TECHNICAL REPORT

Report No:	FCC1703221
File reference No:	2017-04-11
Applicant:	NINGBO BAI-JIA ELECTRIC APPLIANCE CO.,LTD
Product:	Remote control transmitter
Model No:	YLT-40-3C, YLT-40C
Trademark:	
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 regulations for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung
Manager

Dated: April 11, 2017

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

Room 512-519, 5/F., East Tower, Building 4, Anhua Industrial Zone, Futian District, Shenzhen, Guangdong, China

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

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 meets 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 17025:2005 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 899988

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.:899988.

Test Report Conclusion

Content

1.0 General Details

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TESTING LABORATORIES

Address: Room 512-519,5/F., East Tower,Building 4, Anhua Industrial Zone, Futian District,Shenzhen, Guangdong China

Telephone: (755) 83448688

Fax: (755) 83442996

Site on File with the Federal Communications Commission – United Sates

Registration Number: 899988

For 3m & 10 m OATS

1.2 Applicant Details

Applicant: NINGBO BAI-JIA ELECTRIC APPLIANCE CO.,LTD

Address: No.16 Industry Road, Zhangqi Town,Cixi,Zhejiang 315313,China

Telephone: 0574-63753656

Fax: 0574-63753656

1.3 Description of EUT

Product:	Remote control transmitter
Manufacturer:	NINGBO BAI-JIA ELECTRIC APPLIANCE CO.,LTD
Address:	No.16 Industry Road, Zhangqi Town,Cixi,Zhejiang 315313,China
Brand Name:	
Model Number:	YLT-40-3C, YLT-40C
Rating:	DC12V
Operation Frequency:	315MHz
Modulation Type:	ASK
Antenna Designation	PCB Antenna with Gain 0dBi

1.4 Submitted Sample

2 Samples

1.5 Test Duration

2017-03-28 to 2017-04-10

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

The sample tested by Terry Tang

Print Name: Terry Tang

2.0	**Test Equipments**				
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2016-08-23	2017-08-22
System Controller	CT	SC100	-	2016-08-23	2017-08-22
Power Amplifier	AR	150W1000	300999	2016-08-23	2017-08-22
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2016-08-23	2017-08-22
3m OATS	--	--	N/A	2016-08-23	2017-08-22
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2016-08-23	2017-08-22

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 requirements	**PASS**	Compliant
FCC Part 15, Paragraph 15.207	Conducted Emission Test	**PASS**	N/A
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 Bandwidth Testing	**PASS**	Compliant
FCC Part 15, Paragraph 15.231 (a) (1)	Deactivate Testing	**PASS**	Compliant

3.2 Test Standards

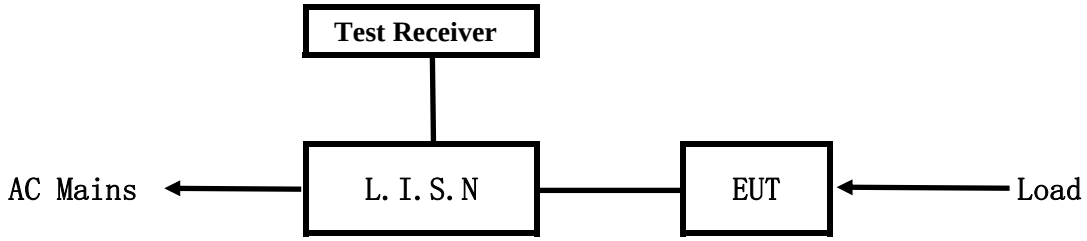
FCC Part 15 Subpart C, Paragraph 15.231, ANSI C63.4 :2014 and ANSI C63.10 :2013

4.0 EUT Modification

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES

5. Power Line Conducted Emission Test

5.1 Schematics of the test

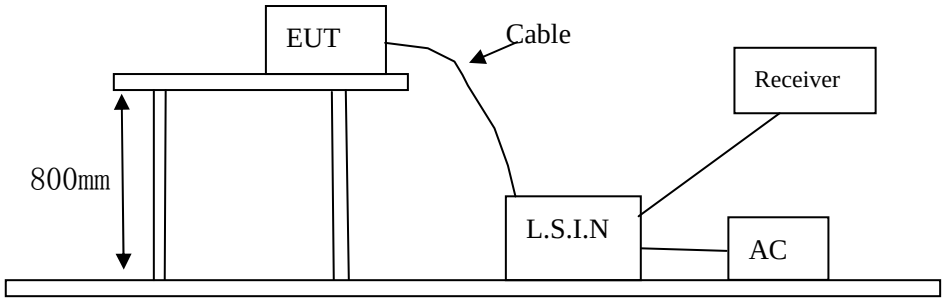


EUT: Equipment Under Test

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 transmitter	NINGBO BAI-JIA ELECTRIC APPLIANCE CO.,LTD	YLT-40-3C, YLT-40C	2AEQYYLT-40-3C

B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
N/A				

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 (MHz)	Class A Limits (dB μ V)		Class B Limits (dB μ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ～ 0.50	79.0	66.0	66.0～56.0*	56.0～46.0*
0.50 ～ 5.00	73.0	60.0	56.0	46.0
5.00 ～ 30.00	73.0	60.0	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: Battery operation, this test item not applicable.

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 Laboratory. This site is on file with the FCC laboratory division, Registration No.899988

(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.

