



FCC REPORT

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

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

Manufacturer/ Factory: NINGBO BAI-JIA ELECTRIC APPLIANCE CO.,LTD

Address of Manufacturer/Factory: No.16 Industry Road, Zhangqi Town, Cixi 315313, China

Equipment Under Test (EUT)

Product Name: Remote control

Model No.: YLT-42A-3C, YLT-42AC

FCC ID: 2AEQYYLT-42A-3C

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.231

Date of sample receipt: May 07, 2018

Date of Test: May 08-11, 2018

Date of report issued: May 14, 2018

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo

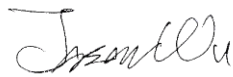
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
01	May 14, 2018	Original

Prepared By:

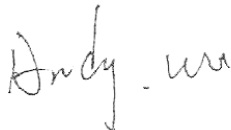


Date:

May 14, 2018

Project Engineer

Check By:



Date:

May 14, 2018

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203	Pass
Conduction Emission	15.207	N/A
Field strength of the Fundamental Signal	15.231 (b)	Pass
Spurious Emissions	15.231 (b)/15.209	Pass
20dB Bandwidth	15.231 (c)	Pass
Dwell Time	15.231 (a)(1)	Pass

Pass: The EUT complies with the essential requirements in the standard.

N/A: Not applicable

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	$\pm 4.34\text{dB}$	(1)
Radiated Emission	30MHz ~ 1000MHz	$\pm 4.24\text{dB}$	(1)
Radiated Emission	1GHz ~ 26.5GHz	$\pm 4.68\text{dB}$	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	$\pm 3.45\text{dB}$	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	Remote control
Model No.:	YLT-42A-3C, YLT-42AC
Test Model No:	YLT-42A-3C
<i>Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are that YLT42-3C has six key buttons while YLT-42C only has 2 key buttons.</i>	
Serial No.:	HD0306
Test sample(s) ID:	GTS201805000068-1
Sample(s) Status:	Engineer sample
Hardware:	V1.0
Software:	V1.0
Operation Frequency:	315MHz
Modulation technology:	ASK
Antenna Type:	PCB Antenna
Antenna gain:	3dBi (declare by applicant)
Power supply:	DC 3.0V (1 x 3V"CR2032"Button cell)

5.2 Test mode

Transmitting mode	Keep the EUT in transmitting mode. (New battery is used during all test)
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Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which only the worst case was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	82.32	82.94	81.23

5.3 Description of Support Units

None.

5.4 Test Facility

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

- **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 381383, January 08, 2018.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone,
Xixiang Road, Baoan District, Shenzhen, Guangdong, China
Tel: 0755-27798480
Fax: 0755-27798960

5.6 Other Information Requested by the Customer

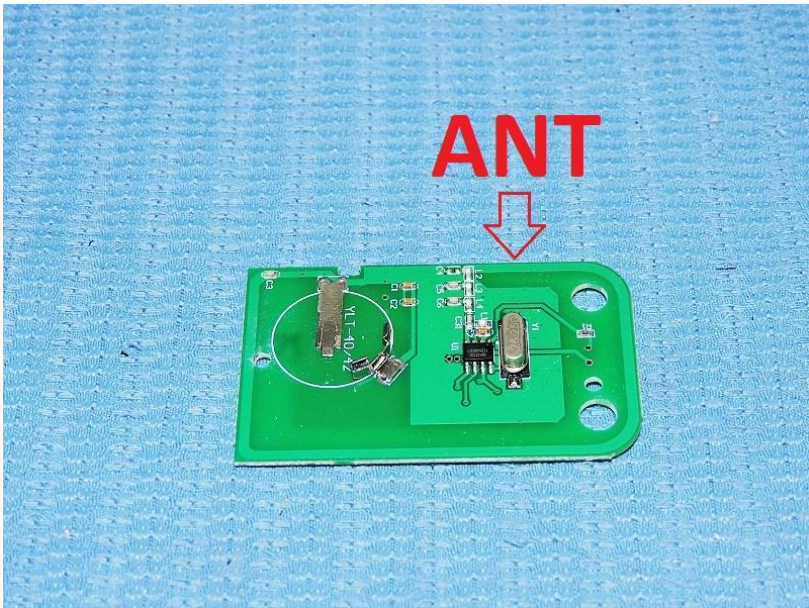
None.

