	74/54	
3150		H/V	75.62/55.62	

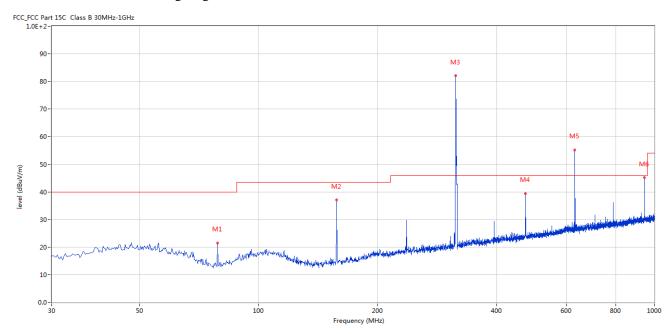
Note: H=Horizontal, V=Vertical, AV=PK- | duty cycle factor | =PK-9.25

# B. General Radiated Emission Data Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Keep Transmitting

**Results:** Pass

# Please refer to following diagram for individual



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(0)	(cm)		
1	78.730	21.53	-17.47	40.0	-18.47	Peak	26.00	200	Horizontal	Pass
2	157.523	37.03	-16.57	43.5	-6.47	Peak	360.00	200	Horizontal	Pass
3	314.866	82.06	-10.84	46.0	36.06	Peak	360.00	100	Horizontal	N/A
4	472.452	39.33	-7.63	46.0	-6.67	Peak	192.00	100	Horizontal	Pass
5	630.037	55.17	-5.06	46.0	9.17	Peak	360.00	200	Horizontal	N/A
6	945.209	45.17	-1.64	46.0	-0.83	Peak	57.00	100	Horizontal	Pass

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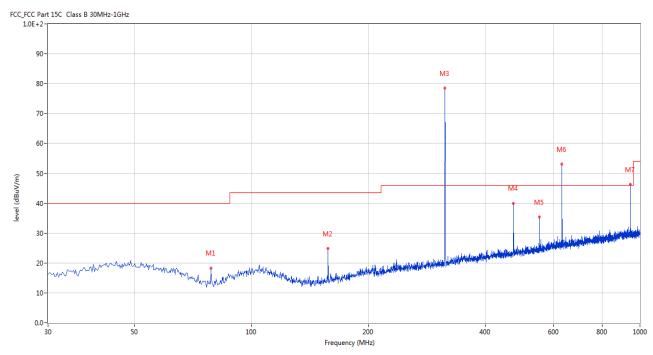
#### **B.** General Radiated Emission Data

#### Radiated Emission In Vertical (30MHz----1000MHz)

EUT set Condition: Keep Transmitting

**Results:** Pass

# Please refer to following diagram for individual



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	78.730	18.26	-17.47	40.0	-21.74	Peak	219.00	100	Vertical	Pass
2	157.523	24.83	-16.57	43.5	-18.67	Peak	143.00	100	Vertical	Pass
3	314.866	78.50	-10.84	46.0	32.50	Peak	196.00	100	Vertical	N/A
4	472.452	39.98	-7.63	46.0	-6.02	Peak	288.00	100	Vertical	Pass
5	551.245	35.32	-6.34	46.0	-10.68	Peak	265.00	100	Vertical	Pass
6	630.037	53.03	-5.06	46.0	7.03	Peak	288.00	100	Vertical	N/A
7	945.209	46.24	-1.64	46.0	0.24	Peak	258.00	100	Vertical	N/A

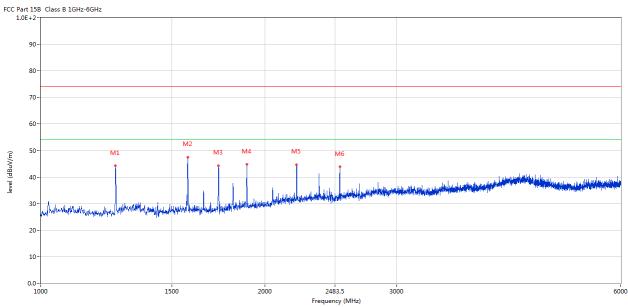
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#### Test Plot above 1G