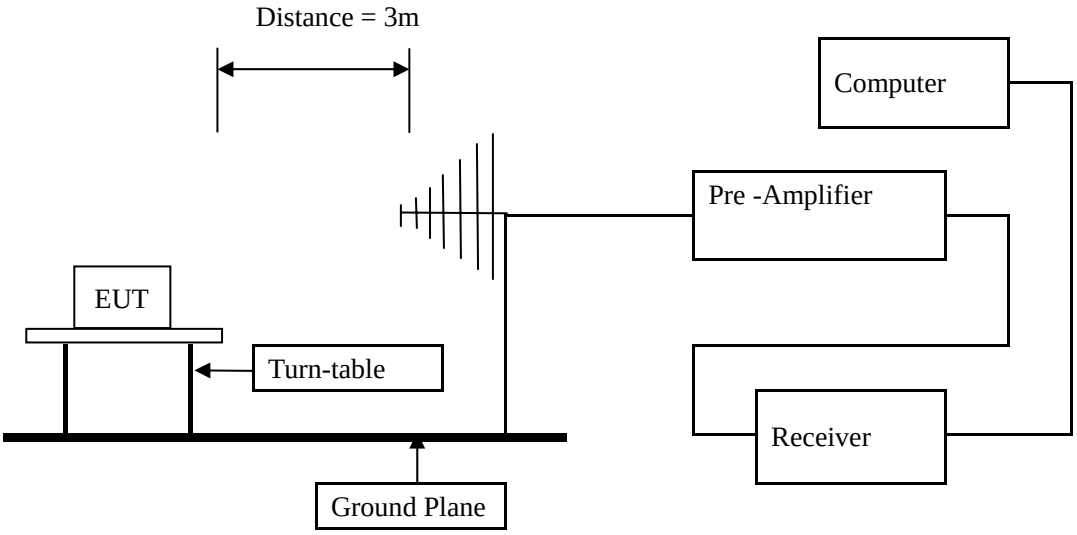
(3) The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.

(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



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:

A FCC Part 15 Subpart C Paragraph 15.231 Limit

Fundamental Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious Emission	
	uV/m	**dBuV/m**	**uV/m**	**dBuV/m**
40.66-40.70	2250	67.04	225	47.04
70-130	1250	61.94	125	41.94
130-174	1250-3370	61.94-70.55	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 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

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

Frequency Range (MHz)	Distance (m)	Field strength (dB μ 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. 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.

5. 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 Value = peak(dBuV/m)+duty cycle factor(dB)

6. New batteries were installed in the equipment under test for radiated emission testing.

6.5 Test result

A Fundamental Radiated Emission Data

Product:	Remote Control – Transmitter	Test Mode:	Keeping Tx transmitting
Test Item:	Fundamental Radiated Emission and Spurious Emission Data	Temperature:	25℃
Test Voltage:	12V	Humidity:	56%
Test Result:	Pass		

Frequency (MHz)	Emission PK/AV (dBuV/m)	Horiz / Vert	Limits PK (dBuV/m)
315	79.00/67.8	Horizontal	95.62/75.62
315	72.70/61.5	Vertical	95.62/75.62
630	58.10/46.9	Horizontal	75.62/55.62
630	56.80/45.6	Vertical	75.62/55.62
945	58.00/46.8	Horizontal	75.62/55.62
945	54.30/43.1	Vertical	75.62/55.62

Note: Average = peak(dBuV/m) + duty cycle factor(dB)

Average = peak(dBuV/m)-11.2dB

Note: New battery is used during all test

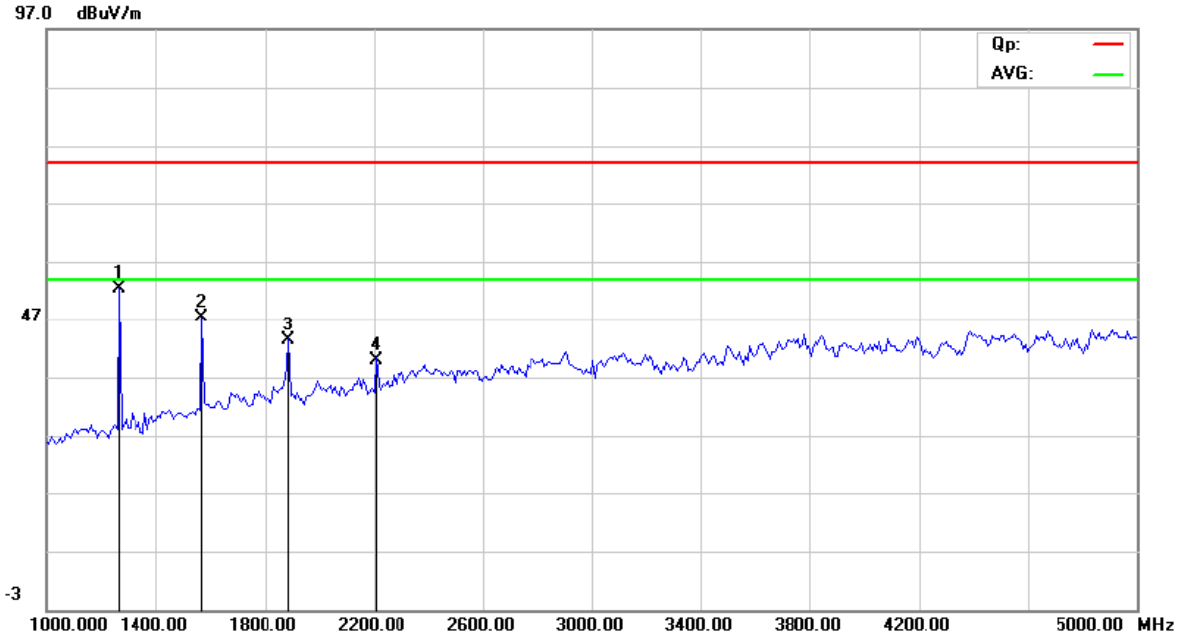
C. **General Radiated Emission Data and Harmonics Radiated Emission Data**

Radiated Emission In Horizontal (1000MHz----6000MHz)

EUT set Condition: Keep Tx Transmitting

Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dB μ V/m) PK/AV	Antenna Polarity	Limit@3m (dB μ V/m)
1260	52.26/41.06	H	74(PK)/54(AV)
1575	47.39/36.19	H	74(PK)/54(AV)
1890	43.28/32.08	H	74(PK)/54(AV)
2205	39.77/28.57	H	74(PK)/54(AV)

Note: Average = peak(dBuV/m) + duty cycle factor(dB)