6 Test Instruments list

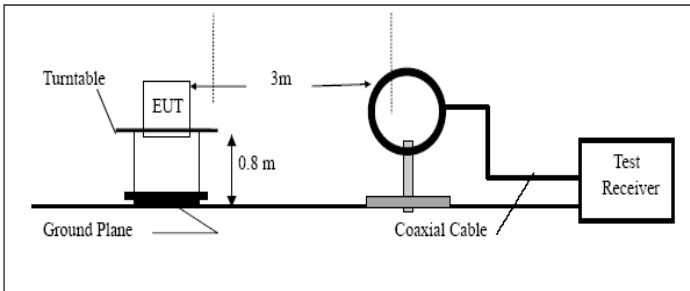
Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June 28 2017	June 27 2018
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June 28 2017	June 27 2018
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June 28 2017	June 27 2018
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 28 2017	June 27 2018
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 28 2017	June 27 2018
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	June 28 2017	June 27 2018
10	Coaxial Cable	GTS	N/A	GTS211	June 28 2017	June 27 2018
11	Coaxial cable	GTS	N/A	GTS210	June 28 2017	June 27 2018
12	Coaxial Cable	GTS	N/A	GTS212	June 28 2017	June 27 2018
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 28 2017	June 27 2018
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 28 2017	June 27 2018
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 28 2017	June 27 2018
16	Band filter	Amindeon	82346	GTS219	June 28 2017	June 27 2018

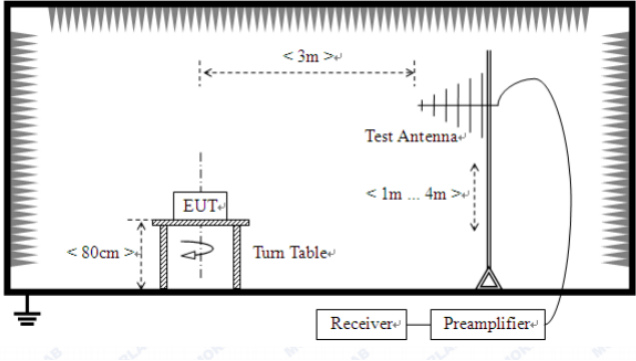
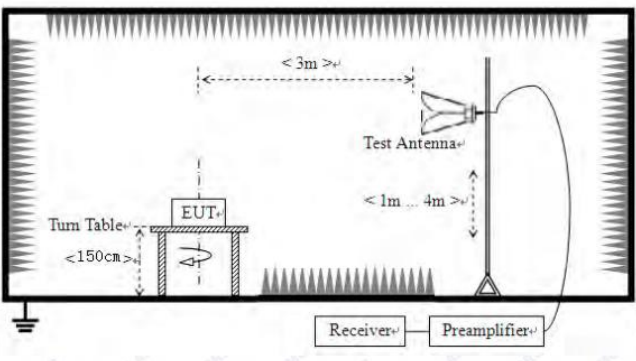
7 Test results and Measurement Data

7.1 Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: 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, 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.	
EUT Antenna:	
The antenna is PCB antenna, the best case gain of the antenna is 3dBi.	
	

7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.231 (b)& Section 15.209																									
Test Method:	ANSI C63.10:2013																									
Test Frequency Range:	9kHz to 4000MHz																									
Test site:	Measurement Distance: 3m																									
Receiver setup:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Value</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr><tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average</td></tr></table>				Frequency	Detector	RBW	VBW	Value	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak	Above 1GHz	Peak	1MHz	3MHz	Peak	Peak	1MHz	10Hz	Average			
Frequency	Detector	RBW	VBW	Value																						
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak																						
Above 1GHz	Peak	1MHz	3MHz	Peak																						
	Peak	1MHz	10Hz	Average																						
Limit: (Field strength of the fundamental signal)	<table><tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr><tr><td rowspan="2">315MHz</td><td>75.62</td><td>Average Value</td></tr><tr><td>95.62</td><td>Peak Value</td></tr></table>		Frequency	Limit (dBuV/m @3m)	Remark	315MHz	75.62	Average Value	95.62	Peak Value																
Frequency	Limit (dBuV/m @3m)	Remark																								
315MHz	75.62	Average Value																								
	95.62	Peak Value																								
Limit: (Spurious Emissions)	<table><tr><td>Frequency</td><td>Limit (uV/m)</td><td>Value</td><td>Measurement Distance</td></tr><tr><td>30MHz-88MHz</td><td>120</td><td>QP</td><td rowspan="6">3m</td></tr><tr><td>88MHz-216MHz</td><td>150</td><td>QP</td></tr><tr><td>216MHz-960MHz</td><td>200</td><td>QP</td></tr><tr><td>960MHz-1GHz</td><td>500</td><td>QP</td></tr><tr><td rowspan="2">Above 1GHz</td><td>500</td><td>Average</td></tr><tr><td>5000</td><td>Peak</td></tr></table> Or The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level whichever limit permits a higher field strength.				Frequency	Limit (uV/m)	Value	Measurement Distance	30MHz-88MHz	120	QP	3m	88MHz-216MHz	150	QP	216MHz-960MHz	200	QP	960MHz-1GHz	500	QP	Above 1GHz	500	Average	5000	Peak
Frequency	Limit (uV/m)	Value	Measurement Distance																							
30MHz-88MHz	120	QP	3m																							
88MHz-216MHz	150	QP																								
216MHz-960MHz	200	QP																								
960MHz-1GHz	500	QP																								
Above 1GHz	500	Average																								
	5000	Peak																								
Test setup:	Below 30MHz  Below 1GHz																									

	 Above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8 meters for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. 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. 4. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. 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.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