# Horizontal



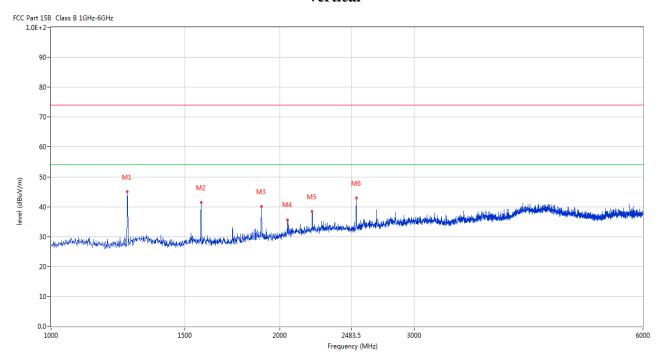
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	1259.935	44.23	-8.51	74.0	-29.77	Peak	1.00	100	Horizontal	Pass
2	1574.856	47.45	-8.02	74.0	-26.55	Peak	0.00	100	Horizontal	Pass
3	1732.317	44.33	-7.31	74.0	-29.67	Peak	20.00	100	Horizontal	Pass
4	1889.778	44.80	-6.01	74.0	-29.20	Peak	0.00	100	Horizontal	Pass
5	2204.699	44.69	-3.24	74.0	-29.31	Peak	0.00	100	Horizontal	Pass
6	2519.620	43.82	-3.53	74.0	-30.18	Peak	26.00	100	Horizontal	Pass

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# Vertical



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	1259.935	44.94	-8.51	74.0	-29.06	Peak	360.00	100	Vertical	Pass
2	1574.856	41.35	-8.02	74.0	-32.65	Peak	217.00	100	Vertical	Pass
3	1889.778	40.03	-6.01	74.0	-33.97	Peak	217.00	100	Vertical	Pass
4	2047.238	35.59	-4.70	74.0	-38.41	Peak	212.00	100	Vertical	Pass
5	2204.699	38.36	-3.24	74.0	-35.64	Peak	339.00	100	Vertical	Pass
6	2519.620	42.85	-3.53	74.0	-31.15	Peak	227.00	100	Vertical	Pass

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# 7.0 20dB and 99% Bandwidth Testing

# 7.1 Requirement

Per 15.231(c) and RSS-210 A1, 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. Bandwidth is determined at the points 20 dB down from the modulated carrier.

# 7.2 Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

#### 7.3 Test Data

Frequency (MHz)	20dB Bandwidth Emission (kHz)	Limit (kHz)	Result
315	179.359	787.5	Pass
Frequency (MHz)	99% Bandwidth Emission (kHz)	Limit (kHz)	Result
315	24.248	787.5	Pass

Limit=Frequency x 0.25%=315x 0.25%=787.5kHz

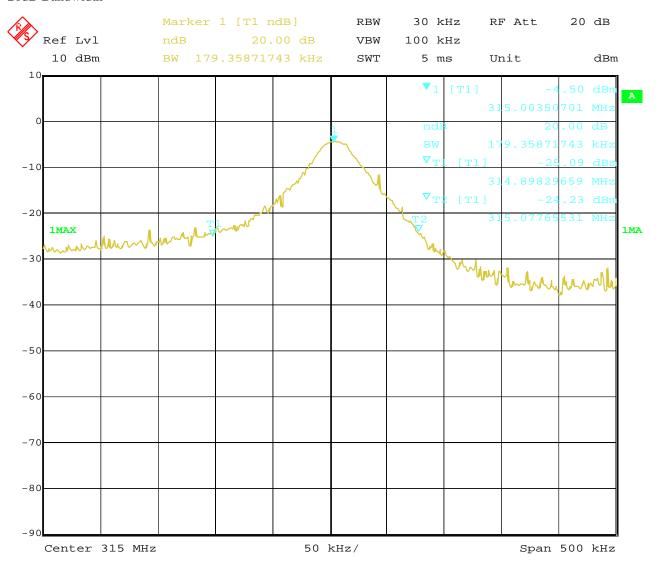
Refer to attached plots:

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#### 20dB Bandwidth



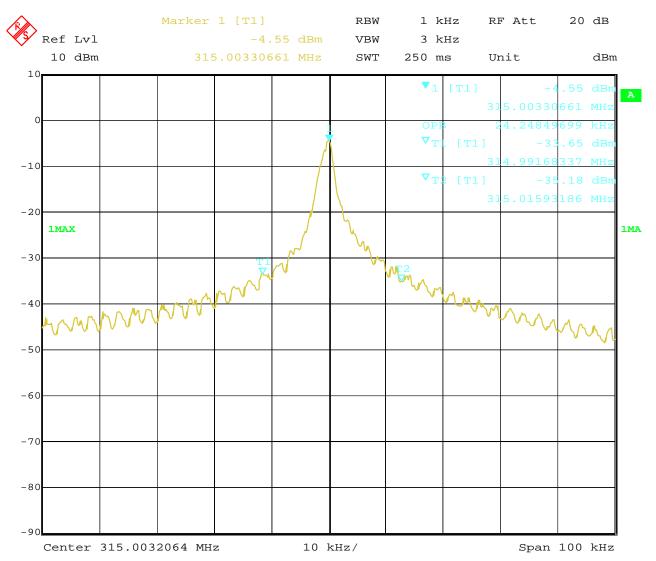
Date: 30.AUG.2022 20:18:09

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#### 99% Bandwidth:



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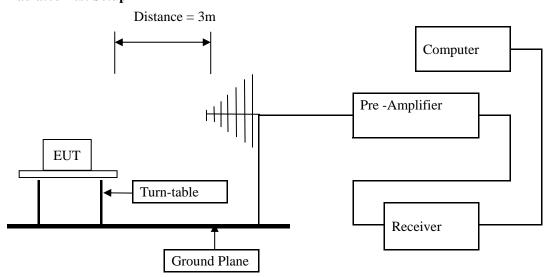
#### **8.0** Deactivate Test

# 8.1 Requirement

Per 15.231(a) (1)

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

#### 8. 2 Radiated Test Setup



For the actual test configuration , please refer to the related items – Photos of Testing The deactivation test was performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.10-2013.

# 8.3 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

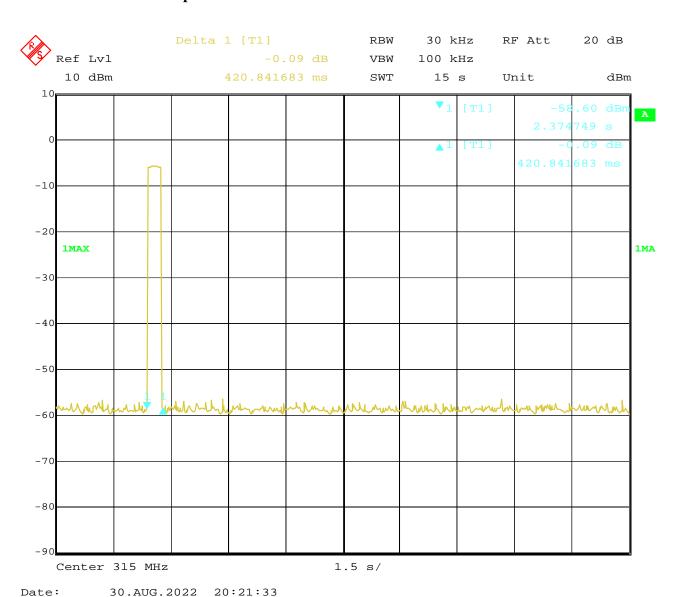
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# 8.4 Test Data Refer to attached plots:



8.5 Test result

**Pass** 

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# 9.0 Duty Cycle

#### **9.1** Limit

No dedicated limit specified in the Rules

#### 9.2 Test Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set center frequency of spectrum analyzer=operating frequency.
- 4. Set the spectrum analyzer as RBW = VBW=1000kHz, Span=0Hz, Adjust Sweep=100ms.
- 5. Repeat above procedures until all frequency measured were complete.

#### 9.3 Test Data

#### Base on the worst case

Tp = 49.058ms

Ton1 = 0.792\*10 = 7.92(ms)

Ton2 = 0.391\*23=8.993(ms)

Duty cycle=Ton/Tp=16.913/49.058=0.3448=34.48%

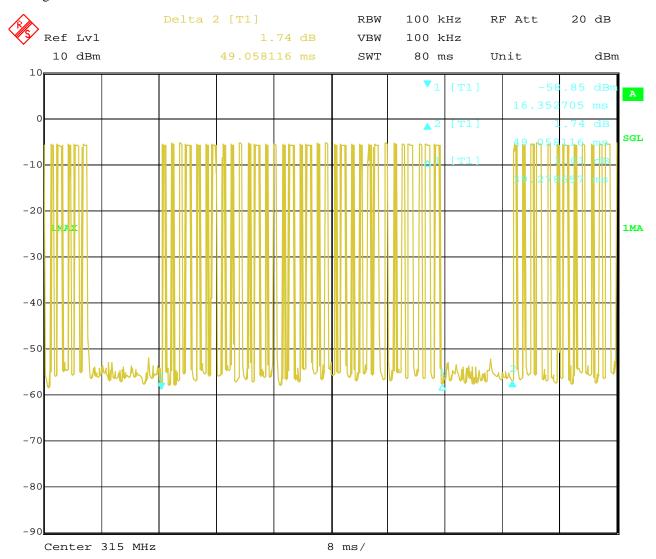
Duty cycle factor =  $20 * \log (\text{duty cycle}) = 20 * \log (0.3448) = -9.25 dB$ 