Average = peak(dBuV/m)-11.2dB

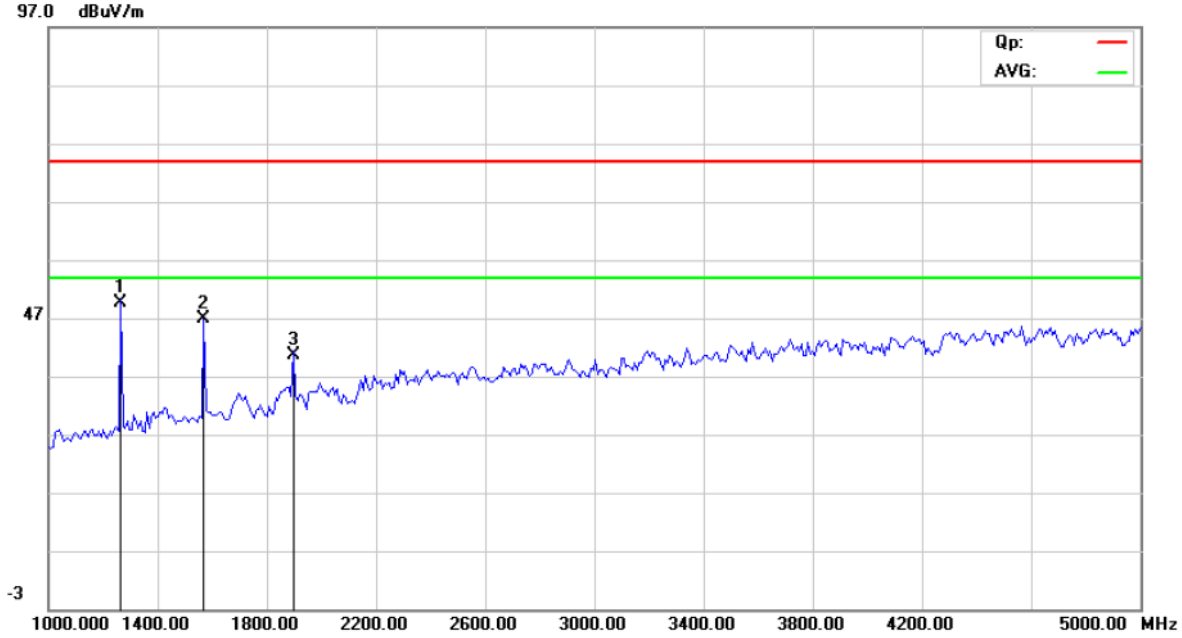
C. **General Radiated Emission Data and Harmonics Radiated Emission Data**

Radiated Emission In Vertical (1000MHz----6000MHz)

EUT set Condition: Keep Tx Transmitting

Results: **Pass**

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m) PK/AV	Antenna Polarity	Limit@3m (dB μ V/m)
1260	49.65/38.45	V	74(PK)/54(AV)
1575	46.82/35.62	V	74(PK)/54(AV)
1890	40.67/29.47	V	74(PK)/54(AV)

Note: Average = peak(dBuV/m) + duty cycle factor(dB)

Average = peak(dBuV/m)-11.2dB

7.0 20dB Bandwidth Testing

7.1 Requirement

Per 15.231(c), 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

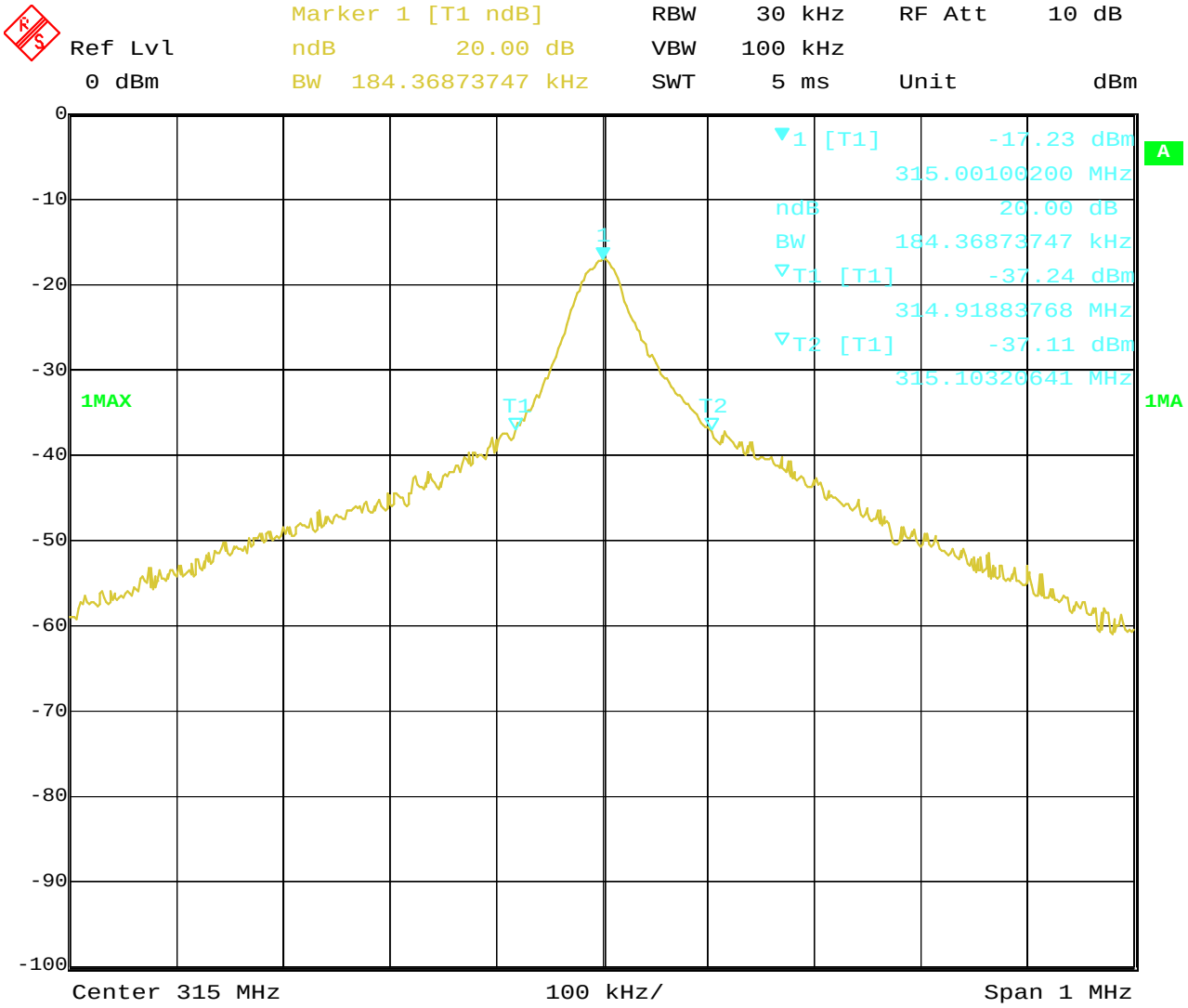
Frequency （MHz）	20dB Bandwidth Emission (kHz)	Limit (kHz)	Result
315	184.37	787.5	Pass