7.2.1 Field Strength of The Fundamental Signal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
315.00	104.04	13.90	2.44	37.44	82.94	95.62	-12.68	Horizontal
315.00	101.36	13.90	2.44	37.44	80.26	95.62	-15.36	Vertical

Remark: Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

Average value:

Frequency (MHz)	Peak Value (dBuV/m)	Average factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
315.00	82.94	-13.29	69.65	75.62	-5.97	Horizontal
315.00	80.26	-13.29	66.97	75.62	-8.65	Vertical

Remark: Average value = Peak value + Duty cycle factor

7.2.2 Spurious Emissions

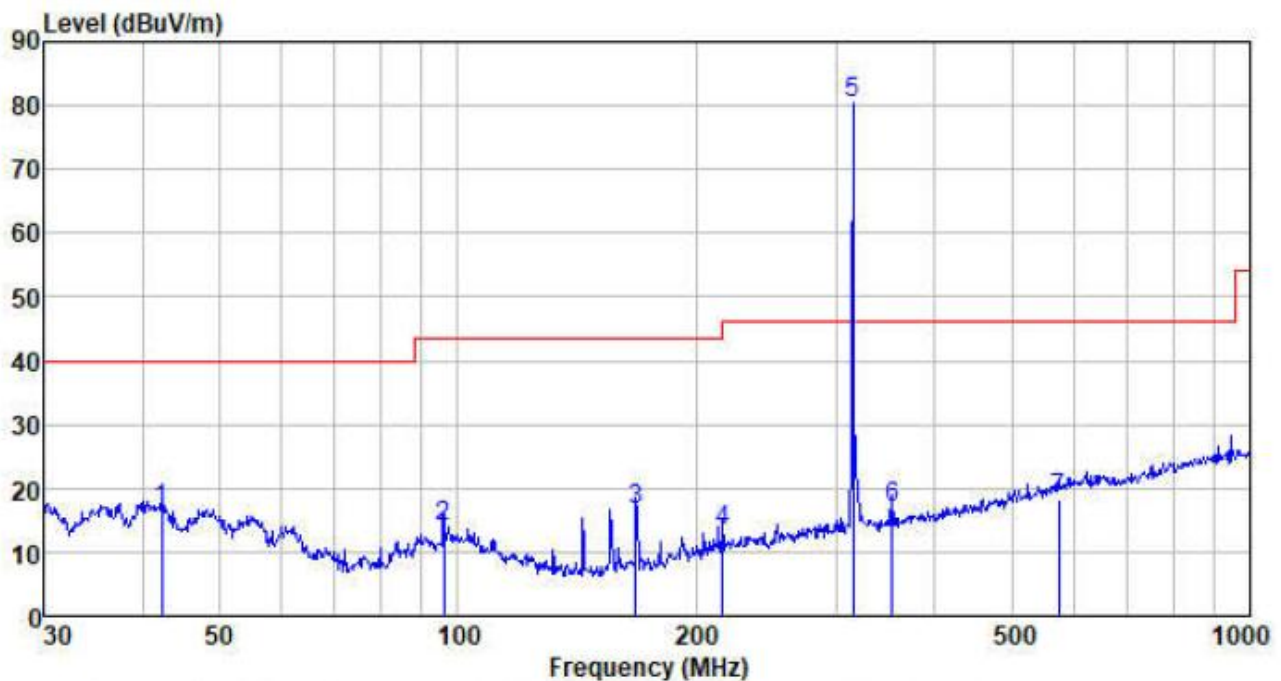
Measurement data:

9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

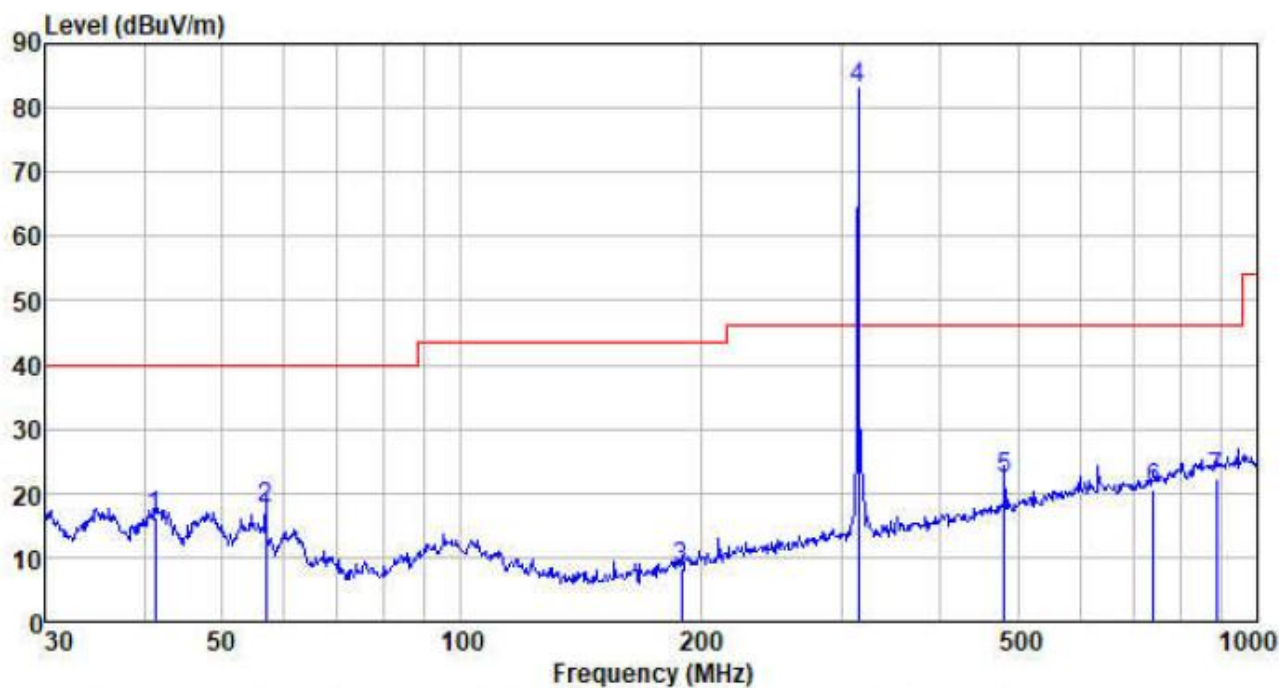
Below 1GHz:

Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
42.302	39.46	12.23	0.69	35.79	16.59	40.00	-23.41	QP
96.099	37.82	11.65	1.16	36.69	13.94	43.50	-29.56	QP
167.824	43.77	8.46	1.67	37.18	16.72	43.50	-26.78	QP
216.024	37.60	11.02	1.93	37.35	13.20	46.00	-32.80	QP
315.000	101.36	13.90	2.44	37.44	80.26	46.00	34.26	Peak
352.943	37.30	14.56	2.64	37.48	17.02	46.00	-28.98	QP
572.614	33.12	18.90	3.62	37.53	18.11	46.00	-27.89	QP

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
41.277	39.01	12.21	0.68	35.74	16.16	40.00	-23.84	QP
56.792	41.37	11.60	0.83	36.28	17.52	40.00	-22.48	QP
189.074	33.92	9.82	1.78	37.28	8.24	43.50	-35.26	QP
315.000	104.04	13.90	2.44	37.44	82.94	46.00	36.94	Peak
480.528	39.57	16.93	3.22	37.51	22.21	46.00	-23.79	QP
739.661	33.69	20.34	4.24	37.63	20.64	46.00	-25.36	QP
887.610	32.84	22.20	4.80	37.60	22.24	46.00	-23.76	QP

Above 1G:

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1575.00	47.89	25.44	4.73	36.22	41.84	74.00	-32.16	Vertical
1890.00	42.10	25.94	4.90	36.43	36.51	74.00	-37.49	Vertical
2205.00	44.62	26.81	5.19	36.69	39.93	74.00	-34.07	Vertical
2520.00	42.83	27.73	5.51	36.96	39.11	74.00	-34.89	Vertical
2835.00	44.38	28.19	5.79	37.19	41.17	74.00	-32.83	Vertical
3150.00	34.80	28.40	6.25	37.32	32.13	74.00	-41.87	Vertical
1575.00	46.87	25.44	4.73	36.22	40.82	74.00	-33.18	Horizontal
1890.00	38.92	25.94	4.90	36.43	33.33	74.00	-40.67	Horizontal
2205.00	51.18	26.81	5.19	36.69	46.49	74.00	-27.51	Horizontal
2520.00	47.42	27.73	5.51	36.96	43.70	74.00	-30.30	Horizontal
2835.00	43.80	28.19	5.79	37.19	40.59	74.00	-33.41	Horizontal
3150.00	34.75	28.40	6.25	37.32	32.08	74.00	-41.92	Horizontal

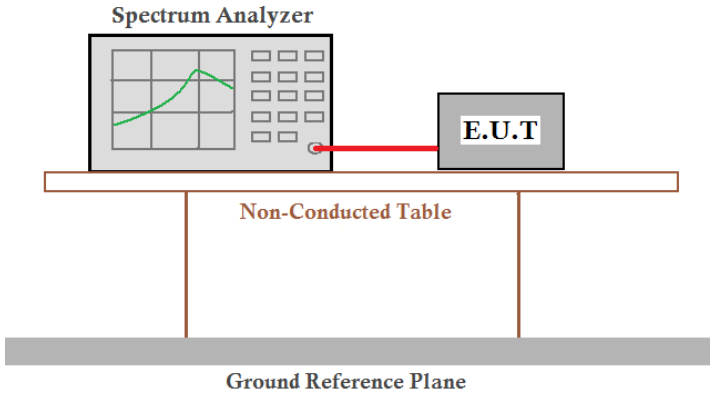
Average value:

Frequency (MHz)	Level (dBuV/m)	Average factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1575.00	41.84	-13.29	28.55	54.00	-25.45	Vertical
1890.00	36.51	-13.29	23.22	54.00	-30.78	Vertical
2205.00	39.93	-13.29	26.64	54.00	-27.36	Vertical
2520.00	39.11	-13.29	25.82	54.00	-28.18	Vertical
2835.00	41.17	-13.29	27.88	54.00	-26.12	Vertical
3150.00	32.13	-13.29	18.84	54.00	-35.16	Vertical
1575.00	40.82	-13.29	27.53	54.00	-26.47	Horizontal
1890.00	33.33	-13.29	20.04	54.00	-33.96	Horizontal
2205.00	46.49	-13.29	33.20	54.00	-20.80	Horizontal
2520.00	43.70	-13.29	30.41	54.00	-23.59	Horizontal
2835.00	40.59	-13.29	27.30	54.00	-26.70	Horizontal
3150.00	32.08	-13.29	18.79	54.00	-35.21	Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. Average value = Peak value + Duty cycle factor

7.3 20dB Occupy Bandwidth

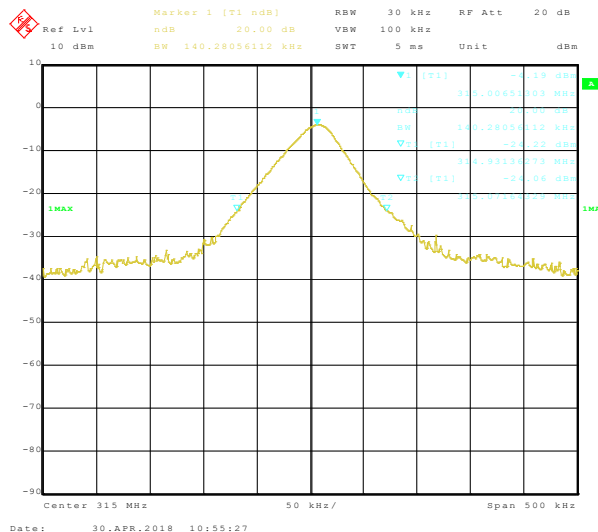
Test Requirement:	FCC Part15 C Section 15.231 (c)
Test Method:	ANSI C63.10:2013
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

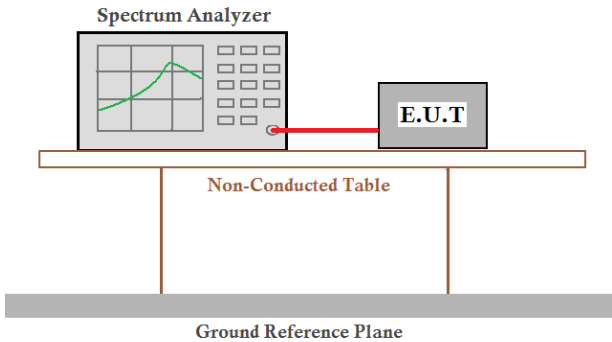
Test Frequency (MHz)	20dB bandwidth (MHz)	Limit (MHz)	Result
315.00	0.140	0.7875	Pass

Note: Limit= Fundamental frequency×0.25%=315×0.25%=0.7875MHz

Test plot as follows:

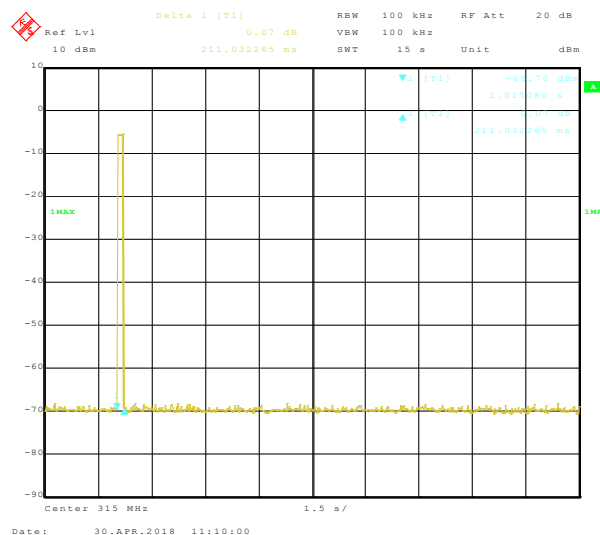


7.4 Dwell Time

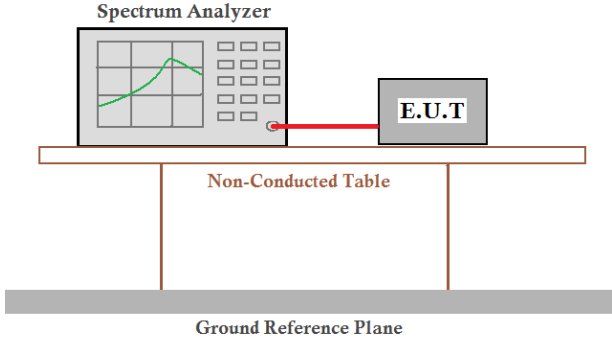
Test Requirement:	FCC Part15 C Section 15.231 (a) (1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100KHz, VBW=300KHz, span=0Hz, detector: Peak
Limit:	Not more than 5 seconds
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