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# **Testing Plots:**

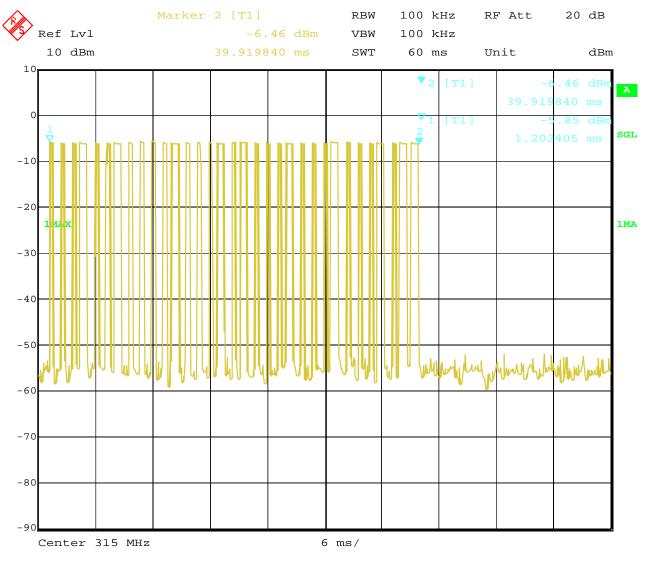


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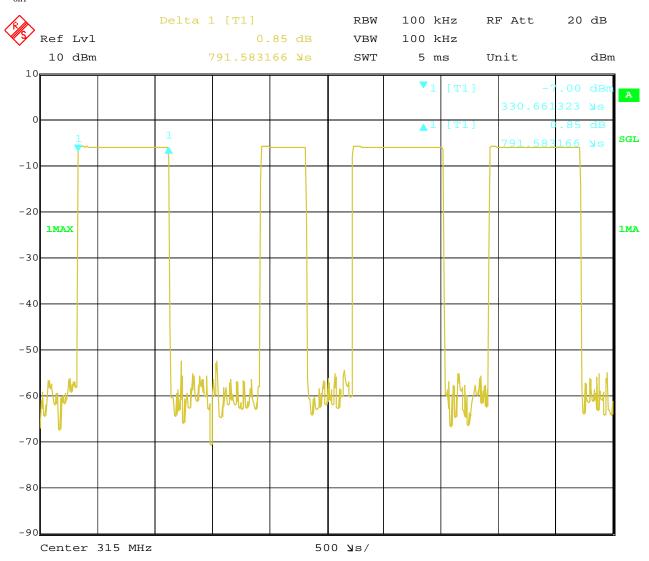
Date: 30.AUG.2022 20:23:01

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 $T_{on1}$ 



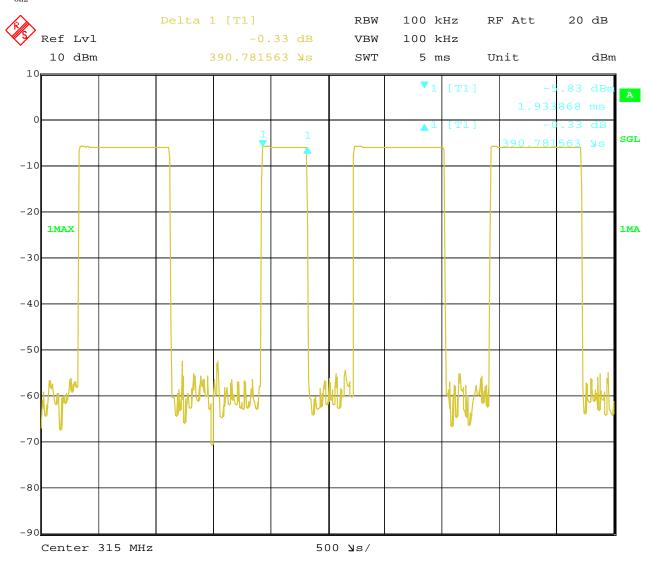
Date: 30.AUG.2022 20:23:33

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 $T_{on2}$ 



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# 10.0 Antenna Requirement

# 10.1 Standard Applicable

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 an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

#### 10.2 Antenna Connected constructions

The antenna is PCB Printed antenna which is built-in. The antenna gain is 0dBi. So, it meets the requirement of 15.203