Frequency （MHz）	99%dB Bandwidth Emission (kHz)	Limit (kHz)	Result
315	338.68	--	Pass

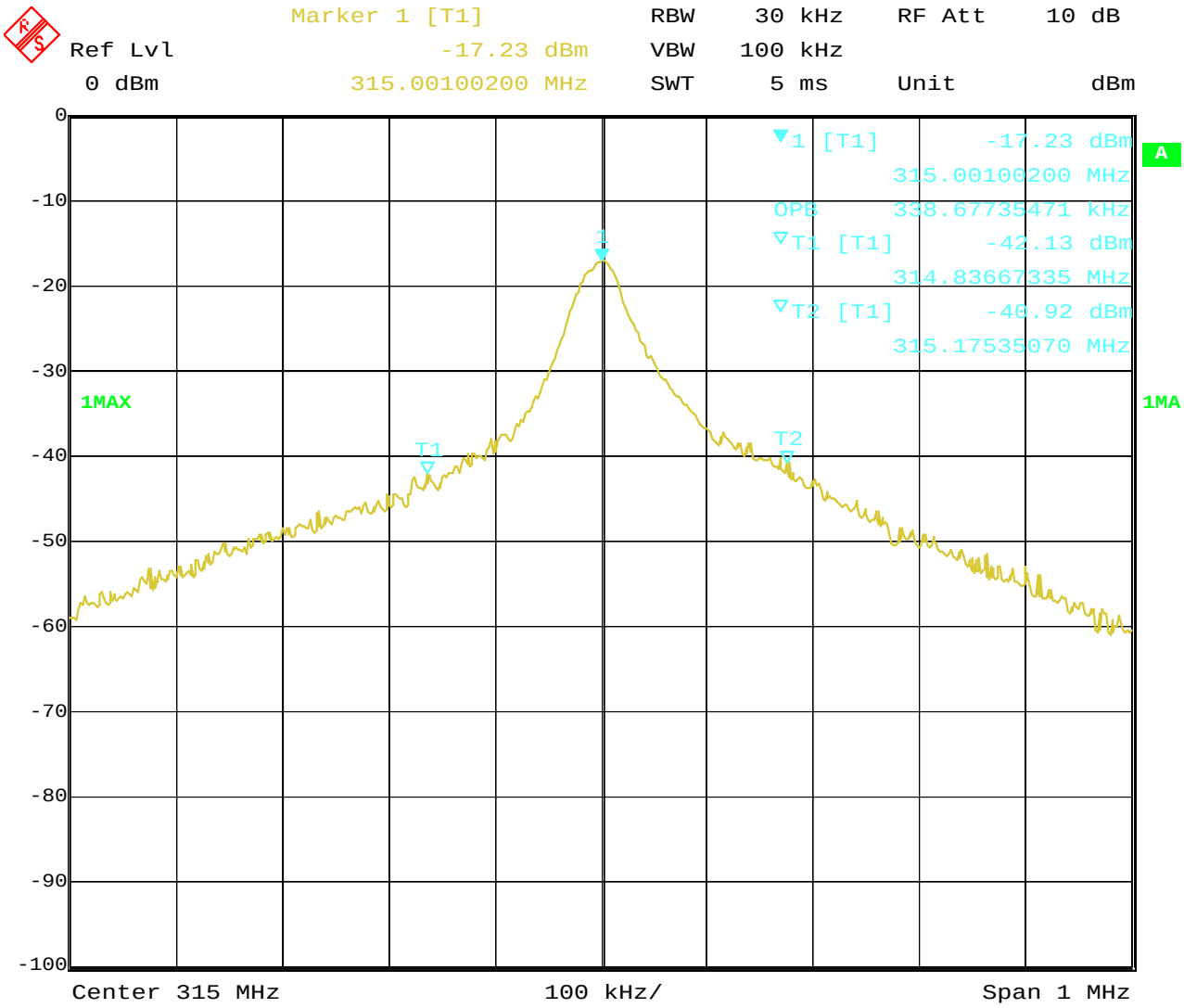
Limit=Frequency x 0.25%=315 x 0.25%=787.5kHz

Refer to attached plots:

20dB Bandwidth



99%dB Bandwidth

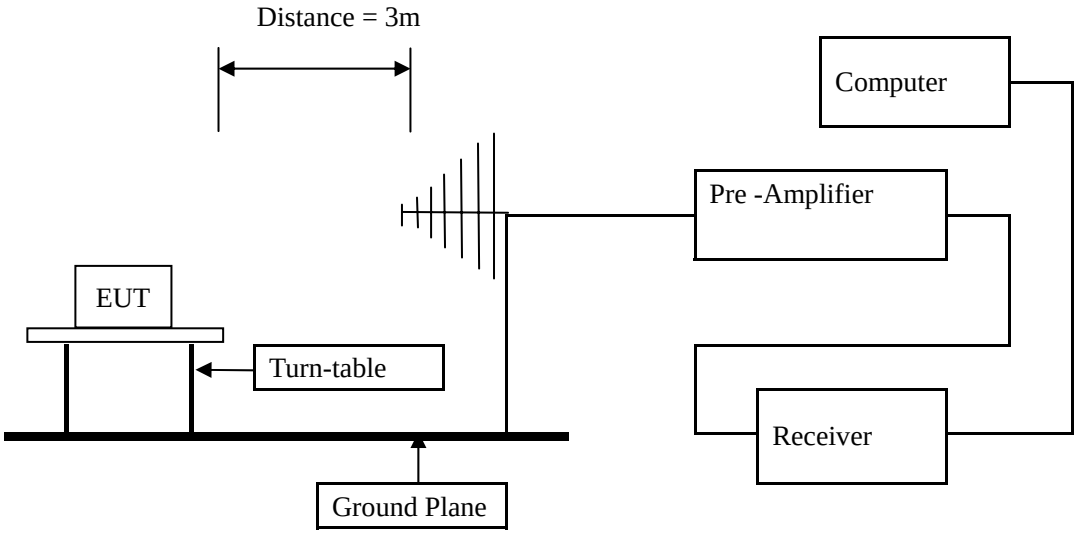


8.0 Deactivate Test

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



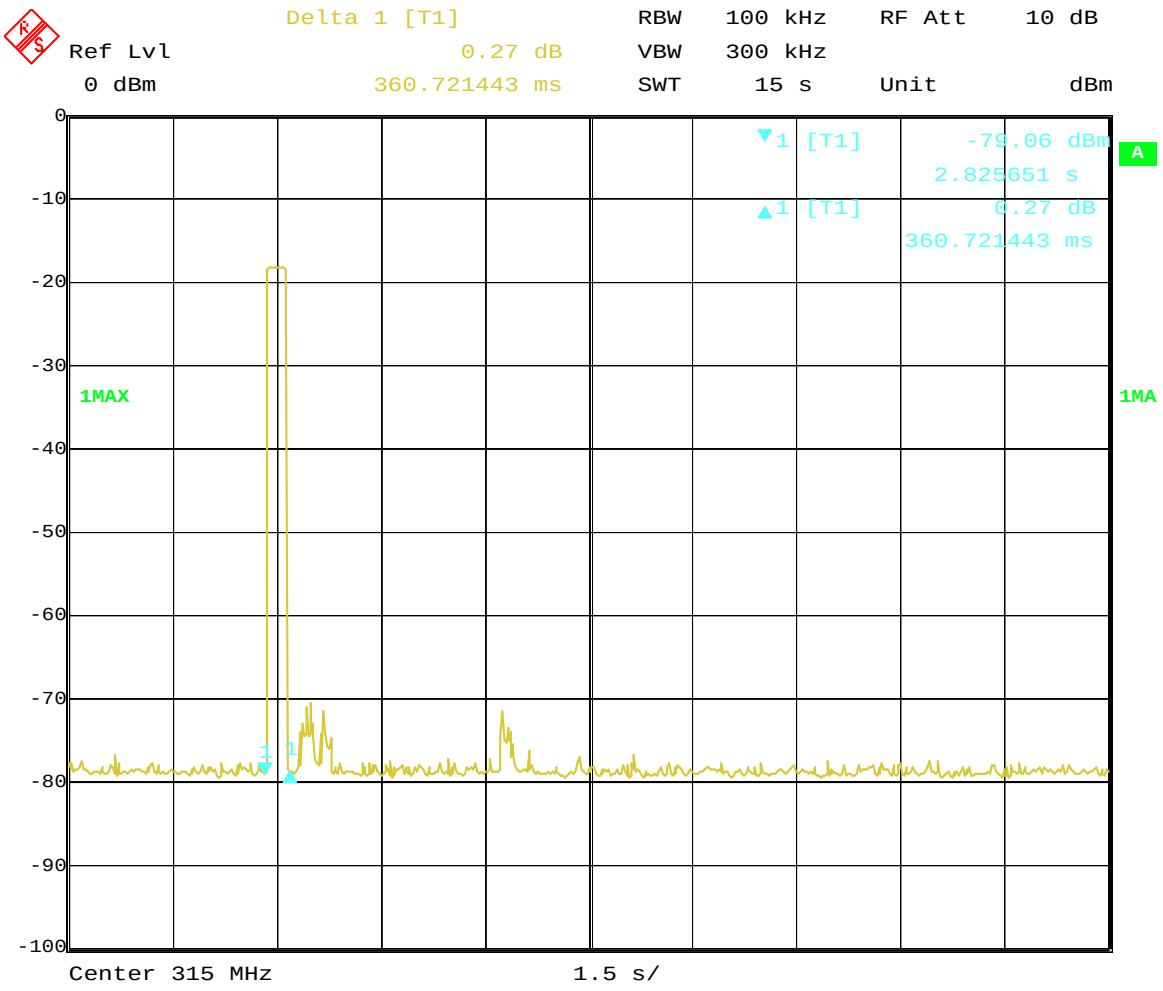
For the actual test configuration , please refer to the related items – Photos of Testing
The deactivation test was performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4 - 2014. The specification used was the FCC 15.231(a) limits.

8.3 Test Procedure

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

8.4 Test Data

Refer to attached plots:



Result: 0.361s<5s

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=100kHz, VBW=300kHz, Span=0Hz, Adjust Sweep=100ms.
5. Repeat above procedures until all frequency measured were complete.