Test Frequency (MHz)	Duration of each TX(second):	Limit (second)	Result
315.00	0.211	<5.0	Pass



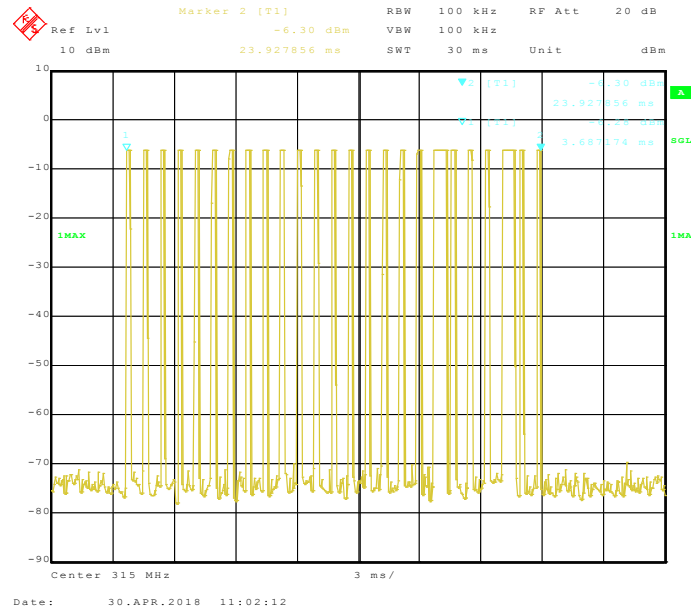
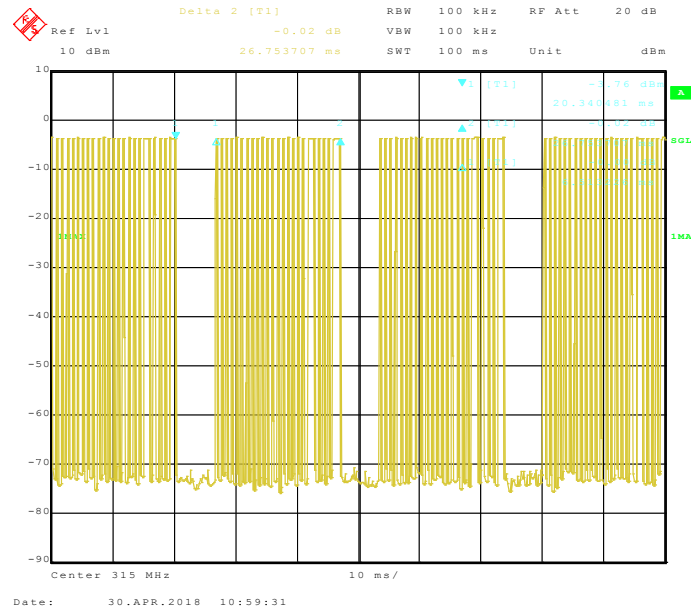
7.5 Duty Cycle

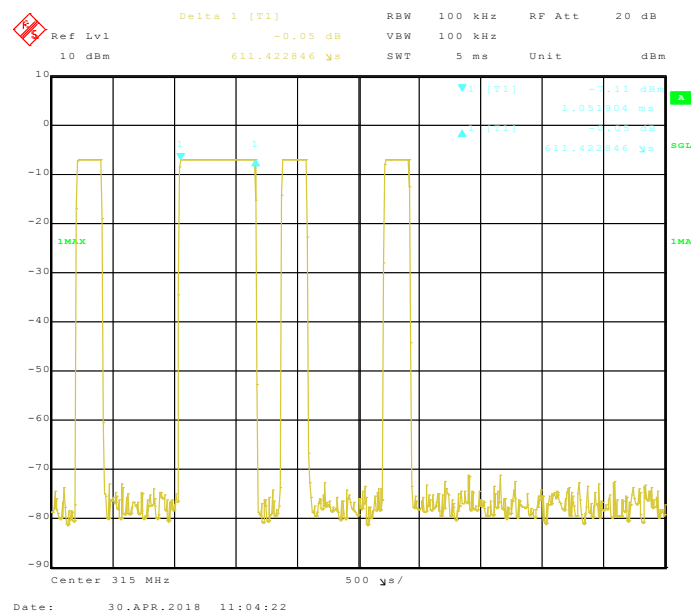
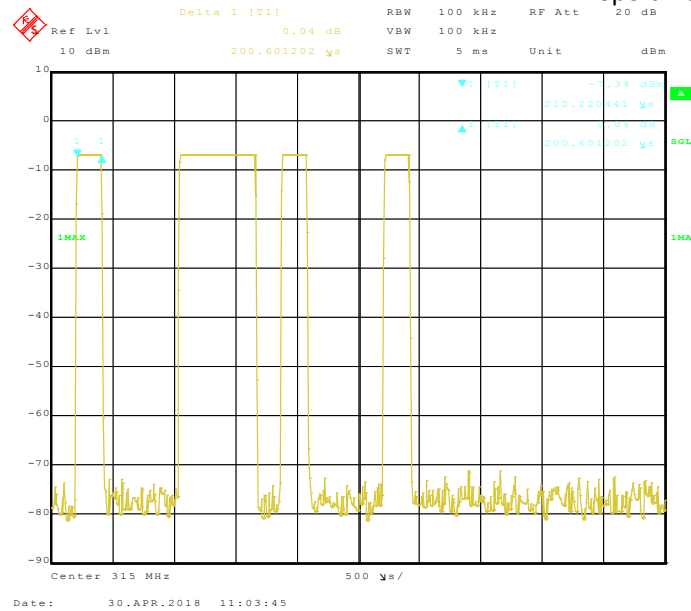
Test Requirement:	FCC Part15 C Section 15.231
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100KHz, VBW=300KHz, span=0Hz, detector: Peak
Limit:	No dedicated limit specified in the Rules.
Test Procedure:	1. Place the EUT on the table and set it in transmitting mode. 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer. 3. Set centre frequency of spectrum analyzer=operating frequency. 4. Set the spectrum analyzer as RBW=100kHz, VBW=100KHz, Span=0Hz, Adjust Sweep=100ms to obtain the "worst-case" pulse on time 5. Repeat above procedures until all frequency measured was complete.
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs and sits on a Ground Reference Plane, which is represented by a thick grey bar at the bottom.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