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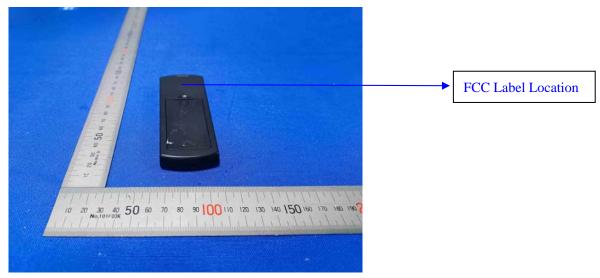


#### 11.0 FCC ID Label

### FCC ID: A25-FA0188

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

#### **Mark Location:**



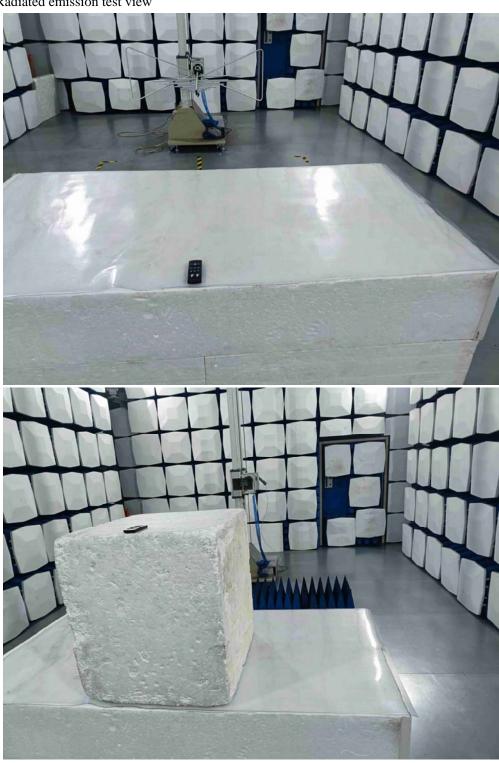
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#### 12.0. Photo of testing

- 12.1 Conducted test View-N/A
- 12.2 Radiated emission test view



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#### Photo for the EUT





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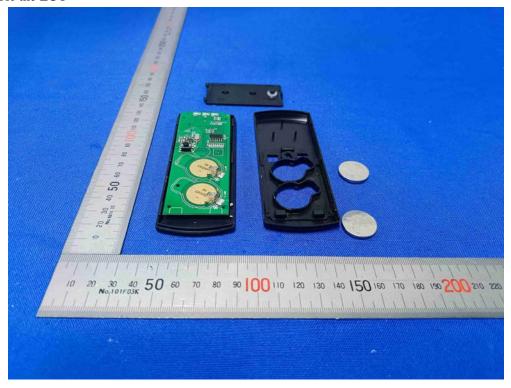
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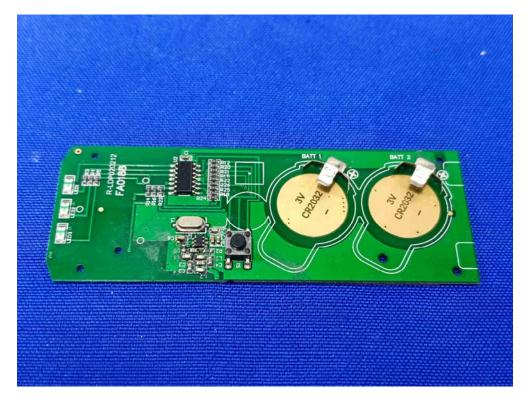
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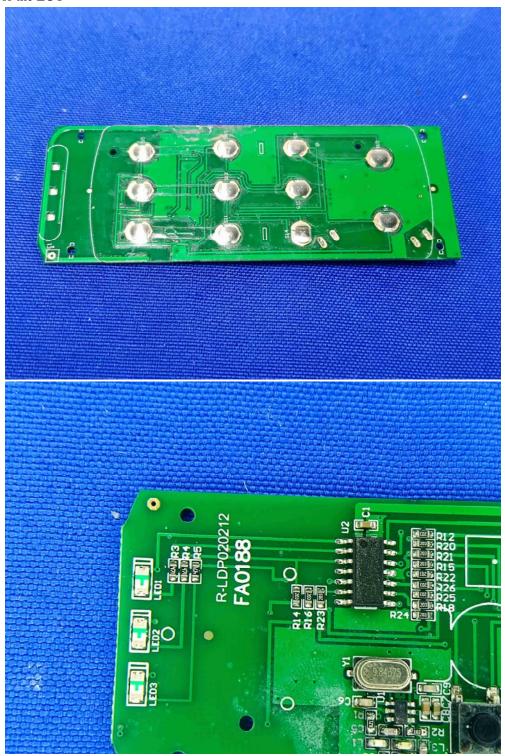
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#### Photo for the EUT



-End of the report-

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