9.3 Test Data

Base on the worst case

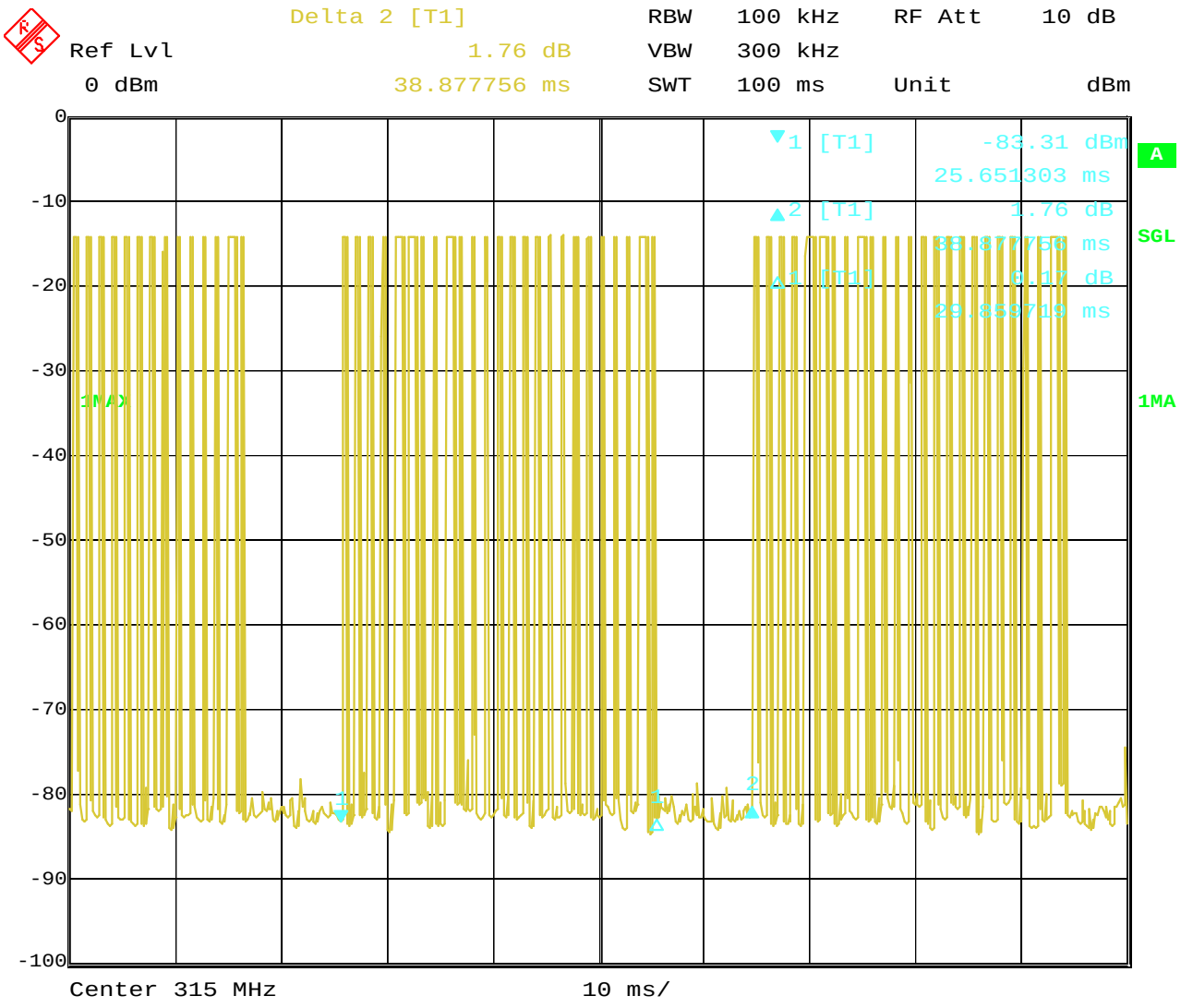
Tp = 100 ms

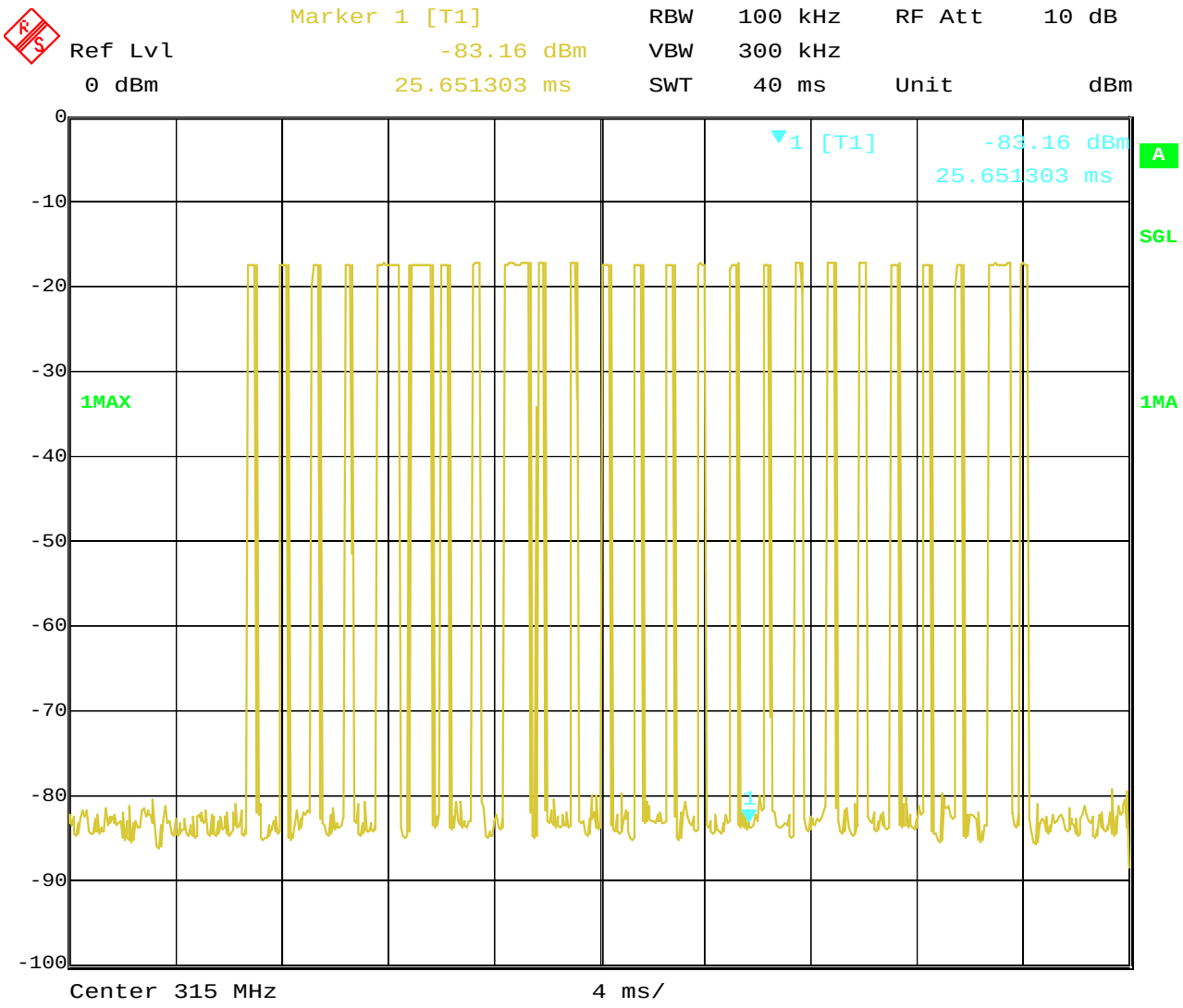
Ton1= 0.361X21X2+0.361X13 =19.855(ms)