Calculate Formula: Duty cycle factor = $20 \log(\text{Duty cycle})$
Duty cycle = on time / 0.1 seconds or period, whichever is less
T on time = $0.6 + 0.6 + 0.2 \times 23 = 5.8 \text{ ms} = 0.0058 \text{ (s)}$
T period = 0.0268 (s)
Duty cycle = $0.0058 / 0.0268 = 21.64\%$
Duty cycle factor = $20 \log(0.2164) = -13.29$

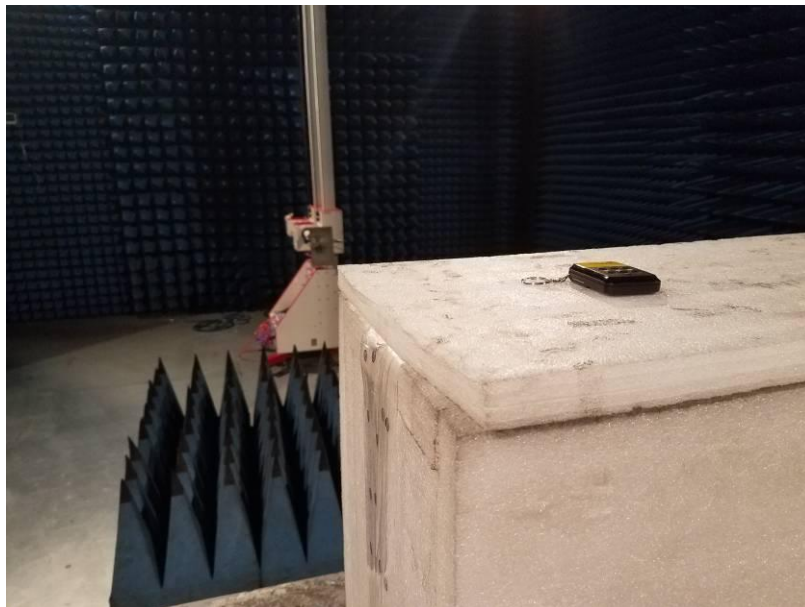
Test plots is below:





8 Test Setup Photo

Radiated Emission

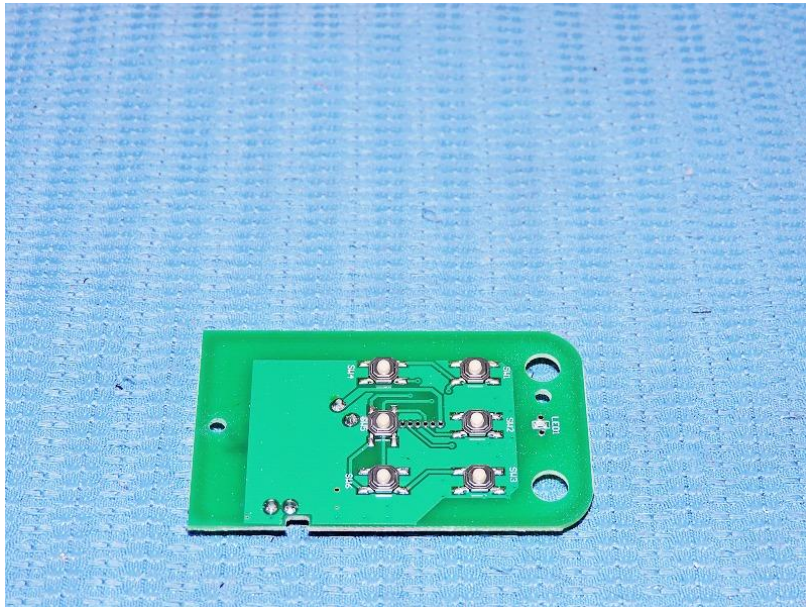
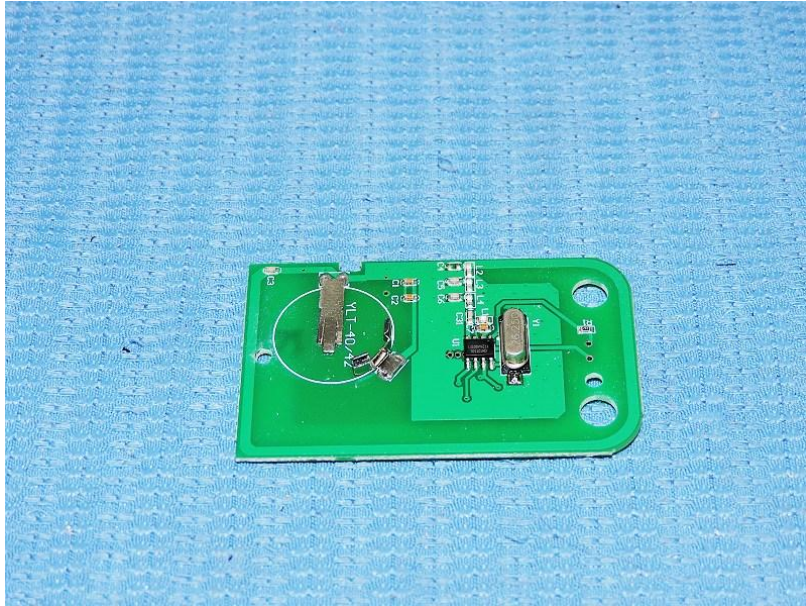


9 EUT Constructional Details





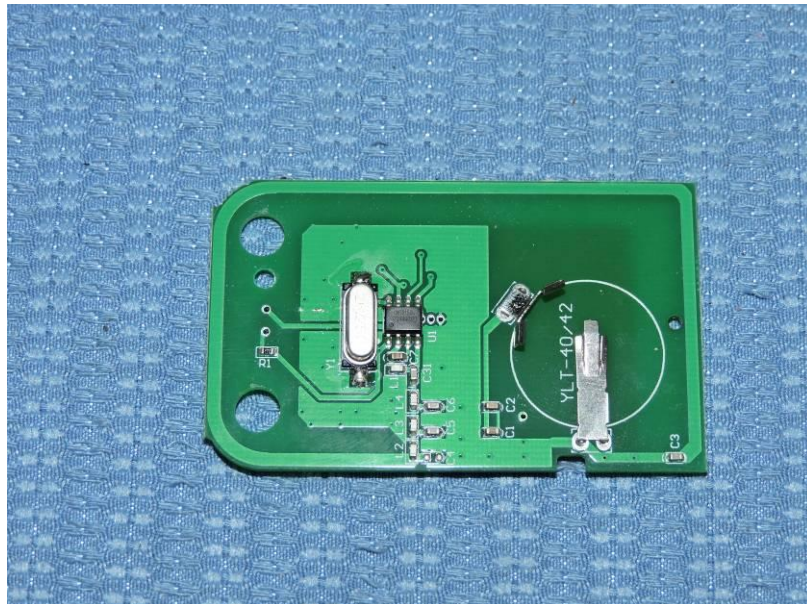


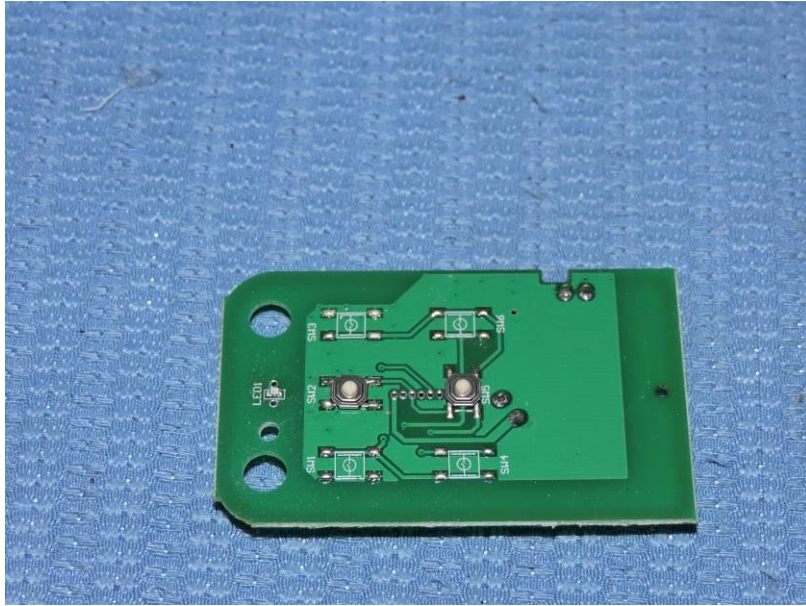












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