Ton2 = 0.962X4X2=7.696(ms)

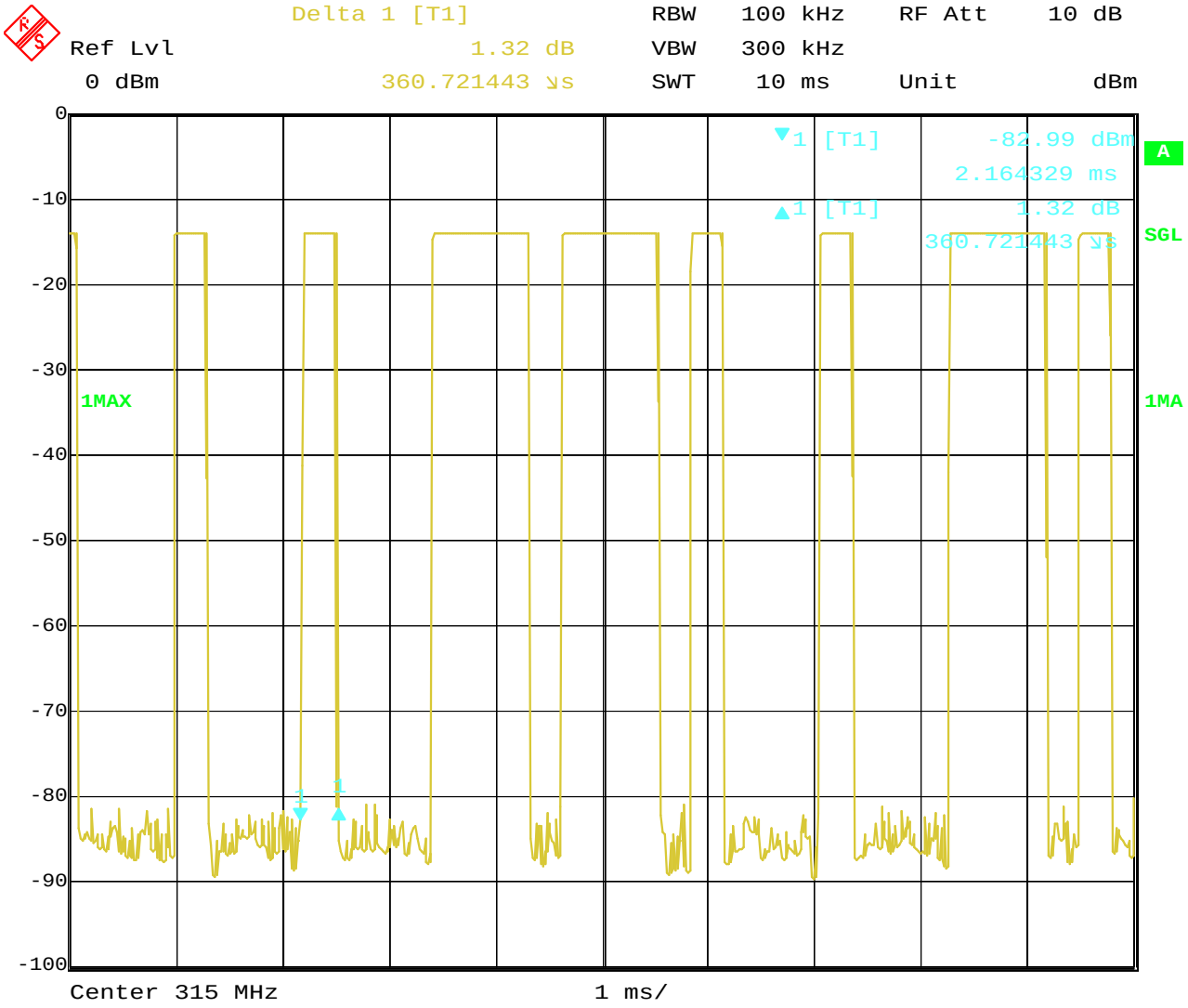
Duty cycle=Ton/Tp=(19.855+7.696)/100= 27.551/100=0.27551

Duty cycle factor = 20 * log (duty cycle) = 20 * log (0.27551) = -11.2dB

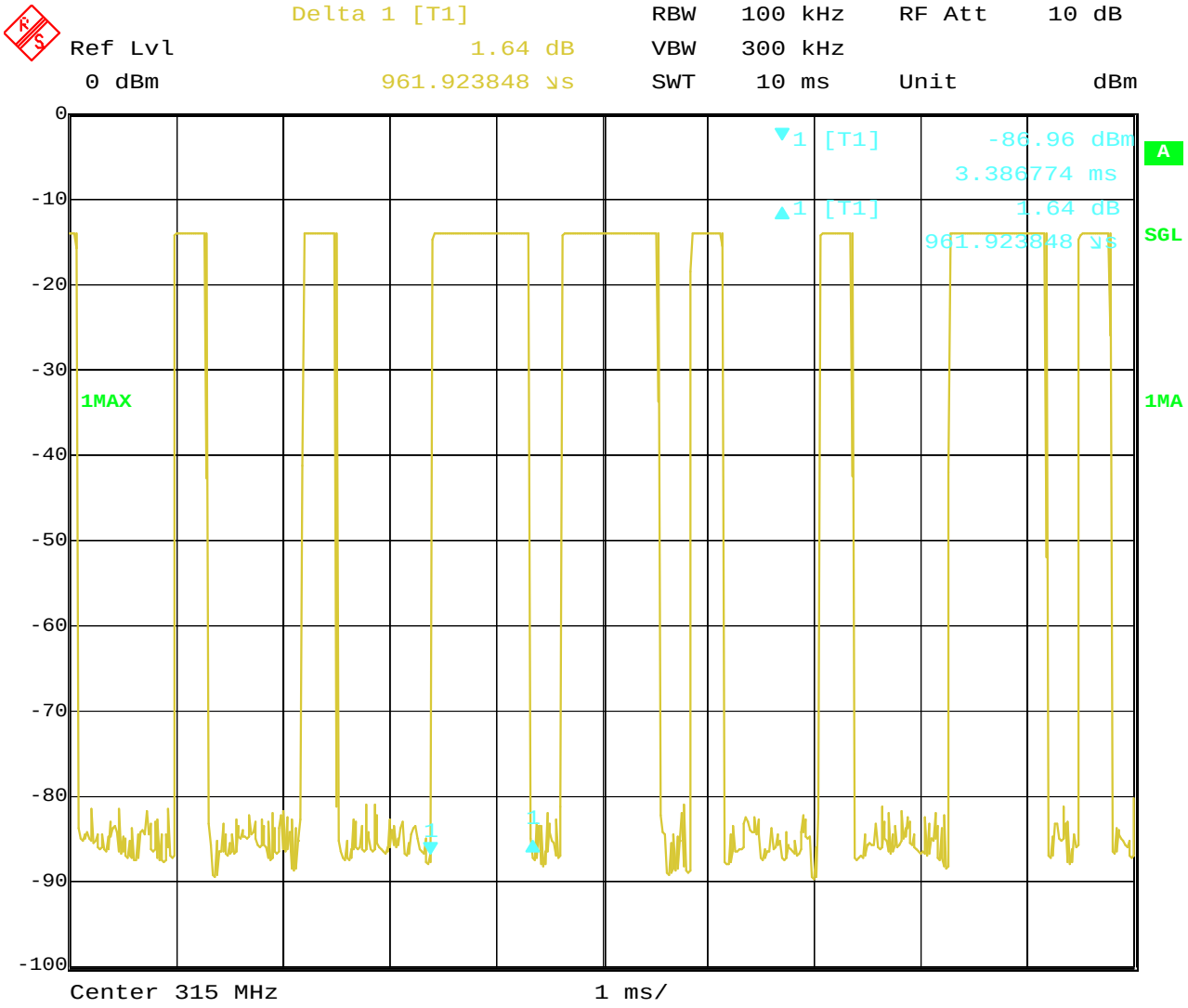




Ton 1



Ton 2



10 **Antenna Requirements**

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

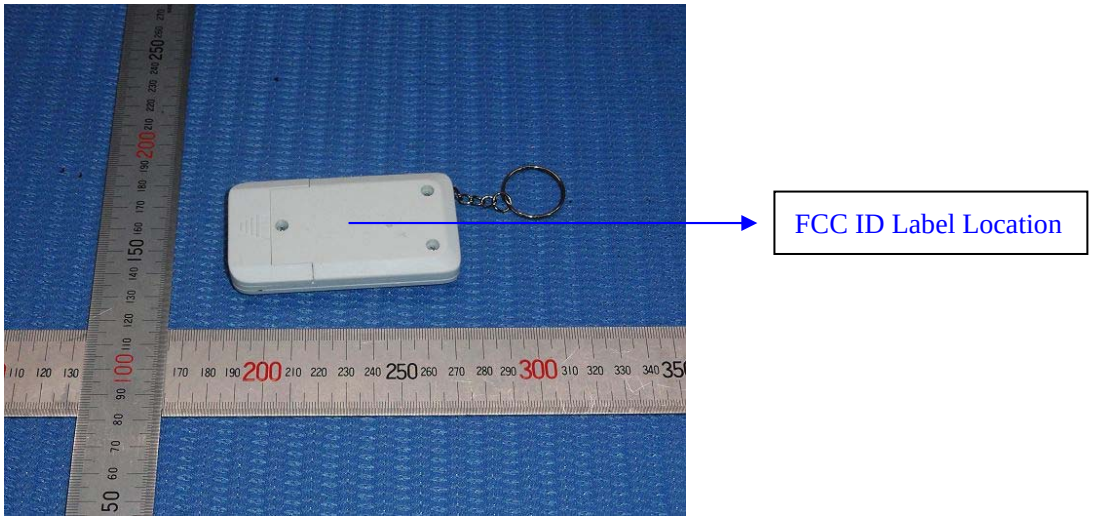
The antenna is PCB Printed antenna which is built-in. The antenna gain is 0dBi. So it meets the requirement of 15.203

11.0 FCC ID Label

FCC ID: 2AEQYYLT-40-3C

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:



12.0. Photo of testing

12.1 Conducted test View—N/A

12.2 Radiated emission test view